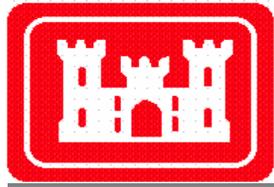


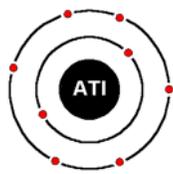
**Contract No. DACA87-00-D-0035
Task Order 0024**

**Work Plan
for
Ordnance and Explosives (OE) Removal Action
Opana Point Bombing Range & Makawao Gunnery Site
Maui, Hawaii**

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A handwritten signature in black ink, appearing to read 'Rick Adkisson'.

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May 14, 2004

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1.0 INTRODUCTION

1.1 General Information

1.1.1 This Work Plan (WP) details the Ordnance and Explosive (OE) Removal Action as stipulated in the CEHNC Scope of Work (SOW) for Task Order 0024 contract DACA87-00-D-0035. The purpose of this WP is to present the site background, project management, objectives, methodology for OE removal actions, OE accountability, explosive storage, demolition procedures, project personnel, and the equipment to be used for the removal action.

1.1.2 The work required under this Scope of Work (SOW) falls under the Defense Environmental Restoration Program-for Formerly Used Defense Sites (DERP-FUDS). Ordnance and explosives (OE) hazards exist as a result of Department of Defense activities. Ordnance and Explosives (OE) may exist on property owned or leased by the Department of Army. During this removal action, it is the Government's intent that the contractor destroy all OE encountered on-site and that the contractor's work is to be performed in a manner consistent with the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA), Section 104 and the National Contingency Plan (NCP), Sections 300.120(d) and 300.400(e).

1.1.3 Ordnance and Explosive (OE) is a safety hazard and may constitute an imminent and substantial endangerment to the site personnel and local populace, thus 29 CFR 1910.120 applies.

1.2 Site Location

1.2.1 The Makawao Gunnery Site and Opana Point Bombing Range are located approximately three miles northeast and five miles north-northeast, respectively, of the City of Makawao and approximately 12 and 14 miles east of Kahului, Island of Maui, Hawaii. The Opana Point Bombing Range is north of the Hana Highway and Makawao Gunnery Site is south of the Hana Highway, approximately two miles southeast of the Opana Point Bombing Range.

1.2.1.1 The Makawao Gunnery Site is comprised of approximately 1,002 acres. The site is south of the Hana Highway and extends approximately one mile to the south. The site is defined by the Hoolawanui Gulch on the east and the Kakipi Gulch to the west. These two north-south drainage features form relatively steep and wide canyons. Although the site is defined on the east by the Hoolawanui Gulch, all land area east of the Honopou Stream is covered by old-growth forest and was not investigated as part of this effort. The Makawao Gunnery Site is underlain on average by 12 or more inches of dark, grayish-brown to brown, strongly acidic, clay-rich soils of the Pauwela-Haiku association (below elevation 900 feet). Somewhat thinner, dark-brown, acidic, silty clays of the Kailua soil series underlay the site at the higher elevations (900 feet to 2,700 feet). Most of the study area is underlain by dark brown silt loam and dark yellowish-brown silty clay of the Honomanu-Amalu association. Permeability is moderate to high (USGS, 1999).

1.2.1.2 The Opana Point Bombing Range, located on the Opana Point on the Island of Maui is comprised of approximately 52 acres, although approximately 86 acres were investigated for potential OE outside the 52-acre site. The original target location is in the northeastern section of the bombing range. The northern boundary of the project site is located along a cliff line, which is about 100 feet above Mean Sea Level (MSL). The Hana Highway is located to the south. The site has been terraced for cultivation and is generally free of thick vegetation. The site lies between the Holumalu Gulch (to the east) and the Manawai Gulch (to the west). The Opana Point site is underlain by dark, grayish-brown to brown, strongly acidic, clay-rich soils of the Pauwela-Haiku association (USGS, 1999).

1.3 Site History - Makawao Gunnery Site

1.3.1 The Makawao Gunnery Site is a former USMC artillery impact area. Land for the site was obtained via a license with the East Maui Irrigation Company (Parcel 7; 897.8 acres) and the C.K.C. Rooke Estate (Parcel 16; 104.2 acres) on April 7, 1944. On December 14, 1945, the license was cancelled. A&B Properties, Inc., which manages East Maui Irrigation Company, Ltd. (EMI) property, does not have a copy of the license or any other information pertaining to the use of the site by the USMC. Naval Facilities Engineering Command, Pacific Division records indicate that the actual licenses and agreements were destroyed in the early 1970's when the Naval Facilities Engineering Command, Pacific Division, Real Estate Office relocated (USACE, 1997). For this reason, the history of the Makawao Gunnery Site cannot be confirmed with high degree of certainty. EMI currently leases the property for cattle grazing.

1.3.2 The Makawao Gunnery Site was used as a firing range and maneuver training area for the USMC for 1-1/2 years during World War II. During the site walk-thru conducted as part of the Inventory Project Report (INPR), a 105mm HE projectile was observed (USACE, 1997). Depressions in the ground surface that could possibly be bomb craters were also observed. Personnel working for the East Maui Irrigation Company, Ltd. have stated that during plowing activities, "smoke bombs" have been uncovered (USACE, 1997).

1.4 Site History - Opana Point Bombing Range

1.4.1 USN records pertaining to the Opana Point Bombing Range indicate the lease on this property was cancelled on May 10, 1946. Between 1946 and 1978, property ownership is unclear because no records were found to document the transfer of land from the DOD to the landowners of the property surrounding the site; i.e., Libby, McNiell, and Libby (USACE, 1992). The Amfac Property Investment Corporation, Kaanapali, Island of Maui, Hawaii acquired the project site in 1978 and leased the property to the Maui Land and Pineapple Company, Inc. In 1981, pineapple cultivation, through the Maui Land and Pineapple Company, Inc., started on the project site (USACE, 1992). Currently, the site is not utilized for pineapple production. The Opana Point Properties Company purchased the site in September 2000 and has developed plans to construct a residential development on the property.

1.4.2 The site was used as a USN bombing range during World War II until as late as May 10, 1946. Limited surface sweeps conducted in April and June 1990 found several AN-Mk 23 3-pound practice bombs (USACE, 1992). In addition to these practice bombs, large metal fragments and what appeared to be bomb craters were also observed on site. This indicates that the site may have been used as a live bombing range or an ordnance disposal site (DEI, 1990).

1.5 Demographic Profile of Maui County

1.5.1 According to the US Census Bureau, Census 2000, Maui County, which includes the Islands of Maui, Molokai, Lanai, and Kahoolawe, has a population of 128,094 or 110.5 persons per square mile. The population represents a 27.6 percent increase since 1990.

1.6 Current and Future Land Use

1.6.1 Currently, the Makawao Gunnery Site is used for cattle grazing. According to the property owner, East Maui Irrigation Company, Ltd., they wish to continue to use the land for that purpose.

1.6.2 Except for a portion along the seaward cliff line, almost all the Opana Point Bombing Range was, until recently, cultivated for the production of pineapples. According to the property owner, Opana Point Properties Company, plans are currently underway to develop residential housing on Opana Point.

1.7 Topography

1.7.1 The Makawao site is located on the northern slopes of the East Maui Volcano (Haleakala) on the Island of Maui, Hawaii. This area is composed of gently sloping and hilly terrain with steep gulches and valleys that have been eroded by numerous streams located throughout. The elevation near the highest point of the Makawao site is approximately elevation 1,300 feet and drops to approximately elevation 600 feet at the northern portion of the site.

1.7.2 The Opana Point site is located on the northern slopes of Haleakala on the Island of Maui, Hawaii. This area is composed of gently sloping terrain typical of a shield volcano except for the steep sides of gulches and valleys that have been eroded by streams. Opana Point is located on the coast of the island where the terrain is relatively flat. The Opana Point site has been terraced and further flattened during cultivation.

1.8 Vegetation

1.8.1 Makawao is located at an elevation that receives a large amount of rain and fog drip during the year. The site contains dense vegetation in some locations, although there is some grassland areas throughout used for cattle grazing.

1.8.2 Opana Point is located along the shoreline and was used until recently as a pineapple farm. The site is currently covered by grassland and scrub vegetation.

1.9 Cultural Resources

- 1.9.1 An archaeological and cultural resources survey was performed during the summer of 2002 prior to field activities and the archaeologists found no archaeological sites within the Makawao Gunnery Site. However, a number of sites in areas nearby indicate that sites probably did exist at one time in the Gunnery Range area, but any surface signs have been disturbed over the years to the point where they are no longer recognizable. In addition to the survey, archaeological monitoring was performed during intrusive site activities and no evidence of archaeological significant sites was found (DEI, 2003).
- 1.9.2 An archaeological and cultural resources survey was performed during the summer of 2002 prior to field activities and the archaeologists found no archaeological sites within Opana Point. However, a heiau (Walker's Site 62, Hawaii State Site No. 50-50-06-0062) formerly existed at Opana Point. In addition to the survey, archaeological monitoring was performed during intrusive site activities and no evidence of archaeological significant sites was found (DEI, 2003).

2.0 TECHNICAL MANAGEMENT PLAN

2.1 Guidance, Regulations and Policy

- 2.1.1 American Technologies, Inc. (ATI) received Contract Number DACA87-00-D-0035 issued by the U.S. Army Engineering and Support Center, Huntsville (USAESCH). Task Order 0024 was issued for the purpose of performing the work identified in the Scope of Work, Ordnance and Explosives (OE) at Opana Point Bombing Range and Makawao Gunnery Site, Maui, HI.
- 2.1.2 The work required under the Scope of Work (SOW) for Opana Point Bombing Range and Makawao Gunnery Site, Maui, HI, falls under the Defense Environmental Restoration Program-for Formerly Used Defense Sites (DERP-FUDS).
- 2.1.3 Ordnance and Explosive (OE) is a safety hazard and may constitute an imminent and substantial endangerment to site personnel and the local populace, thus 29 CFR 1910.120 applies. ATI's work is to be performed in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability ACT (CERCLA), Section 104 and the National Contingency Plan (NCP), Sections 300.120(d) and 300.400(e).

2.2 Discussion, assumptions and procedures relating to Chemical Warfare Materiel (CWM).

- 2.2.1 Chemical Warfare Materiel (CWM) is not suspected at the Opana Point Bombing Range and Makawao Gunnery Site. If, during OE removal actions, ATI personnel identify or suspect CWM, all personnel will immediately withdraw upwind, from the work area, and ATI will contact the USACE OE Safety Specialist. ATI will secure the site by positioning two UXO Technicians (Level II) upwind of the suspected CWM until they are relieved by the Technical Escort Unit (TEU) or Explosive Ordnance Disposal (EOD) personnel.

2.3 Procedures for OE that cannot be destroyed on site and unidentifiable OE

- 2.3.1 If OE is encountered that cannot be moved due to its condition and the location prevents disposal in place, then the USACE OE Safety Specialist will be notified.
- 2.3.2 If an unidentifiable OE is found the USACE OE Safety Specialist will be notified and a request for EOD support will be made.

2.4 Technical Scope of the Project

- 2.4.1 A subsurface clearance action will be performed in accordance with the CEHNC Scope of Work. All OE operations will comply with EP 385-1-95a, Basic Safety Concepts and Considerations for Ordnance and Explosive Operations.
 - 2.4.1.1 ATI will establish a 100 meter by 100 meter grid system. The primary purpose of the grid system is to assist the government in the Quality Assurance inspection of completed areas. The grids will be laid in as depicted in Map B-5 (Appendix B).

- 2.4.2 Surface clearance
- 2.4.2.1 This section describes ATI's standard practices for surface clearance operations and procedures for collecting, processing, and controlling the data associated with the clearance action conducted at the site. The specific surface clearance operation will be based on the results of the GPO.
- 2.4.2.2 The objective is to safely locate, identify, and dispose of surface OE and ordnance-related scrap IAW the Scope of Work.
- 2.4.2.3 Operations will begin by surface clearing 100 meter by 100 meter grids of all metal residue. UXO Removal Teams will be used to conduct the surface clearance activities. UXO Removal Teams will use a separation distance of 200 ft. or K50 whichever is greater of MGFDF at all times. Ordnance related scrap and non-ordnance related scrap will be collected per the Scope of Work and marked for the Disposal.
- 2.4.2.4 The UXO Removal teams will locate a corner of a grid using a GPS system. Based on the terrain and the density of munitions encountered, the UXO Technician III Team Leader will specify the distance between team members that will be used.
- 2.4.2.5 The UXO Removal teams, consisting of all team members, will maintain a specified distance, between team members determined by the UXO Team Leader. The team will stay on line by using a GPS unit operated by an individual deemed competent in its operation. The team member on the left (western) side of the sweep line will use a GPS to stay aligned with the western boundary. This individual will also place pin flags to delineate the clearance boundary. The remaining team members will align themselves on this individual. The team member on the right side of the line will place temporary pin flags to mark the extent of clearance. Upon reaching the northern boundary of the grid, the team will swing around and align themselves to sweep back to the southern boundary of the grid. The team member now on the right side of the line will pull the previously placed pin flags. The team member on the left side of the line will place temporary pin flags. The clearance will continue in this manner until the grid is cleared of OE and ordnance-related scrap.
- 2.4.2.6 The last row of pin flags at the end of each work day will remain in place until the sweep is resumed the next morning.
- 2.4.2.7 Hand held detectors may be used to assist in the surface clearance operations. These hand held detectors will be used to investigate suspicious areas and areas where vegetation obscures a thorough visual clearance.
- 2.4.2.8 When using the EM61 towed array members of the UXO removal team will proceed in front of the towed array and remove OE related scrap IAW the Scope of Work.
- 2.4.2.9 If sub munitions are encountered, the Senior UXO Supervisor will direct personnel to cease operations immediately and to evacuate the area. The USACE OE Safety Specialist will be notified as soon as possible.

- 2.4.2.10 If suspected CWM is encountered, operations will cease immediately and an area 500 meters (m) around the item will be secured, the USACE OE Safety Specialist will be notified as soon as possible. UXO personnel will take a position 500m upwind of the item in an area where the site can be viewed at all times. The USACE OE Safety Specialist will report the incident.
- 2.4.2.11 All encountered OE will be inspected by a UXO qualified person to determine its condition, (i.e., live, armed, inert, etc.).
- 2.4.2.12 OE determined to be live, or containing hazardous components, will be marked for final disposal procedures by Disposal Team. If an item's condition cannot be determined, it will be considered live and marked for the Disposal Team.
- 2.4.2.13 The Senior UXO Supervisor, and/or an UXO Technician III will be responsible for final determination of an OE item that is suspected to be live. At least two UXO personnel must agree on the condition of an OE item before any removal action is attempted. In addition, the USACE OE Safety Specialist must concur before any removal action takes place. Site office publications will be researched, as required. If publications are not available on-site, the Senior UXO Supervisor will request pertinent publications/information from the USACE OE Safety Specialist.
- 2.4.2.14 If the item is not acceptable to move it will be clearly marked with a stake approximately 36 inches high with fluorescent marking tape. The stake will contain sufficient fluorescent marking tape to be visible from a distance. GPS coordinates will be taken and reported to the Disposal Team.
- 2.4.2.15 All live OE items located will be logged, marked and GPS coordinates will be taken prior to disposal. All data required by the SOW will be entered into the OE database provided by CEHNC.
- 2.4.2.16 It is the Team Leader's responsibility to verify that only inert OE items leave the grid.
- 2.4.2.17 The disposal actions by ATI will generate fragments and scrap that will be inspected and removed by ATI after disposal operations are conducted. All access/excavation/detonation holes will be back-filled to grade.
- 2.4.2.18 A post-disposal investigation will be conducted to verify the final disposal procedures were accomplished.
- 2.4.2.19 Ordnance-related scrap, which has been placed in the holding area, will not be mingled with other types of material and will be held in securable containers.
- 2.4.2.20 In the event that live or suspected live OE is discovered, within ordnance related scrap piles, the following procedures shall be followed:
- Stop work immediately, secure the area and evacuate the area of all non-essential personnel.

- Notify a Supervisor, who will notify the Senior UXO Supervisor, and the UXO Safety Officer.
- The Senior UXO Supervisor or the UXO Safety Officer will notify the USACE OE Safety Specialist and Project Manager and plan a course of action to be taken.
- The USACE OE Safety Specialist will be consulted, prior to any course of action being taken, for concurrence and approval.
- After the application of the course of action, the Senior UXO Supervisor shall prepare a report of the incident to be submitted to the USACE Contracting Officer and Program Manager.

- 2.4.2.21 Inert OE items and ordnance-related scrap will be demilitarized in accordance with applicable regulations. OE items that are not acceptable to move will be “blown in-place” on-site. If a scenario is encountered as described in EP385-1-95a (Para 9.a and 9.c) that precludes detonating OE on-site, the on-site USACE OE Safety Specialist will request EOD support.
- 2.4.2.22 Personnel used to conduct surface/subsurface clearance activities shall meet the requirements and qualifications outlined in OE-25.01 of the basic contract. Team composition will be as follows:
- 2.4.2.22.1 The UXO Removal Teams will consist of seven individuals with at least one UXO Technician Level III, six UXO Technician I/II.
- 2.4.2.22.2 The Disposal Team will consist of a minimum of one UXO Technician III, one UXO Technicians Level II. A UXO Technician III will be in charge of, and oversee all disposal operations. Only UXO qualified personnel will be involved in actual explosive operations.
- 2.4.2.23 The Senior UXO Supervisor, UXO Safety Officer/ Quality Control Specialist will interact with all operations conducted on-site.
- 2.4.3 EM Sweep Operations (MineLab Explorer II)
- 2.4.3.1 This section describes ATI’s standard practices for EM Sweep Operations and procedures for collecting, processing, and controlling the data associated with the clearance action conducted at the site.
- 2.4.3.2 The objective is to safely locate, identify, and dispose of surface OE and ordnance-related scrap and flag detected subsurface anomalies.
- 2.4.3.3 The UXO Removal Teams will locate a corner of a grid using a GPS system. Based on the terrain and the density of munitions encountered, the UXO Technician III Team Leader will specify the distance between team members that will be used not to exceed 5 ft.. Each team member will be using a Minelab Explorer II metal detector to assist in the location of subsurface anomalies.

- 2.4.3.4 The UXO Removal Teams, consisting of all team members, will maintain a specified distance, between team members. The team will stay on line by using a GPS unit operated by an individual deemed competent in its operation. Ropes or other devices may be used to define lanes based on area conditions.
- 2.4.3.5 The team member on the left (western) side of the sweep line will use a GPS to stay aligned with the western boundary. This individual will also place pin flags to delineate the clearance boundary. The remaining team members will align themselves on this individual in a formation by the Team Leader. The team member on the right side of the line will place temporary pin flags to mark the extent of clearance. As subsurface anomalies are detected the location of the anomaly will be marked and the GPS information will be recorded. Upon reaching the northern boundary of the grid, the team will swing around and align themselves to sweep back to the southern boundary of the grid. The team member now on the right side of the line will pull the previously placed pin flags. The team member on the left side of the line will place temporary pin flags. The clearance will continue in this manner until the grid is cleared of OE and ordnance-related scrap.
- 2.4.3.6 The last row of pin flags at the end of each workday will remain in place until the sweep is resumed the next morning. Ropes or other devices may be used to define lanes based on area conditions.
- 2.4.3.7 If sub munitions are encountered, the Senior UXO Supervisor will direct personnel to cease operations immediately and to evacuate the area. The USACE OE Safety Specialist will be notified as soon as possible.
- 2.4.3.8 If suspected CWM is encountered, operations will cease immediately and an area 500 meters (m) around the item will be secured, the USACE OE Safety Specialist will be notified as soon as possible. UXO personnel will take a position 500m upwind of the item in an area where the site can be viewed at all times. The USACE OE Safety Specialist will report the incident.
- 2.4.3.9 All encountered OE will be inspected by a UXO qualified person to determine its condition, (i.e., live, armed, inert, etc.).
- 2.4.3.10 OE determined to be live, or containing hazardous components, will be marked for final disposal procedures by Disposal Team. If an item's condition cannot be determined, it will be considered live and marked for the Disposal Team.
- 2.4.3.11 The Senior UXO Supervisor, and/or an UXO Technician III will be responsible for final determination of an OE item that is suspected to be live. At least two UXO personnel must agree on the condition of an OE item before any removal action is attempted. In addition, the USACE OE Safety Specialist must concur before any removal action takes place. Site office publications will be researched, as required. If publications are not available on-site, the Senior UXO Supervisor will request pertinent publications/information from the USACE OE Safety Specialist.
- 2.4.3.12 If the item is not acceptable to move it will be clearly marked with a stake approximately 36 inches high with fluorescent marking tape. The stake will

- contain sufficient fluorescent marking tape to be visible from a distance. GPS coordinates will be taken and reported.
- 2.4.3.13 All live OE items located will be logged, marked and GPS coordinates will be taken prior to disposal. All data required by the SOW will be entered into the OE database provided by CEHNC.
- 2.4.3.14 It is the Team Leader's responsibility to verify that only inert OE items leave the grid.
- 2.4.3.15 The disposal actions by ATI will generate fragments and scrap that will be inspected and removed by ATI after disposal operations are conducted. All access/excavation/detonation holes will be back-filled to grade.
- 2.4.3.16 A post-disposal investigation will be conducted to verify the final disposal procedures were accomplished.
- 2.4.3.17 Ordnance-related scrap, that does not require demilitarization, is collected, inspected by the Team Leader and carried in the on-site pick-up truck for transport to the holding area and processed at the end of the day. It is the Team Leader's responsibility to assure that his team members handle only inert items during this process.
- 2.4.3.18 Ordnance-related scrap, which has been placed in the holding area, will not be mingled with other types of material and will be held in securable containers.
- 2.4.3.19 In the event that live or suspected live OE is discovered, within ordnance related scrap piles, the following procedures shall be followed:
- Stop work immediately and evacuate the area of all non-essential personnel.
 - Secure the area to prevent access of non-essential personnel.
 - Notify a Supervisor, who will notify the Senior UXO Supervisor, and the UXO Safety Officer.
 - The Senior UXO Supervisor or the UXO Safety Officer will notify the USACE OE Safety Specialist, Project Manager and plan a course of action to be taken.
 - The USACE OE Safety Specialist will be consulted, prior to any course of action being taken, for concurrence and approval.
 - After the application of the course of action, the Senior UXO Supervisor shall prepare a report of the incident to be submitted to the USACE Contracting Officer and Program Manager.
- 2.4.3.20 Inert OE items and ordnance-related scrap will be demilitarized in accordance with applicable regulations. OE items that are not acceptable to move will be "blown in-place" on-site. If a scenario is encountered as described in EP385-1-

- 95a (Para 9.a and 9.c) that precludes detonating OE on-site, the on-site USACE OE Safety Specialist will request EOD support.
- 2.4.3.21 Personnel used to conduct surface/subsurface clearance activities shall meet the requirements and qualifications outlined in OE-25.01 of the basic contract. Team composition will be as follows:
- 2.4.3.21.1 The UXO Removal Teams will consist of seven individuals with at least one UXO Technician Level III, six UXO Technician I/II's.
- 2.4.3.21.2 The Demolition Team will consist of one UXO Technician III, one UXO Technician II's or Technician 1 as a minimum. A UXO Technician III will be in charge of, and oversee all operations of, the Demolition Team. Only UXO qualified personnel will be involved in actual explosive operations.
- 2.4.3.22 The Senior UXO Supervisor, UXO Safety Officer/ Quality Control Specialist will interact with all operations conducted on-site.
- 2.4.4 Subsurface Clearance
- 2.4.4.1 This section describes ATI's standard practices for subsurface removal actions.
- 2.4.4.2 The UXO removal operation will start after the geophysical survey is completed and all target anomalies have been reacquired and marked.
- 2.4.4.3 All excavations will be completed by the minimum number of UXO personnel using hand tools or mechanical means.
- 2.4.4.4 OE will be cleared to depth subject to the capabilities of the detection instruments as determined during the geophysical prove out. Each anomaly will be treated as a suspect UXO until it has been determined otherwise. The clearance team will use Minelab Explorer II metal detector to aid in locating the source of the anomaly reading. If possible, the item causing the anomaly reading will be removed from the area so the area can be checked for other readings. If no metallic object is found within the clearance depth of soil, the OE Clearance of that designated anomaly will be deemed complete and the area will be returned to its original condition.
- 2.4.4.5 Items recovered during excavation will be inspected by the Senior UXO Supervisor, or a UXO Technician III.
- 2.4.4.6 OE determined to be live, or containing hazardous components, will be marked for final disposal. If an item's condition cannot be determined, it will be considered live and marked for disposal.
- 2.4.4.7 The Senior UXO Supervisor, and/or an UXO Technician III will be responsible for final determination of an OE item that is suspected to be live. At least two UXO personnel must agree on the condition of an OE item before any removal action is attempted. In addition, the USACE OE Safety Specialist must concur before any removal action takes place. Site office publications will be researched, as required. If publications are not available on-site, the Senior

UXO Supervisor will request pertinent publications/information from the USACE OE Safety Specialist.

- 2.4.5 Selection criteria for detection(s) systems
 - 2.4.5.1 American Technologies Inc. (ATI) may use a combination of man-portable and towed geophysical instruments to complete this OE removal action. Such a combination of geophysical instruments has been successfully used for past OE removal activities.
 - 2.4.5.2 The use of a sensor platform in a specified grid is dependent upon the following factors: Final decision will be made on site for each grid.
 - 2.4.5.2.1 Terrain and vegetative cover - Some areas have steep rugged terrain and heavy vegetative cover.
 - 2.4.5.2.2 Known Ordnance Items – The ability of a specific instrument to detect all of the known ordnance items suspected to be found in a specific grid (may be smaller than the MGFDF).

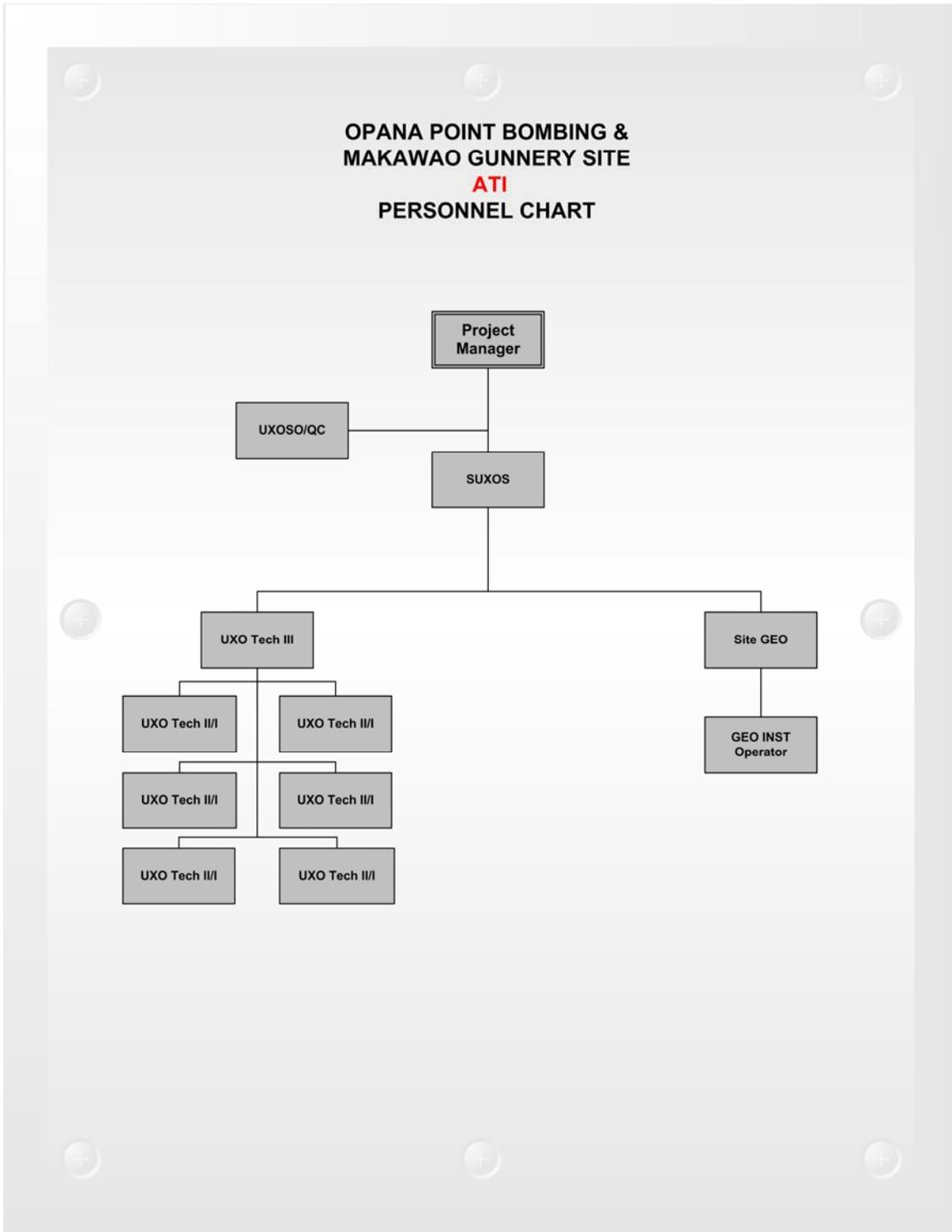
2.5 Procedures for change in site conditions

- 2.5.1 The following are possible changes in site conditions, which may occur during the project along with the procedures to be followed.
 - 2.5.1.1 Water covers the grid. Cease operations since OE and/or scrap cannot be seen.
 - 2.5.1.2 Mud covers the grid to the extent that UXO Removal team is immobile. Cease operations.
- 2.5.2 Regardless of the reason for the change in site conditions, ATI will immediately notify the USACE Contracting Officer and the USACE Project Manager of the changed condition and the action taken. Telephone/fax communication will be followed up with a hard copy.

2.6 Organization

- 2.6.1 The Project Team
 - 2.6.1.1 The project team consists of the USACE Project Manager and the USACE Contractor, ATI. Figure 2-1 is the project team's organization chart. Individuals assigned to the project team were chosen to meet the requirements of project job descriptions as outlined in this section of the WP.

Figure 2-1 Organizational Chart



- 2.6.2 Project Personnel
- 2.6.2.1 Project Manager
- 2.6.2.1.1 The Project Manager is responsible for communicating with USACE through the USACE Project Manager or the on site USACE OE Safety Specialist. He will execute all directions received from the USACE Contracting Officer, managing all aspects of the project, overseeing the overall performance of all individuals on the project team, coordinating all contract and subcontract work, and resolving project problems. The Project Manager is also responsible for controlling the contractual cost and schedule milestones. The Project Manager will also coordinate the preparation of the WP and the implementation of onsite field activities.
- 2.6.2.1.2 The Project Manager will interface directly with subcontractors to keep them advised of the SOW, schedule, and budgets. The Project Manager is also responsible for ensuring that the subcontractor costs are within budget and that schedule commitments are achieved.
- 2.6.2.1.3 The Project Manager performs overall project management and is responsible for the following:
- Preparing and submitting Purchase Orders;
 - Approving and forwarding accounts payable;
 - Approving Daily Activity Report;
 - Procuring necessary equipment and supplies;
 - Establishing, maintaining and tracking petty cash expenditures;
 - Reviewing and approving Time Sheets, Expense Reports, and Travel Order Request;
 - Submitting Equipment Expense Report; and
- 2.6.2.1.4 The Project Manager supervises the SUXOS and UXOSO/QC.
- 2.6.2.2 Project Geophysicist
- 2.6.2.2.1 The Project Geophysicist will perform daily data review. The Project Geophysicist will review all site-specific activities, progress of the survey, and identified problems. The Project Geophysicist will report all problems to the Project Manager and will assist in correcting any problems as soon as possible.
- 2.6.2.3 Site Geophysicist
- 2.6.2.3.1 The Site Geophysicist, with responsibility for processing, and dig-list picks and ensuring the completion of all applicable forms and for notifying the Project Geophysicist of site-specific activities, survey progress, problems, and results on a weekly basis (at a minimum). The Site Geophysicist will be responsible for ensuring that survey activities are performed in accordance with the QCP and method-specific procedures.
- 2.6.2.4 Certified Industrial Hygienist (CIH)

- 2.6.2.4.1 The CIH, with experience in hazardous waste site operations, is responsible for the development, implementation and oversight of the project SSHP.
- 2.6.2.4.2 The CIH will oversee the development of the SSHP, by the ATI Safety Office, and review and initially approve all safety plans and recommended changes submitted to the USACE Contracting Officer for final approval.
- 2.6.2.4.3 The CIH will authorize periodic unannounced audits of this project safety program periodically during the course of the contract work on this site.
- 2.6.2.5 Safety Manager
- 2.6.2.5.1 Under the guidance of the CIH, the Safety Manager is responsible for preparation of the SSHP, and ensuring site compliance with the SSHP and the Corporate Safety and Health Program (CSHP). During the field effort, the Safety Manager will provide UXO safety and health consultation to the UXO Safety Officer and conduct training of site personnel, as required and conduct periodic safety audits.
- 2.6.2.5.2 The ATI Safety Office will be performing unannounced audits of this project safety program periodically during the course of contract work on this site.
- 2.6.2.6 QA/QC Manager
- 2.6.2.6.1 The QA/QC Manager is responsible for the following:
- Review of all QA/QC procedures to be used in the project to ensure compliance with the project QC guidelines presented in the WP;
 - Quality review to ensure the quality of deliverables from the project team to USACE, and
 - Interaction and communication with subcontractor and USACE QA personnel.
- 2.6.2.7 UXO Personnel and Qualifications
- 2.6.2.7.1 UXO personnel required for this project will include UXO supervisors and technicians, all of whom possess the relevant personal training and experience requirements set forth in the SOW and Data Item Description OE-025.01. UXO Technician I may be utilized to perform OE procedures when supervised by a UXO Technician III or a UXO-qualified individual of higher rank than the UXO Technician III. Personnel for this project have been selected from a pool of available UXO technicians. Resumes of ATI key personnel are included in Appendix H if not listed in the UXO database maintained by CEHNC. The following paragraphs describe the specific responsibilities of UXO personnel assigned to the project team.
- 2.6.2.8 Senior UXO Supervisor (SUXOS)
- 2.6.2.8.1 The SUXOS has more than 15 years military/civilian EOD/UXO experience. The SUXOS will manage all on-site field activities. The SUXOS will keep the

Project Manager apprised of activities requiring his notification. The responsibilities of the SUXOS include:

- Identification of personnel and equipment requirements;
- Supervision of all daily field team activities;
- Early detection and identification of potential problem areas and institution of corrective measures;
- Assisting with the preparation of all project reports;
- Preparation of a daily report, which will include man-hours expended, grids cleared, explosives expended and any other information required by the Project manager;
- Providing on-the-job training for selected UXO Supervisor(s) who may be called upon to temporarily perform SUXOS duties during his absence from the site; and
- Supervision of UXO Technicians
- The SUXOS reports to the Project Manager and maintains day-to-day communications with him, assisting with documentation of site conditions and activities and interfacing with the USACE OE Safety Specialist.
- Daily duties will include scheduling and executing a daily safety meeting, scheduling and coordinating subcontractor field team activities and oversight of all field activities.
- Resolving Site Project Problems;
- Reviewing Daily Activity Report;
- Assist in procuring necessary equipment and supplies;
- Maintaining daily liaison with the USACE OE Safety Specialist;
- Daily monitoring of the project schedule;
- Daily monitoring of production output;
- Oversee project equipment maintenance program;
- Assist in the development of all site specific and UXO training;
- Monitoring of all site specific and UXO training;
- Assisting in the development of operating procedures and the work plan;

- Oversee all demil and OE scrap processing;
- Receive and distribute incoming communications
- Input data for the Daily Activity Report
- Produce Daily Activity Report
- Produce Weekly Live Ordnance Status Report
- Produce Weekly Activity Summary
- Calculate Personnel Expense Reports
- Review Time Sheets & Personnel Expense Reports for Accuracy
- Gather required communications for Weekly FedEx shipment
- Maintain files
- Reconcile Petty Cash Account

2.6.2.9 UXO Safety Officer (UXOSO/QC)

2.6.2.9.1 The UXOSO/QC has more than ten years of military/civilian EOD/UXO experience. The UXOSO/QC is responsible for implementing all site SSHP requirements, on-site training requirements and recommending changes to level of personal protection equipment (PPE) to the SUXOS as site conditions warrant. The UXOSO has Stop Work Authority for safety conditions. He will report all safety work stoppages immediately to the USACE OE Safety Specialist. The UXOSO evaluates and analyzes any potential safety problems, implements safety-related corrective actions, and maintains a Daily Safety Log. The UXOSO reports to the Safety Manager. The UXOSO/QC will:

- Perform on-the-job training for selected UXO Technicians who may be called upon to temporarily perform the duties of UXOSO during his absence from the site, upon approval of the USACE OE Safety Specialist.
- Maintain daily liaison with the USACE OE Safety Specialist.

2.6.2.9.2 The UXOQCS will inspect/review all project operations, including explosives inventories, daily reports, time sheets and other documentation, and will inspect and approve each grid prior to turnover to the USACE OE Safety Specialist. The UXOQCS specific duties are outlined in Chapter 10. He maintains daily liaison with the USACE OE Safety Specialist

2.6.2.10 UXO Technician III

2.6.2.10.1 This individual, who supervises a project team, shall be a graduate of a school listed in paragraph 10.2.a. or 10.2.b of DID OE-025.01. This individual shall

have experience in OE clearance operations and supervising personnel, and shall have at least ten years combined active duty military EOD and contractor UXO experience. This individual must be able to fully perform all functions enumerated for UXO Sweep Personnel, UXO Technicians I and II.

Specific duties of the UXO Technician III's include:

- Reconnaissance and classification of UXO
- Identifying fuzes and determining fuze conditions of all munitions including U.S. and foreign
 - Guided missiles
 - Bombs and bomb fuzes
 - Projectiles and projectile fuzes
 - Grenades and grenade fuzes
 - Rockets and rocket fuzes
 - Land mines and associated components
 - Pyrotechnic items
 - Military explosives and demolition materials
 - Submunitions
- Supervising the conduct of all on-site operations directly related to OE operations.
- Supervise the location of subsurface UXO using military and/or civilian magnetometers and related equipment.
- Supervises
 - Excavation and recovery of subsurface UXO by manual means or mechanical means.
 - Construction of UXO-related protective works
 - Location of surface UXO by visual means
 - Transporting and storing UXO/OE assuring compliance with Federal, state, and local laws
 - Disposal of UXO by burning/detonation
 - Preparation of an UXO disposal site
 - Preparation of an on-site safe holding area for UXO.
- Determine UXO-related storage compatibility.
- Preparing explosives storage plans in accordance with all applicable guidance
- Supervise
 - Donning and doffing of personal protective equipment
 - Operation of a personnel decontamination station
 - Maintenance and operator checks on all team equipment
- Preparing required OE- UXO related administrative reports
- Preparing SOPs for on-site OE operations
- Conducting daily site safety briefings
- Supervise:
 - Segregation of UXO-related scrap from non-UXO related scrap
 - Safe handling procedures;
 - Team preventive medicine and field sanitation procedures
- Perform
 - Risk hazard analysis
 - Interpret x-ray of UXO

- Supervise
 - Field expedient identification procedures to ID explosive contaminated soil
 - Determining of a magnetic azimuth using a lensatic compass

2.6.2.11 UXO Technician II

2.6.2.11.1 This individual shall be a graduate of a school listed in paragraph 10.2.a. or 10.2.b of DID OE-025.01. As an exception, a UXO Technician II may be an UXO Technician I with at least five years combined military EOD and contractor UXO experience. This individual must be able to fully perform all functions enumerated for UXO Sweep Personnel and UXO Technician I.

In addition, the ability to perform the following functions is a requirement of the UXO Technician II:

Perform:

- Reconnaissance and classification of UXO and other OE materials;
- Identifying fuzes and determining fuze condition of all munitions U.S. and foreign including:
 - Guided missiles
 - Bombs and bomb fuzes
 - Projectiles and projectile fuzes
 - Grenades and grenades fuzes
 - Rockets and rocket fuzes
 - Land mines and associated components
 - Pyrotechnics;
 - Military explosives and demolition materials
 - Submunitions
- Locate subsurface UXO using military and/or civilian magnetometers and related equipment.
- Perform excavation procedures on buried UXO by
 - Manual means;
 - Mechanical means.
- Perform operator maintenance of military and/or civilian magnetometers.
- Locate surface UXO using visual mean.
- Operate motor vehicle transporting UXO-OE material, when appropriate.
- Preparing an on-site holding area for UXO-OE material;
- Perform storage of UXO-OE material and demolition materials in accordance with applicable guidance;
- Prepare an UXO disposal site.
- Prepare
 - Non-electric firing system for an UXO disposal operation;
 - Electric firing system for an UXO disposal operation;
 - Detonating cord firing system.
- Dispose of UXO/explosives by
 - Burning;
 - Detonation.
- Operate a personnel decontamination station.
- Don and doff appropriate personal protective equipment in contaminated

areas.

- Inspect salvage UXO-related material.
- Erect UXO-related protective works.
- Determining a magnetic azimuth using current navigational/locating equipment;
- Performing field expedient identification procedures to identify explosives contaminated soil;

2.6.2.12 UXO Technician I

2.6.2.12.1 This individual shall be a graduate of the course listed in paragraph 10.2.c of DID OE-025.01. A UXO Technician I can advance to the UXO Technician II category after five years combined active duty military EOD and contractor UXO experience.

2.6.2.12.2 The UXO Technician I's specific duties (under the supervision of a UXO Technician III or a UXO-qualified individual of higher rank than the UXO Technician III) for this project will include:

- Conducting reconnaissance and classification of UXO and other OE materials;
- Identifying all munitions including
 - Bombs and bomb fuzes,
 - Guided missiles,
 - Projectiles and projectiles fuzes,
 - Rockets and rocket fuzes,
 - Land mines and associated components,
 - Pyrotechnics items,
 - Military explosives and demolition materials,
 - Grenades and grenade fuzes,
 - Submunitions;
- Locating subsurface UXO using military and/or civilian magnetometers and related equipment;
- Performing excavation procedures on subsurface UXO by;
 - Manual means,
 - Mechanical means.
- Locate surface UXO using visual means.
- Transporting and storing UXO and demolition materials;
- Preparing firing systems, both electric and non-electric, for destruction operations disposing of ammunition/ explosives by
 - Burning;
 - Disposing of ammunition/explosives by detonation.
- Operating Personnel Decontamination Stations (PDS);
- Donning and doffing personnel protective equipment in contaminated areas.
- Inspecting salvaged UXO-OE related material and erection of UXO-OE related protective works;
- Assist in performing operator maintenance of military and/or civilian magnetometers and related equipment.
- Operate motor vehicle transporting UXO/OE material, when appropriate.
- Preparing an on-site holding area for UXO/OE materials.

- Prepare an UXO disposal site.
- Determining a magnetic azimuth using current navigation/locating equipment.
- Assist in performing field expedient identification procedures to identify explosives contaminated soil.

2.6.2.13 UXO Sweep Personnel.

2.6.2.13.1 UXO Sweep Personnel assist UXO technicians and supervisory personnel in the clearance of UXO, operating only under the direct supervision of qualified UXO technicians and/or UXO supervisors.

- This position requires site and job specific contractor training (which may include ordnance recognition, safety precautions, donning and doffing personnel protective equipment, etc.) but does not require UXO technician qualifications.
- UXO Sweep Personnel conduct visual and/or instrumented UXO search activities in the field;
- Perform field maintenance on military and civilian magnetometers and related equipment;
- Operate ordnance detection instruments and other similar equipment to include digital geophysical mapping instruments;
- Sweep Personnel remove UXO fuze remnants; fragments and related debris only after such items have been positively identified, inspected and verified as safe to handle by a qualified UXO specialist.
- Sweep Personnel are not involved in the execution of explosive operations.

2.6.2.13.2 This position requires site and job specific contractor training, but does not require UXO qualifications.

2.6.2.14 UXO Removal Team

2.6.2.14.1 ATI will use One UXO Removal Teams.

2.6.2.14.2 The UXO Removal Team consists of seven individuals with at least one UXO Technician Level III and six UXO Technician I/II. The UXO Removal Team may be reduced or expanded as conditions dictate, provided that there is always at least two UXO Technicians on the team (one of which must be a UXO Technician III) and further provided that the team size does not exceed seven persons.

2.6.2.15 Disposal Team

2.6.2.15.1 ATI will utilize One Demolition Team

2.6.2.15.2 The Demolition Team will consist of one UXO Technician III, one UXO Technician II's or Technician 1 as a minimum. A UXO Technician III will be in charge of, and oversee all operations of, the Team. Only UXO qualified personnel will be involved in actual explosive operations.

2.6.2.16 Subcontractor Management

2.6.2.16.1 Subcontractors on ATI prime Task Orders will be required to comply with requirements and procedures established in the work plan. Additionally, FAR subpart 45.5 shall be incorporated by reference in all applicable subcontracts and purchase orders to ensure compliance with regulations regarding management of property in the possession of subcontractors.

2.6.2.16.2 Daily supervision of all subcontractor field activity will be the responsibility of the SUXOS, with the Project Manager providing overall supervision. Subcontractor personnel will adhere to all applicable WP, safety, health, and QC requirements. The SSHP (Appendix D) specifies individual requirements for UXO/OE safety and health.

2.7 Mobilization Plan

2.7.1 Mobilization will commence upon notification to proceed from the Contracting Officer.

2.7.2 Once on site, the Project Manager will coordinate the following activities:

2.7.2.1 Hospital. To establish emergency treatment facility point of contact, confirm phone numbers and directions to facility.

2.7.2.2 Establish and set-up an office.

2.7.2.3 Contact the phone company and have phone lines installed.

2.8 Site Preparation

2.8.1.1 Brush Cutting

2.8.1.1.1 ATI will cut only the vegetation which will hamper a safe OE removal action. Only vegetation, which is smaller than 3" in diameter measured on the trunk 4' from ground level will be removed. Brush cutting and vegetation clearance will be limited to only that required to perform a safe OE removal action.

2.8.2 Equipment Field Test Plot

2.8.2.1 An inert 60mm Mortar or similar magnetic/metallic inert item will be buried to a depth of six inches. A daily check of the magnetometer will be conducted and annotated.

2.9 Sampling Plan

2.9.1.1 Sampling is not required under this task order.

2.10 Reporting and Disposition of OE

2.10.1 Personnel Responsibilities

2.10.1.1 SUXOS – The SUXOS has overall responsibility for reporting and disposition of OE. He will:

- Schedule and coordinate all demolition operations.
 - Ensure an OE log is maintained.
 - Assure that ordnance related scrap generated from demolition operations is inspected prior to placement in the holding bins.
 - Inspect all recovered OE and non-ordnance related scrap.
- 2.10.1.2 UXOSO/QCS – The UXOSO/QCS is responsible for insuring all OE operations meet safety and quality requirements. He will:
- Observe and inspect all demolition operations.
 - Insure all requirements of this section are complied with.
- 2.10.1.3 UXO Technician III – The UXO Technician III is responsible for the supervision of the OE disposal operation. He will:
- Post individuals at entry points (if required);
 - Construct appropriate Engineering controls IAW "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions," HNC-ED-CS-S-98-7, August 1998 if required;
 - Assign team members to specific demolition duties;
 - Assure the area is clear prior to capping in; and
 - Check the area following each shot or series of shots.
- 2.10.1.4 UXO Technician II – The UXO Technicians II will perform demolition duties as assigned.
- 2.10.1.5 UXO Technician I – The UXO Technicians I will perform demolition duties as assigned.
- 2.10.2 Safety Precautions
- 2.10.2.1 A minimum of two personnel, with one being a UXO-qualified person, will be present during all OE operations so that one person may always act as a safety observer.
- 2.10.2.2 During all OE operations, only the minimum number of personnel required to safely perform the task will be allowed on-site. All others will evacuate to a pre-designated assembly point.
- 2.10.2.3 If an unidentifiable OE is found, or toxic chemical munitions is found, the USACE OE Safety Specialist will request EOD support.

- 2.10.2.4 UXO personnel required for this project will include qualified UXO supervisors and technicians, all of whom possess the relevant United States military explosive ordnance disposal (EOD) qualifications and experience. Personnel for this project have been selected from a pool of available qualified UXO technicians
- 2.10.2.5 All UXO personnel assigned to this project will meet the personnel training and experience requirements set forth in the SOW and Data Item Description OE-025.01.
- 2.10.2.6 Do not attempt to remove any fuze(s) from the OE. Do not dismantle or strip components from any OE.
- 2.10.2.7 ATI personnel are not authorized to inert any OE items found on-site.
- 2.10.2.8 OE/UXO items will not be taken from the site as souvenirs.
- 2.10.3 OE Identification
- 2.10.3.1 At least two UXO qualified personnel must be in agreement on the condition of a live or suspected live OE item before any removal action is attempted. All available data sources should be consulted prior to this determination.
- 2.10.3.2 A detailed accounting of all live/suspected UXO or OE items encountered during the OE removal action will be accomplished. The ATI Form Number 26, UXO Accountability Form (See Appendix F) will be completed on each live/suspected UXO or OE item encountered. This accounting will include:
- Identification Number (a unique ID #).
 - Grid Location.
 - Nomenclature.
 - Fuse Description.
 - Fuse Condition.
 - Alignment (the longitudinal axis orientation of the item).
 - Placement (the location with respect to ground surface).
 - Additional comments, if required.
- 2.10.3.3 Each type of live or suspect OE item encountered will be identified using a unique numerical identifier, such as WMA – G1 – 0001 (for first live/suspect type item (0001) encountered in Grid (G1) at the project site.
- 2.10.3.4 Photographs of live or suspect OE items may be taken for documentation purposes. A ruler or some similar item, to show scale, will be placed adjacent to the item. The photographer needs to remember these photographs will be

utilized in the final report; thus, a focused, well thought out photograph is necessary.

2.10.4 Transportation

2.10.4.1 Off-Site Transportation

2.10.4.1.1 ATI does not anticipate transporting any OE items off site for disposal.

2.10.5 Safe Holding Areas

2.10.5.1 ATI will not establish a Safe Holding Area, as all live or suspected-live OE will be blown-in-place (BIP) or if deemed acceptable to move transported to collection area for disposal within the grid.

2.10.6 Demolition and Post Demolition Operations

2.10.6.1 Demolition activities will be in compliance with:

- CEHNC Basic Safety Concepts and Considerations for Ordnance and Explosives Operations.
- DoD 6055.9 Std., DoD Ammunition and Explosive Safety Standards.
- TM 60A 1-1-31, Explosive Ordnance Disposal Procedures.
- Electric Firing Procedures

2.10.7 General

2.10.7.1 Review electromagnetic radiation (EMR) hazards and precautions and electrical grounding procedures.

2.10.7.2 Carry blasting caps in approved containers and keep them out of the direct rays of the sun.

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

2.10.7.4 Do not use explosives or accessory equipment that are obviously deteriorated or damaged. They may detonate prematurely or fail completely.

2.10.7.5 Do not abandon any explosives. Fatal or serious accidents can result from such careless practice.

2.10.7.6 Do not use unexploded dud ordnance items for demolition purposes. They may be in an extremely sensitive and hazardous condition.

2.10.7.7 Disposal operations will not be initiated until at least one-half hour after sunrise and will be concluded by at least one-half hour prior to sunset.

- 2.10.7.8 Restrict and control access to the disposal site to a minimum of authorized personnel necessary for safe conduct of the disposal operations.
- 2.10.7.9 Do not carry fire- or spark-producing devices into a disposal site except as specifically authorized.
- 2.10.7.10 Do not smoke except in areas specifically designated. After smoking, assure that all burning tobacco is extinguished.
- 2.10.7.11 Avoid inhaling, and skin contact with explosives, the smoke, fumes, vapors of explosives, and related hazardous materials.
- 2.10.8 Handling Demolition Materials
 - 2.10.8.1 Do not strike, tamper with, or attempt to remove or investigate the contents of a blasting cap (electric or non-electric), detonator, or other explosive initiating device. A detonation may occur.
 - 2.10.8.2 Do not pull on the electrical lead wires of electric blasting caps, detonators or other electro-explosive devices. A detonation may occur.
 - 2.10.8.3 Do not attempt to remove an unfired or misfired primer or blasting cap from a coupling base. There is a high risk of an explosion.
 - 2.10.8.4 Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling. This will minimize injury should the item explode.
 - 2.10.8.5 Shaped charges - be certain there is no obstruction in the conical cavity or between the charge and the target, as any obstruction will materially reduce the penetration effect.
- 2.10.9 Preparation for Firing
 - 2.10.9.1 Use only standard blasting caps of at least the equivalent of a commercial No. 8 blasting cap.
 - 2.10.9.2 Use electric blasting caps of the same manufacture, whenever possible, for each demolition shot involving more than one cap.
 - 2.10.9.3 Keep blasting caps in approved containers, located at least 7.62 meters (25 feet) from other explosives, until needed for priming.
 - 2.10.9.4 Do not bury blasting caps. Use detonating cord to position blasting caps above the ground. Buried blasting caps are subject to unobserved pressures and movement, which could lead to premature firing or misfires.
- 2.10.10 Electric Priming
 - 2.10.10.1 Test electric-blasting caps for continuity at least 50 feet downwind from any explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be short-circuited by twisting the bare ends of the

- wires together. The wires will remain shunted until ready to connect to the firing circuit.
- 2.10.10.2 Unroll the lead wires so that the cap is as far as possible from the operator and pointing away from him/her. Place the blasting cap under a sandbag or behind a barricade before removing the shunt and testing for continuity. Make sure the cap does not point toward other personnel or explosives.
- 2.10.10.3 Use only the special silver-chloride dry cell battery in the testing galvanometer. Other types of dry cells may produce sufficient voltage to detonate blasting caps.
- 2.10.10.4 Do not connect the blasting machine to the firing wires until all pre-firing tests have been completed and until ready in all respects to fire the charges.
- 2.10.10.5 Do not hold the blasting cap directly in the hand when uncoiling the leads. Hold the wires approximately 152 millimeter (6 inches) from the cap. This will minimize injury should the cap explode. The lead wires should be straightened by hand and not thrown, waved, or snapped to loosen the coils.
- 2.10.10.6 Do not remove the shunt from the lead wires of blasting caps except for testing for continuity or actual connection into the firing circuit. The individual removing the shunts will ground himself prior to this operation to prevent accumulated static electricity from firing the blasting cap.
- 2.10.10.7 Keep both ends of the firing wires shorted or twisted together except for testing or firing. Do not connect the blasting caps to the circuit firing unless the power ends of the circuit firing leads are shorted.
- 2.10.10.8 Keep all parts of the firing circuit insulated from the ground or other conductors such as bare wires, rails, pipes, or other paths of stray current.
- 2.10.10.9 The UXO person in-charge will order the final priming of the shot.
- 2.10.11 Firing Demolition Charges
- 2.10.11.1 Keep the power end of the firing wire shunted until ready to connect the blasting machine.
- 2.10.11.2 The signal for detonation will be given by the UXO person in-charge only after all personnel in the area have reached cover or a safe distance from the charge.
- 2.10.11.3 Prior to making connections to the blasting machine, test the firing circuit for electrical continuity.
- 2.10.11.4 The UXO person in-charge will order the firing wires to be connected to the blasting machine, maintaining control over the activating device, while verifying that the area is clear of personnel, animals, and equipment, including aircraft.
- 2.10.11.5 When using a firing panel, lock the switch in the open position until ready to fire. The single key will be in the possession of the UXO person in-charge.

- 2.10.11.6 Do not complete the circuit at the blasting machine (panel) or give the signal for detonation until directed to do so by the UXO person in-charge.
- 2.10.11.7 Do not attempt to fire a single electric blasting cap, or a combination of electric blasting caps in a circuit with less than the minimum current required by the total circuit. Misfires can be expected where this occurs.
- 2.10.11.8 The UXO person in charge and a safety observer shall check the shot following the detonation.
- 2.10.11.9 The team will search the area after each firing for any remaining explosive components and loose explosives. Scattered explosive material should be carefully gathered and destroyed by detonation with the next shot. If left in place these items can create an additional explosive hazard. This search includes verifying that a secondary item is not present in the area after conducting “blow-in-place” operations. Always check the “blow-hole” for secondary items and remove all Ordnance-related scrap and fragmentation.
- 2.10.11.10 Electro-Magnetic Radiation (EMR) Hazards. Prior to the application of detonation-in-place procedures, an EMR survey shall be conducted to determine if there are any transmitting antennas of radio, radar, or other electro-magnetic-generating devices located in the vicinity.
- 2.10.11.11 Radio Frequency (RF) EMR. RF EMR consists of waves of electrical energy. These waves are radiated in a line-of-site from the antennas of electronic devices that transmit radio, radar, television, or other communication, to include cellular telephones, or other communication or navigation radio frequency signals. Table 2-2, states the minimum safe distance from electro-explosive devices (EEDs) and the transmitting antenna of all RF emitters. Table 2-3, states the minimum safe distances, which will be maintained between Mobile RF transmitters and electric blasting operations. The factors to be considered when evaluating the degree of hazard that the EMR (RF) energy represents are:
- The strength of the field (its power);
 - The frequencies transmitted;
 - The distance from the transmitter antenna to the ordnance; and
 - The amount or type of protection available

Table 2-2 Minimum Safe Distance from Electro-explosive Devices (EEDs) and RF Transmitter Antenna Emitters

AVERAGE OR PEAK TRANSMITTER POWER IN WATTS	MINIMUM DISTANCE TO TRANSMITTER IN METERS/FEET
0 – 30	30 / 98.4
31 – 50	50 / 164.1
51 – 100	110 / 360
101 – 250	160 / 525
251 – 500	230 / 755
501 - 1,000	305 / 1,000
1,001 - 3,000	480 / 1,575
3,001 - 5,000	610 / 2,001
5,001 - 20,000	915 / 3,002
20,001 - 50,000	1,530 / 5,020
50,001 – 100,000	3,050 / 10,007
100,001 - 400,000	6,100 / 20,014
400,001 - 1,600,000	12,200 / 40,028
1,600,000 - 6,400,000	24,400 / 80,056

* When the transmission is a pulsed or pulsed continuous wave type and its pulse width is less than 10 microseconds, the power column indicates average power. For all other transmissions, including those with pulse widths greater than 10 microseconds, the power column indicates peak power.

Table 2-3 Minimum Safe Distances Between Mobile RF Transmitters and Electric Blasting Operations

Transmitter Power (Watts)	MF to 3.4 MHz Industrial	HF 28 to 29.7 MHz Amateur	VHF 35 to 36 MHz 42 to 44 MHz 50 to 64 MHz	VHF 144 to 148 MHz 150.8 to 161.6 MHz	UHF 450 to 460 MHz Cellular Car Phones above 800 MHz
5 ¹	30	70	60	20	10
10	40	100	80	30	20
50	90	230	180	70	40
100	120	320	260	100	60
180 ²	170	430	350	130	80

¹ Citizens band radio (walkie-talkie) (26.96 to 27.41 MHz) - minimum safe distance -five feet. Double sideband - 4 watts maximum transmitter power - hand-held, 5 feet; vehicle mounted, 65 feet. Single sideband - 12 watts peak envelope power - handheld, 20 feet; vehicle mounted, 110 feet.

² Maximum power for 2-way mobile units in VHF (150.8 to 161.6 MHz range) and for 2-way mobile and fixed station units in UHF (450 to 460 MHz range).

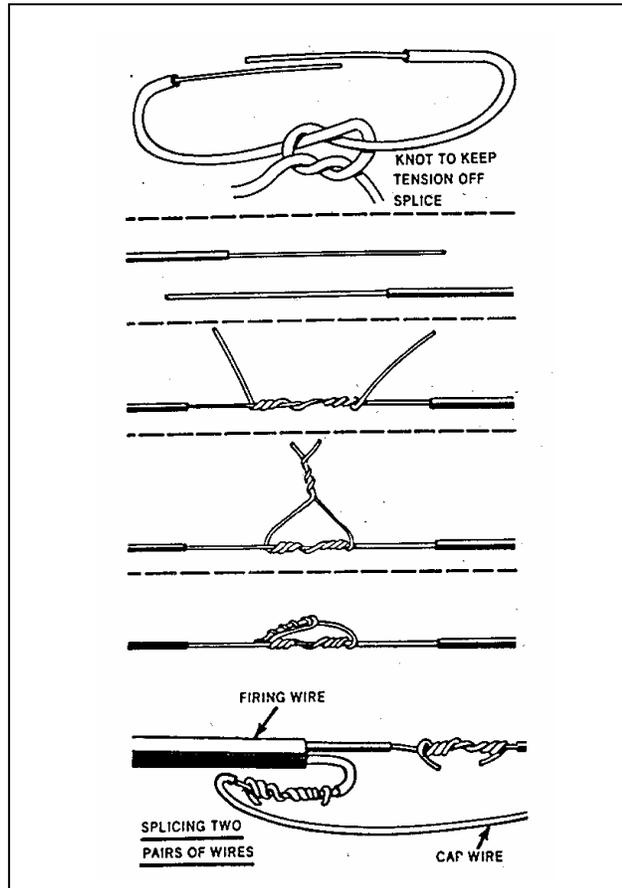
2.10.11.12 Lightning, Electric Power Lines, and Static Electricity. Lightning is a hazard to both electric and non-electric blasting caps. A strike or a nearby miss is almost certain to initiate either type of cap and other sensitive explosive elements such as caps in delay detonators. Lightning strikes, even at remote locations, may cause extremely high local earth currents, which may initiate electrical firing circuits. Effects of remote lightning strikes are multiplied by proximity to conducting elements, such as those found in buildings, fences, railroads, bridges, streams, and underground cables or conduit. The only safe procedure is to suspend all blasting activities during electrical storms and when one is impending. All blasting activities will be suspended when lightning-thunder storms are within ten miles of the project site.

2.10.11.13 Electrical firing will not be performed within 155 meters of energized power transmission lines. When it is necessary to conduct disposal operations at distances closer than 155m to electric power lines, non-electric firing systems will be used or the power lines de-energized.

- 2.10.11.14 Many electric blasting caps have been detonated because they grounded static electricity that was in the air. Static electricity is produced by a great variety of causes; among them, dust storms, which have caused a large number of detonations; snow storms, less dangerous, but known to have caused premature explosions; and escaping steam, known to have charged the air and detonated electric caps. Enough static electricity to detonate electric caps also can be generated by such sources as moving belts and revolving automobile (truck) tires. Static electricity is an increased hazard when operating in an extremely cold climate or area of low humidity.
- 2.10.11.15 Preparation and Priming, Electric. An electric firing system is one in which electricity is used to fire the primary initiating element. The chief components of an electric firing system are the electric blasting cap, firing wire, and the blasting machine, or remote system.
- 2.10.12 Preparations
- 2.10.12.1 Prepare and place all explosive charges.
- 2.10.12.2 After determining and locating a safe location away from the charges, lay out the firing wire.
- 2.10.13 Test Firing Wire
- 2.10.13.1 If using the blasting galvanometer/M51 test set - check the galvanometer by holding a piece of metal across its terminals. If the battery is good, there should be a wide deflection of the needle. Check the M51 test set by holding a piece of wire across its terminals and depress handle - lamp should glow.
- 2.10.13.2 When using a Model "D" Blaster's Ohmmeter with the Lawrence Silver Chloride Dry Cell, a full needle indication is required. Frequently cells, which have been stored for long periods of time, will require re-activation. To obtain full-scale deflection of the meter needle, the meter contact posts should be shorted with a metal instrument such as a screwdriver or knife blade. Place the metal blade in full contact with both terminals simultaneously for a period of twenty seconds to one minute. This should activate the cell to full-scale deflection. If it does not, do not use the ohmmeter.
- 2.10.13.3 Separate firing wire connectors at both ends, and touch those at one end to galvanometer/test set posts. The needle should not move nor lamp glow. If either occurs, the firing wire has a short circuit.
- 2.10.13.4 Twist wires together at one end and touch those at the other end to the 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. Note: Firing wire can be tested on the reel, but unnoticed broken wires could produce false readings. Firing wire must be tested after unreeling. Caution: Do not drag a firing cable over sand or other insulated surfaces as this can generate a static charge that will electrically fire blasting caps.

- 2.10.13.5 Twist free ends of firing wire together to prevent an electric charge from building up in the firing wire.
- 2.10.14 Test Blasting Caps
 - 2.10.14.1 Test galvanometer/M51 test set as outlined above.
 - 2.10.14.2 Test electric-blasting caps for continuity at least 50 feet downwind from any explosives prior to connecting them to the firing circuit.
 - 2.10.14.3 Place the cap under a sandbag or other protective device in the event that the cap accidentally functions.
 - 2.10.14.4 Individual conducting this test will ground himself prior to removing the shunt.
 - 2.10.14.5 Remove short circuit shunt.
 - 2.10.14.6 Touch one cap lead wire to one post and the other cap lead wire to the other post. If the galvanometer's needle deflects slightly less than it did when instrument was tested, or the lamp glows, the blasting cap is satisfactory; if not the cap is defective. Destroy it on the detonation. Note: If the battery is fresh, the galvanometer should read at least half scale when the instrument is tested and when a good blasting cap is tested.

- 2.10.14.7 Connecting the circuit. At the firing position, keep the free ends of the firing wire twisted together until ready to connect the blasting machine.



- 2.10.14.8 A continuity check will be made of the firing wire and blasting cap circuit before inserting cap into charge.
- 2.10.14.9 Individual will ground himself prior to performing next step.
- 2.10.14.10 Splice free cap lead wires to firing wire.
- 2.10.14.11 Insert cap into charge.
- 2.10.14.12 Test the entire circuit.
- 2.10.14.13 Move to the firing position and test the entire firing circuit with the galvanometer or test set as outlined above. If the firing circuit is defective, shunt wires; go down-range and recheck circuit. If the splice is found defective, re-splice wires. If cap is found defective, replace it.
- 2.10.14.14 Twist free ends of firing wire together.

- 2.10.14.15 Exercise the blasting machine. Test blasting machine by actuating it several times with nothing attached to the terminals.
- 2.10.14.16 Connect blasting machine.
- 2.10.14.17 Sound a warning (siren, horn, etc.) and loudly call out “Fire in the hole”! three times.
- 2.10.14.18 Activate blasting machine.
- 2.10.15 Electric Misfire
- 2.10.15.1 Prevention of electric misfires. In order to prevent misfires, insure that:
- All blasting caps are included in the firing circuit;
 - All connections between blasting cap wires, connecting wires, and firing wires are properly made;
 - Short circuits are avoided;
 - Grounds are avoided; and
 - Number of blasting caps in any circuit does not exceed rated capacity of power source on hand.
 - Causes of electric misfires. Common specific causes of electric misfires include:
 - Inoperative or weak blasting machines or power source;
 - Improperly operated blasting machine or power source;
 - Defective and damaged connections, causing either a short circuit, a break in the circuit, or high resistance with resulting low current;
 - Faulty blasting caps;
 - The use in the same circuit of blasting caps made by different manufacturers or different design; and
 - The use of more blasting caps than power source rating permits.
- 2.10.15.2 Clearing electric misfires. If charge is primed electrically, proceed as follows:
- Make several successive attempts to fire;
 - Check firing wire connections to blasting machine terminals to be sure those contacts are good;
 - Make 2 or 3 more attempts to fire charge;

- If available, try again with another blasting machine or power source;
- Make 2 or 3 more attempts to fire charge;
- Disconnect blasting machine, or other power source, and shunt firing wire;
- Allow a minimum of 30 minutes to elapse from the last attempt to fire, before starting to investigate.
- Test firing circuit with circuit tester for breaks and short circuits, and correct any defects noted;
- Remove and disconnect old blasting caps and shunt wires; Note: do not strike or dig into a buried misfired charge. Uncover only enough to position a fresh charge immediately adjacent to the misfired charge.
- Connect wires of new blasting cap(s) to firing circuit and re-prime charge; and
- Reconnect firing wire ends to blasting machine and fire charge.

2.10.16 Engineering Controls

2.10.16.1 Intentional Detonations

2.10.16.1.1 When the Q-D or MSD cannot be met, a sandbag enclosure may be used to meet the requirements. The sandbag enclosure shall be constructed in accordance with (IAW) HNC-ED-CS-S-98-7, para. 3.2 (A copy will be maintained on site). The walls and sides will have a thickness equal to those listed in the MGF D (Munition with the Greatest Fragmentation Distance) Calculation Sheets in Appendix G.

2.10.16.2 Unintentional Detonation

2.10.16.2.1 Minimum separation distance (MSD) applies from OE areas to non-project personnel for ongoing surface or intrusive activities. Project personnel are defined as those contractor and Department of Defense employees who are onsite to conduct the removal action, plus any authorized visitors. All other personnel are considered non-project personnel. The MSD is the fragmentation distance for the MGF D for the area. ATI will take appropriate measures to eliminate/reduce risk for exposures within the exclusion zone. Such measures (including the use of protective works, engineering controls, evacuation of inhabited buildings and traffic control) will be maintained on site for the duration of the project. Any actions that require interaction with the public will be facilitated through the appropriate local departments.

2.11 Ordnance Related Scrap and Other Scrap

- 2.11.1 Ordnance-related scrap found while sweeping the grids will be inspected by a UXO Technician II or III to verify the item is inert or safe to handle before moving.
- 2.11.2 Ordnance related scrap will be picked up by UXO Removal Team during surface sweep operation IAW with the Scope of Work.
- 2.11.3 Items requiring demilitarization will be segregated and processed in a timely manner and placed in securable containers.
- 2.11.4 All final processed material will be placed in lockable containers, for security, before transport to the Solid Waste Facility.
- 2.11.5 Items that require demilitarization will be done in accordance with DoD 4160.21-M-1, Defense Demilitarization Manual. All OE items will be investigated to insure that there are no explosives remaining in the items and that only inert filled or empty items are removed from the grid. Redundancy is built into the investigation process to assure no live items are removed from the site.

2.12 Turn-in of Recovered Inert OE-related.

- 2.12.1 All properly demiled inert ordnance and ordnance-related scrap will be turned-in to a local Solid Waste Facility. The SUXOS will complete and sign a DD Form 1348-1 in accordance with DoD 4160.21-M, and the USACE OE Safety Specialist will sign as the verifier IAW with the Scope of Work. A certificate will be prepared with the following statement:

“This certifies and verifies that the AEDA residue, Range Residue, OE scrap and/or Explosive Contaminated property listed has been 100 percent properly inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related material.”

2.13 OE Accountability and Records Management.

- 2.13.1 A detailed accounting of all live OE items encountered during the investigation activities will be accomplished. This accounting will be entered into the CEHNC Database.
- 2.13.2 The Team Leader will provide validated data to the SUXOS at the close of each working day.
- 2.13.3 The SUXOS will:
 - Collect and review the raw field data for accuracy; and
 - Provide the verified data to the home office for CEHNC Database entry that will be posted onto ATI’s GIS ProCommander Web Site. The USACE Project Manager will have access to Pro Commander.
 - The database will provide the information for the Final Report.

- For documentation purposes, photographs will be taken of encountered live OE and will be posted onto ProCommander and used for the Final Report. The photograph will be taken to show detail and will be annotated with the grid coordinates.
- Photographic records will be used to supplement information recorded as needed.

2.14 Additional Tasks

- 2.14.1 ATI personnel, as directed by the Contracting Officer, will be available to participate in public meetings as required. ATI will have all press releases and media appearances approved by the U.S. Army Corps of Engineers.
- 2.14.2 ATI will prepare a Removal Report IAW DID OE-030.01.

2.15 Lessons Learned

- 2.15.1 The SUXOS, the UXOSO/QCS, and the Project Manager will all be responsible for logging and reporting Lessons Learned as specified in Section 10.2.4. The Project Manager will record these items in the Weekly Status report, and will ensure they are included in the final report.

3.0 EXPLOSIVE MANAGEMENT PLAN

3.1 Acquisition

3.1.1 Explosive materials used during the commission of OE removal actions at Opana Point bombing Range and Makawao Gunnery Site, Maui, HI will be obtained from commercial sources. These explosive materials will be for the specific purpose of disposal of live or suspect OE and explosive venting inert OE items, if required, located during the ordnance and explosives removal action. An electrical or non-electrical firing system will be utilized.

3.1.2 ATI has obtained an agreement with a commercial vendor, Blasting Technology, Inc. 500 Welakahao Road Kihei, Hawaii 96753 to supply the quantities of demolition explosives as needed. Explosives will be delivered upon request by ATI or ATI personnel will pickup the items needed for each demo operations as required.

3.2 Initial Receipt

3.2.1 Initial Receipt Procedures

3.2.1.1 Receipt of explosives from Blasting Technology, Inc. 500 Welakahao Road Kihei, Hawaii 96753.

3.2.1.2 Upon receipt of donor materials, an inventory will be conducted to ascertain:

- Correct type
- Serviceable condition

3.2.1.3 A copy of the invoice(s) for the incoming donor materials will be kept in the on-site donor materials accountability file.

3.2.2 Procedures for Variances between quantities shipped and quantities received.

3.2.2.1 If during the initial receipt inventory a discrepancy is found between the quantity listed on the invoice and the quantity being delivered, the quantity received will be annotated on the invoice.

3.2.2.2 The SUXOS will notify the shipper of the discrepancy as soon as possible.

3.2.2.3 The Project Manager will be notified telephonically, with a copy of the memorandum and a copy of the invoice being faxed as soon as possible.

3.3 Storage

3.3.1 No on site storage of explosives are required.

3.4 Transportation

3.4.1 This section describes standard procedures for transportation of Donor Explosives to Project Site/Transportation of OE items to the CDC.

- 3.4.2 Vehicles used for transportation of explosive materials shall not be loaded beyond their rated capacity and the explosive materials shall be secured to prevent shifting of load or dislodgment from the vehicle; when explosive materials are transported by a vehicle with an open body, a magazine or closed container shall be securely mounted on the bed to contain the cargo.
- 3.4.3 All vehicles transporting explosive materials shall display all placards, lettering, and/or numbering required by DOT and will have two each 10BC fire extinguishers on board.
- 3.4.4 Explosive materials and blasting supplies shall not be transported with other materials or cargoes; blasting caps (including electric) shall not be transported in the vehicle or conveyance with other explosives unless the conditions of 49 CFR 177.835(g) are met (i.e. an IME-22 Container is used to transport the blasting caps).
- 3.4.5 All vehicles for transportation of explosive materials shall be in the charge of and operated by a person who is physically fit, careful, reliable, able to read and understand safety instructions, and not under the influence of intoxicants or narcotics.
- 3.4.6 Only the authorized driver and his or her helper shall be permitted to ride on any conveyance transporting explosive materials or detonators.
- 3.4.7 Explosives shall not be exposed to sparking metal during transportation of materials and all electric wiring completely protected and securely fastened to prevent short circuits; a written record of such inspection shall be kept on file.
- 3.4.8 Vehicles transporting explosive materials shall be operated with extreme care; full stops shall be made at approaches to all railroad crossings and main highways and the vehicles shall not proceed until it is known that the way is clear.
- 3.4.9 No vehicle shall be refueled while explosive materials are on the motor vehicle except in an emergency.
- 3.4.10 Persons employed in the transportation, handling, or other use of explosive materials shall not smoke or carry on their persons or in the vehicle, matches, firearms, ammunition, or flame-producing devices.
- 3.4.11 Provision shall be made for safe transfer of explosive materials to magazine vessels including substantial ramps or walkways free of tripping hazards.
- 3.4.12 Vehicles transporting explosive materials shall not be left unattended.

3.5 Receipt Procedures

3.5.1 Designated Individuals

3.5.1.1 The following individuals are authorized to order and receive explosives from the supplier:

- Senior UXO Supervisor

- UXO Safety Officer
- UXO Technician III

3.5.1.2 The following individuals are authorized to issue donor explosives:

- Senior UXO Supervisor
- UXO Safety Officer
- UXO Technician III

3.5.1.3 The following individuals are authorized to transport and use donor explosives:

- Senior UXO Supervisor
- UXO Safety Officer
- UXO Technician III
- UXO Technician II

3.5.2 Explosive Use Certification

3.5.2.1 At the conclusion of the OE removal at the Opana Point bombing Range and Makawao Gunnery Site, Maui, HI, the SUXOS will complete an ATI Memorandum stating all the donor explosives expended during OE removal operations were used for their intended purpose. All remaining explosives will be disposed of IAW Para. 3.8.2.

3.6 Inventory

3.6.1 Physical inventories will not be required, no onsite storage of explosives will be required.

3.7 Lost, Stolen, or Unauthorized Use of Explosives

3.7.1 Lost, stolen or unauthorized use of explosive materials will be reported as follows:

- The Project Manager will give an immediate telephonic notification to the USACE Contracting Officer, followed up by a written report within 24 hours;
- Notify the Bureau of Alcohol, Tobacco, and Firearms (ATF) at 800-800-3855, within 24 hours of discovery (complete ATF Form 5400.5, Report of Theft or Loss - Explosive Materials and mail to nearest ATF office. Instructions for completion of the form are on the reverse side.); and
- Notify the local law enforcement agency.

3.8 Return of Excess Daily Issue

- 3.8.1 Donor explosives that are drawn but not used will be returned to Blasting Technology, Inc. 500 Welakahao Road Kihei, Hawaii 96753.
- 3.8.2 All unused explosive materials remaining at the end of OE site activities will be disposed of on site or returned to Blasting Technology, Inc. 500 Welakahao Road Kihei, Hawaii 96753.

3.9 Perform an economic analysis for different alternatives

- 3.9.1 Since this is a firm fixed priced (FFP) task order, this requirement does not apply.

4.0 EXPLOSIVES SITING PLAN

4.1 Ordnance and Explosives Areas

4.1.1 The Minimum Separation Distance (MSD) has been calculated by the U.S. Army Engineering and Support Center, Huntsville, Engineering Directorate, (See Appendix G) based on the Munition with the Greatest Fragmentation Distance (MGFD).

4.1.2 Listed below are the sectors and the MFGD for each area.

4.1.2.1 Opana Point - The MGFD is the 4.5 inch Barrage Rocket

4.1.2.2 Makawao - The MGFD is the 105mm M1 HE projectile.

4.2 Planned or Established Demolition Areas

ATI will not use Planned or Established Demolition Areas.

4.3 Foot Print Areas

4.3.1 Blow-in-Place

4.3.1.1 The exclusion zones for selected munitions are shown the MSD calculation sheets in Appendix G. The UXO Technician III in charge of the OE removal team will assign team members to specific demolition duties. Destruction of UXO/OE will be accomplished by detonation utilizing electrical firing systems to assure maximum control and safety. Disposal by detonation will be conducted within approved procedures, regulations and guidelines

4.3.2 Collection Points

4.3.2.1 Collection Points will not be used.

4.3.3 In-Grid Consolidated Shots

4.3.3.1 In-Grid consolidation shots will not be used.

4.4 Explosives Storage Magazines

An Explosive magazine will not be required, all explosives will be delivered or picked up by ATI personnel from the vendor for day use only.

4.5 Engineering Controls

4.5.1 Intentional Detonations

4.5.1.1 When the Q-D or MSD cannot be met, a sandbag enclosure may be used to meet the requirements. The sandbag enclosure shall be constructed in accordance with (IAW) HNC-ED-CS-98-7 (HNC-ED-CS-S-98-7 will be on-site).

4.6 Site Map

Site maps are in Appendix B.

Contract No. DACA87-00-D-0035
Task Order 0024

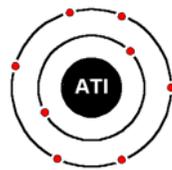
FINAL

Geophysical Prove-Out (GPO) Work Plan
for
Ordnance and Explosives (OE) Removal Action
at the
Opana Point Bombing Range & Makawao Gunnery Site
Maui, Hawaii

Prepared For:
U.S. Army Engineering and Support Center
Huntsville, Alabama



Prepared By:
American Technologies, Inc.
142 Fairbanks Road
Oak Ridge, Tennessee 37830



The project is located in the
U.S. Army Engineer District: Honolulu

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5.0 GEOPHYSICAL PROVE-OUT PLAN

5.1 General

This Geophysical Prove-out (GPO) Plan describes in detail the approach, methods, and operational procedures that ATI will use to demonstrate and document the site-specific capabilities of the proposed sensors, navigation equipment, data analysis, data management, and associated equipment and personnel to operate as an integrated system capable of meeting data quality objectives for project performance goals. This plan was developed in accordance with Data Item Description (DID) OE-005-05.01 and OE-005-05A.01, [<http://www.hnd.usace.army.mil/oew/dids.asp>], and the Statement of Work (SOW).

5.1.1 Site-Specific Safety and Health Plan (SSHP)

A SSHP has been developed and written to support this GPO and is included as Appendix D.

5.1.2 Personnel Qualifications

A qualified geophysicist who meets or exceeds the qualification requirements listed in DID OE-025 will manage all geophysical activities. Specific field activities, such as setting up grids, data collection, and reacquisition, shall be supervised by a person well-trained in geophysical operations and certified by ATI's geophysicist. A Senior Geophysicist and a Site Geophysicist with ATI will oversee all geophysical operations. Unexploded Ordnance- (UXO) qualified personnel who meet or exceed the qualification requirements listed in DID OE-025 will perform all excavation activities.

5.1.3 Past, Current, and Future Uses

5.1.3.1 Opana Point Bombing Range. The former Opana Point Bombing Range project site is located at the northern-most point on the island of Maui, Hawaii, approximately five miles north/northeast of the city of Makawao. Access to the project site is located about 1.1 miles north of Hana Road and 16-road miles east of Kahului, Maui, on land currently owned by Amfac Property Investment Corporation, Kaanapali, Maui, Hawaii and leased to the Maui Land & Pineapple Company, Inc., Paia, Maui, Hawaii. Except for a portion along the seaward cliff line, almost all of the former bombing range (currently called Field 212) is under cultivation for the production of pineapples. The site is located on the Opana Point at an elevation of over 120 feet above Mean Sea Level (MSL). The northern boundary of the project site is located along the cliff line, which is about 100 feet above MSL. The surface of the project site has been cleared and graded to meet the requirements for cultivation of pineapples. During one field investigation of the site in June 1990, sixteen (16) Mark 23 practice bombs were discovered on the surface within the boundaries of the former bombing range.

These were probably placed at this location during ground clearance as part of the pineapple cultivation work.

- 5.1.3.2 Makawao Gunnery Site. The Makawao Gunnery Site is located approximately three miles northeast of the city of Makawao, Maui, Hawaii. The US Marine Corps (USMC) used the Makawao Gunnery Site as an artillery impact area. The site is currently owned by the East Maui Irrigation Company, Ltd. and is primarily used for cattle grazing.
- 5.1.3.3 An EE/CA field investigation for the Makawao Gunnery Site and Opana Point Bombing Range was initiated on August 9, 2002, and was completed on October 10, 2002. Using data collected during the EE/CA field investigation, a qualitative risk evaluation was performed to determine the most appropriate OE response actions for the sites. Characterization of the Makawao Gunnery Site and the Opana Point Bombing Range consisted of the following:
- Visual Reconnaissance;
 - Surface Clearance;
 - Geophysical Mapping;
 - Visual Surface Search; and
 - Intrusive OE Sampling.
- 5.1.3.4 ZAPATA ENGINEERING recovered five UXO items at the Makawao site; two 105mm HE projectiles with point detonating fuzes, one 4.5 in. barrage rocket, and two 60mm HE mortars with point detonating fuzes. Several small arms casings were also recovered.
- 5.1.3.5 Of the 348 anomalies intrusively investigated, three anomalies (0.8%) were UXO, 19 anomalies (5.5%) were OE scrap, and 326 anomalies (93.6%) were miscellaneous metal scrap, “hot rocks”, or false positives (as defined in Chapter 12.0). All of the subsurface OE scrap and UXO items had peak value responses equal to or greater than 23.22 mV and were an average of 6.3 inches below ground surface. The two 105 mm HE projectiles were located on the ground-surface during visual inspections. Based on data collected during the geophysical investigation of 18.5 acres, ZAPATA ENGINEERING projects that additional ordnance items may be encountered at the Makawao Gunnery Site. All OE items were found in the northern portion of the site in an approximately 100-acre area between elevation 700 and 800 feet (Figure 3-3).
- 5.1.3.6 During the field investigation of the Opana Point, ZAPATA ENGINEERING found evidence of expended and unexpended AN-MK 23 and MK 5 practice bombs, two 60mm HE mortars, and two 81 mm HE mortars.
- 5.1.3.7 Of the 322 anomalies intrusively investigated, eight anomalies (2.5%) were UXO, 138 anomalies (42.8%) were OE scrap, and 176 anomalies (54.6%) were miscellaneous metal scrap, “hot rocks”, or false positives (as defined in Chapter 12.0). Most of the OE scrap and UXO items discovered on-site were AN-MK 23

and MK 5 practice bombs or scrap, although two unexploded 60 mm mortars and evidence of 81 mm mortars were recovered. All of the OE scrap and UXO items had peak value responses equal to or greater than 10.15 mV and were an average of 4.4 inches below ground surface. Based on data collected during the geophysical investigation, additional ordnance items are likely to be encountered at the Former Opana Point Bombing Range.

5.1.4 Depth Anticipated

Historical information and previous data indicates that UXO may be found at a depth of zero to 36 inches. The majority of the OE items in the Opana Point area were found near or at the surface. Items found at the Makawao site were deeper in the ground, possibly due to larger UXO size and lower soil density.

5.1.5 Geophysical Conditions

The volcanic soil and rock may cause some geophysical background response. A false positive analysis will be calculated and included in the GPO report.

5.2 **GEOPHYSICAL INVESTIGATION PLAN OUTLINE**

5.2.1 Geophysical Investigation

5.2.1.1 Prove-out. ATI will demonstrate the performance of all geophysical methods, equipment, and personnel prior to the start of geophysical mapping. ATI will perform digital geophysical mapping of the prove-out, analyze the data, and report the results with exactly the same detail and procedures as planned for the project area. Geophysical investigations within the project area will not begin until the project objectives have been achieved within the test plot and the results approved by Corps of Engineers, Huntsville Center (CEHNC).

5.3 **Test Plot Design**

5.3.1 Prove-out Size and Location

Figure 5-1 is the GPO layout, which depicts the size and location of the proposed test plot. The following parameters are currently in effect at the site of the proposed geophysical prove-out:

- 1) The selected area has similar geology, soil type, and topography to represent actual field conditions.
- 2) The area is accessible by present transportation routes.
- 3) The selected area is of sufficient size to represent ordnance distribution.
- 4) The GPO area is approximately 300 feet x 150 feet and will be expanded by 20 feet on the northeast side.
- 5) Table 5-1 shows the GPS Base Station Coordinates that will be used on the Opana Point and Makawao site if present.

Table 5-1			
GPS Base Station Coordinates (NAD83 Hawaii Zone 2 State Plane, US Survey Feet)			
Opana Point		Makawao	
Station 1	Coordinates	Station 1 (9-11 and 9-12)	Coordinates
Easting	1771966.08	Easting	1777930.594
Northing	221636.49	Northing	209153.675
		Station 20 (9-13 to 9-30)	
		Easting	1779076.521
		Northing	208821.904

5.4 Seed Items

The types of inert ordnance used for seeding and depth of burial was determined by data gathered from previous findings. Previous ordnance used on-site includes:

- Mark 23 Practice Bombs
- 105mm
- 81mm
- 60mm
- 4.5 Inch Rockets
- 24 Pound Bombs

All items will be buried at contract requirements and more than six (6) feet apart and will be buried to bedrock depth if the proposed depth can't be reached. Tables 5-2a and 5-2b list the buried items, the orientation, and the depth that they will most likely be buried. All inert ordnance items will be inspected; certified free of explosive hazards; and painted blue, with CEHNC or ATI's corporate office phone number and address included. Figure 5-2 shows the proposed distribution of seed items.

FIGURE 5-1: PROPOSED GEOPHYSICAL PROVE-OUT SITE

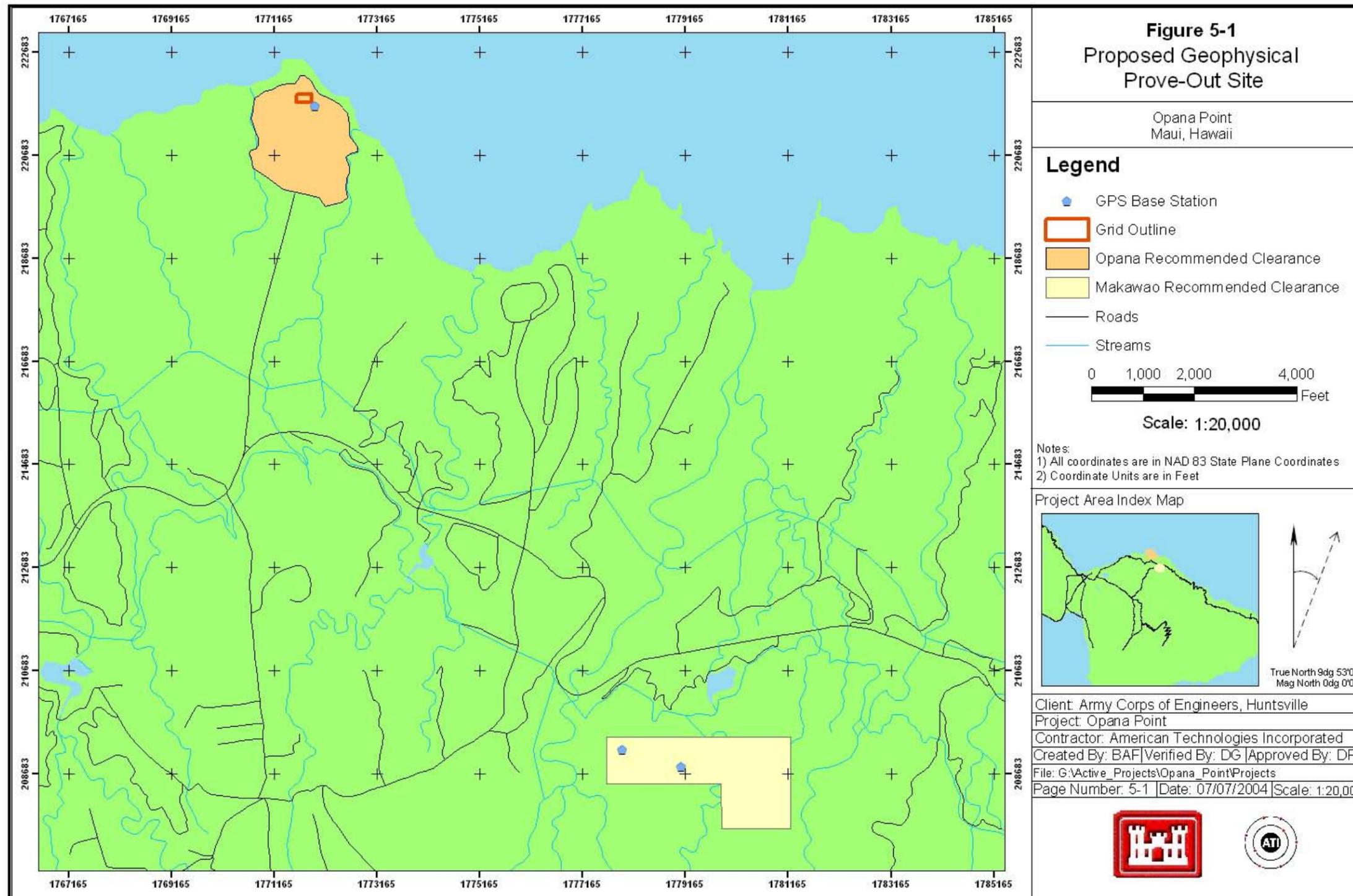
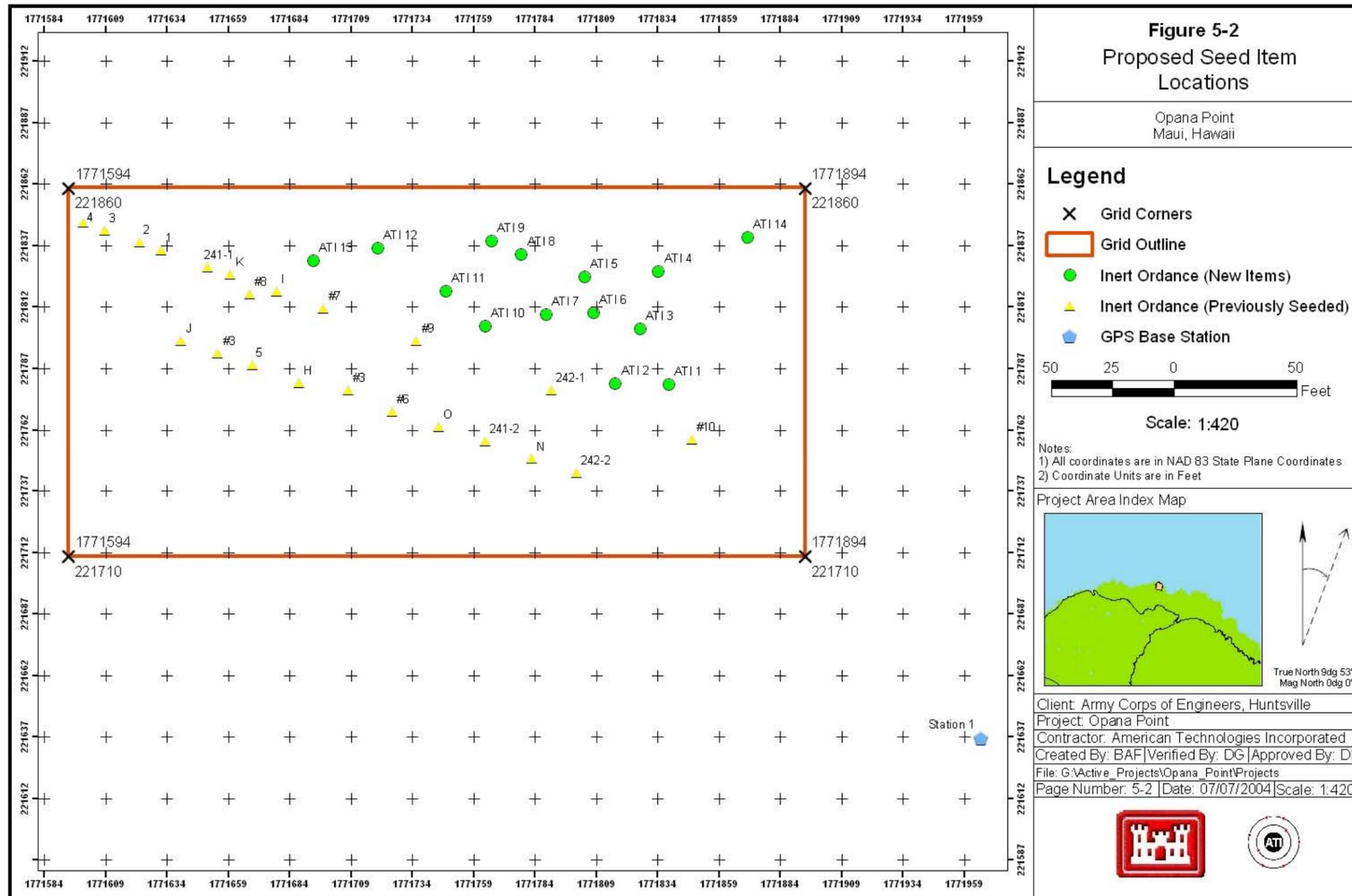


FIGURE 5-2: PROPOSED SEED ITEM LOCATIONS



**TABLE 5-2a: INERT ORDNANCE USED FOR TEST PLOT SEEDING
 (New Items)**

Item Number	Nomenclature	X (Easting) SPC Zone 2 (feet)	Y (Northing) SPC Zone 2 (feet)	Attitude and Depth (Items maybe buried at shallower depths because of soil depth)
ATI 1	60mm	1771838.66	221780.24	V @ 25 inches
ATI 2	60mm	1771816.93	221780.56	(North) H @ 25 inches
ATI 3	60mm	1771826.98	221802.62	(East) H @ 18 inches
ATI 4	MK5 (Zinc)	1771834.44	221825.97	(North) H @ 24 inches
ATI 5	MK5 (Zinc)	1771804.28	221824.03	V @ 18 inches
ATI 6	MK5 (Zinc)	1771807.85	221809.11	(West) H @ 12 inches
ATI 7	81mm	1771788.71	221808.46	(North) H @ 35 inches
ATI 8	81mm	1771778.65	221833.11	V @ 24 inches
ATI 9	81mm	1771766.33	221838.62	(East) H @ 20 inches
ATI 10	4.5 Inch Rocket	1771763.73	221803.92	(North) H @ 24 inches
ATI 11	4.5 Inch Rocket	1771747.84	221817.86	V @ 18 inches
ATI 12	4.5 Inch Rocket	1771720.26	221835.38	(West) H @ 50 inches
ATI 13	105mm	1771693.99	221830.51	(South) H @ 45 inches
ATI 14	4.5 Inch Rocket	1771870.86	221840.05	(East) H @ 36 inches

TABLE 5-2b: INERT ORDNANCE USED FOR TEST PLOT SEEDING
 (Previously seeded items)

Item Number	Nomenclature	X (Easting) SPC Zone 2 (feet)	Y (Northing) SPC Zone 2 (feet)	Attitude and Depth
J	105mm	1771640	221798	V @ 25 inches
5	MK 23	1771669	221788.4	H @ 24 inches
241-2	Sheet Metal	1771764	221756.5	H @ 20 inches
242-2	Pipe	1771801	221743.7	H @ 20 inches
K	105mm	1771660	221824.6	12 inches
I	105mm	1771679	221817.9	12 inches
4	MK 23	1771600	221846	1 inch
3	MK 23	1771609	221842.7	1 inch
2	MK 23	1771623	221838	1 inch
1	MK 23	1771632	221834.6	12 inches
241-1	Sheet Metal	1771651	221828	12 inches
242-1	Pipe	1771791	221778	13 inches
H	105mm	1771687.63	221780.81	19 inches
O	105mm	1771744.50	221762.86	29 inches
N	105mm	1771782.63	221750.03	26.5 inches
#6	MK 23	1771725.88	221769.16	24 inches
#3 (241)	24 lb Bomb	1771654.50	221793.23	15 inches
#3 (242)	24 lb Bomb	1771707.88	221777.86	22 inches
#8	MK 23	1771668.13	221817.28	3 inches
#7	MK 23	1771698.00	221811.14	3 inches
#9	MK 23	1771735.50	221797.78	3 inches
#10	MK 23	1771848.38	221757.69	12 inches

TABLE 5-3: TYPES OF ORDNANCE

Ordnance Item
Mark 23 Bomb
105mm
24 Pound Bomb
4.5 Inch Rocket
81mm Mortar
60mm Mortar

5.5 Site Preparation

The following sections describe the steps that ATI will take to prepare the GPO site and the personnel involved. Once these steps are accomplished, the test plot will, as closely as possible, duplicate the condition under which the geophysical surveys will be conducted.

5.5.1 Prove-out Surface Clearance

UXO-qualified personnel will perform a geophysical instrument- assisted surface clearance of metallic contamination within the extended prove-out grid using the Whites XLT or Explorer II.

5.5.2 Anomaly Avoidance

One UXO-qualified person will use a Whites XLT or Explorer II to assist in conducting visual surveys for surface ordnance prior to personnel entering an area potentially contaminated with UXO. Additionally, the excavation site will be searched with a Whites XLT or Explorer II to ensure that the site is free of anomalies before driving of stakes or beginning intrusive activity.

5.5.3 Vegetation Removal

5.6 Location Surveying

Figure 5-2 shows the GPO locations within the Opana Point Bombing Range and the Makawao Gunnery site. The four (4) corners of the prove-out will be located with a Trimble 5800 or equivalent and the corners marked with rebar and wooden stakes in accordance with DID OE-005-05a.01.

5.7 Pre-Seeding (Background)

The EM61 MK2 or towed array using the Trimble 5800 or 5700 GPS for precise positioning will be used to survey the prove-out in order to determine and document baseline geophysical conditions and contamination in the extended area of the grid prior to seeding. The methods/instruments were chosen based on previous project performance, instrument reliability, and known detection depths. Following the geophysical background survey, the location of all

subsurface anomalies and prominent geology will be marked with plastic pin flags and avoided.

5.7.1 Quality Control

5.7.1.1 Quality Control (QC). The measures outlined in Attachment A of DID OE-005-05.01 will be implemented to ensure the GPO objectives are achieved.

5.7.1.2 Steps/Tests. The required equipment tests and frequency of testing are summarized in Table 5-4.

TABLE 5-4: QC TEST FREQUENCY

Test #	Test Description	Specific detector	Power on	Beginning of Day	Beginning & End of Day	1st Day of Project for each operator	1 Line per Grid or 100 ft. per Linear Mile
1	Equipment Warm-up		X				
2	Record Sensor Positions			X			
3	Personnel Test			X			
4	Vibration Test (Cable Shake)			X			
5	Static Background and Static Spike				X		
6	Azimuthal Test	Magnetometer Only				X	
7	Height Optimization					X	
8	6 Line Test					X	
9	Octant Test - (Heading Error Test)	Magnetometer Only				X	
10	Repeat Lines						X

5.7.2 Equipment/Electronics Warm-up

Equipment/electronics warm-up will be conducted to minimize sensor drift due to thermal stabilization. Most instruments need a few minutes to warm up before data collection begins. Operators will follow the manufacturer’s instructions or, if none are given, observe the data readings until they stabilize. Typically five (5) minutes will suffice.

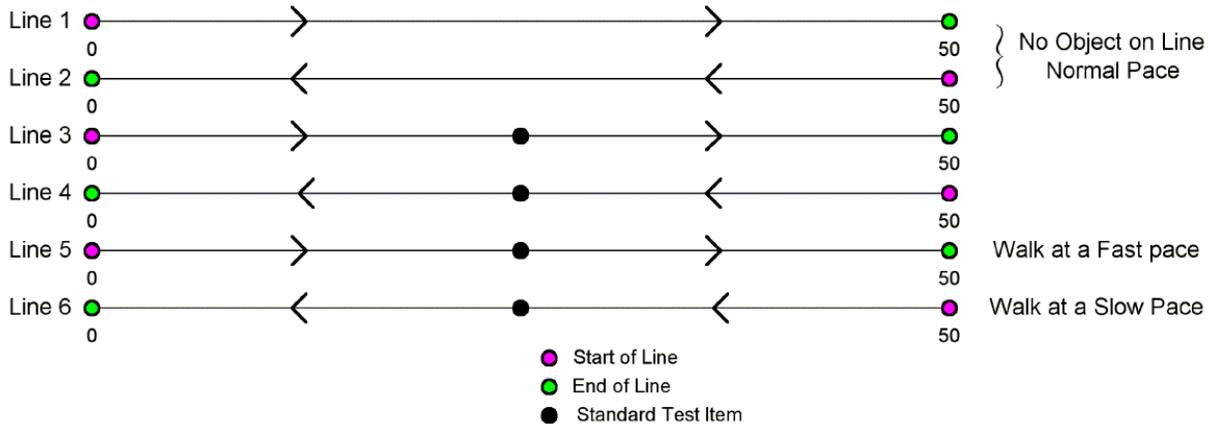
5.7.3 Record Relative Sensor Positions

The purpose of recording relative sensor positions is to document relative navigation and sensor offsets, detector separation, and detector heights above the ground surface. This will ensure that detector offset corrections can be done correctly and that the surveys are repeatable. Acceptance criteria of +/- 20 cm will be used.

5.7.4 Personnel Test

A personnel test will be conducted to ensure survey personnel have removed all potential interference sources from their bodies/clothing. Common interference sources are ballpoint pens in the operator’s pocket and steel-toed boots or large

FIGURE 5-3: SIX LINE TEST



5.7.9 Repeat Data

To determine positional and geophysical data repeatability, one line approximately 30 meters in length will be repeated after the survey. This repeat line should have the test standard placed at approximately the halfway point in an area lacking anomalous responses. The repeat line will be located parallel to the direction of travel.

When viewed in profile and compared to original data, repeat data provides a means of evaluating the ability of the instrument to respond consistently and evaluates the positional accuracy of the data. Errors in positional repeatability outside acceptable tolerances indicate a problem in the method of navigation or navigational equipment operation. Errors outside acceptable tolerances for the amplitude repeatability response indicate a problem in the detector system or in the ability of the operator to perform an adequate survey. Repeatability of response amplitude +/-20% and positional accuracy +/- 20 cm will be used.

5.8 Seeding

Geophysical background data will be processed in the expanded area to verify that the GPO is free of metallic anomalies. Any anomalies that can't be positively identified will be marked with a pin flag and avoided. Holes will be dug and ordnance items will be placed, marked with an identification tag, and buried according to Table 5-2a. The center and the ends of larger horizontal ordnance will be surveyed using Trimble 5800 or 5700 GPS System. Simulates will consist of pipes that represent UXO items. After the seeded items have been buried and surveyed, the GPO will be geophysically surveyed using the following methods.

5.8.1 EM61 MK2

The Geonics EM61 MK2 is a Time Domain Electromagnetic (TDEM) system. The EM61 MK2 generates 16 electromagnetic (EM) pulses per second and

measures during the off time between pulses. After each pulse, secondary EM fields are induced briefly in moderately conductive soils and for a longer time in metallic objects. Between each pulse, the EM61 MK2 waits until the response from the conductive earth dissipates and then measures the prolonged buried metal response. This response is recorded in mV. The EM61 MK2 measures multiple time gates (216, 366, 660, and 1266 msec) to provide a more complete measurement of the response decay rate. The MK2 can record up to 16 records per second with 4 time gates per record. If the top coil is used, one time gate is eliminated.

For the EM61 MK2 single metal detector with GPS or “Wheel Mode”, data will be initially collected at 20 cm intervals or better, using all four bottom coil time gates, along the grid using .8 meter line spacing. The above settings will be adjusted as needed to improve data quality and to meet DQOs (Data Quality Objectives).

The purpose of the GPO is to develop data quality objectives (DQOs) for the survey, including a DQO for line spacing. Therefore, the GPO will establish if a line spacing of 0.8 meters is optimum.

5.8.2 EM61 MK2 Towed Array

The towed array will be used in three-sensor format using the proven Mag LogÒ collection software pulled by a John Deere Gator. Data will be collected at a minimum of 6 readings per second, at speeds less than 3 mph, using GPS, along lines spaced three meters apart or less. ATI will use all four-bottom coil time gates for both wheel and towed array collection. The above settings will be adjusted as needed to improve data quality and to meet DQOs (Data Quality Objectives). An additional DQO will be developed to establish a noise to speed metrics. Collection of data at different speeds over 3 or more inert items will be compared to the false positive ratio and reported in the GPO report.

5.8.3 Analog Handheld Detector (Explorer II)

The Minelab Explorer II will be used for the “detect and flag” investigation. This handheld detector is capable of detecting subsurface ferrous and non-ferrous metals. The Minelab Explorer II can be ‘trained’ to recognize an item at different depths and orientation by expanding the stored library of the known items. Also, the Explorer II has the sophistication to output three types of signals to indicate whether the item found is equivalent to the one the instrument has been trained for or whether the found item is smaller or a larger. The Explorer II also indicates on the control panel whether the item found was a ferrous or a non-ferrous item and the estimated depth to the item. The Explorer II uses an enhanced approach to elimination of ground mineralization via advanced digital filtering.

The EM61 MK2 will be used to collect a profile over each anomaly that is detected with the Minelab Explorer II in open areas, if this confirmation is necessary.

5.8.4 Positioning Instrument (GPS)

The Trimble 5800 or 5700 system will be used during data collection for precise navigation. The GPS accuracy will be checked by verifying position dilution of precision (PDOP) or horizontal dilution of precision (HDOP) and two (2) known GPS points daily before data collection. If the GPS reading is more than 20cm different than one of the known points, data will not be collected until more satellites are available and the accuracy is within 20 cm. If during the data processing stage, an error of more than 20cm is observed, the data will fail QC and the on-site QC and/or Corporate QC Manager will perform corrective QC action. Mission Planner 4.10 software will also be used to check satellite availability to ensure quality positional data.

5.9 Data Collection Variables

During the GPO process, data will be collected, analyzed, and the same equipment used as planned for field use. Some of the collection variables that may be subject to modification include:

- 1) Instrument orientation
- 2) Direction of travel
- 3) Instrument channel selections
- 4) Measurement interval along survey line
- 5) Lane width (1 meter line spacing will also be collected over 10 percent of the grid in areas where there are approximately three or more seeded items.)

5.10 Data Analysis and Interpretation

The primary geophysical data processing and interpretation software will be: Dat61®, Mag Log®, and Oasis Montaj® (Geosoft®) with the UX-Detect extension. Geophysical data processing will include the following procedures:

- 1) Lag corrections
- 2) Normalization or leveling (removal of background)
- 3) Gridding of data
- 4) Selection of anomaly picks (above an appropriate threshold) approved by CEHNC geophysicist
- 5) Preparation of geophysical maps and target maps
- 6) Raw data provided to CEHNC geophysicist

Raw data files will be provided to CEHNC geophysicist within 36 hours of data collection or sooner, in accordance with DID OE-005-05.01. Final draft data sets will be also provided before demobilization of the site. ATI may change some of the final data to maximize detection and positioning accuracy. ATI will try to provide this data within 36 hours but may need additional time to determine new techniques and correction of problems. The final data will be provided in the GPO report.

5.11 Reacquisition

ATI will perform anomaly reacquisition and verification with the Trimble 5800 or 5700 and Explorer II when the ATI geophysics manager or supervisor has published the Anomaly Investigation (dig) Sheet. All measurements after reacquisition will be recorded on the dig sheet and provided to CEHNC. If during the reacquisition stage, an error of more than 1m radius is observed from the mapped location to the buried location, the data will fail QC and the on-site QC and/or Corporate QC Manager will perform corrective QC action.

5.12 Data Evaluation

The geophysical data will be scored so that different geophysical approaches can be compared and ranked. Geophysical scoring will included the following:

- 1) Percent of seeded items detected
- 2) Number of unknown targets
- 3) Production rate
- 4) Cost per unit area
- 5) Equipment durability
- 6) Safety
- 7) Reacquisition analysis
- 8) False positive analysis

ATI will evaluate the results of each detector and will determine which approach is likely to be most efficient for the site. This evaluation will be presented in the GPO Report.

5.13 GPO Letter Report

A GPO report will be submitted upon completion of the GPO. Geophysical mapping data will be provided in accordance with DID OE-005-05A.01 and will include the following:

- 1) As-built drawing of the GPO plot
- 2) Pictures of seeded items
- 3) Color maps of the geophysical data
- 4) Summary of GPO results
- 5) Proposed geophysical equipment, techniques, and methodologies
- 6) Supporting information to justify the project team's recommendations.
- 7) CD containing: raw and processed data, seed item location spreadsheet, spreadsheet of picked anomalies for each system type, and spreadsheet of all survey points

ATI will not proceed with field operations until the government approves the GPO results.

GEOPHYSICAL INVESTIGATION PLAN MAY BE MODIFIED AND UPDATED UPON COMPLETION OF THE GPO.

6.0 GEOPHYSICAL INVESTIGATION PLAN

6.1 General Information

6.1.1 This Geophysical Plan describes in detail the approach, methods, and operational procedures ATI will use to collect geophysical data to identify anomalies potentially related to OE. Specifically, this Work Plan documents the site-specific application of the geophysical sensors, navigation equipment, data analysis, data management, and associated equipment and personnel in a manner capable of meeting data quality objectives for project performance goals. The CEHNC authorized this geophysical task under Contract DACA87-00-D-0035, Task Order 0024. This plan was developed in accordance with DID OE-005-05.01.

6.1.2 Site Description

6.1.2.1 The Makawao Gunnery Site is a former USMC artillery impact area. Land for the site was obtained via a license with the East Maui Irrigation Company (Parcel 7; 897.8 acres) and the C.K.C. Rooke Estate (Parcel 16; 104.2 acres) on April 7, 1944. On December 14, 1945, the license was cancelled. A&B Properties, Inc., which manages East Maui Irrigation Company, Ltd. (EMI) property, does not have a copy of the license or any other information pertaining to the use of the site by the USMC. Naval Facilities Engineering Command, Pacific Division records indicate that the actual licenses and agreements were destroyed in the early 1970's when the Naval Facilities Engineering Command, Pacific Division, Real Estate Office relocated (USACE, 1997). For this reason, the history of the Makawao Gunnery Site cannot be confirmed with high degree of certainty. EMI currently leases the property for cattle grazing.

6.1.2.2 The Makawao Gunnery Site was used as a firing range and maneuver training area for the USMC for 1-1/2 years during World War II. During the site walk-thru conducted as part of the Inventory Project Report (INPR), a 105mm HE projectile was observed (USACE, 1997). Depressions in the ground surface that could possibly be bomb craters were also observed. Personnel working for the East Maui Irrigation Company, Ltd. have stated that during plowing activities, "smoke bombs" have been uncovered (USACE, 1997).

6.1.2.3 USN records pertaining to the Opana Point Bombing Range indicate the lease on this property was cancelled on May 10, 1946. Between 1946 and 1978, property ownership is unclear because no records were found to document the transfer of land from the DOD to the landowners of the property surrounding the site; i.e., Libby, McNiell, and Libby (USACE, 1992). The Amfac Property Investment Corporation, Kaanapali, Island of Maui, Hawaii acquired the project site in 1978 and leased the property to the Maui Land and Pineapple Company, Inc. In 1981, pineapple cultivation, through the Maui Land and Pineapple Company, Inc., started on the project site (USACE, 1992). Currently, the site is not utilized for pineapple production. The Opana Point Properties Company purchased the site

in September 2000 and has developed plans to construct a residential development on the property.

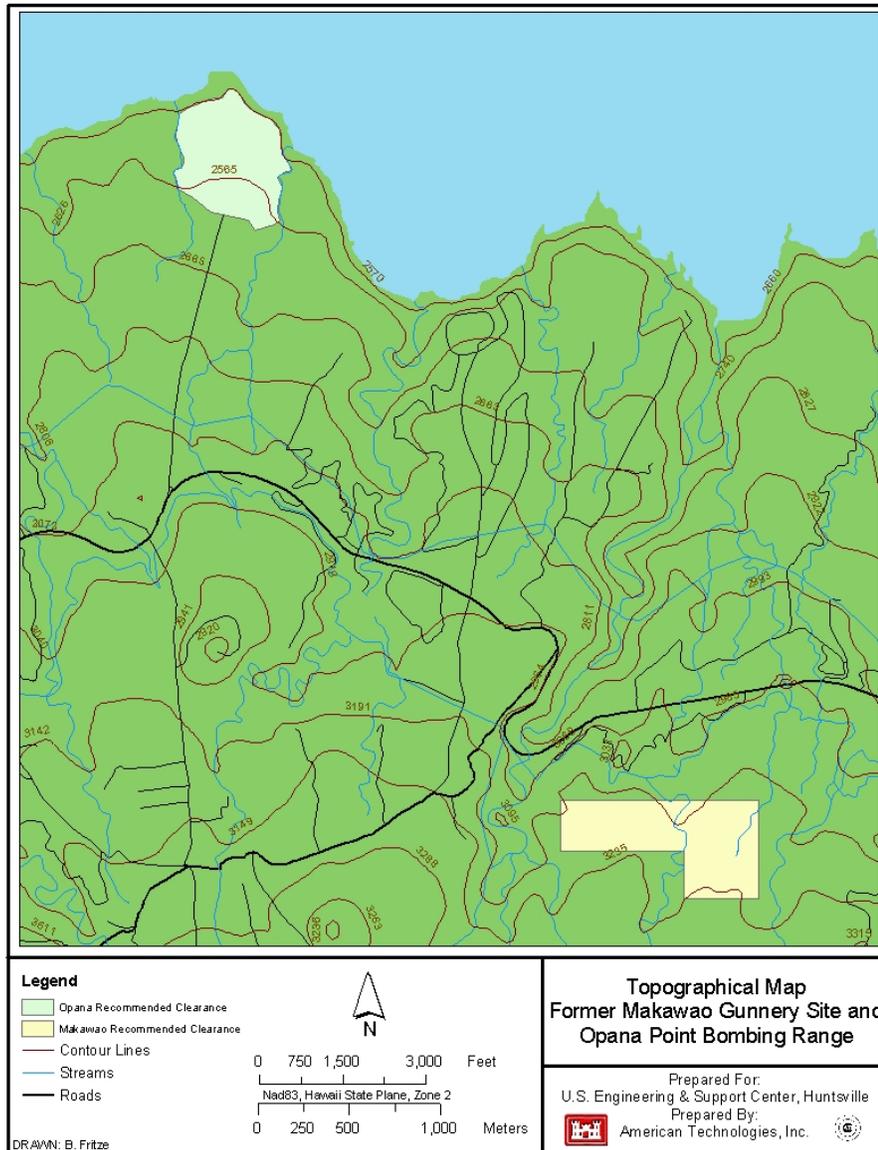
- 6.1.2.4 The site was used as a USN bombing range during World War II until as late as May 10, 1946. Limited surface sweeps conducted in April and June 1990 found several AN-Mk 23 3-pound practice bombs (USACE, 1992). In addition to these practice bombs, large metal fragments and what appeared to be bomb craters were also observed on site. This indicates that the site may have been used as a live bombing range or an ordnance disposal site (DEI, 1990).
- 6.1.3 Data Quality Objectives
 - 6.1.3.1 The Geophysical Data Quality Objectives are to perform a geophysical survey in conjunction with an OE removal action in accordance with the data quality objectives outlined in the in DID OE-005-05.01. Daily quality control tests will be conducted in accordance with the table in attachment B of the DID. Additional requirements outlined in the SOW and as a result the GPO, will be followed.
- 6.1.4 Specific Areas to be Investigated
 - 6.1.4.1 The project area consists of the Makawao Gunnery Site and Opana Point Bombing Range at Maui, Hawaii. A topographic site map is included as Figure 6-1. Task 8a covers the 90 acres defined in the EE/CA Report for the Former Opana Point Bombing Target Area. Task 8b covers the 100 acres of area defined in the EE/CA Report for the Makawao Training Area.
- 6.1.5 Past, Current, and Future Use
 - 6.1.5.1 Currently, the Makawao Gunnery Site is used for cattle grazing. According to the property owner, East Maui Irrigation Company, Ltd., they wish to continue to use the land for that purpose. Channels and other irrigation works including a small reservoir are also maintained on the property. The USGS accesses the site occasionally to monitor stream flow levels.
 - 6.1.5.2 Except for a portion along the seaward cliff line, almost all the Opana Point Bombing Range was, until recently, cultivated for the production of pineapples. According to the property owner, Opana Point Properties Company, plans are currently underway to develop residential housing on Opana Point.
- 6.1.6 Anticipated UXO types
 - 6.1.6.1 Anticipated UXO types are 105mm projectile, 81mm mortar, 4.5 inch rocket, Mark 23 Practice Bomb and 60mm mortar.
 - 6.1.6.2 At Opana point, Eight UXO items were recovered during the EE/CA field investigation, including two 60 mm mortars that have the potential to cause fatal injuries if detonated by an individual's activity. Additionally, numerous Mark 23 practice bombs and AN- MK5's have been discovered during previous investigations.

6.1.6.3 In the Makawao site, the EE/CA field investigation and other previous investigations recovered evidence of OE scrap, including 60mm mortars and a 4.5 in. barrage rocket. Surface and subsurface UXO items found during the EE/CA investigation include two 105mm projectiles, a 4.5 in. barrage rocket, and two 60mm mortars. These items have the potential to cause fatal injuries if detonated by an individual's activities or potentially being disturbed by livestock.

6.1.7 Depth Anticipated

6.1.7.1 Historical information and previous data indicates that UXO may be found at a depth of zero to 36 inches. Majority of the OE items in the Opana Point area, were found near or at the surface. Items found at the Makawao site were deeper in the ground possibly due to larger UXO size and lower soil density.

Figure 6-1 Topographic Site Map



6.1.8 Vegetation

6.1.8.1 Makawao is located at an elevation that receives a large amount of rain and fog drip during the year. The site contains dense tree/shrub vegetation in some locations, although there is some grassland areas throughout used for cattle grazing.

6.1.8.2 Opana Point is located along the shoreline and was used until recently as a pineapple farm. The site is currently covered by grassland and scrub vegetation.

6.1.9 Geologic Conditions

6.1.9.1 Geologic Setting

6.1.9.1.1 East Maui Volcano

6.1.9.1.1.1 The East Maui Volcano (Haleakala) is formed primarily by extrusive shield- and post-shield-stage lavas and secondarily by rejuvenated-stage volcanic rocks. Intrusive volcanic rocks in the form of dikes associated with rift zones and volcanic vents are oriented along three axes. The study area lies on the northern flank of Haleakala between the drainage basins of Maliko Gulch to the west and Makapipi Stream to the east (USGS, 1999a).

6.1.9.1.2 Geologic Units

6.1.9.1.2.1 Three geologic units are found in the study area: the main shield-building-stage Honomanu Basalt, formed mainly by thick accumulations of thin lava flows, the post-shield-stage Kula Volcanics, which consist mainly of lava flows that are many tens to hundreds of feet thick, and the rejuvenated-stage Hana Volcanics, which consist mainly of aa flows of several feet thick to several hundred feet thick where the flows were contained within the walls of previously eroded valleys (USGS, 1999a).

6.1.9.1.3 Extrusive Volcanic Rocks

6.1.9.1.3.1 Extrusive volcanic rocks consist mainly of lava flows that effused from fissures and vents. Most lava flows emerge from fissures as pahoehoe, characterized by smooth, ropy surfaces, and can change to aa as they advance down slope. Pahoehoe flows generally dominate near the rift zones of volcanoes, whereas aa flows dominate farther down the flanks.

6.1.9.1.4 East Maui Volcano

6.1.9.1.4.1 Haleakala was built by eruptions principally from three rift zones and a presumed central vent. Rocks formed from the main shield-building stage of the volcano are known as the Honomanu Basalt and consist of tholeiitic basalt found as thick accumulations of thin lava flows and associated intrusive rocks and rare pyroclastic deposits. The end of the shield-building stage of the volcano has been estimated to be between 0.93 and 0.97 million years ago on the basis of

potassium-argon age dating (Chen and The Kula Volcanics), which overlies the Honomanu Basalt, consists of post-shield-stage lava flows of hawaiiite with some ankaramite and alkalic basalt and associated intrusive rocks and pyroclastic and sedimentary deposits. The Kula Volcanics is estimated to be 0.36 to 0.93 million years old with many of the oldest rocks having chemical compositions transitional from the shield- to post-shield-stage lava. Exposures from this transitional phase are 50 to 100 ft thick and are commonly difficult to characterize as belonging to either the Honomanu Basalt or the Kula Volcanics. In some places the two units are separated by a thin red soil layer that has been altered by the weight and heat of the over-lying flows. The Kula Volcanics almost completely covers the underlying Honomanu Basalt and exposures range from 2,500 ft thick near the summit to 50 to 200 ft thick near the coast. Individual lava flows average about 20 ft in thickness near the summit and 50 ft near the periphery, but flows as much as 200 ft thick are not rare. The usual dip of the flows is about 10 degrees. The flows are thicker and narrower than the Honomanu Basalt and have more lenticular bedding because they filled swales and valleys eroded into the underlying Honomanu Basalt. Flows of the Kula Volcanics are exposed throughout most of the study area with the exception of the Keanae Valley floor, along the coast, and the area east of Kopiliula Gulch. This latter area is covered with flows of the Hana Volcanics (USGS 1999a).

6.1.9.1.5 Primary Rift Zones

6.1.9.1.5.1 Intrusive volcanic rocks include those rocks, such as dikes, that formed when magma cooled below the ground surface. Dikes associated with rift zones are the dominant intrusive rocks in Hawaiian volcanoes. Haleakala has three primary rift zones and the study area includes one of these, the north rift zone. Because of the relative youth of Haleakala, dike exposures are scarce and limited to the summit walls and the larger valleys. However, positive gravity anomalies extending from the summit to the northwest, southwest, and east, indicate the presence of dense, intrusive dikes beneath the ground surface. These gravity anomalies correspond to the locations of typical rift-zone surface features such as cinder, spatter, and pumice cones.

6.1.9.1.6 North Rift Zone

6.1.9.1.6.1 The north rift zone of Haleakala appears to be about 3 mi wide near the coast and could be greater than 5 mi wide at 4,000 ft altitude on the basis of the cinder and spatter cones that are in two parallel and roughly linear patterns.

6.1.9.2 Shallow Groundwater Conditions

6.1.9.2.1 Rift Zone Permeability

6.1.9.2.1.1 The rift zones are hydrologically important because dikes have low permeability and tend to impede the lateral movement of ground water. Ground-water levels in these low-permeability areas can be as high as several thousand feet above sea level.

6.1.9.3 Hydraulic Conductivity

- 6.1.9.3.1 The hydraulic conductivity of the Honomanu Basalt is estimated to be several thousand feet per day in the western part of the study area and less than one foot per day in the eastern part. No hydraulic conductivity estimates are available for the Kula or Hana Volcanics but the specific capacity estimates for wells in the Kula Volcanics are about four orders of magnitude less than average of specific capacity estimates for wells open to the Honomanu Basalt.
- 6.1.9.4 Precipitation
- 6.1.9.4.1 About 989 million gallons per day (MGD) of rainfall and 176 MGD of fog drip enters the study area with the highest rates between 2,000 and 6,000 ft altitude. Of the total precipitation, about 529 MGD enters the ground-water system as recharge. Average annual groundwater withdrawal from wells is only about 3 MGD; proposed additional withdrawals in the Haiku area total about 18 MGD. Tunnels and ditches in the eastern part of the study area remove at least 10 MGD from the groundwater system (USGS, 1999a).
- 6.1.9.5 Stream Flow
- 6.1.9.5.1 The drainage pattern of the stream valleys on east Maui is radial and the streams in the study area drain to the north. Stream flow consists of runoff, base flow and in some cases, flow added to streams from the network of irrigation ditches that cross the study area. Only five streams where flow is recorded by USGS surface water gauging stations have gone dry during the respective period of records for each site (USGS, 1999a). Three of these five sites are at altitudes higher than 2,800 ft and the other two are on the most western stream of the study area. Streams continue to flow during periods of very low rainfall indicating that a significant groundwater source exists upstream of the gauging stations.
- 6.1.9.5.2 The total amount of average annual stream flow in the gauged stream sub basins upstream of 1,300 ft altitude is about 255 MGD and the total amount of average annual base flow is about 62 MGD. Six major surface water diversion systems in the study area have diverted an average of 163 MGD of stream flow (most of which is base flow) for irrigation and domestic supply in central Maui during 1925–97.
- 6.1.9.6 Fresh Ground Water
- 6.1.9.6.1 Fresh ground water is found in two main forms: (1) as a high-elevation saturated zone in relatively low-permeability geologic layers above an unsaturated zone, and (2) as a lower-elevation freshwater-lens system underlain by denser saltwater.
- 6.1.10 Geophysical Conditions (Background Gradients)
- 6.1.10.1.1 The basaltic lavas and their derived soils contain large amounts of magnetite and other iron-rich minerals. This can cause significant variations in the background magnetic response across both the Opana Point and Makawao sites, making the use of magnetic detection methods difficult. The EM techniques, which will be used, are less affected by variations in the magnetic background than are magnetic techniques. A phenomenon known as super-paramagnetism, which has

been documented in some areas of the Hawaiian Islands, can affect EM techniques. This effect can occur when lateritic soils are developed on mafic rocks, such as basaltic lavas. Especially reactive surface areas were observed in the compacted dirt roadways during the EECA.

6.1.11 Site Utilities

6.1.11.1 There are no known utilities on-site that would interfere with geophysical data collection.

6.1.12 Man-Made Features

6.1.12.1 There are no major man-made features located on-site that would interfere with geophysical data collection at the Opana Point and Makawao sites. Furrows from plowing at Opana Point may contribute to increased background noise in the EM data due to the rough surface created. At Makawao, barbed wire fences and ditches may cause some minor obstructions to data collection.

6.1.13 Site Specific Dynamic Events (Tides, Strong Winds)

6.1.13.1 The site is situated on open grasslands and in rolling hills. Strong coastal winds can blow through the area at times. Winds are not anticipated to have an impact on geophysical data collection.

6.1.14 Overall Site Accessibility and Impediments

6.1.14.1 Access to Makawao is via the Hana Highway, which lies to the north of the site. There are a small number of roads and trails that lead onto the property. Several of the trails are narrow and steep and it can be difficult to maneuver safely on them. Access the Opana Point is via the Hana Highway, which lies to the south of the site. One road leads onto the property. This road is passable and should not inhibit site work. Care should be taken in the event of significant rainfall due to possible muddy conditions that could effect vehicle movement.

6.1.15 Potential Worker Hazards

6.1.15.1 Potential hazards that may affect surveying activities are trips and falls due to the irregular surface and occasional slopes. Thunderstorms occur year-round and lightning can be a hazard. The cliff located along the northern portion of Opana Point appears to be unstable and can be very dangerous. All site workers will avoid the area within 25 feet of the cliff.

6.2 Geophysical Investigation

6.2.1 Survey Type

6.2.1.1 As many as three different geophysical methods may be used for detection of UXO.

- Single EM-61 MK2 with GPS or “Wheel Mode”
- EM-61 MK2 Towed Array (3 sensors) with GPS.
- Minelab Explorer II (analog mode)

- 6.2.2 Equipment
 - 6.2.2.1 EM-61 MK2
 - 6.2.2.1.1 The EM-61 MK2 is a Time Domain Electromagnetic (TDEM) system. The EM-61 MK2 generates 16 electromagnetic (EM) pulses per second and measures during the off time between pulses. After each pulse, secondary EM fields are induced briefly in moderately conductive soils and for a longer time in metallic objects. Between each pulse, the EM-61 MK2 waits until the response from the conductive earth dissipates and then measures the prolonged buried metal response. This response is recorded in millivolts (mV). The EM-61 MK2 measures multiple time gates (216, 366, 660, and 1266 usec) to provide a more complete measurement of the response decay rate. The EM-61 MK2 can record up to 16 records per second with four (4) time gates per record. If the top coil is used, one time gate is eliminated.
 - 6.2.2.1.2 For the Geonics EM-61 MK2 single metal detector with GPS or “Wheel Mode”, data will be collected at 20cm intervals or better along the grid using .8 meter line spacing. ATI will collect data from all four possible time gates using the bottom coil.
 - 6.2.2.2 EM-61 MK2 Towed Array
 - 6.2.2.2.1 The towed array will be used in three-sensor format using the proven Maglog or Geomar Multi61 software pulled by a John Deere Gator. Data will be collected along lines spaced approximately 2.5 to 2.8 meters apart, depending on terrain, so that no data collection will exceed a line spacing of 3 meters or be less than 2.5 meters. Data gaps will be subsequently filled in after initial data processing if needed. A minimum of 6 readings per second, at speeds less than 3 mph using GPS will be used to collect geophysical data and the determining factors concluded after the completion of the GPO. ATI will use four-bottom coil time gates for both wheel and towed array collection.
 - 6.2.2.3 Minelab Explorer II
 - 6.2.2.3.1 The Minelab Explorer II will be used for the “detect and flag” investigation. This hand held detector is capable of detecting subsurface ferrous and non-ferrous metals. The Minelab Explorer II can be ‘trained’ to recognize an item at different depths and orientation by expanding the library of the known items stored. Also, the Minelab Explorer II has the sophistication to out-put three types of signals to indicate whether the item found is equivalent to the one the instrument has been trained for and whether the found item is smaller or a larger. The Minelab Explorer II also indicates on the control panel whether the item found was a ferrous or a non-ferrous item and the estimated depth to the item. The Minelab Explorer II uses an enhanced approach to elimination of ground mineralization via advanced digital filtering.
 - 6.2.2.3.2 The EM-61 MK2 will be used to collect a profile over each anomaly that is detected with the Minelab Explorer II in open areas (if this confirmation is necessary) and discriminate anomalies in data interpretation.

- 6.2.2.4 GPS System
 - 6.2.2.4.1 The Trimble 5800 RTK GPS or Trimble 5700 RTK GPS will be used during data collection for precise navigation. The GPS accuracy will be checked by verifying position dilution of precision (PDOP) or horizontal dilution of precision (HDOP) and a known GPS point will be checked daily, before data collection. If the GPS reading is more than 20cm different than the known point, data will not be collected until more satellites are available and the accuracy is within 20cm. Mission Planner® 4.10 software will be used to check satellite availability.

- 6.2.3 Procedures
 - 6.2.3.1 Geophysical EM-61 MK2 or Towed Array data will be collected after boundary stakes have been placed to define the area designated for investigation. Daily QC tests will be performed in accordance with OE-005-05.02 Attachment A. Geophysical data will be downloaded and transferred to ATI's office. ATI will prepare a detailed map and Anomaly Investigation Report (dig sheet) depicting the northing and easting location of all anomalies that meet the identification criteria of potential ordnance items for this site. Each grid anomaly will be assigned a unique reference number for field reacquisition and excavation. Grid corners will only exist in an electronic format with grid identification appearing on the ground via anomaly flag markings.

- 6.2.4 Personnel
 - 6.2.4.1 A qualified geophysicist who meets or exceeds the qualification requirements listed in DID OE-025.01 will manage all geophysical activities. Specific field activities, such as setting up grids, data collection, and reacquisition, shall be supervised by a person well trained in geophysical operations and certified by ATI's geophysicist. UXO-qualified personnel who meet or exceed the qualification requirements listed in DID OE-025.01 will perform all excavation activities.

- 6.2.5 Production Rates
 - 6.2.5.1 It is anticipated that approximately 1.5 to 8 acres of geophysical data will be collected and processed daily. Geophysical data will be processed after the day of collection or as soon as possible.

- 6.2.6 Data Spatial Density
 - 6.2.6.1.1 The Single EM-61 MK2 survey will be performed by collecting data at intervals of approximately 20 cm along lines spaced ~0.8 meter apart. For the Towed Array, data will be collected along lines spaced approximately 2.5 to 2.8 meters apart, depending on terrain, so that no data collection will exceed a line spacing of 3 meters. Data gaps will be subsequently filled in after initial data processing if needed. A minimum of 6 readings per second, at speeds less than 3 mph using GPS will be used to collect geophysical data. ATI will use four-bottom coil time gates for both wheel and towed array collection.

6.3 Instrument Standardization

6.3.1 Data Processing

6.3.1.1 Data recorded in the geophysical instruments will be downloaded to processing computers and copied to storage media for backup purposes. Once copied to the processing computers, the data will be imported to Geosoft, Oasis Montaj, which is a geophysical data processing and mapping software package created by Geosoft, Inc. This software package will be used to process, analyze, and present the findings of the geophysical surveys. The processing and analysis consisted of applying standard corrections to the data and producing color contour maps for the purposes of interpreting the data.

6.3.1.2 The data analyses performed by the project geophysicist or data processor will focus on identifying anomaly responses that could be associated with individual anomalies that represent UXO or OE. These interpretations will be compared with historical and site information that includes: past and current buildings/structures, and utilities.

6.3.2 Initial Field Processing

6.3.2.1 Geophysical data will be downloaded with Dat61[®] and Geometrics MagLog software and verified for completeness by the field geophysicist. Once data has been accepted, data will be electronically transferred to the ATI Geophysics Manager and data processors to review. The following will be performed during initial field processing:

- Collection location and site specific conditions on field notes
- Line numbers, survey direction, fiducial locations (if used), start and end points of field notes.

6.3.2.2 Standard Data Analysis

6.3.2.2.1 The primary geophysical data processing and interpretation software will be: Oasis Montaj[®] (Geosoft[®]) with the UX-Detect extension for the EM-61 MK2 and towed array. UX-Detect will first find large anomalies that may represent a UXO item. The data processor will then analyze the data to find smaller/difficult anomalies by reviewing each line profile and mapped data. The following will be performed during standard data analysis if necessary:

- Removal of spikes and physical feature interference sources.
- Positional offset correction
- Sensor bias, background leveling and/or standardization
- Sensor drift removal
- Latency Correction
- Geophysical noise identification and removal (if possible).

- Gridding of data will be accomplished by using Geosoft and UX-Detect. Search criteria will be completed by manual interpretation of each profile and using UX-Detect.
- Geosoft Linear Transform Contour level selection for the EM61 MK2 will be approximately:
 - -5 minimum
 - 20 maximum
 - 0 Contour interval

- 6.3.3 Advanced Data Processing, Digital Filtering and Enhancement
 - 6.3.3.1 Advanced data processing is not anticipated for this task.
- 6.3.4 Anomaly Selection and Decision Criteria
 - 6.3.4.1 The threshold will be magnitude based on the GPO results. The Geophysics Manager will determine if additional suspicious or potentially valid anomalies require investigation. Completed Dig Sheets will be analyzed to revise the threshold cut-off values throughout the duration of the project with CEHNC's approval.
- 6.4 Dig Sheet Development**
- 6.4.1 Dig Sheets will be developed in accordance with DID OE-005-05.01 Attachment C.
- 6.5 Anomaly Reacquisition**
- 6.5.1 ATI will perform anomaly reacquisition with the same positioning equipment that was used during data collection. The Trimble 5800 or 5700 will be used once the Anomaly Investigation Sheet (Dig Sheet) has been developed/reviewed by the ATI Geophysics Manager. All measurements after reacquisition will be recorded on the dig sheet and provided to CEHNC. Due to the pinpoint ability and smaller sensor, Minelab Explorer II's will be used to relocate the anomalies. Instruments will be tested before daily use.
- 6.6 Feed-Back Process**
- 6.6.1 Completed Dig Sheets will be analyzed by ATI's geophysicists to potentially revise the threshold cut-off values throughout the project with CEHNC's approval. False positive anomalies will be carefully analyzed to verify the interpretation and excavation activities are being followed correctly. Due to the potential ground response, a higher than normal false positive ratio is expected.
- 6.7 Quality Control**
- 6.7.1 The following measures outlined in Attachment B of DID OE-005-05-01 will be implemented to insure the geophysical objectives are achieved.
 - 6.7.1.1 QC Steps/Tests
 - 6.7.1.1.1 The required equipment tests and frequency of testing are summarized in Table 6.1.

TABLE 6-1: TEST FREQUENCY

Test #	Test Description	Specific detector					
			Power on	Beginning of Day	Beginning & End of Day	1st Day of Project for each operator	1 Line per Grid or 100 ft. per Linear Mile
1	Equipment Warm-up		X				
2	Record Sensor Positions			X			
3	Personnel Test			X			
4	Vibration Test (Cable Shake)			X			
5	Static Background and Static Spike				X		
6	Azimuthal Test	Magnetometer Only					
7	Height Optimization						
8	6 Line Test					X	
9	Octant Test - (Heading Error Test)	Magnetometer Only					
10	Repeat Lines						X

6.7.1.2 Equipment/Electronics Warm-up

6.7.1.2.1 Equipment/electronics warm-up will be conducted to minimize sensor drift due to thermal stabilization. Most instruments need a few minutes to warm up before data collection begins. Follow the manufacturer’s instructions or, if none are given, observe the data readings until they stabilize, typically 5 minutes will suffice.

6.7.1.3 Record Relative Sensor Positions

6.7.1.3.1 The purpose of recording relative sensor positions is to document relative navigation and sensor offsets, detector separation, and detector heights above the ground surface. This will ensure that detector offset corrections and can be done correctly and that the surveys are repeatable. Acceptance criteria of +/- 12 inches will be used.

6.7.1.4 Personnel Test

6.7.1.4.1 Personnel test will be conducted to ensure survey personnel have removed all potential interference sources from their “bodies”. Common interference sources are ballpoint pens in the operator’s pocket and steel-toed boots or large metallic belt buckles, which can produce data anomalies similar to OE targets. All personnel who will be coming within close proximity of the sensor during survey operations must approach the sensor and have a second person monitor and record the results. Acceptance criteria of EM61 +/- 2mV

6.7.1.5 Vibration Test (Cable Shake)

6.7.1.5.1 The purpose of the vibration test is to identify and replace shorting cables and broken pin-outs on connectors. With the instrument held in a static position and collecting data, shake all cables to test for shorts and broken pin-outs. If shorts are found, the cable should be immediately repaired or replaced. After repair,

cables need to be rigorously tested before use. If the Data Profile exhibits data spike responses, the malfunctioning equipment must be replaced.

6.7.1.6 Static Background and Static Standard Response (Spike) Test

6.7.1.6.1 To quantify instrument background readings, electronic drift, locate potential interference spikes in the time domain, and determine impulse response and repeatability of the instrument to a standard test item, the operator will conduct a static background and static standard response (spike) test. A minimum of three minutes static background collection after instrument warm-up, followed by a 1-minute standard (spike) test followed by a 1-minute static background data will be performed. A standard 2" diameter steel trailer ball (Uniball - available from U-haul) will be used for the EM-61 MK2. The operator will monitor the readings to confirm their stability prior to continuing with the geophysical survey.

6.7.1.6.2 Acceptance Criteria: Static Background Test: EM61 +/- 2.5 mV (+/- 4 mV towed array). Static Spike Test: EM61 +/- 20% of standard item response, after background correction.

6.7.1.7 Six Line Test

6.7.1.7.1 This test will be performed in an area relatively clear of anomalous response that is 300 feet long. The test line will be well marked to facilitate data collection over the exact same line each time the test is performed. Background response over the test line is established in Lines 1 and 2. A standard test item, such as a steel trailer hitch ball or larger will be placed under each GX³ coil and be used for Lines 3 through 6. Repeatability of response amplitude, positional accuracy, and latency will be evaluated. ATI will use graphs with each line of the 6-line test plotted together on one graph to show results. Figure 6-2 shows the Six line Test. The acceptance criteria for this test are repeatability of response amplitude +/-20%, positional accuracy +/- 20cm.

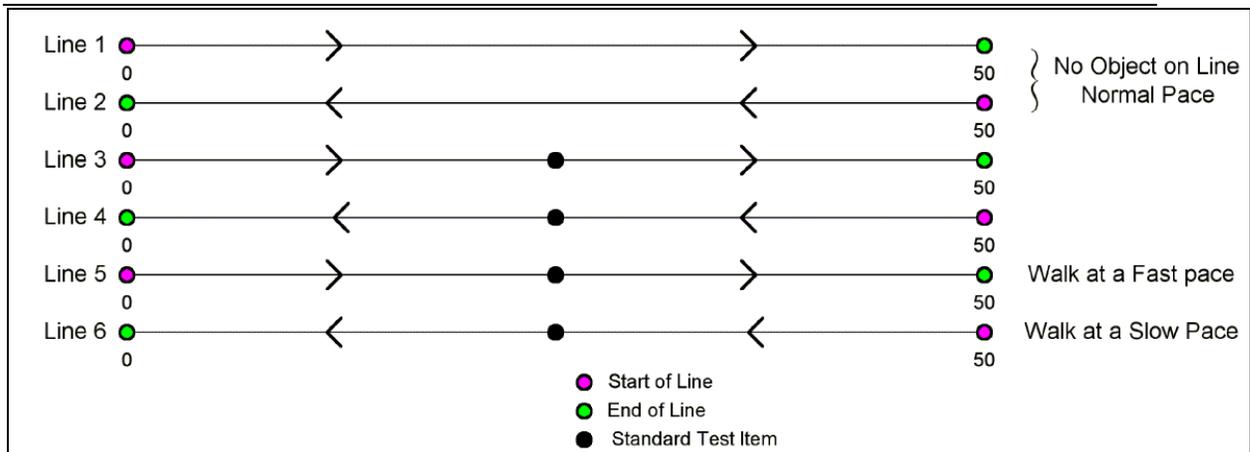


FIGURE 6-2: SIX LINE TEST

6.7.1.8 Repeat Data

6.7.1.8.1 To determine positional and geophysical data repeatability, the first line of each grid will be repeated after the survey. This repeat line should have the test standard placed at a known point in an area lacking anomalous responses and noted on the grid notes.

6.7.1.8.2 When viewed in profile and compared to original data, repeat data provides a means of evaluating the ability of the instrument to respond consistently, and evaluates the positional accuracy of the data. Errors in positional repeatability outside acceptable tolerances indicate a problem in the method of navigation or navigational equipment operation. Errors outside acceptable tolerances for the amplitude repeatability response indicate a problem in the detector system or in the ability of the operator to perform an adequate survey. Repeatability of response amplitude +/-20%, positional accuracy +/- 20cm will be used.

6.7.1.9 GPS Positioning Check

6.7.1.9.1 A GPS positioning test will be performed once in the morning (before data collection) and once in the afternoon (after data collection). The GPS check will be performed over a known point and be within 20cm. The test results will be recorded in the field notes. Geophysical data will not be collected until acceptable GPS accuracy can be achieved.

6.7.2 Corrective Measures

6.7.2.1 In the event that the geophysical QC investigation indicates the presence of an OE item, ATI will intrusively investigate and remove the anomaly. If the anomaly constitutes a QC failure, the entire search lane will be redone at no cost to the government. ATI shall provide full documentation to CEHNC detailing what failed the QA process, why it failed, and how the problem was corrected.

6.8 Records Management

6.8.1 All raw data files, final processed data files, hard copies, and field notes will be maintained for the duration of the project. ATI will place data on the FTP site transmit data to CEHNC within 36 hour of collection. All raw files will be available to CEHNC on-site representative for quality and/or control processing to assure the implemented field and data processing procedures within 36 hours of collection.

6.9 Interim Reporting

6.9.1 Geophysical mapping data will be provided in accordance with DID OE-005-05.01. As soon as practical after collection, the geophysical field data shall be provided in delineated fields as x, y, z, v(1), v(2), etc., for delivery to CEHNC. After completion of survey and processing activities, all final geophysical maps, dig-sheets and supporting geophysical interpretations shall be provided to CEHNC by e-mail or FTP site. Maps that display the geophysical anomalies with annotated, interpreted and identified physical features shall be delivered in .jpg or PDF compatible format.

6.10 Map Format

6.10.1 All Geophysical maps will be in accordance with DID OE-005-05.01 Attachment D.

6.11 Geophysical Investigation Goals

6.11.1 The geophysical investigation goal is to provide a defensible data set in support of the removal action at Makawao Gunnery Site and Opana Point Bombing Range at Maui, Hawaii by December 1, 2004.

6.12 OE Detection

6.12.1 The primary geophysical data processing and interpretation softwares will be: Oasis Montaj® (Geosoft®) with the UX-Detect extension for the EM-61 MK2 and towed array. A threshold cutoff magnitude will be determined by the GPO and as reacquisition and excavation data returns from the project to the Geophysics Manager. Completed Dig Sheets will be analyzed to revise the threshold cut-off values throughout the length of the project with CEHNC's approval. Maximum depth of detection is calculated as:

6.12.2 The Estimated Detection Depth (meters) = $11 * \text{diameter (mm)} / 1000$

7.0 LOCATION SURVEYS AND MAPPING PLAN

7.1 General

7.1.1 Site Specific Requirements

7.1.1.1 In accordance with the SOW and DID OE-005-07.01, this chapter describes the survey techniques, which ATI will utilize to perform the OE Removal Action at Makawao Gunnery Site and Opana Point Bombing Range, Oahu, Hawaii.

7.1.1.2 ATI will conduct Sub-surface clearance of approximately 190 acres.

7.1.1.3 All surveying of the boundary and internal grid corners will be performed using a centimeter grade DGPS system. All required surveying will be overseen and certified by a certified Hawaiian surveyor.

7.1.2 OE Safety Provisions

7.1.2.1 During fieldwork, ATI will use qualified UXO personnel to escort the survey crew.

7.1.2.2 The qualified UXO personnel will conduct visual surveys for surface ordnance. Prior to driving marking stakes in the area, the UXO escort will check the area using a metal detector.

7.1.2.3 The metal detectors will be checked against a 60mm Mortar (or item of similar size and mass) buried to a depth of six inches, on a daily basis to ensure the instrument is operating correctly.

7.1.3 Accuracy

7.1.3.1 ATI will establish horizontal control of "Class 1, Third Order" for all external boundary points. All coordinates will be in UTM and referenced to the North American Datum of 1983 (NAD83).

7.1.3.2 OE will be plotted to an accuracy of plus or minus one foot.

7.1.4 Plotting

7.1.4.1 All control points (i.e., boundary points), will be plotted on reproducible electronic maps at scales of 1:2400 (1" = 200').

7.1.5 Mapping

7.1.5.1 Maps shall be produced in accordance with the DID OE-005-007.01 for submission with the Removal Report. The location, identification and coordinates of all control points recovered and/or established at the site shall be plotted on reproducible electronic format. Each map will include a grid north, a true north, and a magnetic north arrow with the differences in degrees, minutes and seconds shown. Grid lines or tic marks, with their values shown on the edge of map will be provided. Grid corners, with appropriate UTM coordinates will be

shown on the map. The coordinates for OE will be plotted to an accuracy of one foot.

7.2 Digital Data

7.2.1 General Design File Requirements

7.2.1.1 An overall planimetric design file shall be created and digitized into an ArcView file at in accordance DID OE-005-007.01.

7.2.1.2 **Sheet Sizing and Formatting.** Each sheet shall be a standard metric A-1 size drawing. Each sheet shall have a standard border, revision block, title block, bar scale, legend, and grid lines or tic lay out in meters. Each sheet shall also contain a True North, a Magnetic North and a Grid North arrow.

7.2.1.3 **Data Manual.** All production and work files shall be fully documented into a concise data manual. The manual will be included as an ASCII file titled READ.ME and will be included with all distributed digital data. All digital data will be compatible with the USAESCH Graphics System.

7.3 Digital Format for Survey/Mapping Data

7.3.1 All data will conform to the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE).

7.3.2 **Sources and Standard:** Deliverable will be designed so that they will interface with other surveying firms, Government contractors and customers so that the final product will be usable with consistent CADD documents.

7.3.3 **Electronic Submittal:** Data will be submitted on PC CD-ROM.

7.4 Items and Data

7.4.1 Field Survey

7.4.1.1 ATI will provide, as required, original copies of all field books, grid layout sheets, computation sheets, abstracts, and computer printouts of the method used to establish grids and boundaries of the clearance activities for this project.

7.4.2 Control Point List

7.4.2.1 A tabulated list of all control points used for this survey shall be provided.

7.4.3 Aerial Photographs

7.4.3.1 There has been no task established for the taking of aerial photograph during activities under the SOW.

7.4.4 OE List

7.4.4.1 ATI shall provide a tabulated list of all OE/UXO items.

- 7.4.4.2 Report on Establishment of Survey Mark
- 7.4.4.3 A report on establishment of Survey Marks will be provided for any monuments installed for this project. Reports shall be as per DID OE-005-07.01.
- 7.4.5 Drawings and Digital Data
- 7.4.5.1 Drawings and digital data shall be submitted, in accordance with DID OE-005-07.01 and the SOW, with the Removal Report.

8.0 WORK, DATA AND COST MANAGEMENT PLAN

8.1 Work, Data, and Cost Management

8.1.1 Work Management

8.1.1.1 The SUXOS will be responsible for the day-to-day operations on-site. He will accomplish the tasks, outlined in the SOW, in a timely manner. The SUXOS duties are outlined in Chapter 2, Technical Management Plan.

8.1.1.2 The UXOQCS is the key person to insure management is conforming to established procedures and that work is completed in a timely manner. He will perform quality inspections of all work tasks as specified in Chapter 10, Quality Control Plan. Any nonconformance that cannot be immediately resolved on site will be elevated to the Project Manager (PM) and/or the QA/QC Manager.

8.1.2 Data Management

8.1.2.1 ATI will establish a data management system, which will provide data storage and transmission for the project. The digital data will be stored in database format on a secure server at the Oak Ridge location of ATI. Data transmission will take place through a secure, restricted access web site, which will provide user-friendly real time access to all survey data. Immediately after the data is posted, interpreters and the USACE will be notified by email that the data is available, and will be able to retrieve the data via the website. Interpretive results will also be posted as soon as they are completed. A visual tracking system will be posted on the web, which will indicate progress in the field, and what data is available. The website will be monitored on a daily basis. An archive copy of all data will be made on an as received basis. All data files can be retrieved on an as needed basis through custom queries on the web site by the ATI project team and the USACE.

8.1.2.2 Data will be collected from various operations on the work site and recorded on computer disks, in logbooks and on the various ATI, ATF, and DoD forms. Records of the limits of the areas mapped, and cleared, the type and location of OE encountered, and the disposition of OE will be recorded. The forms, logs and disks will remain in the ATI site office while portions of the data will be copied and sent to the PM for inclusion in reports that need to be submitted.

8.1.2.3 All data, whether electronic or paper, will be reviewed by the site UXOQCS.

8.1.3 Cost Management

8.1.3.1 The PM and SUXOS will control and manage costs through the use of Purchase Orders and Travel Orders. A record of expenditures will be kept by the SUXOS and monitored by the PM. The PM will, using an Excel Cost Tracking Program, monitor man-hours and monies used.

- 8.1.4 Schedule
- 8.1.4.1 Appendix K, Project Schedule presents a schedule containing task deliverables.
- 8.1.5 Cost Control and Tracking
- 8.1.5.1 The PM and SUXOS will control and manage cost through the use of Purchase Orders and Travel Orders. A record of expenditures will be kept by the Project SUXOS and monitored by the PM. The PM will, using an Excel Cost Tracking Program, monitor man-hours and monies used.
- 8.1.6 Recurring Deliverables
- 8.1.6.1 A Monthly Status Report shall be forwarded to the USACE Contracting Officer to arrive not later than the 10th calendar day of each month. The report will contain an OE Progress Summary and will include the status of all work completed during the previous month. The report will also contain Exposure Data required by EM 385-1-1, Section 01.D.04.
- 8.1.6.2 A Project Status Report will be submitted to the USACE Project Manager to arrive on the first working day of each week. The report will be prepared in accordance with DID OE-085.01.
- 8.1.6.3 A Draft Removal Report shall be submitted to the government not later than 30 calendar days following completion of fieldwork.
- 8.1.6.4 A Final Removal Report shall be submitted to the government not later than 21 calendar days following receipt of comments from the USACE Contracting Officer.

9.0 PROPERTY MANAGEMENT PLAN

9.1 The requirement of this chapter does not apply.

9.1.1 American Technologies, Inc. does not anticipate the use of Government Property during activities under this Task Order.

10.0 QUALITY CONTROL PLAN

10.1 QC Objectives

10.1.1 This section presents the project Quality Control Plan as required by the CEHNC Scope of Work (SOW). The QC procedures described in this section will be used for all work performed during the OE Removal Actions at the Opana Point bombing Range and Makawao Gunnery Site, Maui, HI. This site-specific QC plan is designed to manage, control, and document performance of work efforts in accordance with the CEHNC SOW to ensure quality throughout the execution of the tasks described therein. This QC Plan will achieve the following objectives:

- Identify QC procedures and responsibilities for OE removal actions.
- Ensure CEHNC notifications as required by the CEHNC SOW.
- Document the quality of work efforts via audits and independent staff reviews of deliverables.
- Ensure data integrity through implementation of data management QC procedures.
- Ensure the development of an appropriate ordnance accountability ledger and appropriate OE chain of custody and disposal.

10.2 Quality Policies

10.2.1 All of ATI services will be consistent with the public good and will meet all applicable laws and regulations.

10.2.2 Quality Management will be applied through all phases of a project - from the first time a potential customer calls, until the Final Report is accepted.

10.2.3 Emphasis will be placed on preventive actions.

10.2.4 All ATI employees and team members are empowered to identify and evaluate potential quality problem areas and are encouraged to recommend solutions or corrective actions.

10.2.5 The tasks outlined in the customer's scope of work will be fully evaluated and identified by ATI personnel.

10.2.6 Quality is Conformance to the Customer's Requirement!

10.2.7 ATI will staff all project sites with the best qualified, trained, available personnel, based upon their knowledge and prior experience with the type of operations and hazards expected to be encountered. The minimum qualifications will meet or exceed the customer's requirements.

- 10.2.8 All ATI personnel will be provided with all of the information necessary to accomplish their assigned tasks in a safe, responsible, cost-efficient manner and they will be held accountable for the quality of their work.
- 10.2.9 ATI personnel will be provided with a USACE Contracting Officer approved Work/Safety and Health Plan prior to the performance of any UXO-related activities on a project site.
- 10.2.10 ATI will provide and maintain an inspection system that is acceptable to the customer.
- 10.2.11 ATI will take corrective actions on any complaint, quality defect, or audit of operations.

10.3 Definitions

- Clearance Standard - a specified size of UXO to a specified depth.
- Customer/Client - refer to the term “Purchaser” for Government contracts.
- Government Representative - an on-site Government employee with specified responsibilities and authority.
- Nonconformance:
 - A minor nonconformance is not likely to materially reduce the usability of the services. It is generally a departure from the approved procedures that has little bearing on the end-product.
 - A major nonconformance is likely to result in failure of the services or to materially reduce the usability of the end-product.
 - A critical nonconformance is likely to result in hazardous or unsafe conditions for individuals using or depending upon the services.
- Purchaser: When used in the Quality Systems definitions of U. S. Government contracts, the term purchaser shall refer to the body of the Government Agency administering the particular contract involved, or the authorized representative of that Government body.
- Quality Conformance Inspections: Normal inspections/audits conducted by authorized ATI personnel during the accomplishment of the organization’s mission to determine conformance to contract requirements.
- Quality Control: The process by which ATI manages, controls, and documents its activities in the accomplishment of the mission.
- Quality Defect: A nonconformance issue with published policy and/or a contractual requirement that requires corrective action(s).

- **Quality Management:** All those control and assurance activities instituted to safely and effectively accomplish the assigned mission.
- **Root Cause:** The basic reason for an undesirable condition or problem which, if eliminated or corrected, would have prevented it from existing or occurring.
- **Stop-Work-Authority:** The right and obligation to stop all work when serious quality or safety concerns arise.
- **Subsurface Clearance:** Locating and removing UXO that are not visible or not partially visible on the surface, requiring the use of geophysical detection equipment, to the clearance standard.
- **Surface Clearance:** Locating and removing UXO that are visible on the surface, or partially visible. This includes items that are partially exposed, which will require only minimal hand excavation to determine identification.
- See FAR Part 2.1 for additional definitions.
- **Associated Material.** The customer's scope of work will be reviewed to determine if specific references are required, in addition to, or in lieu of, the following:
 - Safety Concepts and Basic Considerations for Unexploded Ordnance Operations, USAESCH, February 16, 1996
 - Work Standards for Ordnance Response, USAESCH, October 25, 1994
 - *DoD Manual 4160.21.M, Defense Material Disposition Manual*
 - *DoD Manual 4160.21-M-1, Defense Demilitarization and Trade Security Control Manual*
 - DoD Manual 6055.9-STD, Ammunition and Explosive Safety Standard
 - AR 200-1, Environmental Protection and Enhancement.
 - AR 385-10, The Army Safety Program
 - AR 385-40, Accident Reporting and Records with USACE Supplement
 - AR 385-63, Policies and Procedures for Firing Ammunition for Training, Target Practice and Combat.
 - AR 385-64, Ammunition and Explosive Safety Standards.

- Government-Furnished Technical Manual 60-series.
- EM 385-1-1, USACE Safety and Health Requirements Manual
- ATI Division Program for Quality Assurance/Quality Control
- *Root Cause Analysis, A Tool for Total Quality Management*, by Wilson, Dell, and Anderson
- ATI Standard Operating Procedures

10.4 QC Responsibility

10.4.1 ATI is solely responsible for the control of product quality. Only those products/services that conform to contractual requirements will be offered to the Government for acceptance.

10.5 Quality Management

10.5.1 The Project Manager has the responsibility of ensuring that QC procedures are implemented in accordance with the CEHNC Scope of Work.

10.5.2 The QA/QC Manager will provide the Quality Management oversight for the project. The QA/QC Manager is a part of the project team, but is authorized to elevate any quality problems that cannot be resolved by the project team. The QA/QC Manager interacts with the Project Manager, SUXOS, UXOQCS, subcontractor QC staff, as appropriate, and USACE OE Safety Specialist personnel to prevent and/or correct problem situations, as necessary. Vendors and subcontractors will be monitored to assure that they supply items and services, which meet ATI's Quality Assurance requirements. Periodic audits will be performed to verify that the quality system and the UXOQCS are performing as required. He also ensures that:

- Required site training is conducted prior to the start of field activities.
- The UXOQC Specialist is qualified and trained.
- Quality controls are built into the Project Work Plan to support the OE removal action.
- The requirements of the Quality Control Plan are adhered to.

10.5.3 Effective day-to-day field QC management is delegated to the on-site ATI UXOQCS. He will interact daily with the project team to ensure that all QC procedures presented in the Project Work Plan are followed in the accomplishment of all project tasks. The UXOQCS reports directly to the QA/QC Manager. Scheduled activities are coordinated with the Project Manager, SUXOS, UXO Safety Manager, and all other project team members as needed. He has the authority to:

- Initiate action to prevent the occurrence of nonconformance's relating to the provided services.
- Identify and record any problems relating to the services.
- Initiate, recommend or provide solutions through the on-site management channel.
- Verify the implementation of solutions.
- Control further actions of any nonconforming services until the unsatisfactory conditions have been corrected.
- Elevate Quality concerns, which cannot be resolved on-site to the Quality Manager.

10.5.4 All project team members are responsible for and will be held accountable for the quality of their work. Every team member has Stop-Work-Authority when an immediate safety situation is observed which could cause personal injury or damage to property and equipment. All project team members are encouraged to identify potential quality problems and are encouraged to suggest solutions or corrective actions to ensure all work conforms to the approved work plan and Quality Assurance requirements. During site-specific training, personnel will be briefed by the QA/QC Manager or the UXOQCS, on the importance of quality work and the above stated requirements. This briefing is aimed at insuring that all site personnel understand ATI's dedication to quality.

10.6 QC Plan Processes

10.6.1 This plan documents the processes affecting quality. These are essential steps to ensure a quality product is delivered to the Government.

10.6.2 The following sections describe the specific procedures that will be used to assure quality in this SOW regarding; Audits, Corrective/Preventive Action, Data Management, Anomaly Acquisition and Reacquisition, Field Operations, Equipment Calibration and Maintenance, and Personnel Protective Equipment

10.7 Scheduled Audits

10.7.1 Periodic audits will be performed by the QA/QC Manager to ensure that the requirements of this Quality Plan are being followed. This may include on-site visits as well as frequent document review activities. Training records, periodic reports, and adherence to all aspects of this QC Plan will be monitored to assure compliance.

10.8 Daily QC Audits

10.8.1 All instruments, vehicles/machinery, and equipment will be checked prior to the start of each workday, batteries will be replaced as needed, and instruments requiring calibration will be checked against a known source. Magnetometers will be checked against a 60mm Mortar (or item of similar size and mass) buried

to a depth of eighteen inches. The UXOQCS is responsible for ensuring that personnel accomplish all QC checks and that the appropriate logbook entries are made. The UXOQCS performs random, unscheduled Quality Conformance Inspections (QCI) to ensure that personnel accomplish all work specified in the Project Work Plan. The QCI Schedule will adhere to the following table. The UXOQCS has the latitude to modify this schedule based on the quality of work being performed and the frequency of noted activities.

Table 10-1

TASK	100%	DAILY	WEEKLY	BI-WEEKLY	AS NEEDED
Personnel Qualifications	✓				
Accident/Incident Reporting	✓				
Search Effectiveness	✓				
Turn-in of Recovered Ordnance Related Scrap		✓			
Preventive Maintenance		✓			
Communications Equipment Inspection		✓			
Safety Inspections			✓		
Medical Support			✓		
Communications Effectiveness			✓		
Explosives Storage & Accountability			✓		
Explosives – UXO/OE Transportation			✓		
Physical Security (After hours)			✓		

TASK	100%	DAILY	WEEKLY	BI-WEEKLY	AS NEEDED
Surveying and Mapping			✓		
Brush – Vegetation Removal			✓		
Geophysical Detection Operations			✓		
Excavation Activities			✓		
UXO/OE Final Disposal			✓		
UXO/OE Accountability			✓		
Fire Protection – Prevention			✓		
Project Administration			✓		
Safety and Health Programs				✓	
Management of ATI Property				✓	
Management of Government Furnished Property				✓	
Conservation of Utilities				✓	
Environmental – Cultural – Historical Resources Practices				✓	
Currentness of WP/SSHP				✓	
Re-inspection of completed grids due to adverse weather conditions					✓
Visitor Briefing					✓

TASK	100%	DAILY	WEEKLY	BI-WEEKLY	AS NEEDED
Site – Specific Training					✓
Hazard Assessment – Risk Analysis					✓

10.9 Quality Assurance/Quality Control (QA/QC) Standards

10.9.1 Surface Clearance

10.9.1.1 Every grid will under go a Search Effectiveness QC Inspection (SE QCI) involving a minimum of 10% of the square footage. The exact location of this square footage is at the discretion of the UXOQCS.

10.9.2 Subsurface Clearance

10.9.2.1 The Quality control/Quality Assurance failure criteria shall IAW the SOW Dated 10 February 2004.

- Opana Point : Locate and identify all metallic anomalies with a width or diameter greater than or equal to a 3lb MK23 practice bomb and less than or equal to a 4.5 inch barrage rocket at depths less than or equal to 11 times the diameter of the object.
- Makawao : Locate and identify all metallic anomalies with a width or diameter greater than or equal to a 60mm mortar and less than or equal to a 4.5 inch barrage rocket at depths less than or equal to 11 times the diameter of the object.
- Items do not have to be OE related to result in grid failure\
- Government failed grids shall be completely re-cleared at no cost to the Government.

10.9.2.2 The UXOQCS will perform a UXO QCI on at least 10% of the anomalies excavated by the UXO Clearance Team. The UXO QCI will be performed using one of the following two methods, or a combination of the two methods.

10.9.2.2.1 Method One. The UXOQCS will accompany the UXO Clearance Team while they re-acquire and excavate selected anomalies. He will observe the team’s procedures to ensure quality standards are met. Following excavation, the UXOQCS will check the location using the same detection instrument used during the geophysical survey to ensure the team has removed all anomalies.

10.9.2.2.2 Method Two. Following the UXO Team’s clearance, the UXOQCS will reacquire and check selected anomaly locations using the same navigation and

detection instruments used during the geophysical survey to ensure the team has located and removed the anomaly.

10.10 QC Files

10.10.1 The following two files will be established and maintained by the UXOQCS.

- QCI Record File
- Customer Action Request (CAR) File

10.10.2 The QCI Record File will be a two-part file, containing Active and Inactive Sub-files.

10.10.3 The Inactive Sub-file will contain those QCIR for tasks that were found to be in compliance with the Work Plan and those that were not in compliance, but have been re-inspected and found to have been corrected.

10.10.4 The Active Sub-file will contain those QCIR for tasks that were found to be not in compliance with the Work Plan and have not yet been corrected.

10.10.5 The CAR File will be a two-part file containing an Active Sub-file and an Inactive Sub-file. A CAR will be maintained in the Active File until follow-up has been conducted and deemed satisfactory. Once the follow-up is completed, the CAR will be placed in the Inactive File.

10.11 Corrective/Preventative Action

10.11.1 Nonconformance's will be documented on a Quality Conformance Inspection Record (QCIR). The QCIR will document the reason for the nonconformance and describe the corrective actions taken to resolve the problem and the actions taken to prevent reoccurrence. QCI are generally intended to be preventative, rather than corrective in nature. Through preventative QCI, continuous improvement of site operations will occur.

10.11.2 The QCIR may be legibly hand completed, in ink, but the preferred method is via computer (Word) on the site.

10.11.3 A QCIR will be completed for tasks when they are in conformance with the Work Plan. QCIRs for conforming tasks will not generally be distributed off the project site.

10.11.4 A QCIR will be completed for tasks when they do not conform to the Work Plan. Nonconformance QCIRs will be forwarded by facsimile or email to the Project Manager and the QA/QC Manager.

10.11.5 A QCIR will be completed for re-inspection of nonconformance. If the re-inspection indicates that the nonconformance has been corrected, both QCIRs will be filed in the Inactive Sub-file and a copy of the re-inspection QCIR will be forwarded to the Project Manager and the QA/QC Manager. If the re-inspection indicates the nonconformance has NOT been corrected, both QCIRs will be filed

in the Active Sub-file. A copy of the re-inspection QCIR will be forwarded to the Project Manager and the QA/QC Manager.

- 10.11.6 Nonconformance's will be evaluated and corrective action implemented by on-site management whenever possible. The Project Manager and QA/QC Manager will track all nonconformance's to assure that they have been resolved, actions to prevent re-occurrence have been implemented and that lessons learned are communicated effectively.

10.12 Customer Complaints

- 10.12.1 Customer complaints will be addressed immediately. The complaint may come in the form of a verbal comment, written correspondence, or a HND Form 948, etc. Whatever the vehicle, the Project Manager will conduct an investigation to analyze the complaint and assure corrective action has been initiated. The corrective action will address not only the root cause but also the application of controls to assure its effectiveness.
- 10.12.2 The Project Manager will utilize ATI Form 5, Customer Action Request (CAR) to document the complaint or nonconformance and the investigation.
- 10.12.3 The Project Manager will look for the root cause.
- 10.12.4 Lessons Learned will be documented on the CAR and communicated to Project personnel and the QA/QC Manager.
- 10.12.5 The action on the CAR is not complete until the UXOQCS and/or SUXOS have completed follow-up. The corrective/preventative actions have to be adequate to prevent reoccurrence and the customer must be satisfied with these actions.
- 10.12.6 The issue addressed in the CAR will be an item for a future QCI to ensure that the corrective/preventative actions have in fact addressed the issue and the solution was effective.

10.13 Document Control and Data Management

- 10.13.1 Rigid control must be maintained over the production of QC documents. The following guidelines will apply to all documentation generated by QC staff:
- 10.13.2 Document Completion
- 10.13.2.1 All sections of forms shall be completed. Any unused spaces will be marked N/A. In long columns of empty lines, N/A may be written in the first and last lines of that column with a single line connecting the entries. Large areas of unused spaces may be designated N/A by drawing a single line through the unused areas with the letters N and A on either side of that line.
- 10.13.2.2 Time and date formats: To eliminate misunderstanding, the following formats will be used on all official reports and correspondence:
- 10.13.2.3 Time: 24-hour

- 10.13.2.4 Examples: 0730H, 1930H
- 10.13.2.5 Date: MM/DD/YY
- 10.13.2.6 Examples: 04/05/01, 11/15/01
- 10.13.2.7 All report work will be accomplished by word processor or with a BLACK ink pen. No pencils or colored-ink pens may be used.
- 10.13.2.8 All signatures will be accompanied by the date the signature was made, either in a date block or with the date written following the signature.
- 10.13.2.9 White opaque correction fluids/tape may not be applied to records to correct mistakes.
- 10.13.2.10 Incorrect entries shall be drawn through with a single line with the initials of the author and the date of the correction immediately adjacent. Corrected entries will be placed above or immediately following the line through or otherwise entered on the document in a legible, understandable means.
- 10.13.2.11 Any entries or corrections to a document, other than in document control blocks, made after its date of inception, shall be considered a “late entry”. Late entries will be clearly designated with the capital letters “LE”, the initials of the person making the late entry, and the date the late entry is made.
- 10.13.2.12 Any impressions made on an official document with rubber stamps shall be inked with an intense red ink. The red ink will indicate that the sheet is an original, but standard photocopiers will reproduce the red ink as black.
- 10.13.2.13 A Field Document Control Log shall be maintained for all inspection records generated. Each document will be registered in the logbook and assigned a registration number from the log, which will be inscribed on each page of the original document.

10.14 Data Management

- 10.14.1 Electronic data and records will be managed to prevent accidental loss of information. All data will be backed up periodically and data will not be stored only on one single media. Floppy disks, Zip disks, CDs or other means of storage will be used in addition to standard computer hard drives to assure data is not lost by the failure of any one device. Since conventional Document Control Practices do not always lend themselves to electronic records, the following additional guidelines will be followed for all electronic QC records.
- 10.14.2 Once an electronic record is completed and saved to disk, the file name will be used as the registration number for that document and shall appear on each page of the electronic record such that it also appears on printed copies. This file name will be entered in the Field Document Control Log as that documents registration number.

- 10.14.3 Changes, additions, late entries and corrections to completed electronic records will be accomplished by creating a revision to the previously completed record. Included in the file name of the completed record will be the sequential revision number of that record. The first such revision of any record will be designated as R1 at the end of the file name. Subsequent revisions will be designated R2, R3, etc.
- 10.14.4 The original record will not be deleted electronically, and each revised record will include a description of the changes made on that particular revision as well as retaining the description of any previous revisions.
- 10.14.5 Any document that is revised after any required distribution either off-site or to any electronic or hard copy file will be likewise distributed to all recipients as the original document. The revision will be filed along with the original and any previous revisions.
- 10.14.6 Electronic forms, which require signatures, will be printed, and the printed original signed and dated in black ink as required. The words “signature on file” shall be entered on the electronic copy, in the signature space, of all documents requiring signatures. The signed original will be filed in the proper location. Subsequent revisions to forms requiring signatures will also be printed, signed and filed.
- 10.14.7 Logs maintained electronically may be updated as required for daily activities without going through the above revision process. Each days log, however shall be saved electronically with the date included in the file name. Previous day’s logs will not be deleted from the database and will serve as additional back up should the current days log be damaged or lost.

10.15 Photographic Records

- 10.15.1 Photographic records will be maintained by site personnel in accordance with the CEHNC SOW. Photographs will be utilized to document significant site activities. Locations, along with orientations of picture shall be indicated on a map. OE discoveries may be documented by color prints. Photographic records may be used to supplement information recorded in the daily logs, to include photographs of equipment prior to use, and the condition of the site prior to any activity. Photographs should clearly show the task being accomplished and provide for a visual record of the operations. Operations are to be staged. Photographic records should be taken during normal conduct of the operations. These photographic records will be included in the Final Report.

10.16 Logs and Reports

- 10.16.1 Field activity logbooks will be maintained in ink. All personnel will use bound and numbered field logbooks with consecutively numbered pages. These logbooks are QA records and will be completed in accordance with this section of this QC Plan. These activity logbooks will become part of the Final Report; thus, it is imperative that they be completed clearly and legibly. Appropriate documentation will be maintained regarding the location and disposition of all OE and ordnance-related scrap. Locations will be documented on a site map and

entered in the Ordnance Accountability Log. Daily and Weekly Summary Reports will be prepared by the UXOQCS and forwarded via facsimile or email to the Project Manager on a timely basis.

10.16.1.1 Daily Activity Log

10.16.1.1.1 Daily Activity Logs will be maintained and will include the following:

- Date and recorder of field information.
- Start and end time of work activities including lunch and down time.
- Visitors.
- Weather conditions.
- Important telephone calls.
- Any deviations from planned activities
- Equipment checks and calibrations.
- Equipment monitoring results, if applicable.
- QCI Performed
- Nonconforming conditions
- Lessons Learned
- Signatures of the SUXOS and UXOQCS indicating concurrence.

10.16.1.2 Safety Log

10.16.1.2.1 Safety Logs will include the following:

- Date and recorder of log.
- Significant site events relating to safety.
- Accidents
- Stop Work due to safety concerns.
- Lessons Learned
- Safety Audits.
- Signatures of the SUXOS and UXOQCS indicating concurrence.

10.16.1.3 Training Log

- 10.16.1.3.1 Training will be documented in the Training Log as follows:
- Date and recorder of log.
 - Nature of training
 - Tailgate safety briefings (including time conducted, person conducting the briefing and attendees).
 - Visitor Training (including names of visitors, description of training, and person performing training).
 - Signatures of the SUXOS and UXOQCS indicating concurrence.

10.16.1.4 Ordnance Accountability Log

10.16.1.4.1 The Ordnance Accountability Log will include:

- Date and recorder of log.
- Assigned Identification Number
- Type, condition and location.
- Disposition
- Signatures of the SUXOS and UXOQCS indicating concurrence.

10.17 Field Office/Communications

10.17.1 All official ATI visitors will report to the SUXOS and/or the UXOQCS to sign in, receive a safety briefing/training and obtain an escort within the project site. ALL visitors will be announced to the site via 2-way radio or verbally. All internal communications will be by portable radios or equivalent (radios will NOT be operated within 10 feet of electric blasting caps or firing circuits). All official external communications shall be via cellular telephone, landline or in some case email.

10.18 Lessons Learned

10.18.1 Lessons Learned from day to day activities are an important part of the continuous improvement process. They can prove vital to prevent similar problems from occurring at other sites. Lessons Learned from daily activities and from the occurrence of nonconforming conditions will be documented by the UXOQCS and/or the SUXOS, as appropriate. Lessons Learned as a result of nonconforming conditions are captured and documented on the QCIR as a result of its investigation and disposition. Other Lessons Learned, from both positive and negative events will be documented in the Daily Activity Log and/or Safety Log. These items will be included in the Final Report. The QA/QC Manager will maintain a database of Lessons Learned for communication to other sites and for incorporation into Training Requirements.

10.19 Reviews and Approvals

10.19.1 All contract submittals (reports, work plans, etc.) undergo review by various ATI personnel to ensure that they meet contract requirements prior to being submitted to the Government for acceptance. This review will include, but is not limited to the Project Manager and the QA/QC Manager. Work Plans and Reports are checked against the SOW and applicable Data Item Descriptions to assure they are in conformance. Changes to approved documents will undergo the same review process as the original document and will be communicated to all personnel affected by the revision.

10.20 Training

10.20.1 The Project Manager will verify that all project personnel have completed the following training prior to their assignment:

10.20.2 US Naval Explosive Ordnance Disposal, Indian Head, Maryland / Eglin AFB, FL or EOD Assistance Course, Redstone Arsenal, AL / Eglin AFB, FL or other DoD Certified Equivalent Course.

10.20.3 OSHA 40 Hour HAZWOPER in accordance with 29CFR1910.120 and 8 hour refreshers as need.

10.21 Current Physical Examination

10.21.1 Personnel without a CEHNC UXO# will be submitted to CEHNC for approval prior to assignment.

10.21.2 Site Specific Training on this WP and additional training, as needed, will be performed and documented on a QCIR, which will be forwarded to the Project Manager for review.

10.21.3 Safety Meetings will also be documented. The UXOQCS will ensure that all personnel using geophysical detection equipment are properly trained to use that piece of equipment. This may include verification of past experience as well as on-site training on using specific equipment in site-specific conditions, which will be documented on a QCIR and forwarded to the Project Manager.

10.21.4 The UXOQCS will conduct, as necessary, site-specific training and/or review of known OE to ensure that all site personnel are thoroughly familiar with the hazards and the general safety precautions and procedures required. Contractor personnel and site visitors will also receive site-specific training and safety briefings, as required, to ensure safety on the project. Visitors must be briefed on all of the known or anticipated hazards of the site, required PPE to be worn while on the site, and site emergency procedures. Visitors will be escorted by a UXO qualified person whenever they enter the exclusion zone and all UXO operations will cease whenever a visitor is within the exclusion zone.

10.22 Chemical Quality Data Management (CQDM)

10.22.1 No Hazardous, Toxic and Radiological Waste (HTRW) or Chemical Warfare Materials (CWM) is expected at this site per the CEHNC SOW, therefore a CQDM sub-plan is not applicable.

10.23 QC Documentation Submittal

10.23.1 All QC documentation required by this Work Plan will be submitted as part of or as supporting documentation for the Final Report.

10.24 QC Record Retention

10.24.1 All original QC Records and documentation will be maintained on-site and made available for government inspection upon request.

11.0 ENVIRONMENTAL PROTECTION

11.1 Site Characterization and Mitigation Approach

11.1.1 This Environmental Protection Plan is a site specific plan that describes ATI's methods and procedures during site activities to minimize pollution, protect and preserve natural resources, and control noise and dust within reasonable limits. ATI's goal is to complete the scope of work on schedule and without a safety incident or environmental incident. ATI will achieve this goal through careful planning, training, supervision and quality control related to all aspects of the project.

11.1.2 The project site work and restoration (as required) will be performed in accordance with applicable regulations, guidance and procedures and in coordination with appropriate officials and agencies.

11.1.3 ATI will perform a surface and subsurface clearance within the Opana Point bombing Range and Makawao Gunnery Site, Maui, HI,. The Opana Point bombing Range and Makawao Gunnery Site was used as a Bombing and impact target area for gunnery practice exercises.

11.2 Existing Conditions Survey

11.2.1 The Project Manager and the USACE OE Safety Specialist, or other on-site government inspection personnel, will make a joint existing conditions survey prior to beginning field-work. The purpose of the survey is to identify areas within the project site where proposed work may have a negative environmental impact. Sensitive areas will be identified and marked. Workers will be given instructions on the activities that can and cannot be performed in these areas.

11.3 Potential Environmental Resource Impact

11.3.1 Endangered / Threatened Species within the Project Site

11.3.1.1 There are a number of threatened, endangered or sensitive species that may exist in the vicinity of site. The Dark-Rumped Petrel (*Pterodroma phaeopygia sandwichensis*) is an endemic species that is listed as endangered by the USFWS and may occasionally fly over the area. However, the area does not provide suitable nesting habitat for this species. Hawai'ian Goose (*Branta sandvicensis*) is another endemic species that is listed as endangered by the USFWS. These species were not observed during the EE/CA survey; however, it is possible that the species may utilize portions of the former maneuver area (U.S. Army Corps of Engineers, Pacific Ocean Division, 1997). The Hawai'ian hoary bat (*Lasiurus cinereus semotus*) is Hawai'i's only endemic terrestrial mammal and is listed as endangered by the USFWS and a species of concern for the Hawai'ian Islands.

11.3.2 Vegetation

11.3.2.1 Sensitive Species.

- 11.3.2.1.1 Portulaca scerocarpa, a federally listed endangered plant or species of concern, was found to occur within the central region of the former maneuver area. The species was found growing as a low or prostrate herb with one to several stems, 10 to 20 centimeters long. It was typically observed on rock microsites between Pennisetum setaceum and in proximity to Portulaca ilosa plants (U.S. Army Corps of Engineers, Pacific Ocean Division, 1997). Palmer and Paul identified Portulaca scerocarpa in the Lalamilo area during their 1999 botanical survey of the project area. The Puako parcel supports a population of endangered flowering maple (Abutilon menziesii Seem.) (U.S. Army Corps of Engineers, Pacific Ocean Division, 1996). The former maneuver area supports little habitat for native and sensitive species due to intense cattle grazing and a variety of anthropogenic stresses.

- 11.3.3 Wetlands
 - 11.3.3.1 There are no known wetlands within the site.

- 11.3.4 Cultural, Archaeological, and Water Resources within the Project Area
 - 11.3.4.1 An archaeological and cultural resources survey was performed during the summer of 2002 prior to field activities and the archaeologists found no archaeological sites within the Makawao Gunnery Site. However, a number of sites in areas nearby indicate that sites probably did exist at one time in the Gunnery Range area, but any surface signs have been disturbed over the years to the point where they are no longer recognizable. In addition to the survey, archaeological monitoring was performed during intrusive site activities and no evidence of archaeological significant sites was found (DEI, 2003).

 - 11.3.4.2 An archaeological and cultural resources survey was performed during the summer of 2002 prior to field activities and the archaeologists found no archaeological sites within Opana Point. However, a heiau (Walker's Site 62, Hawaii State Site No. 50-50-06-0062) formerly existed at Opana Point. In addition to the survey, archaeological monitoring was performed during intrusive site activities and no evidence of archaeological significant sites was found (DEI, 2003).

- 11.3.5 Coastal Zones within the Project Site
 - 11.3.5.1 There are no costal zones within the project site.

- 11.3.6 There is no requirement to remove trees or shrubs within the Project Site. Minor removal of shrubs to assist in the gathering of geophysical data may be required and will kept to a minimum.

- 11.3.7 Existing Waste Disposal Sites within the Project Site
 - 11.3.7.1 There are no active waste disposal sites within the project site. Ordnance related scrap will be controlled, handled and accounted for in accordance with the procedures describe in this work plan.

11.4 Mitigating Procedures

11.4.1 Manifesting, Transportation, and Disposal of Waste

11.4.1.1 The only significant waste generated during this project is the ordnance related scrap recovered during the surface clearance. Any item expected to contain a potential explosive hazard will be detonated in place to remediate the hazard and therefore insure that the item is safe for transportation and disposal. Qualified UXO technicians will perform a 100% inspection of ordnance-related scrap and complete a DD Form 1348-1A, in accordance with the Defense Utilization and Disposal Manual. DOD 4160-M. The scrap certification will contain the following statement:

“This certifies and verifies that the AEDA residue, range residue, OE scrap and/or Explosive Contaminated property listed has been 100 percent inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related material.”

11.4.1.2 All certified scrap and residue will be turned over to a Local Solid Waste Facility.

11.4.1.3 Other non-hazardous solid waste generated as a result of activities associated with this project will be transported to and disposed of in a municipal landfill. No tracking or manifesting of this type of waste is required.

11.4.2 Burning Activities

11.4.2.1 There are no burning activities associated with this project.

11.4.3 Dust and Emission Control

11.4.3.1 Light trucks will be used on a limited basis during this project. ATI will limit the operation of trucks and will, to the extent practicable, avoid creating high traffic areas. Lighter vehicles will be used to collect scrap from the grids and consolidate it for pick up by heavier vehicle. All vehicles will be operated at low rates of speed to reduce the dust emitted. Dust emissions will be controlled through the use of administrative controls, such as speed limits and varied traffic patterns.

11.4.4 Spill Control and Prevention

11.4.4.1 Vehicles designed to travel on roads will be fueled at commercial filling stations that designed to prevent and control potential spills. Fuel for use in utility vehicles will be transported and dispensed from fuel cans designed to reduce the potential for spills. Fuel will be transported in small containers (five gallons or less) fueling will be in an areas designated by the SUXOS. Spill kits will be maintained in the same vicinity. Fuel will not be stored on site. It will be delivered in small quantities, as needed.

11.4.5 Storage Areas and Temporary Facilities

11.4.5.1 Explosives will not be stored on site.

- 11.4.6 Access Routes
 - 11.4.6.1 ATI does not anticipate the need to construct access routes. The site will be accessed from existing roads and off-road routes designated by the SUXOS. Off-road routes will be modified and / or varied to prevent erosion and / or dust problems.
- 11.4.7 Trees and Shrubs Protection and Restoration
 - 11.4.7.1 ATI's work will not affect any trees or shrubs during the performance of work associated with this removal action.
- 11.4.8 Control of Water Run-on and Run-off
 - 11.4.8.1 There are no anticipated concerns with run-on or run-off on the site.
- 11.4.9 Decontamination and Disposal of Equipment
 - 11.4.9.1 At the completion of the project and during the project, as required, equipment will be cleaned to remove dirt and dust. Methods will include both dry decontamination and wet decontamination. Wet methods will be performed in an approved location or wash facility. Disposable equipment will not be decontaminated. It will be transferred to an appropriate disposal facility.
- 11.4.10 Minimizing Areas of Disturbance
 - 11.4.11 ATI will only work in areas defined in the SOW and will avoid other activities outside of these areas.
- 11.4.12 Post-Activity Clean-up
 - 11.4.12.1 After completing the removal action, the SUXOS will be responsible to insure that all areas included in the scope are properly cleaned up. No debris will be left as a result of ATI's activities on the site. Facilities used by ATI will be cleaned and restored to their original condition.
- 11.4.13 Air Monitoring
 - 11.4.13.1 The requirements and methods of monitoring are described in Appendix D, Site Safety and Health Plan of this work plan. No air monitoring requirements are anticipated during the work associated with this removal action.

12.0 INVESTIGATIVE DERIVED WASTE PLAN

12.1 In accordance with the Scope of Work, the Investigative Derived Waste Plan is not required by the Task Order.

13.0 GEOGRAPHICAL INFORMATION SYSTEM PLAN

13.1 General

13.1.1 ATI will develop and maintain a GIS for the life cycle of this project. The Geographical Information System Plan will be developed in accordance with DID OE-005-14.01.

13.1.2 All spatial data shall conform to the CADD/GIS Technology Center Spatial Data Standards (SDSIF). All OE related spatial data will conform to the USAESCH OE-GIS standards. Federal Geographic Data Committee (FGDC) standards will apply to only the core spatial data layers, which are defined as past of the USAESCH OE-GIS standards as outlined in this task order.

13.2 Sources and Standard

13.2.1 The developed GIS deliverables for this task order complies with the standard for GIS implementations at Department of Defense installations and Army Corps of Engineers Civil Works activities. This provides a GIS implementation schema for approved Federal Geographic Data Committee (FGDC) Data Standards, to provide a “nonproprietary” standard designed for use with commercially available “off-the shelf” CADD, GIS, and relational database software, and to provide a de facto standard for GIS implementations in other Federal, State, and local government organizations, public utilities, and finally, private industry.

13.3 Geographic Information Systems (GIS) Incorporation

13.3.1 ATI will implement the USAESCH OE-GIS standards, SDSIF standards, and the FGDC metadata standards to all core spatial data entered into the project specific GIS, and apply it to the project to the extent required to create the products outlined in the specific task order SOW. The standard will be used as a starting point to load data and to create a GIS tailored for this task. All GIS data will be created, modified, and updated using software in accordance with USAESCH standards. The main purpose of the project-specific GIS is to assemble all the data required to associate the non-intrusive subsurface geophysics investigative data to its correct geographical location and data that is associated with the investigation including relational databases, mapping, and remote sensing data. GIS technology is used to manage the project, assemble data for the administrative record, help determine areas requiring further investigation and to discriminate OE from background anomalies. A program that uses a subset of the GIS data does the discrimination between background anomalies and OE items.

13.3.2 All final versions of the project specific spatial data will conform to the SDTS format. All imagery (such as ortho-photography, remote sensing, data, and satellite-photography) will be provided in either Tagged Image File Format (TIFF) or Lizerdtech MrSID encoded image format.

13.3.3 Tabular data supporting the site-specific GIS will be developed, converted, and or maintained in Microsoft Access format thought the life cycle of the project.

The Geographic Information System (GIS) will be created, managed and updated through out the life cycle of the project.

- 13.3.4 Existing non OE spatial data will be gathered by the GIS Specialist from past USACE projects and or State-run GIS clearing houses to aid in created a solid base map for the project area. Grid design will be submitted to the GIS Specialist from the surveyor to be added into the GIS. Next Geophysical survey data will be uploaded to procommander.com for pick up by the GIS Specialist. The Geophysical data (anomaly information, Dig sheets, grid data, imagery, etc.) will be formatted to the OE-GIS and the SDSIF standards, also FGDC metadata will also be created for the core OE-GIS data. Data will be posted on the Internet mapping portion of procommander.com to track progress and findings. Maps are created for reports that related to the project. A final version of the GIS will be packaged to a CD for submittal to the USACE.

13.4 Computer Files

- 13.4.1 ATI will submit the GIS data in a format that is in accordance with DID OE-005-14.01.
- 13.4.2 All final text files generated by this task will be furnished to USAESCH in MS Office 97 or higher software, IBM PC compatible format and in Adobe Portable Document Format (PDF), suitable for viewing, without modification, on the Internet. Freeware versions of Adobe Acrobat Reader, Netscape, and Internet Explorer will accompany the text files on CD-ROM, so that the user can use the CD to either install the programs and text files on a machine, or use the CD in a stand-alone mode to view the text files. The basic software supported to the field will be capable of operating on a typical single Intel Pentium processor PC utilizing the Windows NT version 4.0 operating system with a minimum of 64 megabytes of memory and adequate disk storage for project data.
- 13.4.3 Selected GIS data, design drawings, survey data, relational databases and related data generated will be available on line to the government through ATI's Project Commander ® project collaboration website: www.procommander.com. Formal submittals for all GIS, survey and mapping data, and design drawings, generated for this task will be submitted in the proper format and media that will permit their loading, storage, and use without modification or additional software on the USAESCH GIS workstations.

14.0 INTERIM HOLDING FACILITY SITING PLAN FOR RCWM PROJECTS

14.1 In accordance with the Scope of Work, the Interim Holding Facility Siting Plan for RCWM Projects is not required by the Task Order.

15.0 PHYSICAL SECURITY PLAN FOR RCMW PROJECT SITES

15.1 In accordance with the Scope of Work, the Physical Security Plan for RCWM Project Sites is not required by the Task Order.

16.0 REFERENCES

DOD Manual 4160.21.M, Defense Utilization and Disposal Manual.

AR 200-1, Environmental Protection and Enhancement.

AR 385-40 with USACE Supplement.

AR 386-63, Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat.

EM 385-1-1, CE Safety and Health Requirements Manual.

DA PAM 385-64, Ammunition and Explosive Standards.

EP 385-1-95a, Basic Safety Concepts and Considerations for Ordnance and Explosive Operations.

DoD 6055.9 Std. DoD Ammunition and Explosive Safety Standards

TM 60A 1-1-31, Explosive Ordnance Disposal Procedures

National Contingency Plan, 40 CFR 300.

Federal Acquisition Regulation, F.A.R. Clause 52.236-13: Accident Prevention.

Occupational Safety and Health Administration (OSHA) General Industry Standards, 29 CFR 1910 and Construction Industry Standards, 29 CFR 1926

DID OE-005-01.01 Removal Action Work Plan

DID OE-005-02.01 Technical Management Plan

DID OE-005-03.01 Explosives Management Plan

DID OE-005-04.01 Explosives Siting Plan

DID OE-005-05.01 Geophysical Investigation Plan

DID OE-005-05A-01 Geophysical Prove Out Plan

DID OE-005-06.01 Site Safety and Health Plan

DID OE-005-07.01 Location Surveys and Mapping Plan

DID OE-005-08.01 Work, Data, and Cost Management Plan

DID OE-005-11.01 Quality Control Plan

DID OE-005-12.01 Environmental Protection Plan

DID OE-15.01 Accident reports

DID OE-025.01 Personnel and Work Standards

DID OE-030.01 Site Specific Removal Report

DID OE-045.01 Reports

DID OE-055.01 Telephone Conversations

DID OE-085.01 Weekly Status Report

DID OE-080.01 Monthly Status Report

APPENDIX A

Scope of Work

SCOPE OF WORK

ORDNANCE AND EXPLOSIVES (OE)

REMOVAL ACTION

at the

Opana Point Bombing Range & Makawao Gunnery Site, Maui, Hawaii

10 February 2004

1.0 OBJECTIVE: The objective of this task order is for the contractor to safely locate, identify and and dispose of all Unexploded Ordnance (UXO) and hazardous Ordnance and Explosives (OE) items within 90 acres at the former Opana Point Bombing Target (see Figure 1), and 100 acres at the former Makawao Gunnery Site (see Figure 2).

2.0 BACKGROUND:

2.1 The work required under this Scope of Work (SOW) falls under the Defense Environmental Restoration Program - Formerly Used Defense Sites (DERP-FUDS). Ordnance and Explosives (OE) exists on property formerly owned or leased by the Department of Defense.

2.2 OE is a safety hazard and may constitute an imminent and substantial endangerment to site personnel and the local populace. All personnel on site shall adhere to the applicable provisions of 29CFR 1910.120.

2.3 **Work Week:** Due to the inherent risk in OE operations, the contractor shall be limited to 40 hours of OE procedures during the workweek (either four 10 hour days or five eight hour days). Two consecutive workweeks shall be separated by 48 hours of rest. Unexploded Ordnance (UXO) personnel shall not perform UXO-related tasks for more than 10 hours per day.

2.4 The Munition with Greatest Fragmentation Distance (MGFD) for Opana Point is the 4.5 inch barrage rocket, and the MGFD for Makowao is 105mm M1 projectile.

2.5 Chemical Warfare Materiel (CWM). There is no evidence that CWM has been tested or exists within the area comprising this project. This site is not a suspected CWM facility. However, during conventional OE operations, if the contractor identifies or suspects CWM, the contractor shall immediately withdraw upwind from the work area and notify the appropriate personnel as identified in each Task Order or approved Work Plan. The contractor shall secure the area and provide two personnel located upwind of the suspect CWM to secure the site until relieved by the Technical Escort Unit (TEU) or Explosive Ordnance Disposal (EOD) personnel.

2.6 Site Description.

2.6.1 The former Opana Point Bombing Range project site is located at the Northern most point on the island of Maui, Hawaii. Access to the project site is located about 1.1 miles north of Hana Road and 16-road miles east of Kahului, Maui, on land currently owned by Arnfac Property Investment Corporation, Kaanapali, Maui, Hawaii and leased to the Maui Land & Pineapple Company, Inc., Paia, Maui, Hawaii. Except for a portion along the seaward cliff line, almost all of the former bombing range (currently called Field 212) is under cultivation for the production of pineapples. The site is located on the Opana Point at an elevation of above 120 feet above Mean Sea Level (MSL). The northern boundary of the project site is located along the cliff line, which is about 100 feet above MSL. The surface of the project site has been cleared and graded to meet the requirements for cultivation of pineapples. During one field investigation of the site in June 1990, sixteen (16) Mark 23 practice bombs were discovered on the surface within the boundaries of the Bombing Range. These were probably placed at this location during ground clearance as part of the pineapple cultivation work.

162 The Makawao Gunnery Site and Opana Point Bombing Range are located approximately three miles northeast and five miles north-northeast, respectively, of the City of Makawao, Island of Maui, Hawaii (Figure 1-1). The US Marine Corps (USMC) used the Makawao Gunnery Site as an artillery impact area. The site is currently owned by the East Maui Irrigation Company, Ltd. and is primarily used for cattle grazing.

3.0 SPECIFIC REQUIREMENTS:

- 3.1 (TASK 1) SITE VISIT (PHP): Not used.
- 3.2 (TASK 2) PREPARE WORK PLAN (WP) (EFP): The contractor shall prepare a WP in accordance with OE -005-01.01. The Contractor shall submit a "Draft", and "Final" version of the Work Plan in accordance with Section 4.0 of this SOW.
- 3.3 (TASK 3) GEOPHYSICAL PROVE-OUT (GPO) (EFP): The Contractor shall perform a geophysical prove-out in accordance with DID OE-005-05A.01 Geophysical Prove-Out (GPO) Plan to test the instruments that will be proposed to accomplish Task 8. The Contractor shall submit "Draft" and "Final" versions of the GPO Plan. The Contractor shall also submit a Site Safety and Health Plan (SSHP), with the GPO Plan, for approval. The Government will provide coordinates of the plot and seeded items. The Contractor shall evaluate the existing test grid and propose the addition of items to the grid, as needed. The GPO Plan shall be included in the final Work Plan as an appendix. The Contractor shall not begin field operations on the GPO plot until the Government has approved the GPO Plan and SSHP.
- 3.3.1 The Contractor shall submit a "Draft" and "Final" version of the GPO Letter Report. The GPO Letter Report shall be in accordance with DID OE-005-05.01 and section 4.0 of this SOW. The GPO Letter Report shall be included in the final version of the removal report as an appendix.
- 3.4 (TASK 4) BRUSH CLEARING (EFP): Contractor shall clear brush as necessary to successfully execute the surface and subsurface ordnance removal. Brush clearing costs shall be included in Task 8a and 8b.
- 3.5 (TASK 5) LOCATION SURVEYS AND MAPPING (EFP): Location surveying and mapping shall be in accordance with DID OE-005-07.01 and the approved Work Plan. The coordinate system used for the Task Order shall be UTM in meters. All data submitted shall be in UTM. Setting of control monuments and/or location of any property boundaries shall be performed by a Professional Land Surveyor licensed in the State of Hawaii. Contractor personnel who are knowledgeable and competent in land surveying and use of surveying.

equipment may perform grid location and layout. OE locations shall be measured from grid corners to the nearest quarter-meter. Survey data shall be submitted as follows:

Control Monument Data	With weekly status report following completion of work
Site grid Data	With weekly status report following completion of work
OE location data	With weekly status report following completion of work

Survey data may be submitted by CD or electronically via email. Other methods of submittal must be proposed and approved by the contracting officer. The site grid data shall include a map of the entire site with grids shown and other pertinent features. A tabulated list of grid corners shall be submitted in a Microsoft Excel Spreadsheet version 98 or higher. OE location data shall be submitted in a Microsoft Excel Spreadsheet version 98 or higher. Data shall include grid number where found, item number assigned, type of item, location in UTM coordinates, and depth below ground surface. All survey data shall be included in the Final Report.

3.6 (TASK 6) ESTABLISHMENT AND MANAGEMENT OF GIS (FFP)

The Contractor shall take the GIS data, manual, file, and database structure from the Huntsville Center OE GIS standard and the previously developed ArcGIS database and layer files (shapefiles) and expand on there development through the Removal Action process. Further guidance can be found in DID OE-005-14.01. The GIS database shall be assembled and used to direct daily geophysical and intrusive investigative activities, to compile and analyze the daily digital data, plot surveying and mapping data, and plot OE information. All changes from the standard shall be fully documented into a manual specifically tailored for this project. The Contractor shall submit the GIS database and updates on a monthly basis and as a final product at the completion of the project. The Contractor shall provide on a secure Website all project related submittals and project correspondence. CEHNC shall approve requests for a password.

3.7 (TASK 7) EXPLOSIVE SAFETY SUBMISSION (FFP): NOT USED.

3.8 (TASK 8a & b) PERFORM SURFACE AND SUBSURFACE CLEARANCE (FFP):

The Contractor shall provide the necessary personnel and equipment to safely conduct a surface and subsurface ordnance removal action with the objective of finding all metallic items that are

within the "target box" in DID OE-005.05.01. Task 8a covers the 90 acres defined in the EE/CA Report for the Former Opana Point Bombing Target (Figure 1). Task 8b covers the 100 acres of area defined in the EE/CA Report for the Makawao Training Area (Figure 2). For estimation, assume that there will be 100 anomalies per acre to investigate at Opana Point, and 50 anomalies per acre at Makawao, during the subsurface clearance of the areas. The 100-acre Makawao area designated for clearance is bracketed by the coordinate sets provided in the following Table.

Point	NAD 83, Hawaii State Zone 2	
	Northing (US ft)	Easting (US ft)
Makawao	209394.88	1777630.85
Makawao	208490.15	1777630.85
Makawao	208490.15	1779866.07
Makawao	207620.90	1779866.07
Makawao	207620.90	1781202.47
Makawao	209394.88	1781202.47

Acrobat Document

Figure 1 — EE/CA Report (Figure 9-2)

Figure 2 — EE/CA Report (Figure ES-4)

3.8.1 Hazardous UXO/OE Destruction: The Contractor shall be responsible for the daily destruction of all UXO/OE encountered during the surface clearance and intrusive investigations utilizing qualified UXO personnel and in accordance with all aspects of the project Work Plan. The Contractor shall establish in the Work Plan a method of disposal, if required, for all UXO/OE

3.8.2 Backfilling Excavations: All access/excavation/detonation holes shall be backfilled by the Contractor. The Contractor shall restore such areas to their prior condition.

3.8.3 OE Accountability: The Contractor shall maintain a detailed accounting of all UXO/OE items/components encountered. This accounting shall include the amounts of UXO/OE, the identification and condition, depth located, disposition and location. The accounting system

shall also account for all demolition materials utilized to detonate UXO/OE on site. This accounting shall be a part of an appendix to the Final Report.

3.8.4 INSPECTION & DISPOSITION OF OE SCRAP/RANGE RESIDUE

The Contractor shall furnish all necessary personnel and equipment to perform inspection and disposition of all recovered OE Scrap and Ammunition, Explosives and Dangerous Articles (AEDA) and Range Residue. The methodology to accomplish this task shall be proposed in the WP. All inspected OE scrap shall be secured in a lockable container to ensure positive control of the material, and to prevent commingling with uninspected material. The Contractor shall complete a DD Form 1348-1A or similar form as turn-in documentation. Instructions for completing this form are contained in the Defense Utilization and Disposal Manual, DOD 4160.21-M. The UXO contractor shall ensure that this property is one hundred percent (100%) properly inspected LAW the inspection procedures specified in the WP. Qualified UXO personnel shall perform the inspection. UXO Contractor personnel responsible for certifying AEDA/Range residue and OE scrap must meet the qualification requirements specified in DID OE-025.01. AEDA/Range residue and OE scrap certification will be entered as follows:

"This certifies and verifies that the AEDA residue, Range Residue, OE scrap and/or Explosive Contaminated property listed has been 100 percent properly inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related material"

The certification requires dual signatures. The SUXOS shall sign as the certifier, and the USACE OE Safety Specialist will sign as the verifier. All AEDA/Range residue and OE scrap shall be stored in labeled, locked containers and properly disposed of at a scrap metal processing plant by smelting. It is the intent that the OE scrap is disposed of permanently and is in a form that is not recognizable as OE scrap. The Contractor shall provide a complete chain-of-custody record, which includes transport of the scrap and transfer of the scrap to the responsible party. The method/location of disposal shall be detailed in the WP. The Contractor shall include in the WP a signed statement from the processing plant that the scrap will be properly processed prior to resale or release.

3.8.5 QUALITY CONTROL. The Contractor shall develop a Quality Control (QC) Program that shall ensure a quality product for all aspects of the project IAW DID OE-0005-1 1.01, which includes any work performed by a subcontractor on the project. The Contractors' QC procedures for all phases and types of work should be included in the WP. The Contractor shall ensure that documentation is maintained and provided in the final report that supports the QC process.

3.8.5.1 UXO Quality Control Specialist (UXOQCS)

The UXOQCS shall not perform any removal or investigation tasks. The UXOQCS and UXO Safety Officer (UXOSO) positions may be dual-hatted when there are 15 or less people on site. The UXOQCS shall meet the requirements as shown DID OE-025.01.

3.8.5.2 Quality Control/Quality Assurance

For QC purposes, at the Opana Point site the Contractor shall locate and identify all metallic anomalies with a width or diameter greater than or equal to a 3lb MK23 practice bomb and less than or equal to a 4.5-inch barrage rocket at depths less than or equal to 11 times the diameter of the object. At the Makawao site the Contractor shall locate and identify all metallic anomalies with a width or diameter greater than or equal to a 60mm mortar and less than or equal to a 4.5-inch barrage rocket at depths less than or equal to 11 times the diameter of the object. Quality failure is defined in DID OE-005-05. 01. The item does not have to be OE related to result in grid failure. Failed grids shall be completely re-cleared at no cost to the Government.

3.8.5.3 QA Inspections.

In addition to the QC process performed by the Contractor, the Government will conduct Quality Assurance (QA) inspections on all phases and types of work performed. Quality failure can also be defined as workmanship not complying with the approved work plan or other accepted industry practices or defined as not complying with basic safety concepts and other industry safety practices. QA inspections will be accomplished only after the Government has been notified in writing that the Contractor's QC activities have been completed. The Government reserves the right to perform QA inspections at any time. If a grid fails Government QA, the Contractor shall provide full documentation detailing what failed the QC process, why it failed, and how the problem was corrected.

3.9 (TASK 9) FINAL REPORT (FRP): The Contractor shall prepare a final report in accordance with DID OE-030.01. The Contractor shall submit a "Draft" and "Final" version of the Final Report in accordance with Section 4.0 of this SOW.

3.10 (TASK 10) PROJECT MANAGEMENT (FRP): The Contractor shall perform project management activities necessary to maintain project control, to include but not limited to the following.

3.10.1 Schedule: The Contractor shall submit a proposed Project Schedule in Microsoft Project. The Contractor shall update the schedule in accordance with DID OE-085.01 Project Status Report. A final schedule shall be submitted a minimum of 30 days before commencing fieldwork (i.e. GPO).

3.10.2 Telephone Conversations/Correspondence Records: The Contractor shall keep a record of each phone conversation and written correspondence concerning this Task Order in accordance with DID OE-055.01. A copy of this record shall be attached to the Weekly Status Report.

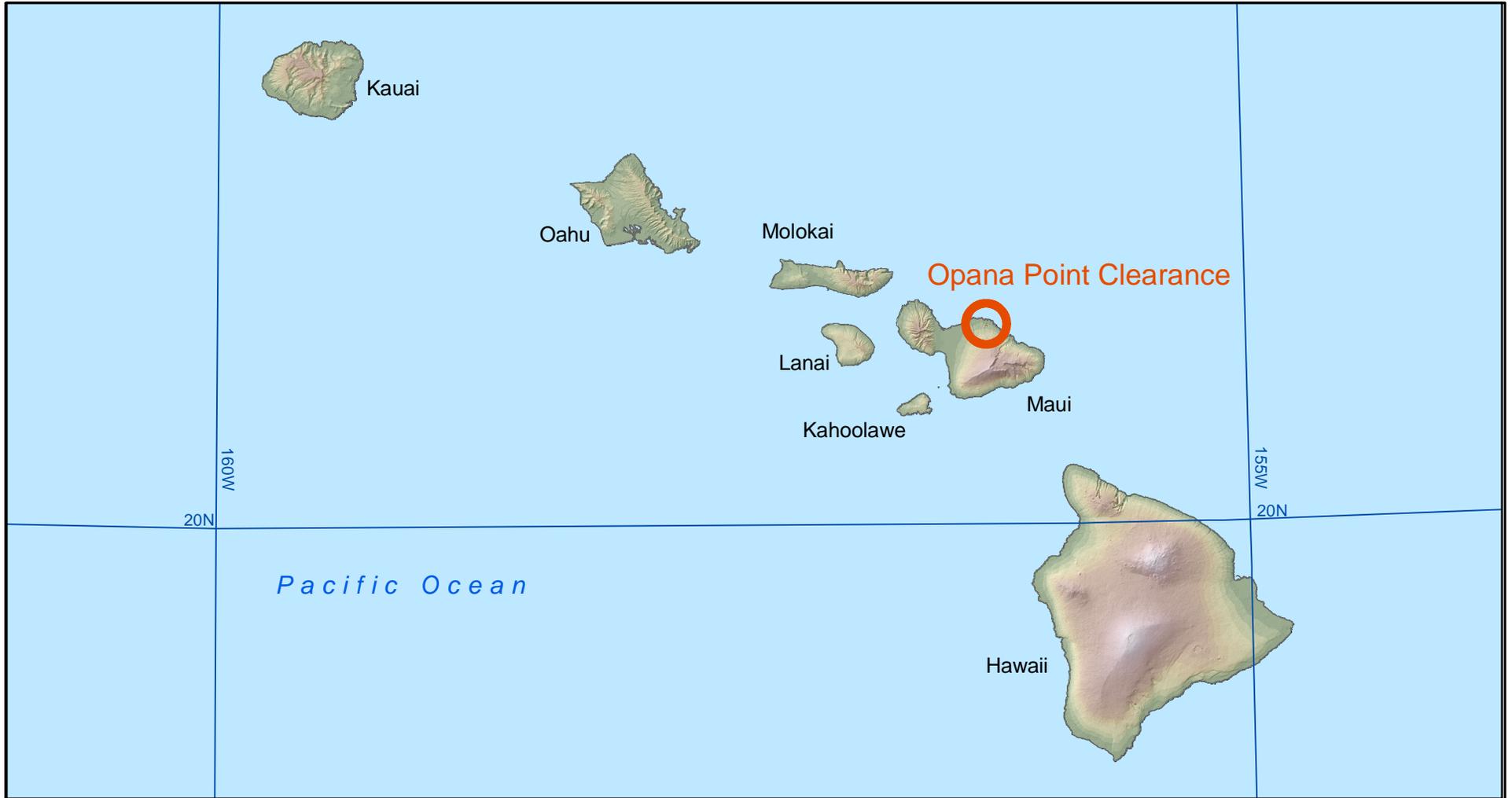
3.10.3 Monthly Status Report: The Contractor shall prepare and submit a monthly status report, if necessary, in accordance with DID OE-080.01 and including any other items required in the SOW.

3.10.4 Weekly Status Reports: The Contractor shall prepare and submit Project Status Report in accordance with DID OE-085.01 and including any other items required in the SOW.

APPENDIX B

Site Maps

MAP B – 1	Hawaiian Islands
MAP B – 2	Site Location – Island of Maui
MAP B – 3	Opana Site Map
MAP B – 4	Makawao Site Map
MAP B – 5	Opana & Makawao Grid Systems
MAP B – 6	Overlay
MAP B – 7	Opana Point Hospital Route



Pacific Ocean



UTM Zone 4 NAD 83 (Meters)



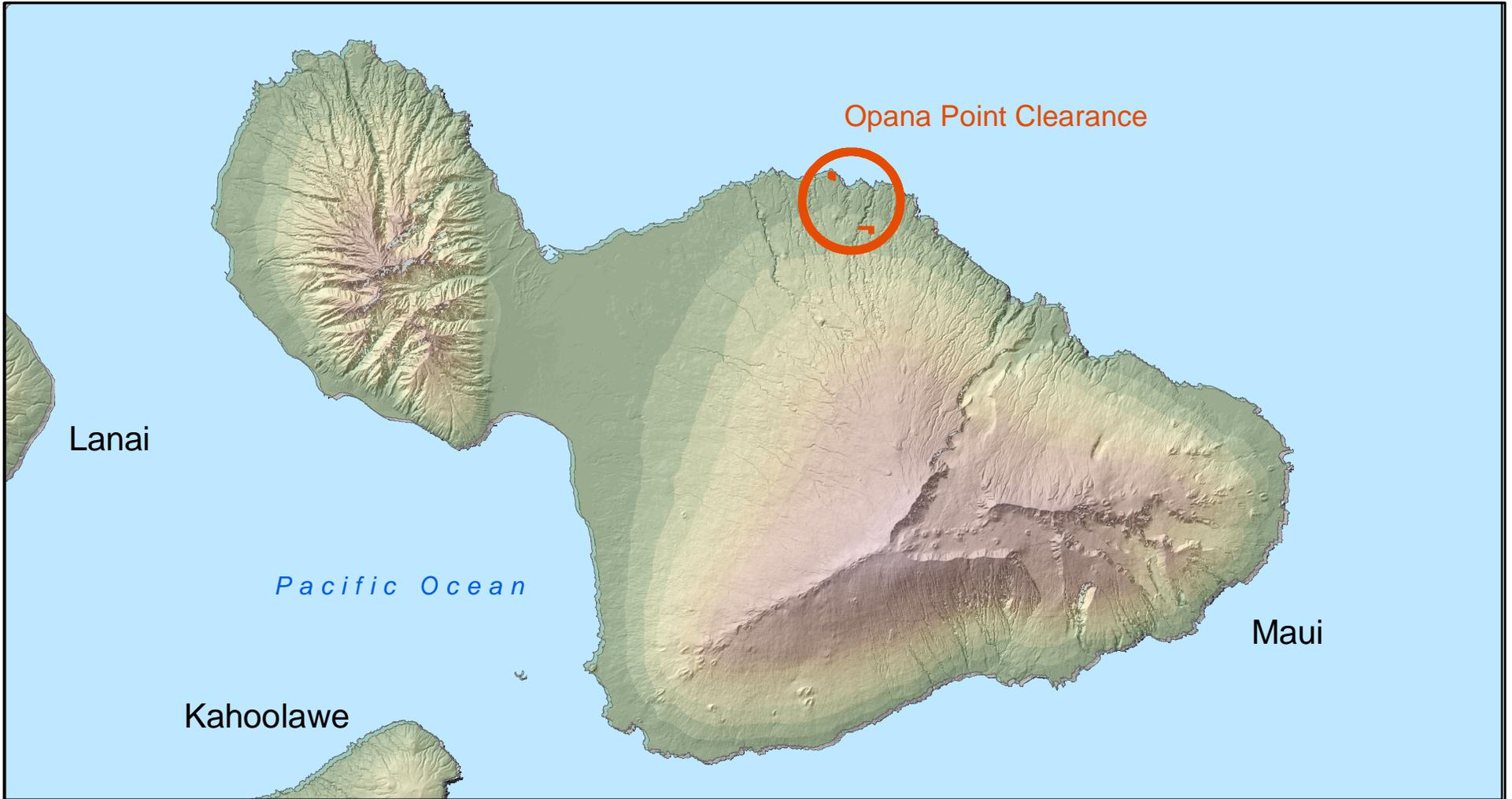
Project Area Hawaii Islands

Prepared For:
U.S. Army Engineering & Support Center, Huntsville
Prepared By:
American Technologies, Inc.



DRAWN BY: B. Fritze

REV. - DATE: 05/05/04



Opana Point Clearance

Lanai

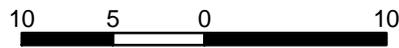
Pacific Ocean

Kahoolawe

Maui



UTM Zone 4 NAD 83 (Meters)



Kilometers

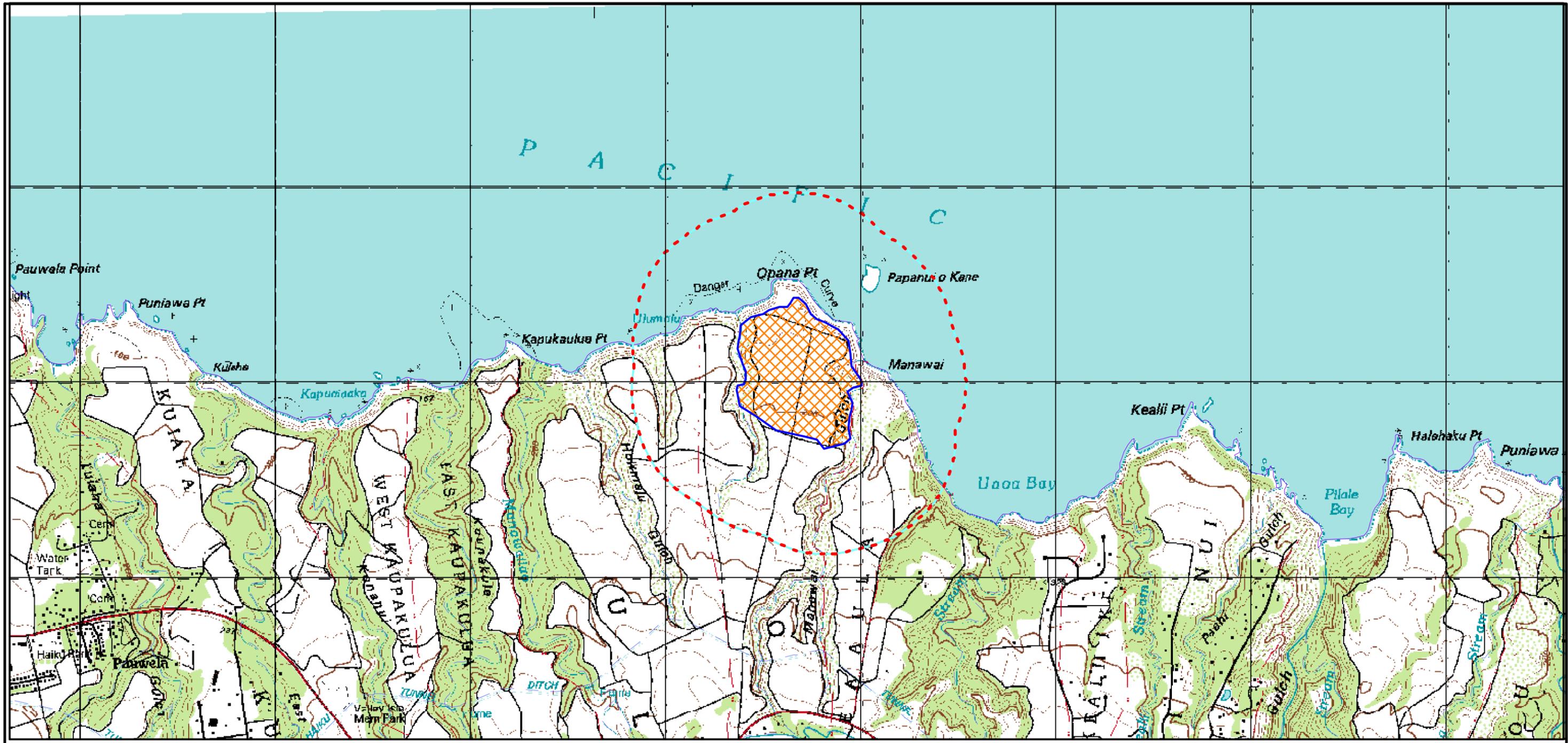
**Project Area
Maui**

Prepared For:
U.S. Army Engineering & Support Center, Huntsville
Prepared By:
American Technologies, Inc.



DRAWN BY: B. Fritze

REV. - DATE: 05/05/04

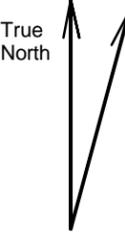


Legend

-  1759_ft_MSD for 4.5in Barrage Rocket
-  Opana_recommended_area_for_clearance
-  streams_rivers

A metal detector assisted surface and subsurface clearance will be performed over the entire 80 acre site. OE will be detonated in place or may be moved within the site. Shots will not be consolidated.

Minimum Separation Distance (MSD) for unintentional detonation is 1759 ft based on the Munition with Greatest Fragmentation Distance (MGFD): a 4.5 in. Barrage Rocket.



Magnetic Declination
11 15' East

No Annual Change

Rev	Drawn By	Checked By	Date
0	dbaker	rvanhuss	5/6/04

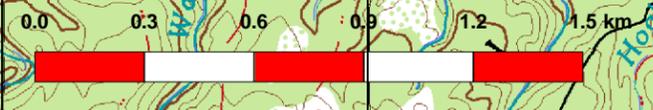
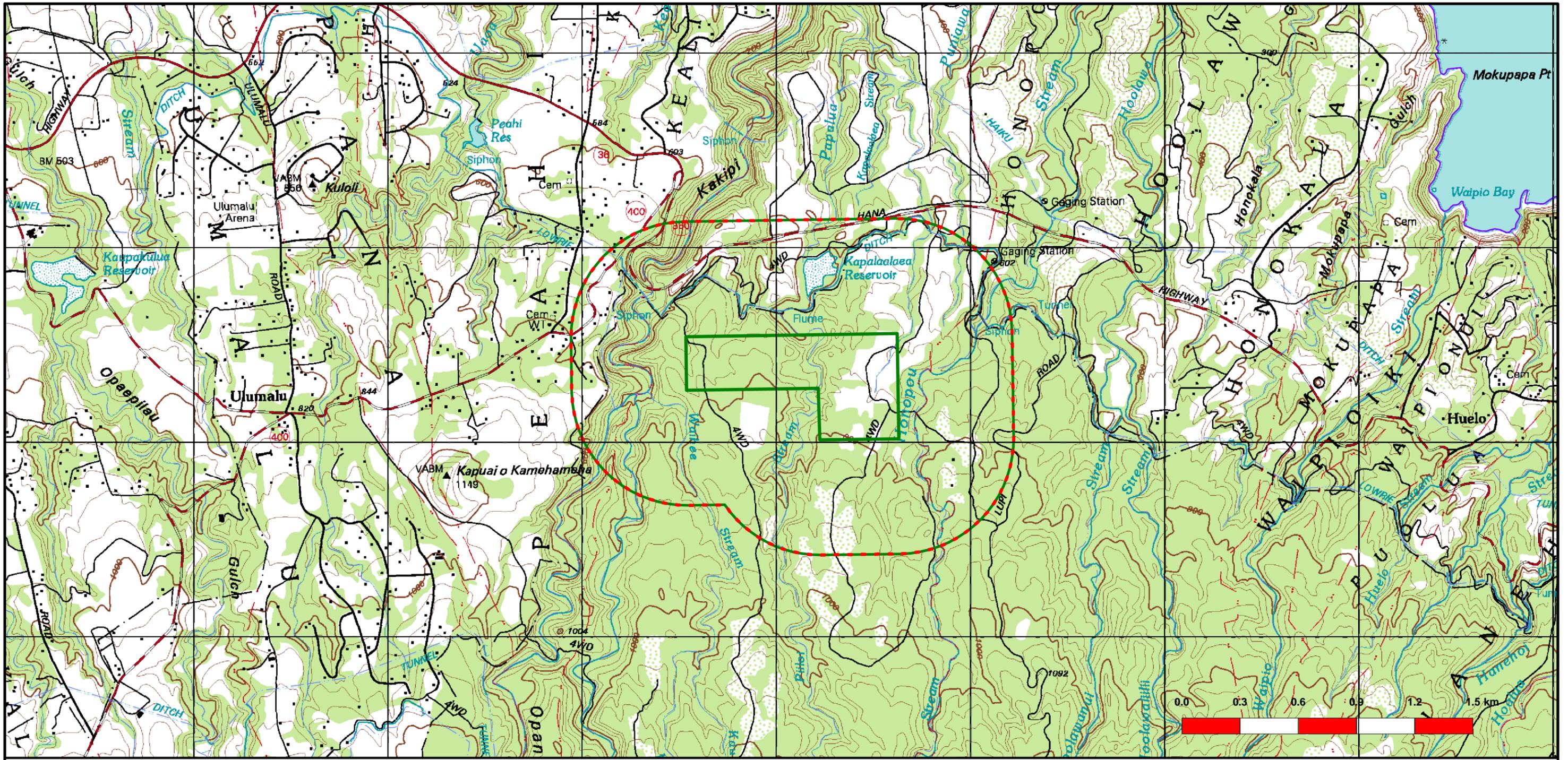
Files Reference
 MauiUTMz4_nad83m.gws scale: 1:19685
 Layout: Opana_OE_Response, Legend: Opana1

**OE Response Actions - Opana Point Site
Maui, Hawaii**

Prepared For:
 U.S.Engineering & Support Center, Huntsville AL
 by: American Technologies, Inc.

782000 783000 784000 785000 786000 787000 788000 789000

2316000
2315000
2314000
2313000

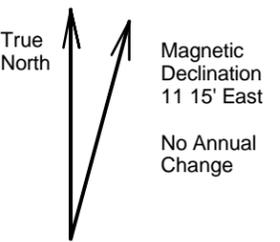


782000 783000 784000 785000 786000 787000 788000 789000

- Legend**
- 1939_ft_MSD for 105mm
 - Makawao_recommended_area_for_clearance
 - ~ streams_rivers

A metal detector assisted surface and subsurface clearance will be performed over the entire 100 acre site. OE will be detonated in place or may be moved within the site. Shots will not be consolidated.

Minimum Separation Distance (MSD) for unintentional detonation is 1939 ft based on the Munition with Greatest Fragmentation Distance (MGFD): a 105mm projectile..



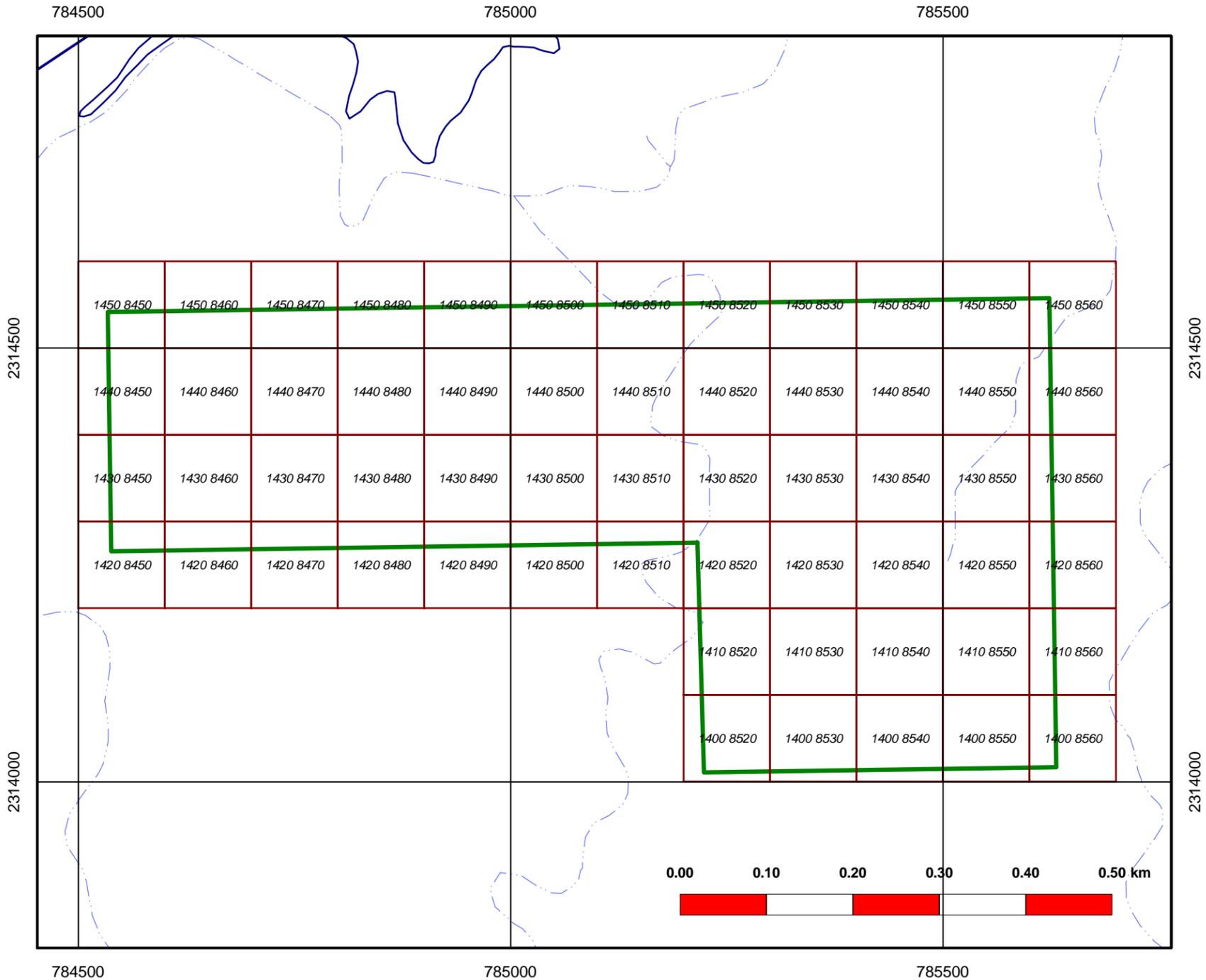
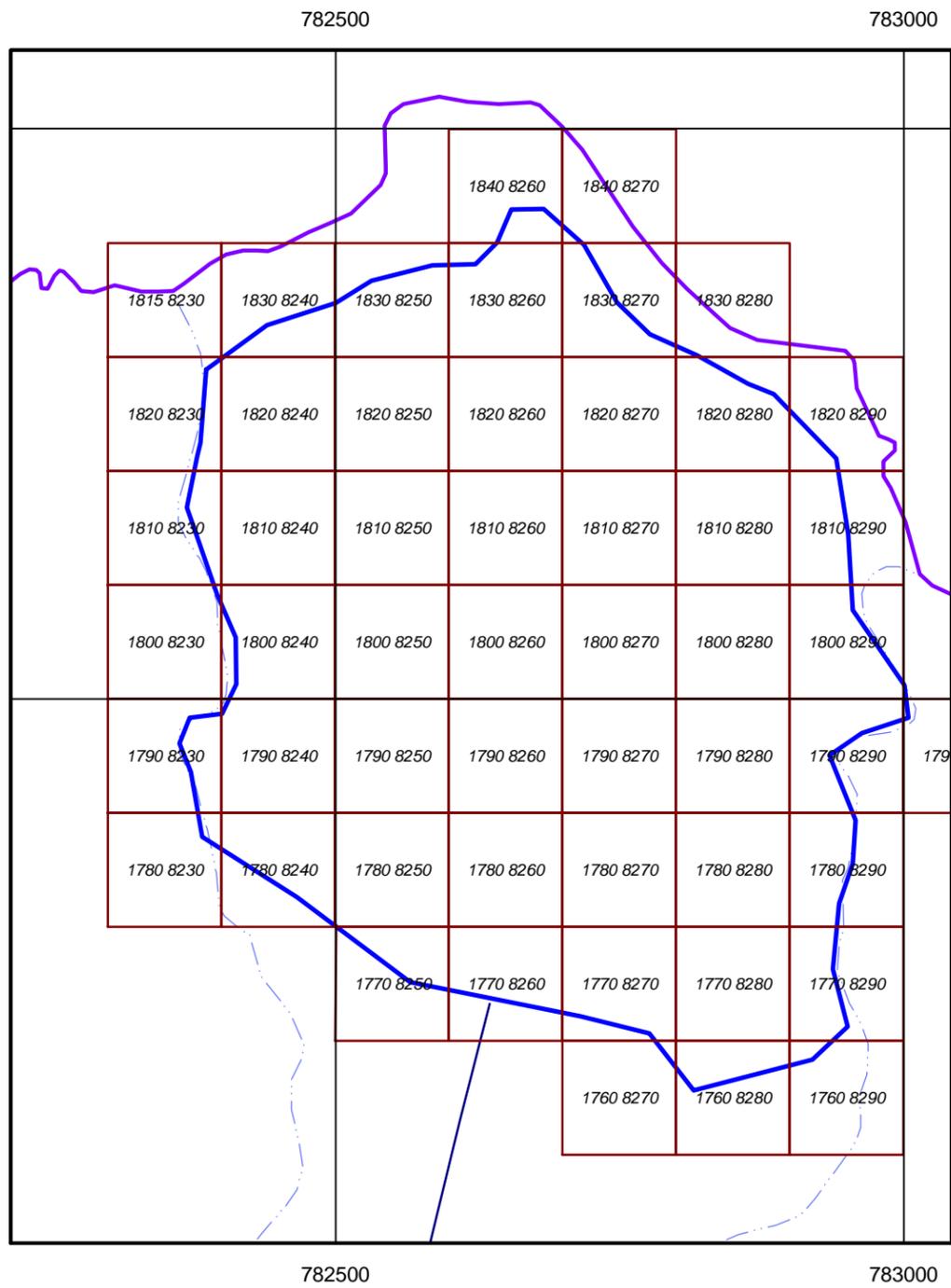
Rev	Drawn By	Checked By	Date
0	dbaker	rvanhuss	5/6/04

Files Reference

MauiUTMz4_nad83m.gws scale: 1:19685
 Layout: Makawao_OE_Response, Legend: Makawao1

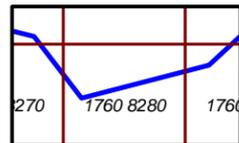
OE Response Actions - Makawao Site Maui, Hawaii

Prepared For:
 U.S.Engineering & Support Center, Huntsville AL
 by: American Technologies, Inc.



Legend

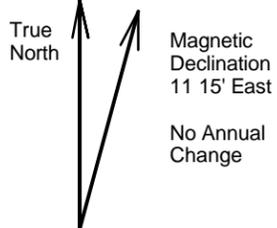
- grid
- Opana_recommended_area_for_clearance
- major_roads
- minor_roads
- streams_rivers



Northing, Easting
= 2217600, 782800
Grid ID: 1760 8280

Grid Numbering based on UTM coordinates. Eight digits extracted from Northing and Easting (see diagram at left).

To determine Grid ID from coordinates, remove the ending 0 from Northing and Easting values, and use the last 4 characters from each.



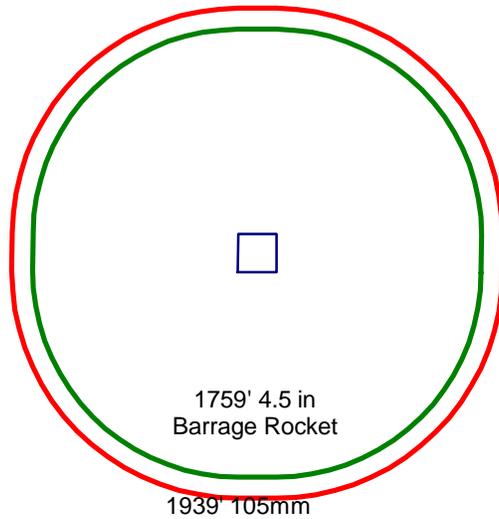
Rev	Drawn By	Checked By	Date
0	dbaker	rvanhuss	5/6/04

Files Reference

MauiUTMz4_nad83m.gws scale: 1:5905
 Layout: Opana_OE_Response, Legend: Opana1

Grid Numbering - Opana Point and Makawao Sites Maui, Hawaii

Prepared For:
U.S.Engineering & Support Center, Huntsville AL
by: American Technologies, Inc.



MSD OVERLAY

scale 1:19685

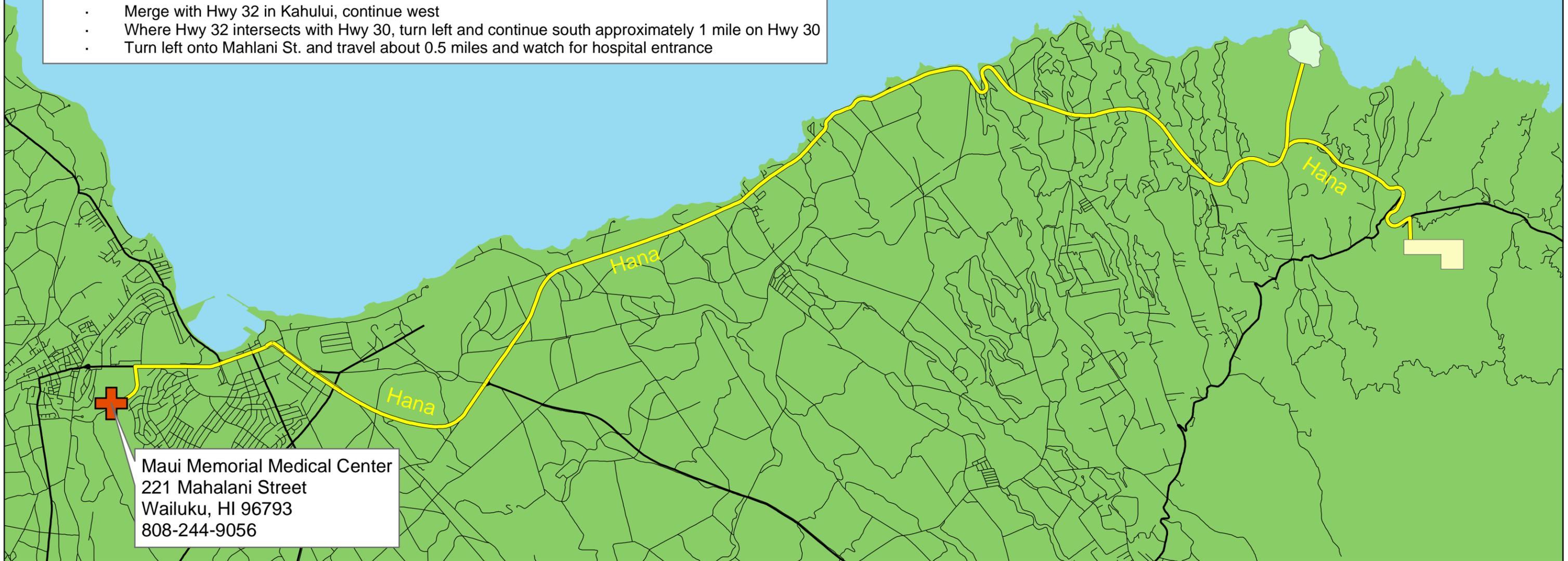
Area	MPM	Min Safe Dist	Notes
Opana Makawao	4.5in Barrage Rocket 105mm projectile	1759 feet 1939 feet	Use with map B-3 Use with map B-4

From Opana Point (distance approximately 25 miles):

- Take access roads to Hana Hwy (36/360), turn right (west) onto Hana Hwy (36/360)
- Merge with Hwy 32 in Kahului, continue west
- Where Hwy 32 intersects with Hwy 30, turn left and continue south approximately 1 mile on Hwy 30
- Turn left onto Mahlani St. and travel about 0.5 miles and watch for hospital entrance

From Makawao Gunnery Site (distance approximately 27 miles)

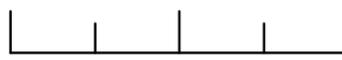
- Take access roads to Hana Hwy (36/360), turn right (west) onto Hana Hwy (36/360)
- Merge with Hwy 32 in Kahului, continue west
- Where Hwy 32 intersects with Hwy 30, turn left and continue south approximately 1 mile on Hwy 30
- Turn left onto Mahlani St. and travel about 0.5 miles and watch for hospital entrance



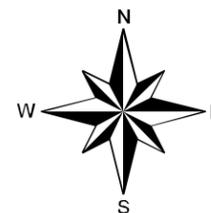
Legend

- Roads
- Opana Recommended Clearance
- Makawao Recommended Clearance
- Hospital Route
- ⊕ Maui Memorial Medical Center

0 0.5 1 2 Miles



Nad83, Hawaii State Plane, Zone 2



Hospital Route Map
Former Makawao Gunnery Site and
Opana Point Bombing Range

Prepared For:
U.S. Engineering & Support Center, Huntsville
Prepared By:
American Technologies, Inc.



DRAWN: B. Fritze

APPENDIX C

Local Points of Contact

Appendix C Project Contact List.

Service	Telephone Number
Ambulance Service	“911”
Police	"911" or (808) 935-3311
Fire Department	“911”
Fire Department Non-emergency	(808) 243-7911/7569
National Poison Control Center	(800) 222-1222
Hawaii Poison Control Center	(808) 941-4411
Hospital: Maui Memorial Medical Center, 221 Mahalani Street, Wailuku, Hi 96793	(808) 244-9056
ATI PM (Roger Van Huss)	(808) 885-3435
ATI SUXOS (Richard Wesner)	(808) 885-3435
ATI Safety Manager (Paul Duncan)	(865) 481-5337
U.S. Army Engineering and Support Center, Huntsville, Project Manager, Mr. Bob Nore)	(256) 895-1507
Honolulu Engineer District (CEPOH) Project Manager, Mr. Chuck Streck	(808) 438-6934
CHEMTREC	(800) 424-9300
National Response Team	(800) 424-8802
Centers for Disease Control (CDC) http://www.cdc.gov/health/diseases.htm	(800) 311-3435 or (404) 639-3534
EPA Environmental Response Team (ERT)	(800) 424-8802 or (202) 267-2675

ATI = American Technologies Incorporated
 CDC = Centers for Disease Control
 CHEMTREC = Chemical Transportation Emergency Center
 EPA = Environmental Protection Agency
 ERT = Environmental Response Team
 OSHA = Occupational Safety and Health Administration
 PM = Project Manager
 USACE = U.S. Army Corps of Engineers

APPENDIX D

Site Safety and Health Plan

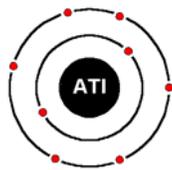
Contract No. DACA87-00-D-0035
Task Order 0024

Site Safety and Health Plan (SSHP)
for
Ordnance and Explosives (OE) Removal Action
at the
Opana Point Bombing Range & Makawao Gunnery Site
Maui, Hawaii

Prepared For:
U.S. Army Engineering and Support Center
Huntsville, Alabama



Prepared By:
American Technologies, Inc.
142 Fairbanks Road
Oak Ridge, Tennessee 37830



The project is located in the
U.S. Army Engineer District: Honolulu

May 14, 2004

APPENDIX G

MGFD Calculation Sheets

APPENDIX H

Resumes

APPENDIX I

Geophysical Prove-Out Report

APPENDIX J

MSDS

APPENDIX K

Project Schedule

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SSHP APPROVAL SHEET

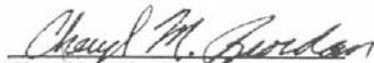
Project: **Ordnance and Explosives
(OE) Removal Action**

Site Location: **Maui, Hawaii**

Contract Number: **DACA87-00-D-0035**
Task Order: **0024**

Site Name: **Opana Point Bombing Range
and Makawao Gunnery Site**

Reviewed and Approved By:


Cheryl M. Riordan, CSP



11 May 2004
Date


Paul C. Duncan, ATI Safety Manager

12 May 2004
Date

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D.0 SITE SAFETY AND HEALTH PLAN (SSHP)

D.1 Introduction

D.1.1 Background Information.

D.1.1.1 American Technologies, Inc. (ATI) out of Oak Ridge, Tennessee was issued Contract Number DAC87-00-D-0035, Task Order 0024.

D.1.1.2 This contract is for an Ordnance and Explosives (OE) Removal Action at the Opana Point Bombing Range & Makawao Gunnery Site in Maui, Hawaii.

D.1.1.3 The objective of this task order is for ATI to safely locate, identify and dispose of all Unexploded Ordnance (UXO) and hazardous OE items within 90 acres at the former Opana Point Bombing Target and 100 acres at the former Makawao Gunnery Site in Maui, Hawaii. Refer to site maps in Appendix B.

D.1.1.4 ATI has maintained an Experience Modification Rate (EMR) for the three most recent years as follows:

Policy Year	EMR
2003	0.95
2002	0.83
2001	0.94

D.1.1.5 The phases of work and hazardous activities, which require Activity Hazard Analyses, are listed in paragraph D.4.1.2.

D.1.2 Statement of Safety and Health Policy

D.1.2.1 American Technologies, Inc. (ATI) believes strongly that our people are the company's most important and valuable asset. The actions of the personnel, working together as a team, determine ultimately the success of the endeavors of the company.

D.1.2.2 Accidental injuries and illnesses can cause needless pain and suffering of employees and their families, as well as increasing costs and decreasing productivity and morale among employees. ATI is committed to providing a safe and healthful work environment for all of our employees in all locations. ATI's ultimate goal is an accident-free work environment. ATI is committed to doing all in its power to make this a reality.

D.1.3 **Supervisors Accountability**

D.1.3.1 On each ATI project jobsite, the site senior supervisor or superintendent will be accountable to management for the successful achievement of targeted Company safety and health goals. ATI's project safety and health goals are:

- Zero fatalities or serious injuries.
- Reduce injuries, lost workday accidents and workers compensation claims.
- Prevention of damage or destruction to company property or equipment.
- Increased productivity through reduction of injuries.
- Reduced worker's compensation costs.
- Enhance company's image by working safely
- Keep safety a paramount part of the workers daily activities.
- Recognize and reward safe work practices.
- Improve morale and productivity.

D.1.3.2 The role of supervisors in safety leadership is obvious. They are the liaison between management's mission and the employees' ability to follow through in accomplishing it.

D.1.3.3 An active safety accountability system contributes to an effective work environment resulting in improved productivity, higher morale and quality performance. Safety accountability is achieved by total management commitment, active safety supervision, employee involvement, safety performance evaluations, new employee orientation, and effective communication.

D.1.4 **Site Safety and Health Plan (SSHP) Preparation**

D.1.4.1 The ATI Safety Office has prepared this SSHP to address all on-site work to be performed by ATI and all of its' subcontractors. This plan is developed, and will be implemented and overseen, by a Certified Safety Professional (CSP) and approved by the ATI Project Manager (ATI PM), with final approval from the government's Contracting Officer. Once approved, this SSHP will be enforced as if it were an addition to the contract specifications. This SSHP will be enforced, on-site, by the Unexploded Ordnance Safety Officer (UXOSO), the Senior Unexploded Ordnance Supervisor (SUXOS), and the ATI PM, with oversight by the ATI Safety Office.

D.1.4.2 The purpose of this SSHP is to describe protocols necessary for the anticipation, recognition, evaluation, and control of hazards associated with each task performed at this site. The SSHP addresses site-specific safety and health requirements and

procedures based upon-site-specific conditions. The level of detail in the SSHP is tailored to the type of work, complexity of operations to be performed, and hazards anticipated. A copy of this SSHP will be available on this project site for the duration of site operations.

- D.1.4.3 Any incident of threats to worker health and safety, or the potential for environmental impacts, will result in the immediate implementation of corrective actions, by the UXOSO and site managers, to protect the workers and the environment.
- D.1.4.4 This SSHP is developed in accordance with the requirements of 29 CFR 1910/29, CFR 1926, ER 385-1-92, EM 385-1-1, any other applicable federal, state, and local safety and occupational health laws and regulations, and the ATI Corporate Safety and Health Program (CSHP). Where requirements of various applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements will apply to this site. The SSHP addresses all elements required by 29 CFR 1910.120(b)(4)(ii), 29 CFR 1926.65(b)(4)(ii), and ER 385-1-92, Appendix B, and EM 385-1-1.
- D.1.4.5 When activities are to be conducted, and those activities fall within the major sections of EM 385-1-1, this SSHP shall be written to meet requirements outlined in that manual.
- D.1.4.6 Changes may be required in this SSHP to adapt to new conditions or unanticipated situations. Prior to the start of any new tasks, the ATI Safety Office will prepare any changes required in this plan, with concurrence by the ATI PM and approval of the CSP. Approval of such changes will be requested, in writing, to the government's Contracting Officer, prior to implementing any changes. Should any unforeseen hazard become evident during the performance of the work, the UXOSO will implement immediately corrective actions to protect workers and bring such hazard to the attention of the ATI Safety Office, the SUXOS, and the ATI PM. They will, in turn, notify the government's Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, necessary action will be taken to re-establish and maintain safe working conditions in order to safeguard on-site personnel, visitors, the public, and the environment.
- D.1.4.7 ATI has an extensive CSHP in place, which has the full support of the Corporate Management staff. The ATI CSHP is reviewed and updated annually to ensure that it remains current with regulatory requirements.

D.1.5 Safety and Health Inspections

There are no tasks to be performed during activities under the SOW, which require external agency safety and health inspections. Should additional tasks to the SOW be added, which will require additional inspection activities, this section of the site safety and health plan shall be revised to include these procedures.

D.2 Staff Organization, Qualification, and Responsibilities

D.2.1 General

D.2.1.1 All site operational and other personnel having exposure potential to site hazards are subject to the requirements of this SSHP. Work may not be performed in a manner that conflicts with the intent of, or the inherent safety, health, or environmental precautions expressed in this SSHP. After due warnings, personnel violating safety procedures will be dismissed from the site.

D.2.1.2 The safety and health requirements listed in this SSHP may change as site work progresses; however, no changes will be made that would lower the inherent safety, health, or environmental precautions expressed in this SSHP without approval of the United States Army Engineering and Support Center, Huntsville (USAESCH) and ATI.

D.2.1.3 Figure D-2.1 shows the key project personnel positions for safety and health and the lines of authority.

D.2.2 ATI Project Manager (ATI PM)

D.2.2.1 The ATI PM, James R. Van Huss, will provide project management and administrative support during the conduct of field operations and will prepare or approve all United States Army Corps of Engineers (USACE)-required reports and documents. ATI will have overall responsibility for the health and safety of site personnel operating under this SOW for the Ordnance and Explosives (OE) Removal Action at the Sierra Army Depot East Shore Base Realignment and Closure (BRAC) Parcels in Herlong California.

D.2.2.2 The ATI PM will be the point of contact (POC) on all project-related issues with USACE. He will ensure that ATI and subcontractor personnel on-site, through close coordination with the SUXOS, meet all safety and health requirements.

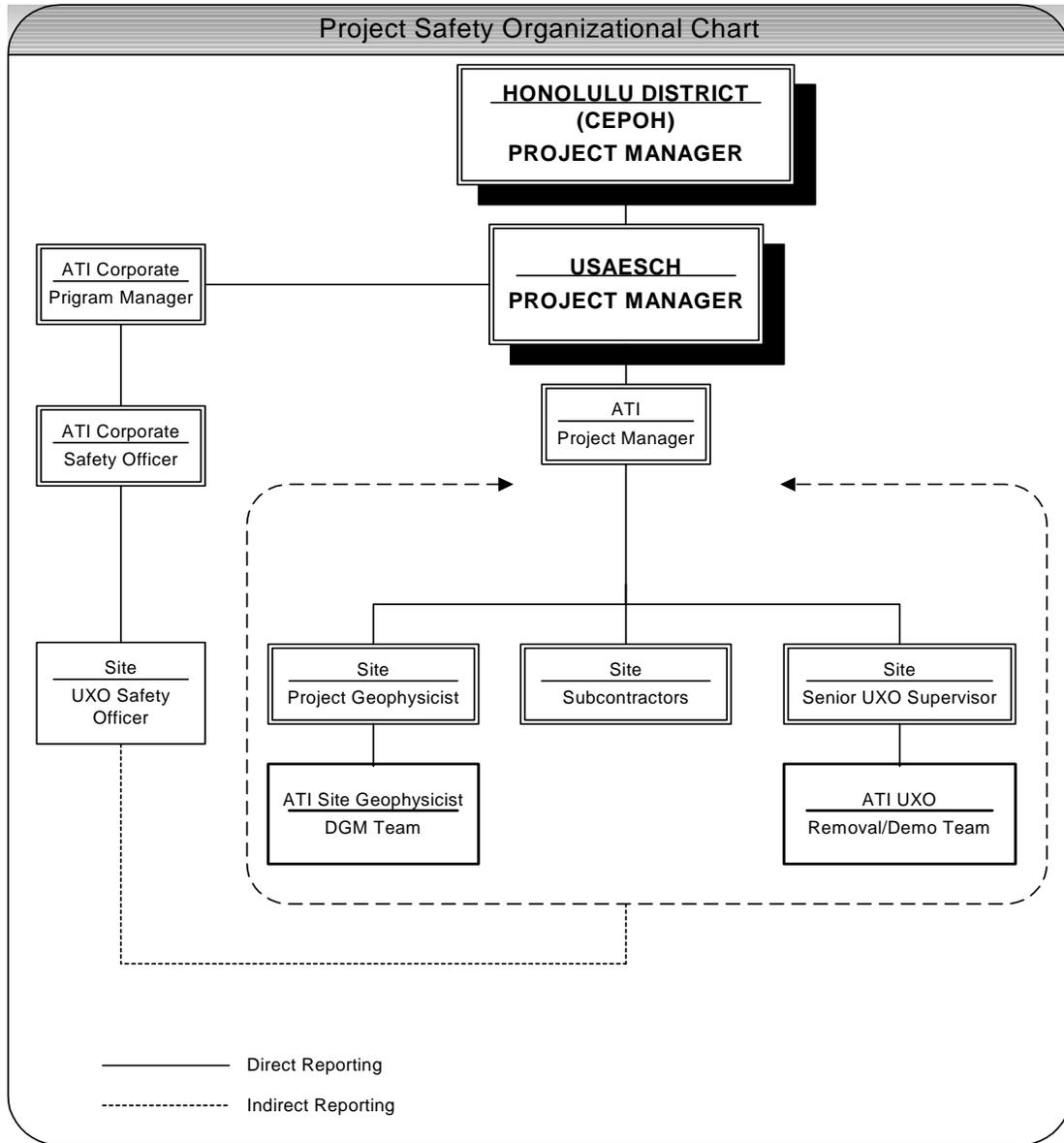
D.2.3 Senior Unexploded Ordnance Supervisor (SUXOS)

D.2.3.1 The SUXOS, Richard Wesner, is responsible for on-site enforcement of all Work Plan and site-specific safety and health plan requirements. He will provide direct supervision of on-site personnel and will coordinate activities with subcontractor personnel.

D.2.3.2 The SUXOS will coordinate closely with the ATI PM regarding site activities and will be the on-site POC with the USACE on-site representative.

D.2.3.3 The SUXOS will work closely with the ATI UXOSO to ensure that all employees on the site are trained adequately and continue to follow safe operating procedures.

Figure D-2.1. Project Safety Organization



ATI = American Technologies, Inc.
 DGM = Digital Geophysical Mapping
 USAESCH = United States Army Engineering and Support Center, Huntsville
 UXO = Unexploded Ordnance

D.2.4 ATI Corporate Safety Office

D.2.4.1 The ATI Corporate Safety Office shall develop the site-safety and health plan.

D.2.4.2 A Certified Safety Professional (CSP), within the safety office, is responsible to oversee the development of the SSHP, by the ATI Safety Office, to review and approve initial safety plans and recommended changes submitted to the government's Contracting Officer for final approval.

- D.2.4.3 The Safety Manager, who is aligned with the ATI Safety Office, is responsible for preparation of this SSHP.
- D.2.4.4 The Safety Manager will authorize periodic, unannounced audits of this project safety program during the course of contract work on this site.
- D.2.5 **ATI Site Unexploded Ordnance Safety Officer (UXOSO)**
- D.2.5.1 The ATI UXOSO, John S. Wilson, reports directly to the ATI PM. He is the primary POC for on-site safety issues.
- D.2.5.2 The UXOSO will coordinate closely with the SUXOS regarding all safety matters on the work site. He will be authorized to stop work at any time for safety and health reasons and will notify immediately the SUXOS and the on-site USACE Safety Specialist of the stop work and explain the cause of the stoppage.
- D.2.5.3 The UXOSO will be responsible for implementing and enforcing the requirements of this SSHP. Any changes in operations or conditions requiring changes to this SSHP will be coordinated through the ATI Safety Office and the ATI PM.
- D.2.5.4 The UXOSO will provide safety training to on-site employees and subcontractors through mobilization training sessions, daily tailgate safety briefings, daily debriefings, weekly supervisor safety meetings, visitor training, Personal Protective Equipment (PPE) training, as well as any other training needs that may surface during the course of operations. The UXOSO will enforce the proper levels of PPE in accordance with this SSHP and will coordinate with the ATI Safety Office prior to making any changes in PPE requirements.
- D.2.5.5 The UXOSO will conduct daily safety inspections, weekly safety audits, and maintain all required safety forms (as well as the safety log), and he will follow up on any discrepancies noted until correction has been verified. The UXOSO will investigate all onsite accidents, incidents, and near misses.
- D.2.6 **Subcontractor Responsibilities**
- D.2.6.1 Subcontractor personnel working on this site will be required to prepare a site-specific safety and health plan, which is at least as stringent as the ATI SSHP, or they will follow requirements of this SSHP.
- D.2.6.2 All ATI subcontractors will be responsible for providing medically approved and properly trained site personnel with certifications provided to the on-site UXOSO and updated as necessary. Current training certificates (i.e., 40-hour, 8-hour refresher, and 8-hour supervisors) and medical clearance certification will be maintained on-site with the UXO Safety Officer.
- D.2.6.3 The subcontractor will also be responsible for providing equipment, including PPE that is safe for operation and free from any obvious hazards.

D.2.7 **Responsibilities of all Site Personnel**

D.2.7.1 All ATI, USACE, subcontractor personnel, and visitors, who will be involved in on-site activities, are responsible for the following:

- Taking all reasonable precautions to prevent injury to site personnel and being alert to potentially harmful situations.
- Performing only those tasks that can be done safely with proper training provided. All on-site personnel have stop-work authority when imminent safety or environmental hazards are found or identified.
- Notifying the ATI UXOSO of any special medical conditions (e.g., allergies, contact lenses, diabetes, etc.) that may be impacted by site operations.
- Notifying the ATI UXOSO of any prescription and/or nonprescription medication that a worker may be taking that might cause drowsiness, anxiety, or other unfavorable side effects.
- Preventing spillage and splash of materials to the greatest extent possible.
- Practicing good housekeeping by keeping the work area neat, clean, and in order.
- Reporting immediately all injuries, no matter how minor, to the ATI UXOSO.
- Complying with the SSHP and all safety and health recommendations and precautions, and using properly the PPE as determined by this SSHP and/or the ATI UXOSO.

D.2.8 **Resumes**

The resumes of all ATI personnel assigned specific safety and health responsibilities are included in Appendix H of the Work Plan.

D.3 Site Description and Contamination Characterization

D.3.1 Background

D.3.1.1 The work required under this Scope of Work (SOW) falls under the Defense Environmental Restoration Program – Formerly Used Defense Sites (DERP-FUDS). In addition, all activities involving work in areas potentially containing OE hazards shall be performed consistent with U.S. Army Engineering and Support Center, Huntsville (USAESCH), U.S. Army Corps of Engineers (USACE), Department of the Army (DA), and Department of Defense (DOD) requirements regarding personnel, equipment and procedures. Ordnance and explosives (OE) hazards exist because of Department of Defense activities.

D.3.1.2 OE is a safety hazard and constitutes an imminent endangerment to the general public, on site personnel and the environment. During this action, it may be necessary for the contractor to destroy on site any OE encountered. ATI will comply with applicable provisions of 29 CFR 1910.120.

D.3.2 Site Description and History

D.3.2.1 Opana Point Bombing Range

D.3.2.1.1 The former Opana Point Bombing Range project site is located at the Northern most point on the island of Maui, Hawaii. Access to the project site is located about 1.1 miles north of Hana Road and 16-road miles east of Kahului, Maui, on land currently owned by Amfac Property Investment Corporation, Kaanapali, Maui, Hawaii and leased to the Maui Land & Pineapple Company, Inc., Paia, Maui, Hawaii. Except for a portion along the seaward cliff line, almost all of the former bombing range (currently called Field 212) is under cultivation for the production of pineapples. The site is located on the Opana Point at an elevation of above 120 feet above Mean Sea Level (MSL). The northern boundary of the project site is located along the cliff line, which is about 100 feet above MSL. The surface of the project site has been cleared and graded to meet the requirements for cultivation of pineapples. During one field investigation of the site in June 1990, sixteen (16) Mark 23 practice bombs were discovered on the surface within the boundaries of the Bombing Range. These were probably placed at this location during ground clearance as part of the pineapple cultivation work.

D.3.2.1.2 Although detailed information is not available, records from the Department of Navy Pacific Division Naval Facilities Engineering Command, Pearl Harbor, HI show that the Opana Point, Maui, HI was identified as a bombing range. The lease was cancelled on 10 May 1946.

D.3.2.1.3 Wilson Okamoto & Associates conducted a field investigation on the former Opana Point Bombing Range in June 1990. During that investigation, sixteen AN-Mk 23 practice bombs, large metal fragments, and what appeared to be bomb craters were discovered on the surface within the boundaries of the bombing range. It is likely

that the practice bombs were probably placed at the location where they were found during ground clearance as part of the pineapple cultivation work. Donaldson Enterprises Inc. performed an OE clearance operation during the summer of 2001, during which they recovered a total of 88 OE items. Eighty-five Mk 5 and AN-Mk 23 3-lb practice bombs (27 possibly live) were located and disposed of during their effort. Two live M49 series 60 mm HE mortars and one live 4.5 inch Mk 3 HE barrage rocket were also discovered and disposed of during this removal action. In January 2002, a site visit was conducted by ZAPATAENGINEERING. The project team noted that the site was mostly covered with short to medium length grasses and patches of short dense woody plants. The area is no longer being used for agriculture and no evidence of OE was noted. During the geophysical prove-out, conducted in March 2002 by ZAPATAENGINEERING and subcontractor Blackhawk, two AN-Mk 23 practice bombs were discovered and properly disposed of.

D.3.2.2 Makawao Gunnery Site

D.3.2.2.1 The Makawao Gunnery Site and Opana Point Bombing Range are located approximately three miles northeast and five miles north-northeast, respectively, of the City of Makawao, Island of Maui, Hawaii. The US Marine Corps (USMC) used the Makawao Gunnery Site as an artillery impact area. The site is currently owned by the East Maui Irrigation Company, Ltd. and is primarily used for cattle grazing.

D.3.2.2.2 The gunnery site was used as a firing range and maneuver training area for the US Marine Corps. The site (comprising 1,002 acres) was acquired by license on April 7, 1944 for the duration of the war (World War II), plus six months. The US Navy Real Estate Office (Naval Facilities Engineering Command, Pacific Division) had record that the license existed but they destroyed their actual document files in the early 1970's. The East Maui Irrigation Company, (owned/leased since 1941) also destroyed their records of agreements with the United States of America DOD during WWII. The State of Hawaii's Tax Branch Offices (both City and County of Honolulu and County of Maui) do not have any records indicating DOD use of the site.

D.3.2.2.3 On June 8, 1993 as site reconnaissance of the former Makawao Gunnery site was conducted by representatives of R.M. Towill Corporation and Donaldson Enterprises, Inc. During this site investigation, Mr. Steven Cabral, a representative of the East Maui Irrigation Company met the investigation team and escorted them to an area where he had unearthed an unexploded 105mm artillery shell while plowing the site with a tractor. On August 18, 1995, a second site visit was conducted by the USACE, Honolulu District in an attempt to determine the potential cultural significance of the property. During this investigation, the US Army Corps of Engineers, Pacific Ocean Division (CEPOD) archeologist, stated that he did not identify any sites of archaeological significance. In January 2002 a site visit was conducted by ZAPATAENGINEERING however, the owner did not grant a right-to-enter so this site was not visited.

D.3.3 **Climatic Date**

D.3.3.1 At sea level Maui has a remarkably stable tropical climate with highs in the region of 28 °C (80 to 85 °F) and lows around 20°C (65 to 70 °F); rainfall is greater in the northern hemisphere winter (wet season is November through April). However, because of the two volcanoes that dominate the topography of the island, Maui has a very wide range of climatic conditions depending on elevation and whether an area faces toward or away from the prevailing trade winds (blowing from the north east). Kahului airport (the main airport on Maui) has average rainfall of about 19 inches (480 mm) whereas Olinda (upcountry above Makawao) receives about 73 inches (1.8 m).

D.3.4 **Topography**

Maui is a volcanic doublet: an island formed from two volcanic mountains that abut one another. The older volcano, Mauna Kahalawai, is much older and has been eroded considerably; it is called the West Maui Mountains. The larger volcano, Haleakala, rises above 10,023 feet (3,050 m). The last eruption of Haleakala occurred in ca. 1790. Both volcanoes are shield volcanoes and the low viscosity of the Hawaiian lava makes the likelihood of large explosive volcanic eruptions negligible.

D.3.5 **Contamination Characterization**

D.3.5.1 **Chemical Warfare Material (CWM) Contamination**

D.3.5.1.1 There is no evidence that CWM has been tested or exists within the area comprising this project. This site is not a suspected CWM facility. However, during conventional OE operations, if ATI identifies or suspects CWM, all personnel shall immediately withdraw along cleared paths upwind from the work area and notify the Corps of Engineers, OE Safety Specialist. ATI shall secure the area and provide two personnel located upwind of the suspect CWM to secure the site until relieved by the Technical Escort Unit (TEU) or Explosive Ordnance Disposal (EOD) personnel.

D.3.5.2 **Hazardous Substance Contamination**

D.3.5.2.1 By definition, hazardous substances are those materials that can threaten human health and/or environmental well being if released into the environment.

D.3.5.2.2 This describes those hazardous substances or chemical contaminants present in soil that pose a threat to the environment, and as such may pose a threat to site personnel and the public during removal actions.

D.3.5.2.3 Results of previous activities conducted at these sites do not indicate a potential for other hazardous substance contamination. The potential for a hazardous substance

to adversely impact site personnel, during the removal action would be extremely unlikely.

D.3.5.3 UXO/OE Contamination

D.3.5.3.1 As a result of past usage and investigations, OE contamination may exist in the Opana Point Bombing Range & Makawao Gunnery Site in Maui, Hawaii.

D.3.5.3.2 Table D-3.1, *UXO/OE Previously Found During Activities*, lists the type items, which have been found during previous activities.

Table D-3.1 UXO/OE Previously Found During Activities

<u><i>Opana Point Bombing Range</i></u>
Projectile, 60MM, 81MM, M49
Rocket, 4.5-inch Barrage, High Explosive, MK 3
Bomb, Practice, Mk 5, Mk 23, 24lb Bomb
<u><i>Makawao Gunnery Site</i></u>
Projectile, 60MM, M49
Rocket, 4.5-inch Barrage, High Explosive, MK 3
Projectile, 105MM, High Explosive

D.4 Hazard Analysis and Risk Assessment

D.4.1 Project Task Hazard Analysis

D.4.1.1 Individual hazard analyses have been performed for each major task at this project site. Table D-4.1 lists the tasks, operations, and their associated hazards. The potential hazards have been identified, control measures have been outlined, training requirements and PPE requirements have been established, and equipment inspection procedures have been established. Should new operations be introduced to this site, the ATI Safety Office will perform a hazard analysis. Should operations change significantly during the course of this project, the hazard analysis will be updated to accommodate these changes. The ATI Safety Office will approve any changes in PPE or safe operating procedures. As stated in the Work Plan, approval of such changes shall be requested, in writing, to the government's Contracting Officer prior to implementing any changes.

D.4.1.2 The hazard analyses performed for this project include the following activities and are presented below and in the noted tables:

- Establish a Geophysical Function Test/Quality Control Test Plot/Strip. (Table D-4-2)
- Performing Surface UXO/OE Removal Action Activities. (Table D-4.3)
- Operating Geophysical Instruments. (Table D-4.4)
- Conducting Demolition Operations. (Table D-4.5)
- Performing UXO/OE Inspection Activities. (Table D-4.6)
- Location Survey and Mapping Operations. (Table D-4.7)
- Operating Mechanical Handling Equipment. (Table D-4.8)
- Operating Portable Hand and Power Brush Cutting Equipment. (Table D-4.9)
- Gain access to subsurface anomalies utilizing mechanical Earth Moving Machinery (EEM). (Table D-4.10)
- Gain access to subsurface anomalies utilizing hand operated excavation equipment. (Table D-4.11)
- Perform Quality Control (QC) Activities. (Table D-4.12)
- Performing Motor Vehicle Operations. (Table D-4.13)

Table D-4.1. Project Task Hazard Analysis

TASK	OPERATION	HAZARDS
Establish a Geophysical Function Test/Quality Control Test Plot/Strip	<ul style="list-style-type: none"> • Determine a location for Function/QC test plot/strip. • Use a Garrett™ Sea Hunter II metal locator to ensure there are no anomalies, where stakes are to be driven by the survey team, and mark the site. • Drive stakes to mark the test plot/strip corners. • Conduct brush-cutting activities, if required. • Use UXO avoidance techniques to ensure location of excavations of surrogates and plot/strip corners are clear of anomalies. • Excavate locations for surrogate placement. 	<ul style="list-style-type: none"> • Slips, trips, and falls hazards. • UXO/OE hazards. • Biological hazards. • Heat/cold stress hazards. • Noise hazards. • Eye hazards. • Head hazards. • Cuts and abrasions hazards.
Performing Surface UXO/OE Removal Action Activities	<ul style="list-style-type: none"> • Establish work area. • Locate surface UXO/OE items with the assistance of magnetic locators. • Identify UXO/OE items. • Live UXO/OE or suspected items will be disposed of by detonation. • Inert (explosive-free) OE items, requiring venting, will be set aside for venting to be performed. • Inspected OE scrap will be placed in a secure container to prevent commingling with OE scrap, which has not been inspected. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • UXO/OE hazards. • Biological hazards. • Heat/cold stress hazards. • Eye hazards. • Head hazards. • Cuts and abrasions hazards.
Operating Geophysical Instruments	<ul style="list-style-type: none"> • Using an appropriate geophysical instrument to establish working grids. • Ensure that there are no anomalies where marking stakes are to be driven. • Assist in locating surface anomalies during the investigation. • If required, wooden, fiberglass pin flags, or other non-metallic items will be used to mark survey lines, UXO, and OE scrap. • Perform the geophysical survey. • If surface clearance has not been conducted, UXO escort will accompany geophysical survey team. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • UXO/OE hazards. • Biological hazards. • Heat/cold stress hazards. • Eye hazards.
Conducting Demolition Operations	<ul style="list-style-type: none"> • Make required notifications of demolition/venting operations. • Retrieve donor explosives required for operation. • Set up demolition charges in accordance with the demolition procedures. • Utilize filled sandbags around demolition charge, if required, to reduce the range in which fragments may travel. • Post sentries outside the Fragment Zone on all access roads. • Ensure sentries have a full view of the demolition and access areas. • Contact sentries to ensure that no pedestrian traffic is in the vicinity. • Evacuate demolition crew to a safe location. • Demolition occurs. • Inspect the demolition-site to ensure that demolition/venting has been completed properly. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • UXO/OE hazards. • Biological hazards. • Heat/cold stress hazards. • Blast hazards (due to static electricity and EMR). • Overpressure hazards (due to Blast Hazard). • Fragmentation hazards (due to Blast Hazard). • Eye hazards (due to Blast Hazard). • Noise hazards (due to Blast Hazard). • Cuts and abrasions hazards (due to Blast Hazard).

TASK	OPERATION	HAZARDS
Performing UXO/OE Inspection Activities	<ul style="list-style-type: none"> • Thorough inspection of UXO/OE items. • Inspected OE scrap will be placed in a secure container to prevent commingling with OE scrap, which has not been inspected. • Inert (explosive-free) OE items requiring venting will be set aside for venting to be performed. • Live UXO/OE or suspected items will be set aside for disposal, by detonation. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • UXO/OE hazards. • Biological hazard. • Heat/cold stress hazards. • Eye hazards. • Cuts and abrasion hazards.
Location Survey and Mapping Operations	<ul style="list-style-type: none"> • UXO Escort for Land Surveyors to conduct survey activities. • Use appropriate geophysical instrument to ensure there are no anomalies where marking stakes or survey pins are to be driven by the survey team. • Drive marking stakes to mark grid corners and transects. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • UXO/OE hazards. • Biological hazard. • Heat/cold stress hazards. • Eye hazards.
Operating Heavy Equipment (Brush Cutter)	<ul style="list-style-type: none"> • Inspect heavy equipment to ensure that it is functioning properly. • Have a ground guide in clear view at all times (if required). • If required, when guide signals it is safe to start, begin brush-cutting operations. • When operations are complete, safely store equipment. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • Biological hazards. • Heat/cold stress hazard. • Eye hazard. • Head hazard. • Cuts and abrasions hazard (from flying debris within the equipment throw area). • Crush and pinch point hazard. • Noise hazard. • Exhaust from equipment in the breathing zone of workers. • Handling flammable liquids during fueling.
Operating Portable Hand and Power Brush Cutting Equipment	<ul style="list-style-type: none"> • Inspect portable hand and power brushing cutting equipment to ensure that it is functioning properly and has no defects. • Ensure that all Personal Protective Equipment (PPE) is on hand and used. • When individual area of operation is clear of all unnecessary personnel, start brush-clearing operation. • When operations are complete, safely perform equipment maintenance and storage. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • Biological hazards. • Heat/cold stress hazard. • Eye hazard. • Head hazard. • Cuts and abrasions hazard (from flying debris within the equipment throw area). • Noise hazard. • Exhaust from equipment in the breathing zone of workers. • Handling flammable liquids during fueling.
Gain access to selected subsurface anomalies utilizing mechanical Earth Moving Machinery (EMM)	<ul style="list-style-type: none"> • Inspect EMM to ensure that it is functioning properly and has no defects. • Ensure that all Personal Protective Equipment (PPE) is on hand and used. • When individual area for excavating is clear of all unnecessary personnel start excavation operation, carefully removing soil to within 12-inches over anomaly. • When operations are complete, safely perform equipment maintenance and storage. • EMM will be stored in the off position, with the bucket at ground level. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • UXO/OE hazards. • Biological hazards. • Heat/cold stress hazard. • Eye hazard. • Head hazard. • Crush and pinch point hazard. • Noise hazard. • Exhaust from equipment in the breathing zone of workers. • Handling flammable liquids during fueling.

Table D-4.1. Project Task Hazard Analysis (continued)

TASK	OPERATION	HAZARDS
Gain access to selected subsurface anomalies utilizing portable hand operated excavation equipment	<ul style="list-style-type: none"> • Inspect hand excavation equipment to ensure that it is functioning properly and has not defects. • Ensure that all Personal Protective Equipment (PPE) is on hand and used. • When individual area of operation is clear of all unnecessary personnel, start soil excavation operation. • When operations are complete, safely perform equipment maintenance and storage. 	<ul style="list-style-type: none"> • Slips, trips, and fall hazards. • UXO/OE hazards. • Biological hazards. • Heat/cold stress hazard. • Eye hazard. • Head hazard. • Noise hazard. • Cuts and abrasions hazard.
Perform Quality Control (QC) Activities	<ul style="list-style-type: none"> • Using an appropriate geophysical instrument, perform QC activities. • Ensure that there are no surface and sub-surface UXO or UXO like items within completed grids. • Investigate discovered surface or sub-surface anomalies. • Report any anomalies meeting failure criteria to the SUXOS. 	<ul style="list-style-type: none"> • Slips, trips, and falls hazards. • UXO/OE hazards. • Biological hazards. • Heat/cold stress hazards. • Eye hazards.
Performing Motor Vehicle Operations	<ul style="list-style-type: none"> • Inspect vehicles to ensure proper working condition. • Ensure that vehicles are properly equipped. • Explosive materials, when transported, will be loaded and secured to prevent shifting. • Conduct motor vehicle operations. 	<ul style="list-style-type: none"> • Explosive hazards. • Heat stress. • Personnel struck by mobile equipment. • Vehicle collisions.

EMM = Earth Moving Machinery.
 EMR = Electromagnetic Radiation.
 OE = Ordnance and Explosives.
 PPE = Personal Protective Equipment
 QC = Quality Control.
 SUXOS = Senior UXO Supervisor.
 UXO = Unexploded Ordnance.
 UXO/OE = Unexploded Ordnance/Ordnance and Explosives.

Table D-4.2. Establish a Geophysical Function Test/Quality Control Test Plot/Strip

ACTIVITY HAZARD ANALYSIS

ACTIVITY Establish a Geophysical Function Test/Quality Control Test Plot/Strip **ANALYZED BY/DATE** Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Determine a location for Function/QC test plot/strip. o Use a Garrett™ Sea Hunter II magnetometer to ensure there are no anomalies where stakes are to be driven by the survey team, and mark the site. o Drive stakes to mark the test plot/strip corners. o Conduct brush-cutting activities, if required. o Use UXO avoidance techniques to ensure location of excavations, surrogates, and plot/strip corners are clear of anomalies. o Excavate locations for surrogate placement. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Noise hazards. o Heat/cold stress hazards. o Eye hazards. o Head hazards. o Handling flammable liquid during fueling. o Cuts and abrasions hazards. o Chemical hazards (fuels and oils). 	<ul style="list-style-type: none"> o Personnel will be aware of areas they are to be working in and observant of any obstacles, which may present a trip hazard. o Personnel will be trained to recognize UXO/OE hazards on-site and be familiar with procedures to be followed if UXO/OE are located. In areas with poor visibility, a magnetometer will be used to clear pathways prior to brush clearing. o Intrusive operations will only be conducted after the area has been cleared of anomalies. o Personnel will observe all precautions for biological hazards and for heat/cold stress monitoring. o Personnel will operate equipment in a manner consistent with the manufacturer’s procedures. o Storage of gasoline will be in approved containers, with spring-loaded flame arrestor caps. o Personnel performing refueling operations will wear safety glasses and chemical-resistant gloves, for protection against splashes and spills. o Gasoline-powered equipment will NOT be fueled while running, hot, or near open flames. Gasoline-powered equipment will be taken to the fueling point for refueling. Equipment will not be started within 3 m (10 feet) of a fuel container. o All ignition sources are prohibited within 15 m (50 feet) of operations with a potential fire hazard. o Operators will receive proper training on equipment used and will maintain the equipment in good condition. o PPE will be worn at all times, by personnel operating equipment and in the immediate vicinity of operations, during brush clearing.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o Garrett™ Sea Hunter II magnetometer. o Trimble Pro XRS™ GPS. o John Deere Gator™. o Marking stakes and hammer. o Level D PPE: <ul style="list-style-type: none"> - Work clothes or coveralls (cotton), - Leather work gloves, - Leather work boots, and - Safety glasses and/or safety goggles. o Fuel-handling PPE: <ul style="list-style-type: none"> - Chemical-resistant gloves. - Haz Mat Spill response kit. 	<ul style="list-style-type: none"> o The work area will be inspected with a magnetic locator to insure anomalies are not present. o Equipment will be inspected daily prior to use. o If, during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. o All safety guards designed on equipment will remain in place. o If any safety device on equipment is missing, that piece of equipment will be placed out of service until it can be repaired/replaced. o Inspect all power equipment to ensure that spark-arresting mufflers are in place. 	<ul style="list-style-type: none"> o Equipment operators will be trained in the safe use of required equipment and in the required PPE. o All personnel will receive training on the site-specific hazards to be encountered. o All operators will be trained in performing field calibration tests of the magnetometers. o Personnel will receive site-specific training for UXO/OE recognition anticipated at the site. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance. o Personnel will receive training in small quantity spill containment cleanup and reporting procedures.

Table D-4.3. Performing Surface UXO/OE Removal Action Activities

ACTIVITY HAZARD ANALYSIS

ACTIVITY Performing Surface UXO/OE Removal Action Activities **ANALYZED BY/DATE** Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Establish work area. o Locate surface UXO/OE items with the assistance of magnetic locators. o Identify UXO/OE items. o Live UXO/OE or suspected items will be disposed of by detonation. o Inert (explosive-free) OE items requiring venting will be set aside for venting to be performed. o Inspected OE scrap will be placed in a secure container to prevent commingling with OE scrap, which has not been inspected. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Heat/cold stress hazards. o Eye hazards. o Head hazards. o Cuts and abrasions hazards. 	<ul style="list-style-type: none"> o Personnel will be aware of areas they are to be working in and observant of any obstacles, which may present a trip hazard. o Personnel will be trained to recognize UXO/OE hazards on-site. o Upon locating any UXO or Hazardous OE, notify UXO-qualified personnel. o Only UXO-qualified personnel will perform OE operations. o In areas with poor visibility, a metal locator will be used to clear pathways. o Personnel will observe all precautions for biological hazards. o Personnel will observe all precautions for heat/cold stress including monitoring and proper hydration. o Personnel will operate equipment in a manner consistent with the manufacturer’s procedures. o Each operator will receive proper training for each piece of equipment used and will maintain the equipment in good condition. o PPE will be worn at all times, by personnel operating equipment and in the immediate vicinity of operations.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o Schonstedt™ Model GA-52Cx magnetic locator. o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leatherwork boots with non-slip soles. - Safety glasses and/or safety goggles (ANSI Z87.1-1989). 	<ul style="list-style-type: none"> o All equipment is to be inspected daily before use. o Equipment is to be calibrated in accordance with the manufacturer’s instructions. o Metal locators will undergo a field calibration on a daily basis where the operator, on a test bed, tests it to ensure continued functioning of equipment in the field. o If equipment is not functioning properly or it is not in useable condition, it is to be turned in for repair/replacement. 	<ul style="list-style-type: none"> o Operators will be trained in the proper use of required equipment and in the required PPE. o All operators will be trained in performing field calibration tests of the metal locators. o Personnel will receive site-specific training for UXO/OE recognition anticipated at the site. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance.

Table D-4.4. Operating Geophysical Instruments

ACTIVITY HAZARD ANALYSIS

ACTIVITY Operating Geophysical Instruments

ANALYZED BY/DATE Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS	
<ul style="list-style-type: none"> o Using an appropriate geophysical instrument to establish working grids. o Ensure that there are no anomalies where marking stakes are to be driven. o Assist in locating surface anomalies during the investigation. o If required, wooden, fiberglass pin flags, or other non-metallic items will be used to mark survey lines, UXO, and OE scrap. o Perform the geophysical survey. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Heat/cold stress hazards. o Eye hazards. 	<ul style="list-style-type: none"> o Personnel will be aware of areas they are to be working in and observant of any obstacles, which may present a trip hazard. o Personnel will be trained to recognize UXO/OE hazards on-site. o Upon locating any UXO or Hazardous OE, notify UXO-qualified personnel. o Only UXO-qualified personnel will perform OE operations. o Personnel will observe all precautions for biological hazards. o Personnel will observe all precautions for heat/cold stress including monitoring and proper hydration. o Operators will wear all required PPE. o Personnel will operate equipment in a manner consistent with the manufacturer's procedures. o The following precautions shall be followed (Reference: CEHNC Safety Advisory 02-01) o Never place an operating geophysical instrument, its electronics, data processor, or battery pack on the ground in an area suspected of containing unexploded ordnance (UXO) with electronic fuzing. o Do not use conductivity meters around trash piles or trenches that may contain UXO with electronic fuzing. o Ground Penetrating Radar (GPR) units shall not be used on sites suspected of containing UXO with electric fuzing. 	
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS	
<ul style="list-style-type: none"> o Geophysical detection instrumentation <ul style="list-style-type: none"> - Schonstedt™ Model GA-52Cx Magnetic locator. - Geonics EM 61, Mark II - GTL TM-5 Magnetometer o Level D PPE: <ul style="list-style-type: none"> - Leather gloves. - Leatherwork boots with non-slip soles. - Safety glasses and/or safety goggles (ANSI Z87.1-1989). 	<ul style="list-style-type: none"> o All equipment is to be inspected daily before use. o Equipment is to be calibrated in accordance with the manufacturer's instructions. o If equipment is not functioning properly or it is not in useable condition, it is to be turned in for repair/replacement. o The metal locator will also undergo a field calibration on a daily basis where the operator, on a test bed, tests it to ensure continued functioning of equipment in the field. 	<ul style="list-style-type: none"> o Operators will be trained in the proper use and functions of the geophysical/tracking equipment and in required PPE. o All operators will be trained in performing field calibration tests of the metal locators. o Personnel will receive site-specific training for UXO/OE recognition anticipated at the site. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance. 	

Table D-4.5. Conducting Demolition Operations

ACTIVITY HAZARD ANALYSIS

ACTIVITY Conducting Demolition Operations

ANALYZED BY/DATE Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Make required notifications of demolition/venting operations. o Retrieve donor explosives required for operation. o Set up demolition charges in accordance with the demolition procedures. o Utilize filled sandbags around demolition charge, if required, to reduce the range in which fragments may travel. o Post sentries outside the Fragment Zone on all access roads. o Ensure sentries have a full view of the demolition and access areas. o Contact sentries to ensure that no pedestrian traffic is in the vicinity. o Evacuate demolition crew to a safe location. o Demolition occurs. o Inspect the demolition-site to ensure that demolition/venting has been completed properly. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Heat/cold stress hazards. o Blast hazards (due to static electricity and EMR). o Overpressure hazards (due to Blast Hazard). o Fragmentation hazards (due to Blast Hazard). o Eye hazards (due to Blast Hazard). o Noise hazards (due to Blast Hazard). o Cuts and abrasions hazards (due to Blast Hazard). 	<ul style="list-style-type: none"> o Personnel will be aware of areas they are to be working in and observant of any obstacles, which may present a trip hazard. o Establish and maintain communications with the USACE OE Safety Specialist during demolition operations. o All UXO workers will be well trained in hazards inherent with UXO/OE operations and in safe operating procedures. o All UXO workers will be required to wear cotton clothing (under- and outerwear) to reduce the generation of static electricity. o Radios will not be used in the area once the pit is primed or during the priming process, unless the radios are at the firing point and the firing line is shunted. o Exclusion Zone (EZ) sentries will be posted at access road barricades to prevent all unauthorized personnel from entering the EZ during demolition operations. o EZ sentries will wear orange vests during demolition operations. o EZ sentries will maintain radio communications with the demolition team supervisor during demolition operations. o The demolition crew will observe fragmentation distances when seeking shelter from blasting. The fragmentation distance, based on the Most Probable Munitions (MPM), an M48, 75MM Projectile, is 1701 feet. o Hearing protection will be strictly enforced during all demolition operations. o Procedures for demolition operations contained in Chapter 2.0 of the Work Plan, will be followed at all times.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o Donor explosive materials. o Blasting circuits. o Orange safety vests (for EZ sentries). o Appropriate radio communications. o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leatherwork boots with non-slip soles - Safety glasses (ANSI Z87.1-1989). - Hearing protection (NRR 29 dB). 	<ul style="list-style-type: none"> o All equipment will be inspected prior to use. o If equipment is not in good condition or is not functioning properly, it will be removed from service for repair/replacement. o Explosive materials will be inspected to ensure that they are in serviceable condition. 	<ul style="list-style-type: none"> o All UXO workers are required to be graduates of one of the schools or courses outlined in DID OE-025.01. o Personnel will receive site-specific training for UXO/OE recognition anticipated at the site. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance. o All workers will receive supervised OJT from the SUXOS to ensure that they are familiar with safe operating procedures, emergency procedures, and PPE requirements during demolition operations.

Table D-4.6. Performing UXO/OE Inspection Activities

ACTIVITY HAZARD ANALYSIS

ACTIVITY Performing UXO/OE Inspection Activities

ANALYZED BY/DATE Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Thorough inspection of UXO/OE items. o Inspected OE scrap will be placed in a secure container to prevent commingling with OE scrap, which has not been inspected. o Inert (explosive-free) OE items requiring venting will be set aside for venting to be performed. o Live UXO/OE or suspected items will be set aside for disposal, by detonation. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Heat/cold stress hazards. o Eye hazards. 	<ul style="list-style-type: none"> o Personnel will be aware of areas they are to be working in and observant of any obstacles, which may present a trip hazard. o Personnel will be trained to recognize UXO/OE hazards on-site. o Only UXO-qualified personnel will perform OE operations. o Upon locating any UXO or Hazardous OE, notify UXO-qualified personnel. o Personnel will observe all precautions for biological hazards. o Personnel will observe all precautions for heat/cold stress including monitoring and proper hydration. o UXO basic safety rules will apply. o Minimum number of personnel for efficient operations will be allowed on-site. o Cotton clothing will be worn to reduce the potential for static build-up. o Leather gloves, at a minimum, will be worn to protect hands. o Leather, Kevlar™ gloves are highly resistant to tears and cuts from handling sharp objects and may be used. o PPE will be worn at all times.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o Level D PPE: - Cotton clothing or coveralls. - Leather gloves. - Leatherwork boots with non-slip soles. - Safety glasses and/or safety goggles (ANSI Z87.1-1989). 	<ul style="list-style-type: none"> o All PPE will be inspected prior to use. o Defective equipment will be removed from service until repaired/replaced. 	<ul style="list-style-type: none"> o All UXO personnel are required to be graduates of one of the schools or courses outlined in DID OE-025.01. o Personnel will also receive site-specific training involving recognition of all types of UXO/OE, expected on this site, other anticipated site hazards, and PPE requirements. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance.

Table D-4.7. Location Survey and Mapping Operations

ACTIVITY HAZARD ANALYSIS

ACTIVITY Location Survey and Mapping Operations

ANALYZED BY/DATE Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Escort Land Surveyors to conduct activities. o Use appropriate geophysical instrument to ensure there are no anomalies where marking stakes or survey pins are to be driven by the survey team. o Drive marking stakes to mark grid corners and transects. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Heat/cold stress hazards. o Eye hazards. 	<ul style="list-style-type: none"> o Personnel will be aware of areas they are to be working and observant to any obstacles, which may be a trip hazard. o Personnel will be trained to recognize UXO/OE hazards on-site. o Only UXO-qualified personnel will perform OE operations. o Upon locating any UXO or Hazardous OE, notify UXO-qualified personnel. o In areas with poor visibility, the UXO escort will use a metal locator to clear pathways. o Observe all precautions for biological hazards. o Observe all precautions for heat/cold stress including monitoring and proper hydration. o Operators will wear all required PPE. o Personnel will operate equipment in a manner consistent with the manufacturer's procedures. o Each operator will receive proper training for each piece of equipment used and will maintain the equipment in good condition. o Personnel will wear PPE, at all times.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o Schonstedt™ Model GA-52Cx magnetic locator. o Survey Equipment. o Grid-marking stakes and hammer. o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leatherwork boots with non-slip soles. - Safety glasses and/or safety goggles (ANSI Z87.1-1989). 	<ul style="list-style-type: none"> o All equipment is to be inspected daily before use. o All equipment is to be calibrated in accordance with the manufacturer's instructions. o If equipment is not functioning properly or it is not in useable condition, it is to be turned in for repair/replacement. o The metal locator will undergo also a field calibration on a daily basis, where the operator, on a test bed, tests it to ensure continued functioning of the equipment in the field. 	<ul style="list-style-type: none"> o Operators will be trained in the proper use and functions of the Survey and metal locators, and in required PPE. o All operators will be trained in performing field calibration tests of the metal locators. o Personnel will receive site-specific training for UXO/OE recognition anticipated at the site. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance.

Table D-4.8. Operating Mechanical Handling Equipment

ACTIVITY HAZARD ANALYSIS

ACTIVITY Operating Mechanical Handling Equipment

ANALYZED BY/DATE Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS	
<ul style="list-style-type: none"> o Inspect heavy equipment to ensure that it is functioning properly. o Have guide in clear view at all times (if required). o If required, when guide signals it is safe to start, begin brush-cutting operations. o When operations are complete, safely store equipment. o EMM will be stored in the off position with the buckets at ground level. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o Biological hazards. o Heat/cold stress hazard. o Eye hazard. o Head hazard. o Cuts and abrasions hazard (from flying debris within the equipment throw area). o Crush and pinch point hazard. o Noise hazard. o Exhaust from equipment in the breathing zone of workers. o Handling flammable liquids during fueling. 	<ul style="list-style-type: none"> o Personnel will be aware of areas to be worked in and observant of obstacles, which may present a trip hazard. o Personnel will observe all precautions for biological hazards. o Personnel will observe all precautions for heat/cold stress including monitoring and proper hydration. o Personnel will operate equipment in a manner consistent with the manufacturer's procedures. o Ensure that heavy equipment is clear of any obstructions prior to starting. o Keep hands, fingers, and feet clear of moving parts. o Storage of gasoline or fuels will be in approved containers. o Personnel performing refueling operations will wear safety glasses and chemical-resistant gloves for protection against splashes and spills. o Gasoline-powered equipment will NOT be fueled while running, hot, or near open flames. o Gasoline-powered equipment will be taken to the fueling point for refueling. Equipment will not be started within 3 m (10 feet) of a fuel container. Cellular phones will not be used around Flammable Liquids IAW OE Safety Group Safety Advisory 03-2003. o All sources of ignition will be prohibited within 15 m (50 feet) of operations with a potential fire hazard. o Each operator will receive proper training in equipment use and will maintain the equipment in good condition. o PPE will be worn at all times, while in and around the immediate vicinity of brush clearing operations. 	
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS	
<ul style="list-style-type: none"> o Mechanical Handling Equipment. o Fuel-handling PPE: <ul style="list-style-type: none"> - Chemical-resistant gloves. o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leather work boots, - Protective footwear when an impact or compressive forces hazard exist, - Hard hat (per ANSI Z89.1-1997), - Safety glasses (ANSI Z87.1-1989). - Hearing protection (NRR 29 dB). - Protective leg chaps (if required). 	<ul style="list-style-type: none"> o Equipment will be inspected daily prior to use. o If, during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. o All safety guards designed on equipment will remain in place. o If any safety device on equipment is missing, that piece of equipment will be placed out of service until it can be repaired/replaced. 	<ul style="list-style-type: none"> o Operators will be trained in the safe use of required equipment and in the required PPE. o All personnel will receive training on the site-specific hazards to be encountered. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance. 	

Table D-4.9. Operating Portable Hand and Power Brush Cutting Equipment

ACTIVITY HAZARD ANALYSIS

ACTIVITY **Operating Portable Hand and Power Brush Cutting Equipment** **ANALYZED BY/DATE** Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS	
<ul style="list-style-type: none"> o Inspect portable hand and power equipment to ensure that it is functioning properly. o Have guide in clear view at all times (if required). o If required, when guide signals it is safe to start, begin brush-cutting operations. o When operations are complete, safely store equipment. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o Biological hazards. o Heat/cold stress hazard. o Eye hazard. o Head hazard. o Cuts and abrasions hazard (From flying debris within the equipment throw area). o Noise hazard. o Exhaust from equipment in the breathing zone of workers. o Handling flammable liquids during fueling. 	<ul style="list-style-type: none"> o Personnel will be aware of areas to be worked in and observant of obstacles, which may present a trip hazard. o Personnel will observe all precautions for biological hazards. o Personnel will observe all precautions for heat/cold stress including monitoring and proper hydration. o Personnel will operate equipment in a manner consistent with the manufacturer's procedures. o Ensure that equipment is clear of any obstructions prior to starting. o Keep hands, fingers, and feet clear of moving parts. o Storage of gasoline or fuels will be in approved containers. o Personnel performing refueling operations will wear safety glasses and chemical-resistant gloves for protection against splashes and spills. o Gasoline-powered equipment will NOT be fueled while running, hot, or near open flames. o Gasoline-powered equipment will be taken to the fueling point for refueling. Equipment will not be started within 3 m (10 feet) of a fuel container. Cellular phones will not be used around Flammable Liquids IAW OE Safety Group Safety Advisory 03-2003. o All sources of ignition will be prohibited within 15 m (50 feet) of operations with a potential fire hazard. o Each operator will receive proper training in equipment use and will maintain the equipment in good condition. o PPE will be worn at all times, by personnel in and around the immediate vicinity of brush clearing operations. 	
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS	
<ul style="list-style-type: none"> o Portable hand and power brush cutting equipment. o Fuel-handling PPE: <ul style="list-style-type: none"> - Chemical-resistant gloves. o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leather work boots, - Protective footwear when an impact or compressive forces hazard exist, - Hard hat (per ANSI Z89.1-1997), - Safety glasses (ANSI Z87.1-1989). - Hearing protection (NRR 29 dB). - Protective leg chaps (if required). 	<ul style="list-style-type: none"> o Equipment will be inspected daily prior to use. o If, during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. o All safety guards designed on equipment will remain in place. o If any safety device on equipment is missing, that piece of equipment will be placed out of service until it can be repaired/replaced. 	<ul style="list-style-type: none"> o Operators will be trained in the safe use of required equipment and in the required PPE. o All personnel will receive training on the site-specific hazards to be encountered. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance. 	

Table D-4.10. Gain access to subsurface anomalies utilizing mechanical Earth Moving Machinery (EEM)

ACTIVITY HAZARD ANALYSIS

ACTIVITY Gain access to subsurface anomalies utilizing mechanical EMM **ANALYZED BY/DATE** Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Inspect EMM to ensure that it is functioning properly and has no defects. o Ensure that all Personal Protective Equipment (PPE) is on hand and used. o When individual area for excavating is clear of all unnecessary personnel start excavation operation, carefully removing soil to within 12-inches over anomaly. o When operations are complete, safely perform equipment maintenance and storage. o EMM will be stored in the off position with the buckets at ground level. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Heat/cold stress hazard. o Eye hazard. o Head hazard. o Crush and pinch point hazard. o Noise hazard. o Exhaust from equipment in the breathing zone of workers. o Handling flammable liquids during fueling. 	<ul style="list-style-type: none"> o Personnel will be aware of areas to be worked and observant of obstacles that present trip hazards. o Personnel will be trained to recognize UXO/OE hazards on-site. o Only UXO-qualified personnel will perform OE operations. o Upon locating any UXO or Hazardous OE, notify UXO-qualified personnel. o EMM will not be used to excavate within 12-inches of suspected OE item. Once EMM is within 12-inches of the suspected OE item, excavation will be completed by hand excavation methods. o Excavation operations, weather by hand or EMM, will employ a step-down or offset access method. Under no circumstances will any excavation be made directly over suspected OE items. o Personnel will observe all precautions for biological hazards. o Personnel will observe precautions for heat/cold stress monitoring and proper hydration. o Personnel will operate equipment in a manner consistent with the manufacturer's procedures. o Ensure that EMM is clear of any obstructions prior to starting. o Keep hands, fingers, and feet clear of moving parts. o Storage of gasoline or fuels will be in approved containers. o Personnel used for refueling operations will wear PPE for protection against splashes and spills. o Gasoline-powered equipment will NOT be fueled while running, hot, or near open flames. o Gasoline-powered equipment will be taken to the fueling point for refueling. Equipment will not be started within 3 m (10 feet) of a fuel container. Cellular phones will not be used around Flammable Liquids IAW OE Safety Group Safety Advisory 03-2003. o All ignition sources are prohibited within 15 m (50 feet) of operations with a potential fire hazard. o Operators will receive training in equipment use and maintain the equipment in good condition. o PPE will be worn at all times around the immediate vicinity of brush clearing operations.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o EMM (Excavation equipment). o Chemical-resistant gloves. o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leather work boots, - Protective footwear when an impact or compressive forces hazard exist, - Hard hat (per ANSI Z89.1-1997), - Safety glasses (ANSI Z87.1-1989). - Hearing protection NRR 27db). 	<ul style="list-style-type: none"> o Equipment will be inspected daily prior to use. o If, during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. o All safety guards designed on equipment will remain in place. o If any safety device on equipment is missing, that piece of equipment will be placed out of service until it can be repaired/replaced. 	<ul style="list-style-type: none"> o Operators will be trained in the safe use of required equipment and in the required PPE. o All personnel will receive training on the site-specific hazards to be encountered. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance.

Table D-4.11. Gain access to subsurface anomalies utilizing portable hand operated excavation equipment

ACTIVITY HAZARD ANALYSIS

ACTIVITY Gain access to subsurface anomalies utilizing portable hand operated excavation equipment

ANALYZED BY/DATE Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Inspect heavy equipment to ensure that it is functioning properly. o Have guide in clear view at all times (if required). o If required, when guide signals it is safe to start, begin brush-cutting operations. o When operations are complete, safely store equipment. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Heat/cold stress hazard. o Noise hazard. o Eye hazard. o Head hazard. o Cuts and abrasions hazard. o Crush and pinch point hazard. o Exhaust from equipment in the breathing zone of workers. o Handling flammable liquids during fueling. 	<ul style="list-style-type: none"> o Personnel will be aware of areas to be worked in and observant of obstacles, which may present a trip hazard. o Personnel will be trained to recognize UXO/OE hazards on-site. o Only UXO-qualified personnel will perform OE operations. o Upon locating any UXO or Hazardous OE, notify UXO-qualified personnel. o Excavation operations, weather by hand or EMM, will employ a step-down or offset access method. Under no circumstances will any excavation be made directly over suspected OE items. o Personnel will observe all precautions for biological hazards. o Personnel will observe precautions for heat/cold stress monitoring and proper hydration. o Personnel will operate equipment in a manner consistent with the manufacturer's procedures. o Ensure that heavy equipment is clear of any obstructions prior to starting. o Keep hands, fingers, and feet clear of moving parts. o Storage of gasoline or fuels will be in approved containers. o Personnel used for refueling operations will wear PPE for protection against splashes and spills. o For gasoline-powered equipment, they will NOT be fueled while running, hot, or near open flames. o Gasoline-powered equipment will be taken to the fueling point for refueling. Equipment will not be started within 3 m (10 feet) of a fuel container. Cellular phones will not be used around Flammable Liquids IAW OE Safety Group Safety Advisory 03-2003. o All ignition sources are prohibited within 15 m (50 feet) of operations with a potential fire hazard. o Each operator will receive proper training in equipment use and will maintain the equipment in good condition. o PPE will be worn at all times around the immediate vicinity of brush clearing operations.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o Portable Hand excavation equipment. o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leather work boots and non-slip soles, - Hard hat (per ANSI Z89.1-1997), - Safety glasses and/or safety goggles (ANSI Z87.1-1989). 	<ul style="list-style-type: none"> o Equipment will be inspected daily prior to use. o If, during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. o All safety guards designed on equipment will remain in place. o If any safety device on equipment is missing, that piece of equipment will be placed out of service until it can be repaired/replaced. 	<ul style="list-style-type: none"> o Operators will be trained in the safe use of required equipment and in the required PPE. o All personnel will receive training on the site-specific hazards to be encountered. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance.

Table D-4.12. Perform Quality Control Activities

ACTIVITY HAZARD ANALYSIS

ACTIVITY Perform Quality Control Activities **ANALYZED BY/DATE** Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Using an appropriate geophysical instrument, perform QC activities. o Ensure that there are no surface and sub-surface UXO or UXO like items within completed grids. o Investigate discovered surface or sub-surface anomalies. o Report any anomalies meeting failure criteria to the SUXOS. 	<ul style="list-style-type: none"> o Slips, trips, and fall hazards. o UXO/OE hazards. o Biological hazards. o Heat/cold stress hazards. o Eye hazards. 	<ul style="list-style-type: none"> o Personnel will be aware of areas they are to be working in and observant of any obstacles, which may present a trip hazard. o Personnel will be trained to recognize UXO/OE hazards on-site. o Only UXO-qualified personnel will perform OE operations. o Upon locating any UXO or Hazardous OE, notify UXO-qualified personnel. o Personnel will observe all precautions for biological hazards. o Personnel will observe all precautions for heat/cold stress including monitoring and proper hydration. o Personnel will wear all required PPE. o Personnel will operate equipment in a manner consistent with the manufacturer's procedures.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o Geophysical detection instrumentation - Schonstedt™ Model GA-52Cx magnetic locator. o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leatherwork boots with non-slip soles. - Safety glasses and/or safety goggles (ANSI Z87.1-1989). 	<ul style="list-style-type: none"> o All equipment is to be inspected daily before use. o Equipment is to be calibrated in accordance with the manufacturer's instructions. o If equipment is not functioning properly or it is not in useable condition, it is to be turned in for repair/replacement. o The metal locator will undergo a field calibration on a daily basis where the operator, on a test bed, tests it to ensure continued functioning of equipment in the field. 	<ul style="list-style-type: none"> o Operator will be trained in the proper use and functions of the geophysical/tracking equipment and in required PPE. o All operators will be trained in performing field calibration tests of the metal locators. o Personnel will receive site-specific training for UXO/OE recognition anticipated at the site. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance.

Table D-4.13. Performing Motor Vehicle Operations

ACTIVITY HAZARD ANALYSIS

ACTIVITY Performing Motor Vehicle Operations **ANALYZED BY/DATE** Paul C. Duncan / May 14, 2004

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> o Inspect vehicles to ensure proper working condition. o Ensure that vehicles are properly equipped. o Explosive materials, when transported, will be loaded and secured to prevent shifting. o Conduct motor vehicle operations. 	<ul style="list-style-type: none"> o Explosive hazards. o Heat stress. o Personnel struck by mobile equipment. o Vehicle collisions. 	<ul style="list-style-type: none"> o Complete motor vehicle inspection form. o If the vehicle is not working properly, it will be turned back to the rental agent for repair/replacement. o All vehicle operators are required to have valid driver's license issued from his state of residence. o The driver and all passengers will use safety belts when the vehicle is in operation. o The vehicle will be placarded as carrying explosive materials, if required. o Operators will be familiar with, and comply with, requirements in this Work Plan. o Explosives, if transported, will be placed securely in the back of the pick-up truck and anchored firmly to prevent movement. o Any vehicle with explosive cargo will not be left unattended. o The driver will observe all posted speed limits. o The driver will ensure that telephone or radio contact is available in the vehicle. o A minimum of two personnel, in the vehicle, will be required to transport explosive materials. o Cellular phones will not be used around Flammable Liquids IAW OE Safety Group Safety Advisory 03-2003.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> o Vehicle. o Safety Equipment: <ul style="list-style-type: none"> - Seat belts, First Aid kits, Two-way communications, Emergency eyewash kit, Blood-borne pathogen (BBP) kit, One, 20 B:C, fire extinguishers (two for explosive materials), Haz-Mat Spill response kit. o Transporting Explosive Materials <ul style="list-style-type: none"> - Explosive placards, if required. - Roadside emergency markers. - Explosives storage boxes o Level D PPE: <ul style="list-style-type: none"> - Cotton clothing or coveralls. - Leather gloves. - Leatherwork boots. - Safety glasses (ANSI Z87.1-1989). 	<ul style="list-style-type: none"> o Vehicle will be inspected daily, prior to use, utilizing DD Form 626 or ATI Form 025. o Any hazardous conditions noted during the inspection will be repaired prior to using the vehicle. o Inspection of the contents of the vehicle will ensure that emergency supplies and communication equipment are readily available. o If traveling to a remote location, the inspection of the vehicle will ensure that an adequate supply of drinking water and cups are available. o The driver will inspect the packing of explosive materials for transport to ensure segregation of the blasting caps from other explosive items and to ensure anchoring in place and explosives are in a secure position prior to transport. 	<ul style="list-style-type: none"> o Any vehicle operator on this site is required to have a valid driver's license issued from his state of residence. o All personnel driving or riding as passengers in vehicles will be trained in fire extinguisher usage and will be trained not to attempt to fight any fire involving explosive materials. o Personnel will receive site-specific training for UXO/OE recognition anticipated at the site. o Personnel will observe all precautions for heat/cold stress monitoring. o All operators will have current OSHA HAZWOPER training. o Employees working on-site will receive medical clearance. o Personnel will receive training in small quantity spill containment cleanup and reporting procedures.

D.4.2 **Safety Hazards**

Due to the nature of planned site operations, the potential risk for exposure to safety hazards is high. Anticipated Safety hazards, which may be encountered during site activities and precautions, to be followed are listed below and in individual Activity Hazard Analyses.

D.4.2.1 Slips, Trips, and Fall Hazards

Site conditions consist of light to moderate terrain, light to moderate-heavy brush, which make the possibility of slips, trips, and fall hazards high during the UXO escort, establishing working grids, surface sweep, geophysical survey, and quality control activities. Site personnel shall be instructed to make themselves aware of the placement of their feet at all times to avoid site conditions, which attribute to slips, trips, and falls. The use of sturdy leatherwork boots with ankle support and non-slip soles will reduce the risk of slips, trips and falls.

D.4.2.2 Cuts/laceration hazard from handling sharp surfaces on OE scrap

OE scrap surfaces can be expected to have sharp and rusted surfaces. Project personnel should expect a high likelihood of cuts/lacerations if proper care is not taken. During all activities involving the handling of UXO, OE scrap, and site materials, personnel shall wear leatherwork gloves to prevent injury to hands.

D.4.2.3 Pinched/crushed fingers and toes from handling OE scrap

The weight of OE scrap expected to be recovered and handled during surface sweep and UXO/OE inspection activities is expected to pose only a light to moderate hazard to fingers and toes. The mishandling of even light materials can cause injuries to site personnel. All site personnel are required to wear leatherwork boots and gloves while activities are being conducted. Personnel shall utilize proper lifting techniques and when appropriate, shall use additional personnel or material handling equipment for heavy objects.

D.4.2.4 Inclement weather (high winds, fog, heavy rain, and thunder/lightning storm)

High winds and fog are only considered hazards if they impair personnel ability to conduct operations (i.e. fog and heavy rain, reduced visibility to see work area). Personnel will not continue operations if visibility is greatly affected. During heavy rain, personnel can be at risk due to flash floods, visibility, and stability. The UXOSO will make recommendations to the SUXOS to determine risk hazards. Thunder/lightning storms are a high-risk hazard to all site personnel especially during disposal operations. All blasting activities shall be suspended when an electrical storm approaches to within 10 miles of the site. Site personnel, in the open, are at great risk and shall be moved to safe sheltered locations until the storm has passed.

D.4.3 **Chemical Hazards**

The only anticipated chemical hazards, which would be expected during site activities are those fuels and oils brought on-site, for equipment maintenance. All site personnel will follow the procedures and precautions outlined in appropriate Task Hazard Analysis. Chemical Warfare Material (CWM) procedures are outlined in paragraph D.12.4.7.

D.4.4 **Physical Hazards**

For the planned site activities to be conducted, the potential for exposure to physical hazards is high for this project. The physical hazards that may be encountered during site operations and precautions to be taken are listed below.

D.4.4.1 Flammable/explosive hazards from fueling and maintenance of site vehicles

The chance of fire and/or explosion during vehicle refueling and maintenance is high when improper procedures are used. All site vehicles will be equipped with a portable fire extinguisher readily available to fight a fire. Equipment will never be refueled on the back of a pick-up truck with a bed liner. Cellular phones will not be used around Flammable Liquids IAW OE Safety Group Safety Advisory 03-2003.

D.4.4.2 Material lifting hazard (back strain, pulled muscles and tendons) from inspecting and moving OE scrap

The lifting and handling of UXO and OE scrap can have a high probability of causing back strain, pulled muscles and tendons. Personnel will utilize proper lifting techniques when moving site materials. When required for heavier items to move, additional personnel or material handling equipment shall be used.

D.4.4.3 Noise hazard from excessive noise levels from the operation of heavy equipment, powered hand tools and demolition operations.

The operation of heavy equipment, powered hand tools and demolition operations may create a noise hazard to site personnel. Site personnel working with or near powered hand tools will wear hearing protection when exposed to noise levels greater than 85 decibels (dB).

D.4.5 **Radiological Hazards**

In accordance with previous activities performed at the project a radiological hazard is not anticipated within the project area.

D.4.6 **Biological Hazards**

Biological hazards, which are usually found on-site, include insects, such as mosquitoes, spiders, bees, and centipedes; dangerous animals; hazardous plants; and microorganisms. Employee awareness and adherence to the safe work

practices outlined in the following sections should reduce the risks associated with these hazards.

D.4.6.1 Hazardous Plants

During the conduct of site activities, the number and variety of hazardous plants that may be encountered are few. Contact poisonous plants are not a concern in Hawaii. However, there are plants that are poisonous to eat. Site personnel will not eat or taste any plant on or near the project site. The plants with the greatest degree of risk, to site personnel (i.e., potential for contact versus effect produced), are those, which produce skin reactions and skin and tissue injury.

D.4.6.1.1 Plants Causing Skin and Tissue Injury

Contact with splinters, thorns, and sharp leaf edges is of special concern to site personnel, as is the contact with the pointed surfaces found on branches, limbs, and small trunks left by site clearing and grubbing crews. The Kaiwe tree, which has large sharp and strong thorns may be encountered. This concern stems from the fact that punctures, cuts, and even minor scrapes caused by accidental contact may result in non-infectious skin lesions and the introduction of fungi, or bacteria, through the skin or eye. Personnel receiving any of the injuries listed above, even minor scrapes, will report immediately to the UXOSO for initial and continued observation and care of the injury.

D.4.6.1.2 Plants Causing Skin Reaction

D.4.6.1.2.1 It is not anticipated that plants found on-site will cause skin reactions like poison ivy, oak or sumac. At this time, there are no known poisonous plants of concern that site personnel should encounter. Prior to the start of site operations, the UXOSO will consult with local resources to determine if any plants are on-site that could cause these type of reactions and will provide a full briefing to site personnel during the initial site training.

D.4.6.2 Snakes

There are no native snake species associated with the Hawaiian Islands. With the very rare exception of possibly encountering a brown tree snake (an alien snake species that periodically invades the Hawaiian Islands from Guam), there is virtually no potential for site personnel to encounter a snake during site operations. In the highly unlikely event that on-site personnel encounter any snakes, the location of the snake will be recorded and OE Safety Specialist will be notified immediately.

D.4.6.3 Spiders

D.4.6.3.1 A large variety of spiders may be encountered during site activities. While most spider bites merely cause localized pain, swelling, reddening, and in some cases, tissue damage, there are a few spiders, which, due to the severity of the physiological

effects caused by their venom, are dangerous. These species include the black widow and the brown or violin spiders. Table D-4.14 provides descriptions of these spiders.

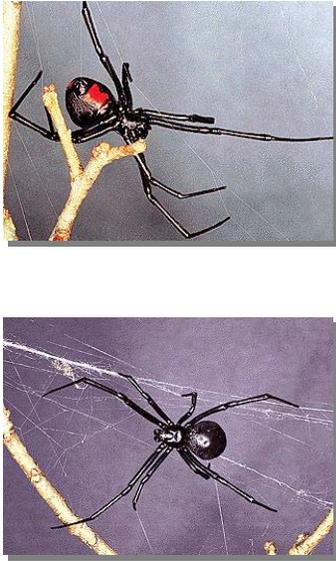
D.4.6.3.2 Victims of a black widow bite may exhibit the following signs or symptoms:

- The sensation of a pin prick or minor burning at the time of the bite;
- The appearance of small punctures (but sometimes none are visible); and
- After 15 to 60 minutes, intense pain is felt at the site of the bite, which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils, and generalized swelling of the face and extremities

D.4.6.3.3 There is no effective first aid treatment for these bites. Except for very young, very old or weak victims, these spider bites are not considered to be life threatening; however, medical treatment must be sought immediately to reduce the extent of damage caused by the injected toxins.

D.4.6.3.4 The UXOSO will brief site personnel as to the identification and avoidance of the spiders. As with stinging insects, site personnel will report to the UXOSO if they locate either of these spiders on-site or notice any type of bite while involved in site activities.

Table D-4.14. Dangerous Spiders

<p>Black Widow</p>		<p>The black widow, is a coal-black bulbous spider 3/4 to 1 1/2 inches in length, with a bright red hourglass on the under side of the abdomen.</p> <p>The black widow is usually found in dark moist locations, especially under rocks, rotting logs and may even be found in outdoor toilets where they inhabit the underside of the seat.</p> <p>Victims of a black widow bite may exhibit the following signs or symptoms:</p> <p>Sensation of pinprick or minor burning at the time of the bite.</p> <p>Appearance of small punctures (but sometimes none are visible).</p> <p>After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils and generalized swelling of face and extremities</p>
<p>Brown Recluse</p>		<p>The brown or violin spider is brownish to tan in color, rather flat, 1/2 to 5/8 inches long with a dark brown "violin" shape on the top.</p> <p>Of the brown spider, there are three varieties found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin and the Arizona violin.</p>

D.4.6.4 Bees and Wasps

There are several types of bees and wasps, which may be encountered during site activities. These include the Southern Yellow Jacket, Common Yellow Jacket, Paper Wasps, Honey and Carpenter bees. Bees are generally not as aggressive as wasps and hornets. Most stinging insects are relatively safe to be near, even in large numbers, so long as they are not aggravated. However, dozens of people a year die from insect stings, mostly due to anaphylactic shock, some as a direct result of the toxins. However, bee venom appears to contain more proteins than wasp venom and therefore there is a greater likelihood of being allergic to bees than

wasps! The sting of bees and wasps are quite different. The wasp may sting a victim multiple times and still live. The bee will sting once, tearing itself away leaving the sting still connected to the venom sac, which continues to pump venom into the victim for up to a minute from the time of insertion.

D.4.6.4.1 Prevention of Bee and Wasp Stings

The following precautions will be taken during field activities for the prevention of stings from bees and wasps:

- Be aware of the presence of bees and wasps while you are working especially in the vicinity of flowers. Bees tend to sting if they feel threatened or are disturbed, so use caution.
- Avoid wearing floral patterns or using floral scents, which will attract bees.
- Personnel that are sensitive to bees must make the UXOSO aware of this and should carry a bee sting kit with them.
- If bees or wasps get trapped inside your vehicle while you are driving, pull off the shoulder and let the creature escape before you continue driving.
- Only strike a wasp if you are sure to kill it. If you strike or kill a bee you will set off its defense pheromone, which will bring unhappy relatives calling.
- In the event of a massed sting attack, try to stay calm, cover your head if possible, and run steadily to safety. Get into anything that is sealed in such a way as not to allow insect entry, such as a vehicle.

D.4.6.4.2 Treatment of normal insect stings

- All bee stings include an alarm pheromone, which incites their mates to attack, so step one is to get away from a nest/hive with all speed.
- Scrape/pull out stings as soon as possible. A honeybee sting has a pump attached that continues to introduce venom for 1 minute after stinging. A wasp does not leave its stinger.
- Apply an ice pack to minimize swelling and pain.
- Lift limb to heart level to reduce swelling.

D.4.6.4.3 Treatment of severe reaction to insect stings

- D.4.6.4.3.1 If the victim has been stung multiple times, is young or old, or is one of the 1% that is super-sensitive to stings, watch for signs of systemic allergies. These may include:

- Headaches,
- Fever,
- Nausea,
- Vomiting,
- Swelling of the tongue or throat,
- Difficulty in breathing,
- Cramps,
- Drowsiness or
- Unconsciousness.

GET MEDICAL HELP

D.4.6.4.3.2 Personnel with known sensitivity to stings and who have Epinephrine kit should have it administered, followed by an ice pack and hospital. Employees on the site who know they are allergic to bee stings should make the UXOSO and co-workers aware of that fact, and should have their Epinephrine kit with them at all times. Co-workers should know where the kit is located and how to administer it in an emergency. Bee stings can be sensitizers and allergies can develop over time. Because a person has been stung in the past and has had no reaction, does not necessarily mean that the next sting won't bring on an allergic reaction. All employees will be made aware of the symptoms of anaphylactic shock, so that they can recognize it in themselves and co-workers and act accordingly.

D.4.6.5 Tick Borne Illnesses

D.4.6.5.1 There are two species of ticks endemin in Hawaii, the brown dog tick (*Rhipocephalus sanguineus*) and the cattle ear tick (*otobiius megnini*), neither of which is known to transmit human disease, although cattle ear tick bites have been associated with otoacariasis (ear mites). On occasion, disease-transmitting tick spices have been found on dogs in the animal quarrantine station, but have been destroyed. As a result, the following diseases transmitted by ticks are not found in Hawaii: Rocky Mountain Spotted Fever, Tularemia, Ehrlichosis and Lyme Disease.

D.4.6.6 Mosquito Borne Illnesses

The Hawaii State Department of Health has recently confirmed the presence of Dengue fever in the East Maui area. Although, evidence suggests that locally transmitted cases have subsided with no confirmed cases since February 2002.

D.4.6.6.1 General Information

Dengue fever is an acute, viral disease that causes severe flu-like illness (fever, headache, body pains, eye pain and rash) in people of all ages. The principal vector mosquito, *Ae. aegypti*, prefers to feed on humans during the daytime and most frequently is found in or near human habitations. There are two peak periods of biting activity, in the morning for several hours after daybreak and in the late afternoon for several hours before dark. The mosquito may feed at any time during the day, however, especially indoors, in shady areas, or when it is overcast. Mosquito breeding sites include artificial water containers such as discarded tires, uncovered barrels, buckets, flower vases or pots, cans, and cisterns.

D.4.6.6.2 Signs and Symptoms

The symptoms of dengue fever include sudden onset of fever, painful headaches, eye, joint, and muscle pain, and rash. The rash, typically begins on the arms or legs 3 to 4 days after the onset of fever. The symptoms usually resolve completely within 1 to 2 weeks. Occasionally, individuals with dengue fever experience blood-clotting problems. When this occurs, the illness is called dengue hemorrhagic fever. Dengue hemorrhagic fever is a very serious illness characterized by abnormal bleeding and very low blood pressure (shock).

D.4.6.6.3 Treatment

D.4.6.6.3.1 If you become ill and have symptoms as described above, contact your health care provider. Be sure to protect yourself from mosquitoes while sick and 10 days afterwards to prevent spreading the disease.

D.4.6.6.3.2 There is no specific treatment for dengue fever. Bed rest and common drugstore pain and fever medications are recommended. Vaccines against dengue fever are still in development.

D.4.6.6.4 Mosquito Borne Illnesses Precautions

D.4.6.6.4.1 No vaccine is available. Wearing long-sleeved shirts, long pants, and hats minimizes areas of exposed skin. Shirts should be tucked in, and applying insect repellent to both skin and clothing. Repellents applied to clothing, shoes, tents, mosquito nets, and other gear will enhance protection. The most effective repellents are those containing N, N-diethylmetatoluamide (DEET).

D.4.6.6.4.2 Permethrin-containing repellents (e.g., Permanone or deltamethrin) are recommended for use on clothing, shoes, bed nets, and camping gear. Permethrin is highly effective as an insecticide and as a repellent. Permethrin-treated clothing repels and kills ticks, mosquitoes, and other arthropods and retains this effect after repeated laundering. There appears to be little potential for toxicity from permethrin-treated clothing. The insecticide should be reapplied after every five washings.

D.4.6.6.4.3 Mosquito control efforts are currently underway in the infected areas of East Maui. ATI will follow the *Hawaii Department of Health's* recommended precaution measures listed below:

- Cover or discard items that collect rainwater or are used to store water (plastic containers, 55-gallon drums, buckets, used automobile tires, flower pots).
- Empty and clean pet watering containers at least once a week.
- Empty and scour vases with fresh flowers at least once a week.
- Check all screen doors and windows. Repair any tears.
- Wear long sleeved shirts and pants.
- Make sure your water catchment tank is "mosquito proof".
- To control breeding areas; add 4-6 oz. of liquid dishwashing detergent to one gallon of water and spray on breeding areas and surface water. Repeat this process every 2-3 days.

D.4.6.7 Fire Ants

Among the pest ants that have not yet been discovered on the island of Maui are two species, both of which are referred to as "fire ants." One species, the "little fire ant" (*Wasmannia auropunctata*), is established on the island of Hawaii but has not yet been found on Maui. The other, the "red imported fire ant" (*Solenopsis invicta*), has been spreading across the continental United States since the 1930s but has not yet been discovered in Hawaii.

D.4.6.8 Rats/Mice

Rats and mice may be found at the site. Hantaviruses are transmitted by mice, but have not been associated with the species of mouse present in Hawaii. The disease has never been diagnosed here (*Hawaii Department of Health, Communicable Disease Division*).

D.4.6.8.1 Leptospirosis

The Hawaii State Department of Health (DOH) is cautioning residents and visitors to protect themselves against leptospirosis. Although the island of Maui, where work activities will be conducted, is considered a low threat for contracting this disease (1% of reported Hawaii cases), site personnel will be made aware of its potential.

D.4.6.8.1.1 General Information.

1. Leptospirosis is a bacterial disease that is primarily carried by rats and mice, although dogs, pigs, cattle and horses can also become infected.
2. The disease is generally transmitted to humans by exposure to fresh water that is contaminated with urine from infected animals. Infection can take place when

contaminated water enters the body through the mouth, nose, eyes or open wounds. The term Weil's disease applies to severe cases of leptospirosis.

3. Known exposure sites and all state and county parks that have fresh water streams or ponds are regularly posted with leptospirosis warning signs. Residents and visitors should use additional caution when coming in contact with fresh water.
4. Signs and Symptoms.
5. Individuals who develop flu-like symptoms (high fever, severe headaches, muscle aches, nausea and vomiting) and have had fresh water, mud or animal exposure during the preceding three weeks, should immediately see a physician and inform the doctor of any environmental exposures and skin wounds. The symptoms may last from a few days to several weeks. Although deaths have occurred with this disease, they are rare. In some persons, the infection can be mild and without obvious symptoms.

D.4.6.8.1.2 Treatment.

A doctor can prescribe medications to treat leptospirosis. If left untreated, the patient can develop kidney, liver, blood, and nervous tissue damage. In rare cases, even death may occur.

D.4.6.8.1.3 Precautions.

The following precautions shall be followed to aid in the prevention of contracting this disease:

1. Report all rodent nesting to a team leader and the UXOSO.
2. The UXOSO will control rats, mice, and mongoose in areas around the work site by removing their nests.
3. Do not swim or wade in freshwater streams or ponds, especially when you have open cuts or sores. Swimming with the head underwater also increases the risk of infection through the eyes, nose, and mouth.
4. Do not drink pond or stream water without boiling or chemically treating it.
5. Wear protective clothing including gloves, boots, long-sleeved shirts, and pants when clearing shrubs or grass, or working in wet soil where leptospirosis is a problem.
6. Wear gloves when disposing of dead animals and when gutting (cleaning) livestock or game animals.
7. Drain areas that have still, standing water.

D.4.6.9 Mongooses and Bats

Mongoose and bats are known vectors of rabies in other areas, a disease that has not entered the State by virtue of the Department of Agriculture's animal quarantine program for incoming pets. (*Hawaii Department of Health, Communicable Disease Division*).

D.4.6.10 Scorpion (Lesser Brown)

Hawaii has one form of scorpion, the Lesser Brown (Table D-4.15). Its Hawaiian name is *Kopiana*. Its sting is not considered dangerous, about the intensity of a bee sting. Its distribution is on the islands of O`ahu, Maui, Kaua`i, Big Island, and therefore may be seen in the areas covered by the SOW.

Table D-4.15 – Lesser Brown Scorpion Description.

<p>Lesser Brown Scorpion <i>(Isometrus maculatus)</i></p>		<p>Description:</p> <ul style="list-style-type: none"> • Long curved tail with stinger and 10-legs. • Smaller than Emperor scorpions, under 3" at their largest. • Found in Hawai'i since 1880. <p>Scorpions prefer to live in warm areas. They are nocturnal creatures. They hunt and feed during the night while they rest during the day, hiding beneath loose rocks, loose bark of fallen trees, boards, piles of lumber, floors of outbuildings, and debris.</p> <p>Despite its appearance, this is not a deadly enemy. It has a painful sting, but it does not have a neurotoxin like some of its mainland cousins, so the sting is more like that of a bee.</p> <p>The poison of the non-deadly species of scorpions is local in effect and causes swelling and discoloration of the tissues in the area of the puncture. There will be intense pain at the site of the sting but very little inflammation or swelling but these symptoms usually disappear after 24 hours. In Hawaii, there have been no reported fatalities due to scorpion stings.</p>
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D.4.6.11 Giant Centipede / kanapi (*S. subspinipes*)

Poisonous centipedes and scorpions are found at low elevations, but are not life threatening to most adults. In Hawaii, *S. subspinipes* (Table D-4.16), is the only centipede of medical importance. There are two other common but harmless species. When humans are bit, two puncture wounds are evident, and reaction to the injected venom can range from slight swelling of the immediate area to massive swelling of the affected limb. With the latter, medical attention should be sought.

Table D-4.16 – Giant Centipede /Kanapi Description.

<p>Giant Centipede / kanapi <i>(Scolopendra subspinipes)</i></p>		<p>Description:</p> <p>This centipede has a brown head and a dark green body; the first segment is a lighter green than the rest of the body. The jaws are composed of a venom gland; a venom duct; a venom-injecting curved, pointed jaw; and powerfully developed muscles. Adults of this species have been reported to reach body lengths of 15 to 19 cm (6 to 7.5 inches), although these creatures rarely get over 6 inches in length.</p> <p>Behavior:</p> <p>Juvenile and adult centipedes live alone and are most active at night. During the day they can be found in damp, dark places: under leaf litter, rocks, and logs, and in soil crevices.</p> <p>The large centipede is not aggressive toward people and will bite only when disturbed or threatened. Their bite is extremely painful and some people and pets require hospitalization if getting a severe reaction to it.</p>
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D.5 Employee Training

D.5.1 General Information

Prior to commencement of site activities, the Safety Manager and the UXOSO will ensure that all ATI employees and contractor/subcontractor personnel who are actually engaged in UXO/OE operations are informed of all site hazards. This information will be in the nature and degree of exposure to chemical and physical hazards, which are likely to result from participation in site operations. ATI will accomplish this by ensuring that all personnel entering the site have received the appropriate OSHA and site-specific training, as outlined in this section, prior to participation in site activities.

D.5.2 Hazardous Waste Workers Training

D.5.2.1 40-Hour General Site Workers Training

D.5.2.1.1 All ATI employees and subcontractors involved in UXO/OE site activities must have received a minimum of 40 hours of hazardous, toxic, and radiological waste (HTRW) health and safety instruction off-site in accordance with 29 *CFR* 1910.120(e). In addition, site workers will have received a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.

D.5.2.1.2 Current training of all employees on the site will be verified prior to mobilization. This level of training also is required for all site visitors who enter a potentially hazardous work area where respirators or other PPE are required to protect entrants from known or potential overexposures.

D.5.2.2 8-Hour Refresher Training

Employees, managers, and supervisors will receive eight hours of refresher training annually on the items specified in 29 *CFR* 1910.120(e), any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.

D.5.2.3 Management and Supervisor Training

D.5.2.3.1 On-site management and supervisors directly responsible for, or who supervise, employees engaged in hazardous waste operations will have received 40 hours initial and 3 days of supervised field experience, and at least 8 additional hours of specialized training at the time of job assignment.

D.5.2.3.2 This additional training includes a review of the CSHP, management of UXO/OE cleanup operations, management of site work zones, communication with the public and the media, PPE selection and limitations, spill containment, and monitoring site hazards. The safety and health staff, with specific responsibilities for safety and

health guidance on-site will receive the training provided to general site workers and their supervisors. They also receive additional training in safety and health issues, policies, and techniques.

D.5.3 **Site-Specific Training**

In order to fulfill the site information training requirements of 29 *CFR* 1910.120(b)(1)(iv) and 29 *CFR* 1910.120(e)(1), all ATI employees, contractors, subcontractors, and visitors will attend site-specific training sessions. These training sessions will apply to individual jobs and responsibilities, and provide an overview of the site hazards and the means to control those hazards.

D.5.3.1 General Site-Specific Training

D.5.3.1.1 This training will be conducted by the Safety Manager and/or the UXOSO and will include classroom instruction.

D.5.3.1.2 Training may address the following subject areas, depending upon individual jobs: details of the SSHP; employee rights and responsibilities; safe work practices; nature and extent of anticipated chemical and physical hazards; measures and procedures for controlling site hazards; handling emergencies and accidents; rules and regulations for vehicle use; safe use of field equipment; handling, storage, and transportation of hazardous materials; use, care, and limitations of PPE, to include proper donning, doffing, cleaning, and storage; and hazard communication.

D.5.3.2 UXO/OE Training

D.5.3.2.1 All UXO personnel assigned to positions as UXO Technician I, UXO Technician II, UXO Technician III, UXO Safety Officer, UXOQCS, and SUXOS, will meet the qualification requirements detailed in USAESCH-OE-CX, DID OE-025.01. A copy of their certificates of graduation will be kept on file at corporate headquarters and on-site. UXO qualified personnel will have knowledge and experience in military ordnance, ordnance components, and explosives location, identification, render safe recovery/removal, transportation, and disposal safety precautions. UXO personnel will have the knowledge and experience to effect safe handling and transportation of found ordnance items.

D.5.3.2.2 Non-UXO qualified personnel working or visiting the UXO/OE sites will receive a site-specific UXO/OE recognition briefing from the UXOSO. This site-specific training will be used to familiarize non-UXO-qualified personnel with the appearance of ordnance type items that may be found on site. Non-UXO-qualified personnel will not touch any ordnance-related items unless they have been inspected first by UXO-qualified personnel and determined to be ordnance related scrap or inert ordnance.

D.5.3.3 Personal Protective Equipment Training

PPE training is covered under Appendix D.6 of the Work Plan.

D.5.3.4 First Aid/CPR Training

Two ATI personnel certified in first aid/CPR will be on-site to provide immediate response to an accident situation until medical assistance arrives on the site. Daily, during the Tailgate Safety Briefing, the names of these individuals will be briefed to employees.

D.5.3.5 Ongoing Training

Ongoing training will be conducted for employees during work activities. This ongoing training will consist of briefings and periodic site training, as necessary, to provide a safe work environment for workers.

D.5.3.6 Daily Tailgate Safety Briefing

D.5.3.6.1 Tailgate safety briefings consist of providing short training sessions in various subjects that give the site worker knowledge and confidence in performing duties in a potentially hazardous environment. The tailgate safety briefing will be given prior to commencing work each day and will include such items as:

- Expected weather conditions,
- General site hazards,
- UXO hazards,
- PPE required at each site,
- Emergency evacuation procedures,
- Cold/heat stress precautions,
- Buddy system procedures, and
- A review of any safety violations from the previous day

D.5.3.6.2 Additional briefings will be provided, as needed, concerning the use of safety equipment, emergency medical procedures, emergency assistance notification procedures, accident prevention, the Work Plan, and site orientation to ensure that accomplishment of the project can be carried out in a safe and effective manner.

D.5.3.7 Daily Debriefing

At the conclusion of each workday, a debrief, for all employees, will be held, if appropriate, and the day's work will be discussed to determine if changes are warranted before commencing the next day's activities.

D.5.3.8 Periodic Site Training

On the first day of each work week/period, or more frequently if needed, a pertinent topic will be selected and elaborated upon by the UXOSO during the tailgate safety briefing. These safety meetings will help ensure the safety and health of site personnel in the performance of regular work activities and in emergency situations. Safety meetings will be documented in the appropriate log, and the “Documentation of Training Form”(see Appendix F, page F-18) will be completed.

D.5.3.9 Visitor Training

All visitors to the site, even if escorted, must receive, as a minimum, a briefing on site conditions, hazards, and emergency response procedures. Visitors will not be permitted in the restricted work areas unless they have the appropriate level of OSHA training. Visitors not complying with the above requirements will not enter the restricted work areas. They may observe site conditions from a safe distance. All visitors will make appropriate entries in the Visitor’s Log.

D.5.3.10 Documentation

A training record will be kept in each employee’s individual file to confirm that adequate training for assigned tasks are provided and that training is current. In addition, “Documentation of Training” forms will be completed and kept on file at the work site. See Appendix F, Page F-18.

D.6 Personnel Protective Equipment (PPE)

D.6.1 PPE Selection

Whenever engineering controls or other protective measures are not feasible or adequate to reduce exposures and safeguard the worker, the Safety Manager will select appropriate PPE. PPE will be selected on the basis of hazards known or suspected at the work site, and the level of PPE will not be reduced until adequate documentation can demonstrate that the hazard level has been reduced enough to warrant such adjustment.

D.6.2 Selection of PPE

D.6.2.1 Each task outlined in the SOW will be assessed in the Hazard Analysis prior to its initiation to determine the risk of personnel exposure to safety and health hazards, which may be encountered during its conduct. The hazard assessment will be based on available information pertaining to the historical use of the site, site contaminant characterization data, and the anticipated operational hazards. This information will be provided by the client or collected by ATI site personnel. The PPE assigned as a result of the hazard assessment represents the minimum PPE to be used during initial site activities.

D.6.2.2 Since hazard/risk assessment is a continuing process changes in the initial types and levels of PPE will be made in accordance with information obtained from the actual implementation of site operations and data derived from the site monitoring. As a general rule, the levels of PPE will need to be reassessed if any of the following occur:

- Commencement of a new work phase, such as the start of work on a different portion of the site, or different types of work due to a change in the SOW.
- Change in job tasks during a work phase.
- Change of season/weather.
- When temperature extremes or individual medical considerations limit the safe use of PPE.
- Unanticipated contaminants are encountered.
- Change in expected levels of contaminants.
- Change in work scope, which affects the degree of contact with contaminants.

D.6.2.3 If work tasks are added, or amended, after completion and approval of the SSHP, the UXOSO will conduct the task hazard assessment and consult with the Safety Manager. The level and type of PPE to be used will be identified and the UXOSO

will complete the “Certificate of Task Hazard Assessment” form. The ATI Safety Office will allow any changes in PPE, which involve downgrading the level of PPE, only after review.

D.6.3 **Selection Criteria**

The ATI Safety Office performs PPE selection after consultation with the UXOSO. During the selection of PPE, the Safety Manager and UXOSO will utilize general chemical resistance information, the manufacturer’s permeation and breakthrough specifications, and the anticipated chemical and physical hazards to select the level and types of PPE to be used for each task. Once the specific types of PPE have been selected for each task, the UXOSO and Safety Manager will ensure that the items purchased will properly fit each employee designated to wear PPE. The following factors also will be considered:

- Limitations of the equipment.
- Work mission duration.
- Temperature extremes.
- Material flexibility.
- Durability/integrity of the equipment.
- Selection of respiratory protection, if required at a later time, will be conducted in accordance with the Respiratory Protection Program

D.6.4 **Level D PPE**

Due to the type of work that will be taking place during the OE Removal Action at the Opana Point Bombing Range & Makawao Gunnery Site, Level D is recommended. This level of PPE will not be allowed in areas of the site where atmospheric hazards are known or expected to exist. Level D should also be worn only if the activity in which personnel are engaged does not have the potential for splash, immersion or any other contact with hazardous substances. Level D involves the use of the following PPE:

- Work clothes or coveralls (cotton).
- Leatherwork gloves.
- Leatherwork boots.
- Hardhat (when working around heavy equipment, clearing and grubbing equipment, or overhead hazards).

- Eyewear providing protection against ultraviolet light and glare will be provided for protection if working around bodies of water.
- Safety goggles (when working in high winds, dusty environments, or when directed to by UXO Supervisors or the UXOSO).
- Hearing protection (when working in a noise hazard area).
- Leg chaps (when working with portable hand brush clearing and grubbing operations).
- Face shield (when working with clearing and grubbing operations).

D.6.5 **Inclement Weather PPE**

Other than working in cold weather, severe weather conditions are not anticipated during activities to be conducted under the SOW. ATI will ensure that employees take appropriate precautions to protect themselves from inclement weather. When there are warnings or indications of impending severe weather (heavy rains, damaging winds, tornadoes, floods, etc.), weather conditions will be monitored and appropriate precautions taken to protect personnel and property from the effects of the severe weather. Evacuation will take place if an electrical storm is within 10 miles of the project site.

D.6.6 **PPE Use and Limitations**

Whenever feasible, engineering controls and work practices, or a combination thereof, will be utilized to maintain personal exposures to hazardous substances below established exposure limits and to protect site workers from other safety and health hazards. The exposure limits used by ATI will be the Threshold Limit Values (TLV) recommended by the American Conference of governmental Industrial Hygienists (ACGIH). Other recognized published exposure levels, such as those found on MSDSs, will be used if OSHA does not regulate the substance. ATI will not utilize a system of employee rotation as a means of complying with the permissible exposure limit (PEL), TLV, or other published limits. Compliance will be maintained through engineering controls, wherever possible, and if the hazard cannot be engineered out of the work area, PPE and safe work practices will be used to prevent exposures in excess of the PELs.

D.6.7 **Work Mission Duration**

ATI anticipates the OE Removal Action at the Opana Point Bombing Range & Makawao Gunnery Site in Maui, Hawaii to be accomplished within approximately eight months. Due to the inherent risk in this type of operation, UXO personnel shall not perform OE-related tasks more than 8 hours per day. ATI anticipates using a 10-hour, 4 day work week, but may consider a 5 day week, to lower costs and enhance the sharing of resources with other Hawaii jobs. Two consecutive

workweeks shall be separated by at least 48-hours of rest. Once PPE is selected, the safe duration of work/rest periods will be determined based on the:

- Anticipated work rate,
- Ambient temperature and other environmental factors,
- Type of protective ensemble, and
- Individual worker characteristics and fitness.

D.6.8 **PPE Maintenance and Storage**

The UXOSO will be responsible for ensuring that PPE is in good, clean, working order prior to issuing the PPE the first time. Once issued, site personnel will be responsible for the inspection and maintenance of re-usable articles of PPE. Site personnel will ensure that re-usable articles of PPE are maintained in a clean and sanitary fashion.

D.6.8.1 Maintenance

Maintenance of PPE can vary greatly, based upon the complexity of the PPE and the intricacy of the repair involved. The UXOSO will become familiar with the manufacturer's recommended maintenance and, when possible, repair defective PPE. If unable or unauthorized to conduct the repair, the UXOSO will return the item to the manufacturer for repair, or procure a replacement.

D.6.8.2 Storage

PPE will be stored in a location that is protected from the harmful effects of sunlight, damaging chemicals, moisture, extreme temperatures, impact or crushing. The PPE for this site will be stored in the ATI field office.

D.6.9 **PPE Procedures**

D.6.9.1 ATI does not anticipate activities to be conducted in areas containing HTRW contamination. The decontamination and disposal of PPE will not be required during activities under this project. Specific procedures include:

D.6.9.2 All ATI, contractor, or subcontractor site personnel will be given initial, PPE-specific training, which complies with this section. The UXOSO or the Safety Manager, prior to personnel participating in site operations where PPE is required, will give this training.

D.6.9.3 All personnel receiving PPE training will be required to demonstrate an understanding of the training topics and the ability to correctly use the PPE. This will be accomplished through the UXOSO supervising and visually inspecting each individual's ability to properly don and use the PPE during initial use of the PPE.

D.6.9.4 Upon completion of the training and after each employee has successfully demonstrated the requisite understanding; the UXOSO will complete the “Documentation of Training” form. This form identifies the employees who attended the training course and successfully demonstrated the required knowledge, the date(s) of the training and demonstration session(s), and the PPE covered by the training session.

D.6.10 **PPE Donning and Doffing Procedure**

D.6.10.1 PPE donning procedures are outlined below:

- The general donning procedures are given as a guide and may be altered by the UXOSO if the improvements are warranted by site operations and approved by the Safety Manager.
- Prior to donning, gather the PPE required for performing the task specified for the day’s operations.
- Always inspect protective gloves, boots/boot covers, hard hats, and outer garment for proper fit, integrity, and function. If something is wrong with the PPE, which may affect its use, turn it in for other PPE that is in good condition.
- If kneeling will be necessary during site activities, avoid kneeling on any contaminated surfaces, if present, and place tape over the knee areas to reduce the possibility of tearing or wearing out the knees.
- If earplugs are to be worn, insert them before putting on gloves or any other PPE that might obstruct the proper insertion of the plugs.
- Don all other PPE (hard hat, safety glasses, etc.), saving the gloves for last.

D.6.10.2 PPE doffing procedures are presented below:

- The procedures to follow in removing PPE are common-sense procedures. Care should be taken to ensure that no damage to reusable PPE is made. Most PPE utilized on this site is of the reusable type. Disposable PPE is considered that which cannot be cleaned, or which may be subjected to contamination from hazardous materials. It is not anticipated that contamination from hazardous materials will be encountered during activities on this project.
- Sufficient quantities of PPE will be maintained, on-site, for replacement of any defective or deteriorated PPE.
- If hearing protection is required, and a disposable type is used, it will be replaced and disposed of daily.

D.6.11 **PPE Inspection Procedures**

The UXOSO, or a designated appointee, will inspect all incoming shipments of PPE received from the ATI office, the manufacturer, or the distributor. This inspection will include checking the shipment for correctness of size, quantity, material, and quality. Any deficiencies should be noted and defective material returned to the supplier. Prior to donning PPE, site personnel will thoroughly inspect each piece of PPE to determine if it is in proper working order, and ensure that the item will be capable of protecting the employee from site hazards. Site personnel will check the following when pre-donning inspections are conducted:

- Ensure that equipment is ANSI approved.
- Check that hard hats are in good condition, with no cracks or chemical/material build-up visible.
- Check hard-hat headband for proper function and completeness.
- Ensure all eye/face/head PPE fits comfortably and securely.
- Check safety glasses and face shields for cracks or scratches that could impair vision or compromise structural integrity.
- Check safety glasses for side shields.
- During the work task, buddy teams should periodically inspect each other's PPE for evidence of chemical attack, such as discoloration, swelling, stiffening, or softening. Also check for closure failure, tears, punctures, and seam discontinuities. If defective or deficient PPE is identified, it will be repaired or replaced immediately.

D.6.12 **Evaluation of PPE Program**

Since hazard/risk assessment is a continuing process, changes in the initial types and levels of PPE will be made in accordance with information obtained from the actual implementation of site operations and data derived from the site monitoring. The UXOSO will review periodically the on-site PPE program to ensure that the proper level of PPE is being utilized. If changes to operations on-site are encountered, the UXOSO will make a request for appropriate changes to the required level of PPE for activities on this site.

D.7 Medical Surveillance

D.7.1 General

Medical surveillance of ATI and subcontractor employees will be conducted in accordance with the requirements of OSHA 29 *CFR* 1910.120(f), 29 *CFR* 1910.134(e), 29 *CFR* 1910.95, and the Corporate ATI Safety Program. All ATI employees working at the Opana Point Bombing Range & Makawao Gunnery Site are on the ATI Medical Surveillance Program. A baseline health assessment is conducted prior to participating in site operations, and it is updated annually thereafter, which determines the worker's ability to perform UXO/OE operations in a safe and healthful manner. Prior to assigning any employee to work at the Opana Point Bombing Range & Makawao Gunnery Site, that employee's records will be checked to ensure that the medical surveillance physical is current and will remain in effect for the duration of the assignment. Current and updated medical clearance certification will be maintained on-site with the UXO Safety Officer.

D.7.2 Physician's Statement

The results of the physical examination will be made available to the employee, and a written physician's statement will be sent to ATI. The physician's statement will include the following:

- The physician's opinion regarding any conditions, which would place the employee at an increased risk from working in UXO/OE operations.
- The physician's recommended limitations upon the employee's assigned work, if any, and clearance to wear a respirator.
- A statement in which the employee has been informed, by the physician, of the results of the examination and any conditions which may require further examination or treatment.
- A copy of the current physician's statement will be kept in the employee's file on-site for the duration of his work on the project.

D.7.3 Supplemental Examination

Any site worker who has been injured, received health impairment, developed signs or symptoms of possible over-exposure; or received a documented over-exposure without the use of respiratory protection, will undergo a supplemental examination. The contents of this examination will be based upon the type of injury, illness, signs or symptoms, or exposure involved and will be determined by the physician. Prior to reassignment to site activities, the physician will certify that the employee is fit to return to work. If necessary, the physician will specify, in writing, any activity restrictions or additional tests that may be required.

D.7.4 **Termination Examination**

Upon termination of employment, personnel who have worked continuously at an ATI UXO/OE project site will be afforded an opportunity to undergo a termination examination. This physical will be equivalent to the pre-assignment health assessment as long as the employee is not terminating for the purpose of employment with another firm. The content of this examination may be modified by the physician, based on input from ATI, related to the nature and type of exposure the worker received. As a result of the analysis performed during the archive search conducted for the Opana Point Bombing Range & Makawao Gunnery Site, radiological contamination is not expected to be present in the area where work will be performed. Related monitoring, therefore, is not planned for this project.

D.8 Radiation Dosimetry

- D.8.1 As a result of the pervious investigation activities conducted at the Opana Point Bombing Range & Makawao Gunnery Site, radiological contamination is not expected to be present in the area where work will be performed.
- D.8.2 Related monitoring, therefore, is not planned for this project.

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D.9 Environmental and Personnel Monitoring

D.9.1 General

On-site monitoring will be conducted during specific site activities to evaluate the potential physical hazards that may be encountered. These on-site monitoring activities will be used to assist in determining the effectiveness of control measures, the need for upgrading or downgrading of PPE requirements, and the effectiveness of safe work practices. ATI will use direct reading, real-time instruments whenever possible, or required, to detect and quantify site hazards. If a reading is achieved, which exceeds the action level specified in Table D-9.1, the UXOSO will take the steps outlined in this Appendix or other referenced paragraphs to correct the situation or minimize the exposure. In accordance with the SOW, OE hazards exist as a result of DOD activities. OE is classified as a safety hazard; thus, the applicable provisions of 29 *CFR* 1910.120 apply.

D.9.2 Perimeter Monitoring Requirements

There will be no perimeter monitoring conducted during activities under the SOW since site operations, which would result in the release of toxic materials in a gaseous, vapor, or particulate form will not be conducted.

D.9.3 Personal Monitoring Requirements

D.9.3.1 Real-time Direct-reading Monitoring

The guidelines presented in Table D-9.1 represents the initial real-time, direct-reading monitoring requirements for this site. The results of previous monitoring or the detection of factors that indicate a potential for exposure may require an increase or reduction of monitoring frequency. The monitoring equipment to be used to assess exposure hazards for this project site will include:

- Sound level meter – Used as a screening device to measure sound power emitted by a source.
- Noise dosimeter – Used to calculate the 8-hour time-weighted average (TWA) exposure.
- Wet-bulb, Globe Temperature (WBGT) meter – Provides a useful, first-order index of the environmental contribution to heat stress as influenced by air temperature, humidity, and radiant heat. Used as a screening tool to initially assess the potential for personnel to experience heat strain.

Table D-9.1. Site Monitoring Schedule and Action Levels

Hazard	Equipment	Monitoring Frequency/Location	Action Level	Action to be taken
Heat Stress	Wet-bulb, Globe Temperature (WBGT) Meter	Daily when ambient temperatures are expected to exceed 78.8°F for acclimated workers, 72.5°F for non-acclimatized workers, and 70.0°F for workers using impermeable or semi-impermeable clothing	Above ACGIH screening criteria presented in Table D-15.1	Institute physiological monitoring and appropriate controls as outlined in paragraphs D.15.3 and D.15.4
Cold Stress	Meteorological Data and Table D-15.2	Daily when ambient temperatures are expected to drop below 32°F.	Above ACGIH screening criteria presented in Table D-15.3	Institute physiological monitoring and appropriate controls as outlined in paragraphs D.15.3
Noise	Sound Level Meter	Conducted during initial operation of high noise equipment, and periodically thereafter, according to the recommendations of the ATI Safety Office.	Whenever noise levels in the hearing zone exceed 85 dB.	Conduct noise dosimetry as outlined below. Issue hearing protection devices to effected personnel
	Noise Dosimeter	Whenever noise levels in the hearing zone exceed 85 dB.	Noise readings greater than 80 dB 8-hour time-weighted average	Report dosimeter readings to the ATI Safety Office to ensure hearing protection is adequate for the level of noise experienced.

D.9.3.2 Integrated Breathing Zone Sampling

Exposure monitoring will focus on the potential for exposure to physical hazards (including OE) during surface clearance activities. Table D-9.1 identifies the type of monitoring equipment to be used, the frequency at which the monitoring will be conducted, monitoring method to be employed, action level, and the action to be taken if the action level is exceeded.

D.9.3.3 Temperature Extreme Monitoring

D.9.3.3.1 Heat Stress Monitoring

Heat stress monitoring will be conducted in accordance with (IAW) the guidelines presented in Table D-9.1 and the manufacturers procedures. This monitoring will be conducted by, or at the direction of the UXOSO and will be used to minimize physiological effects of high temperatures. The guidance presented in Table D-9.1 will be used by the UXOSO to determine when and what type of heat and cold stress monitoring will be conducted.

D.9.3.3.2 Cold Stress Monitoring

Cold temperature extremes can be made more dangerous by water and wind speed. A wind chill chart in Section D-15, Table D-15.2, “Cooling Power of Wind” (on Exposed Flesh Expressed as Equivalent Temperature) should be used to monitor the cooling power of wind on exposed flesh. The UXOSO will also use meteorological data and Table D-15.2 to inform site personnel of the combined temperature/wind chill effect to be expected during the day’s activities.

D.9.3.4 Noise Monitoring Procedures

High noise levels are anticipated during the operation of earth moving machinery (EMM) and clearing and grubbing equipment. The noise levels will be monitored to determine if additional hearing protection devices will be required and to ensure that the level of hearing protection being used is adequate. At the start of potential high noise operations, sound level readings will be taken in the hearing zone of the affected personnel. Noise dosimetry will be conducted for any operation where sound level readings indicate a potential for exposures above 85 decibels (dB) as recorded in the A-weighted sound level. Table D-9.1 will be consulted to determine the type, amount, and frequency of noise monitoring.

D.9.4 **Monitoring Equipment Calibration and Maintenance**

All sampling and monitoring instrumentation used in site will be calibrated and/or response-checked IAW the manufacturer’s specifications before and after use each day. If an instrument fails to calibrate or respond correctly, it will be removed from service until it can be repaired IAW manufacturer’s specification.

D.9.5 **Blood-Borne Pathogen (BBP) Monitoring**

D.9.5.1 Minimum requirements for procedures to prevent contact with blood or other potentially infectious materials and comply with OSHA standard 29 *CFR* 1910.1030 will be adhered to for this project. This section applies to all ATI operations and personnel whose occupational responsibilities may present possible exposures to blood or other potentially infectious materials. This program meets or exceeds all requirements set forth in OSHA standard 29 *CFR* 1910.1030.

D.9.5.2 ATI will also comply with other OSHA, state, or local regulations or client requirements for minimizing contact with BBPs.

D.9.5.3 The strategy of “Universal Precautions” was developed by the Centers for Disease Control to address concerns regarding transmission of human immunodeficiency virus (HIV). This “Universal Precautions” concept stresses all sources should be assumed to be infectious for HIV, Hepatitis B virus (HBV), and other BBPs. The philosophy of universal precautions will be applied whenever ATI employees render first aid involving potential contact with blood or other potential infectious materials.

D.9.6 Monitoring/Sampling Results

The requirements of this section are not anticipated as a result of the project task hazardous analysis assessment.

D.9.7 Exposure Monitoring Records

The requirements of this section are not anticipated as a result of the project task hazardous analysis assessment.

D.10 Site Control

D.10.1 Site Access Control

D.10.1.1 Site access control will be implemented by the UXOSO and will be accomplished through a program that limits movement and activities of people and equipment at the project site.

D.10.1.2 Site control procedures will be modified by the UXOSO if site conditions change during operations or a breach of the system occurs which would indicate more stringent controls be enacted.

D.10.1.3 Site access control will be based on site-specific characteristics including:

- Potential chemical, biological, physical, or explosive hazards;
- Expected weather conditions;
- Planned site activities; and
- Site proximity to populated areas.

D.10.2 Site Security (physical and procedural) Description

D.10.2.1 Physical Site Security: There are no secured established ingress/egress points into the Opana Point Bombing Range & Makawao Gunnery Site in Maui, Hawaii. Access into the project site will be accomplished as stated above.

D.10.2.2 Procedural Site Security: Persons desiring entrance into the EZ must first meet with the UXOSO and receive the appropriate safety briefing in the SZ before gaining admittance to the EZ.

D.10.2.3 General site access description: Access into both these sites is granted by existing roads and will be used for site access and egress. Vehicle traffic off of existing roads will be kept to a minimum. The unpaved road into Opana Point requires a 4x4 or All-Wheel-Drive vehicle.

D.10.3 Worker/Visitor Registration

D.10.3.1 The UXOSO will be responsible for logging in/out all personnel who enter the EZ.

D.10.3.2 Visitors will receive a safety briefing outlining the potential hazards, control measures, limits of site, access to the site, and emergency procedures.

D.10.3.3 The on-site USACE OE Safety Specialist will be notified of all personnel entering into the work area within their boundaries.

D.10.4 **Escort of Visitors**

A qualified UXO individual will escort visitors into the EZ at all times.

D.10.5 **PPE requirements.**

All workers and visitors into the EZ will wear all PPE required for that site.

D.10.6 **Posting of Site/Work Area Boundaries**

ATI will place placarded barricades at the access routes to the OE removal site.

D.10.7 **Work Zones**

Site work zones will be established, by the UXOSO, prior to initiating operations in order to control site access. Establishment of site work zones will be based upon site conditions, activities, and exposure potentials. Whenever possible, site work zones will be clearly marked using placards or signs and enclosed using hazard tape, ropes, chains, or fences. The UXOSO will control access to each work zone and will ensure that all site workers and visitors have received the proper training and medical surveillance required entering a specific zone. Access will be denied to any potential entrant not meeting these requirements.

D.10.7.1 Exclusion Zone (EZ)

D.10.7.1.1 The EZ boundaries will be established for the work site and coordinated with the US Army Corps of Engineers, On-site Safety Representative.

D.10.7.1.2 This is the area where hazards or contamination do or could occur and will include all areas where PPE is required to control worker exposure to physical hazards.

D.10.7.1.3 During the OE removal action, the EZ will be established as the minimum separation distance (MSD) for unintentional/intentional detonation based on the Most Probable Munition (MPM), as described in Chapter 2.0 of the Work Plan.

- For the Opana Point Bombing Range this is the 4.5-inch barrage rocket, with a maximum fragmentation range of 1759 feet.
- For the Makawao Gunnery Site this is the 105mm M1 projectile, with a maximum fragmentation range of 1939 feet.

D.10.7.1.4 Demolition activities will be conducted on all live or suspect OE found during the OE Removal activities. Disposal activities will be conducted at established sites, as described in Chapter 7.0 of the Work Plan.

D.10.7.2 **Support Zone (SZ)**

D.10.7.2.1 The SZ is the area outside the EZ where site support activities are conducted. This zone includes the break areas.

D.10.7.2.2 Persons desiring entrance into the EZ must first meet with the UXOSO and receive the appropriate safety briefing in the SZ before gaining admittance to the EZ.

D.10.8 **Site Maps**

The site maps will be used by the UXOSO during the Tailgate Safety Briefings to inform the workers of the location of barricades and warning signs going into the EZ. Maps of the project site are included in Appendix B of the Work Plan.

D.10.9 **On-site and Off-site Communications**

D.10.9.1 Effective on-site and off-site communication is an integral part of site control and will be established prior to initiating site activities. All site personnel will be familiar with the different methods of off-site and on-site communication.

D.10.9.2 On-site communication will be used to coordinate site operations, maintain site control, and pass along safety information, such as monitoring results and work/rest periods, and alert site personnel to emergency situations.

D.10.9.3 The methods of on-site communications shall be Cellular telephone, Hand-held radios, and Hand signals.

D.10.9.4 The SUXOS, UXOSO, and individual team leaders will utilize cellular telephones and/or hand-held radios to maintain communications with personnel on site.

D.10.9.5 Upon mobilization to the site, the SUXOS and UXOSO will establish the on-site communication system.

- Team leaders and site personnel (SUXOS, UXOSO) will be issued cellular telephones, and/or hand-held radios along with a list of contact numbers and call signs of on-site personnel.
- On-site personnel assigned communications shall perform daily communication checks to the SUXOS.
- On-site communications will be checked at a minimum:
 - At the start of each workday upon teams reaching their area of activities, and
 - After the mid-day break, when work resumes.

- At anytime that communications with the SUXOS or UXOSO cannot be maintained, that on-site team shall stop all activities until communications can be re-established.

D.10.9.6 Hand signals: Site personnel will be familiar with the following hand and audible signals:

- Hand gripping throat: ***“Breathing problem, can’t breathe”***
- Thumbs up: ***“OK, I’m all right, I understand”***
- Thumbs down: ***“No, negative”***
- Pointing to ear(s): ***“Can’t hear, don’t understand”***
- Waving hand(s) over head: ***“Need assistance now”***
- Pointing to eyes then pointing to a person/object: ***“Watch person/object closely”***
- Grab buddy’s wrist: ***“Evacuate site now, no questions”***
- One long horn/siren blast: ***“Evacuate site to assembly point”***
- Two short horn/siren blasts: ***“Condition under control, return to site”***

D.10.9.7 Off-site communication is required to ensure effective communication with off-site management, USACE personnel, and Emergency Services personnel. The cellular telephone will be the method used to conduct off-site communications.

D.11 Personal and Equipment Decontamination

The SOW for the OE Removal Action at the Opana Point Bombing Range & Makawao Gunnery Site in Maui, Hawaii includes performing the OE removal action described in the SOW and making final disposition of all OE and OE-related scrap recovered from the site. Hazardous and toxic waste, are not anticipated during activities under the SOW. The site is not suspected to contain radiological waste or Chemical Warfare Materiel (CWM).

D.11.1 Personnel Decontamination

D.11.1.1 A program for the personal decontamination of on-site workers is not an anticipated requirement during activities under the SOW. However, every ATI employee and site visitor will take normal personal hygiene precautions during activities being conducted on-site.

D.11.1.2 Adequate sanitation facilities will be provided at each work site to ensure proper personal hygiene. Site sanitation will be established and maintained in accordance with OSHA 29 *CFR* 1910.120(n) and USACE EM 385-1-1, Section 2.

D.11.1.3 All personnel will use the provisions outlined in Section D.16.2.12 of this Work Plan on-site for personal hygiene.

D.11.1.4 If site conditions change or unanticipated hazardous contamination is encountered, work will be suspended. The on-site USAESCH safety representative will be notified, and the appropriate procedures will be developed and submitted for approval before work is resumed.

D.11.2 Equipment Decontamination

D.11.2.1 Based on the SOW and previous activities conducted at the site CWM is not expected within the project area. Therefore, related decontamination procedures are not applicable.

D.11.2.2 The analysis of hazards of concern presented by each task, under work to be performed at the site, does not reflect the requirement for equipment decontamination at this time.

D.11.2.3 If site conditions change or unanticipated hazardous contamination is encountered, work will be suspended; the on-site USACE safety representative, still to be determined, will be notified; and the appropriate procedures will be developed and submitted for approval before work is resumed.

D.11.2.4 General decontamination procedures that might apply to a given situation include:

- D.11.2.4.1 All equipment, working surfaces and non-working surfaces will be decontaminated after contact with potentially infectious materials. A solution of 10 parts water to 1 part bleach, or equally effective material, will be used to clean contaminated areas.
- D.11.2.4.2 Contaminated, sharp objects will be cleaned up using mechanical means, such as a brush and dustpan. Sharp objects will not be picked up directly with the hands.
- D.11.2.4.3 Two pairs of gloves, inner surgical gloves and outer utility gloves, will be worn for cleaning contaminated surfaces. A smock or apron and eye protection will also be worn.
- D.11.2.4.4 Only those employees directly involved with the decontamination efforts will be allowed in the work area while cleaning is taking place.
- D.11.2.4.5 All cleaning equipment will be disinfected or disposed of in accordance with this section.
- D.11.2.4.6 For minor injuries where the employee is able to return to work, the injured employee will clean up his/her own blood or other potentially infectious materials.

D.12 Emergency Response and Contingency Procedures

D.12.1 Introduction

A thorough emergency response and contingency procedure shall be designed and implemented to handle anticipated emergencies on site prior to commencement of hazardous waste activities. This can dramatically reduce the severity of emergencies. The procedures outlined in this Appendix shall be implemented prior to and reviewed during the conduct of any site activities that involves the possibility of personnel exposure to safety and health hazards.

D.12.2 Pre-Emergency Planning

The UXOSO will perform pre-emergency planning before starting field activities and will coordinate emergency response with emergency medical technician (EMT)/police/fire personnel when appropriate. Pre-emergency planning meetings shall be used to inform local authorities of the nature of site activities that will be performed under the SOW and the potential hazards that activities may pose to site workers, the environment, and the public. The UXOSO will verify all on-site emergency services information, to include telephone numbers and procedures for requesting services. It shall be the UXOSO's responsibility to post these procedures and telephone contact numbers IAW the requirements of this Appendix.

D.12.2.1 Potential Emergencies

The following are the potential emergencies that may arise during the conduct of activities under the SOW:

- Injury or illness associated with physical or biological hazards
- Inclement weather
- Fire
- Personal injury from the unintentional detonation of OE

D.12.2.2 Emergency Services

The UXOSO shall verify the availability of all local emergency services and to confirm the procedures used to request the service. It shall be the responsibility of the SUXOS to ensure that adequate off-site communications are available at all times. A break in off-site communications shall result in the temporary halting of all on-site activities until communications are reestablished. Off-site communications shall be accomplished using telephone service to the responsible support agencies. Emergency telephone numbers are presented in this plan and the UXOSO shall post in the site office and in all site vehicles. All site personnel will

receive a period of instruction on the procedures for obtaining off-site emergency services.

D.12.2.3 Initial Reporting Procedures

At the onset of an emergency, the respective team leader will contact the UXOSO and/or the SUXOS to start the emergency response action. Once action is initiated, the SUXOS will notify the USACE On-site Safety Specialist as soon as possible. The UXOSO will ensure that remaining site personnel are advised of the situation and informed of their proper response procedures. Personnel will be notified to:

- Stop work activities;
- Evacuate to the ATI site vehicle and proceed to the work site “Personnel Emergency Rally Point” (Described daily during the “Tailgate Safety Briefing”, by the UXOSO);
- Begin emergency procedures; and
- Notify off-site emergency response organizations.

D.12.3 Personnel Roles, Lines of Authority, and Communication

To ensure a smooth process during an emergency response, the following positions have been established. Site personnel and local points of contact will be notified of changes to personnel roles, lines of authority, and communications as they take place.

D.12.3.1 On-scene Incident Commander

In the event of an emergency, the UXOSO will assume the responsibility of the On-scene Incident Commander. The SUXOS will assist the UXOSO, and in the event that the UXOSO is unavailable or incapacitated, the SUXOS will be the alternate person to assume this role. The On-scene Incident Commander will have the responsibility of directing all on-site and off-site emergency response personnel until relieved by competent authority. The SUXOS will notify the USACE On-site Safety Specialist as soon as possible of the emergency.

D.12.3.2 On-site Emergency Response Personnel

During site activities ATI personnel will act in the role of on-site emergency response personnel. Those personnel assigned to these tasks will be designated by the SUXOS prior to initiation of site activities involving the potential for an on-site emergency. ATI on-site emergency response personnel will receive training in the response actions that they will be authorized to, and may be directed to perform during a site emergency.

D.12.4 **Emergency Recognition and Prevention**

D.12.4.1 General

Prevention of emergencies will be aided by the effective implementation of the SSHP, personnel awareness, contingency planning, and on-site safety meetings. Anticipated emergencies may include physical injury, fire, explosion, inclement weather, and natural disasters. The UXOSO will use the site-specific briefing and/or the Tailgate Safety Briefings to inform site workers of the recognition, prevention, and response procedures for each anticipated emergency.

D.12.4.2 Small Fires

A small fire is defined as a fire that can most likely be extinguished by site personnel using a 4A: 20B:C portable fire extinguisher. The decision on whether or not to try to extinguish a fire using available site personnel and equipment will be made by the UXOSO and based on whether the fire is small, large, or involves explosives. The following actions shall be taken in the event of a small fire:

- The UXOSO and/or SUXOS shall be notified immediately. The SUXOS will notify the USACE On-site Safety Specialist.
- All unnecessary personnel shall be evacuated to an unwind position.
- Personnel shall attempt extinguish the fire from an upwind position.
- The UXOSO/On-site Incident Commander will request any emergency response services if needed.
- All personnel shall be prevented from fighting a fire if the possibility of explosive materials are involved.
- After the fire has been extinguished, the area around where the fire occurred must be watched for a minimum of 30 minutes to ensure that re-ignition does not occur. If personnel are not working in the area, the UXOSO should check the area of the fire periodically.

D.12.4.3 Large Fires

In the event that a large fire occurs or a small fire cannot be extinguished, the following actions shall be taken:

- The UXOSO and/or SUXOS shall be notified immediately. The SUXOS will notify the USACE On-site Safety Specialist.
- All unnecessary personnel shall be evacuated to an upwind position.

- The UXOSO/On-site Incident Commander shall request local emergency response services necessary to handle the situation.
- To the extent possible, the UXOSO/On-site Incident Commander will direct personnel to move vital equipment/supplies form the fire's path, if this can be accomplished safely.
- To the safest extent possible, available resources shall be used to fight the fire, but only from an upwind position.
- No personnel shall attempt to fight a fire that may involve explosive materials.
- The UXOSO shall warn responding personnel of location of any known hazards (i.e., UXO, flammable materials, etc.).

D.12.4.4 Fires Involving Explosive Materials

D.12.4.4.1 If a fire occurs which involves explosive materials, such as chemicals, fuels or UXO/OE, the UXOSO/On-site Incident Commander will order the immediate evacuation of all site personnel to an upwind assembly point at least the MSD from the fire site. At no time will ATI personnel fight a fire involving explosive materials. The on-site USAESCH OE Safety Specialist will be advised of the situation and the requirement that fire fighting personnel should not enter any closer than the MSD from the fire and may spray water to surrounding buildings, structures, etc., in order to prevent the spread of fire. Cellular phones will not be used around Flammable Liquids IAW OE Safety Group Safety Advisory 03-2003.

- For the Opana Point Bombing Range this is the 4.5-inch barrage rocket, with a maximum fragmentation range of 1759 feet.
- For the Makawao Gunnery Site this is the 105mm M1 projectile, with a maximum fragmentation range of 1939 feet.

D.12.4.4.2 After the fire has burned itself out, the site must be barricaded and entry prohibited until adequate cooling time has passed. The cool-down period should be a minimum of 24 hours. Explosive materials that may not have discharged during the fire may still be liable to function in the presence of extreme heat. After the site has cooled down, the SUXOS and UXOSO will inspect the site, and the condition of any UXO/OE involved in the fire and make a determination as to whether or not the site is safe for others to enter.

D.12.4.4.3 If UXO/OE is still intact; the SUXOS will determine whether or not it is safe to move to a secured holding area. If it is considered unsafe to move, it will be left in place and non-UXO/EOD personnel will be prevented from going into the area. The UXO will be reported to the USAESCH Safety Specialist who will request EOD support.

- D.12.4.4.4 If non-UXO qualified personnel must enter the site for purposes of fire investigation, etc., they must receive a briefing on the potential hazards of UXO on the site. They must be accompanied, at all times, by a UXO qualified ATI employee. No outside personnel will be permitted on-site while there is a known UXO/OE hazard present.
- D.12.4.4.5 If, during the course of the investigation, UXO/OE is observed, the site will be evacuated of all non-UXO qualified personnel until the site can be rendered safe for re-entry.
- D.12.4.5 Explosions
- D.12.4.5.1 In the event of an explosion all non-essential site personnel shall be evacuated to a safe, upwind assembly point outside the EZ. The UXOSO/On-site Incident Commander, the SUXOS, and the UASCE On-site Safety Specialist shall be immediately notified of the situation and the UXOSO/On-site Incident Commander shall request the required emergency response services needed. After an explosion has occurred, the site will remain barricaded for a minimum of 30 minutes before entry is permitted. The SUXOS and the UXOSO will enter the site and inspect for the presence and condition of UXO/OE.
- D.12.4.5.2 If UXO/OE is still intact; the SUXOS will determine whether or not it is safe to move to a secured holding area. If it is considered unsafe to move, it will be left in place and non-UXO/EOD personnel will be prevented from going into the area. The UXO will be reported to the USAESCH Safety Specialist who will request EOD support.
- D.12.4.6 Inclement Weather
- Inclement weather may necessitate ceasing site operations and the evacuation of personnel from the work area. Heavy precipitation, high winds, electrical storms, or cold-damp weather may affect workers ability to function properly. The UXOSO shall be responsible for obtaining daily local weather advisories and ensuring that the SUXOS is informed of possible adverse forecasts. When inclement weather does occur, the procedures outlined below shall be followed.
- D.12.4.6.1 Heavy Precipitation
- The UXOSO shall be alert when the possibility of heavy precipitation is forecasted even if expected in distant areas from the work site. The UXOSO shall assess each work site to determine if the area is prone to flash flooding. Site operations shall be halted, equipment will be secured, and personnel shall withdraw to adequate shelter. The SUXOS will be responsible to determine when operations shall resume, after consultation with the UXOSO.
- D.12.4.6.2 High Winds
- High winds may create conditions that threaten the safety of workers. The UXOSO may determine that wind conditions are at a level that site operations shall be

halted, equipment will be secured, and personnel shall withdraw to adequate shelter. The SUXOS will be responsible to determine when operations shall resume, after consultation with the UXOSO.

D.12.4.6.3 Electrical Storms

Electrical storms, with their associated lightening, present a significant hazard to site workers. The UXOSO shall be responsible for obtaining daily local weather advisories and ensuring that the SUXOS is informed of possible adverse forecasts. He will monitor local weather stations for electrical storm advisories. Once a storm is within ten miles of the site, operations will be terminated. All workers will seek adequate shelter. If the UXOSO determines that it is unsafe to remain on site, he shall call for the evacuation of the site. Once the storm is outside the ten-mile range of the work site, work may resume if all other factors are favorable.

D.12.4.6.4 Cold-damp Weather

D.12.4.6.4.1 If project activities are extended through the late fall and winter months, it is possible that circumstances could present themselves where employees could be affected by freezing and nonfreezing cold injury. Whenever you go into an environment that is less than your body temperature, you are exposed to a Cold Challenge. Cold weather can lower body temperature, resulting in impaired performance and cold injuries. When protection from clothing and shelter is inadequate, the body protects its temperature by reducing skin blood flow and by shivering.

D.12.4.6.4.2 The UXOSO will cover cold injury precautions and procedures with workers prior to the start of the winter months. Section D.15, of the SSHP, shall be used for review of the affects of cold weather. Employees shall monitor each other for the effects of cold weather. Supervisors and the UXOSO will be notified when workers show signs of cold weather injuries.

D.12.4.7 Chemical Warfare Material (CWM) Procedures

D.12.4.7.1 The site is not suspected to contain Chemical Warfare Materiel (CWM). However, if suspect CWM is encountered during any phase of site activities personnel shall withdraw upwind from the work area, secure the site and contact the USACE On-site Safety representative.

D.12.4.7.2 All work will immediately cease. Project personnel will withdraw along cleared paths upwind from the discovery.

D.12.4.7.3 A team consisting of a minimum of two personnel will secure the area to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area.

D.12.4.7.4 The SUXOS will notify the USACE On-site Safety representative to facilitate technical Escort Unit (TEC) or Explosive Ordnance Disposal (EOD) response, and two personnel will secure the site until their arrival.

D.12.4.7.5 Emergency Contact List, Table D-12.1 provides an emergency contact list for the OE Removal activities at the Opana Point Bombing Range & Makawao Gunnery Site in Maui, Hawaii project.

D.12.5 **Safe Distances and Staging Areas**

D.12.5.1 Safe Distance

Work zones will be established and posted to prevent unauthorized persons from entering into hazardous areas. As established, in paragraph D.10.7.1 the site Exclusion Zone (EZ) is to protect nonessential personnel from blast overpressure and fragmentation hazards. The EZ shall be at a distance equal to or greater than the minimum separation distance (MSD) calculated by the USAESCH Directorate of Engineering. For activities being conducted at this site the safety distance established for the EZ is calculated at:

- For the Opana Point Bombing Range this is the 4.5-inch barrage rocket, with a maximum fragmentation range of 1759 feet.
- For the Makawao Gunnery Site this is the 105mm M1 projectile, with a maximum fragmentation range of 1939 feet.

D.12.5.2 Staging Area

The UXOSO, in conjunction with the SUXOS, will identify staging areas, outside the MSD, for the various work areas on the site. These staging areas will be identified on the site map and will be communicated each morning to workers during the daily tailgate safety briefings. In the event of the need to suspend operations and evacuate the work site, all personnel will proceed to the staging areas where personnel shall be accounted for.

D.12.6 **Site Security and Control**

During an emergency, site security and control will be paramount to control any possibility of negative effects on the public. Upon notification of an emergency, each team leader will be responsible for accounting for and evacuation of their team personnel to the Staging Area. Once the team has evacuated, the team leader will report its completion to the UXOSO, acting as the On-site Incident Commander. At that time the team leader will ensure that personnel not authorized by the On-site Incident Commander are not allowed access into the EZ. If ATI personnel are needed for other response actions, the On-site Incident Commander will request assistance from the USACE On-site Safety Specialist. The USACE On-site Safety Specialist will then request security and access control services from the local police or sheriff department.

D.12.7 Evacuation Routes and Procedures

- D.12.7.1 In the event of an emergency that requires evacuation of the site, an alarm will be sounded or verbal instruction given by the UXOSO to evacuate the area to the work site “Staging Areas.” This point will be established outside the work area Maximum Fragmentation Range.
- D.12.7.2 Personnel will be shown the location of the staging areas daily, during the Site Safety Briefing. The location of the assembly point may change as work activity progresses within the project area.
- D.12.7.3 After evacuation, the UXOSO will account for all personnel, ascertain information about the emergency, and advise responding on-site personnel. The UXOSO will contact, advise, and coordinate with responding off-site emergency personnel, if deemed necessary by the situation or the client Safety and Health Representative.
- D.12.7.4 In all situations that require evacuation, personnel will not re-enter the work area until the conditions causing the emergency have been corrected; the hazard reassessed; the SSHP has been revised and reviewed with on-site personnel, if needed; and instructions have been given for authorized re-entry by the UXOSO.
- D.12.7.5 The route directions to the medical facility will be posted in the ATI office, at the work site, and in site vehicles. This map also will indicate the evacuation route.

D.12.8 Decontamination Procedures

It is not anticipated that hazardous waste decontamination shall be required during any activities under the SOW. This determination has been made based upon archival documentation and past activities conducted at the site.

D.12.9 Emergency Medical Treatment and First Aid

- D.12.9.1 In the event of an emergency involving personal injury or illness, on-site first-aid/CPR-trained personnel shall render first aid. Emergency medical services will be summoned, if deemed necessary by the UXOSO. If the injured employee feels he/she requires additional treatment, the employee will be given access to professional medical attention.
- D.12.9.2 ATI will have personnel trained and qualified in CPR and First Aid on-site to provide immediate response until the arrival of professional medical personnel. Adequate first aid supplies will be on hand at all times for qualified personnel to use.
- D.12.9.3 The UXOSO will ensure that all employees are informed who the First Aid/CPR-trained and qualified personnel are during the daily Site Safety Briefings.
- D.12.9.4 First aid kits will be available in the ATI office building and in each site vehicle. The UXOSO will have final authority on the decision to require additional

professional medical services (i.e., paramedics, hospital visit, etc.) for any illness or injury. If the injured employee feels he/she requires additional treatment, the employee will be given access to professional medical attention.

D.12.10 Emergency Alerting

It is the responsibility of the SUXOS to ensure that adequate on-site and off-site communications are available at all times. At any time that communications between individual teams and the SUXOS or UXOSO, or to off-site emergency services are lost, field operations shall be suspended until communications is re-established. The telephone numbers for all emergency services and points of contact are listed in Table D-12.1. This will be posted in the office/break area and all site vehicles. All site personnel shall be briefed daily on the procedures for obtaining off-site emergency services.

D.12.11 Emergency Response Procedures

In the event of an on-site emergency the individual team leader or first person aware of the emergency will contact the SUXOS or UXOSO by field radio or cellular phone. The UXOSO and/or the SUXOS will normally be responsible for requesting emergency services. If the order is given to evacuate the site of all personnel, each on-site team leader will assemble, account for, and evacuate all team personnel to the pre-designated staging area. The UXOSO or the SUXOS will initially instruct the on-site CPR/First Aid trained personnel to respond to the emergency. These individuals shall render emergency first aid treatment and stay with the injured until relieved by off-site emergency services personnel.

D.12.12 Post Emergency Actions

Prior to the re-start of on-site activities the UXOSO will ensure that sufficient emergency supplies are on hand to replace those used during the emergency. That on-site emergency CPR/First Aid trained personnel are on site, equipped, and prepared to respond. A critique of the emergency response actions taken will be initiated, with the results driven to look for flaws in the system and to improve on the emergency response.

D.12.13 Personal Protective Equipment

D.12.13.1 It is the responsibility of the UXOSO to ensure that all individuals performing activities on-site have and use personal protective equipment that will protect the employee from hazards. Section D-6, of the SSHP, describes the personal protective equipment which will be utilized during activities described under the SOW.

D.12.13.2 Due to the type of work that will be taking place at the Opana Point Bombing Range & Makawao Gunnery Site project location, Level D will be used. This level of PPE will not be allowed in areas of the site where atmospheric hazards are known or expected to exist. Level D should also be worn only if the activity in

which personnel are engaged does not have the potential for splash, immersion or any other contact with hazardous substances.

D.12.14 Incident Reporting

All accidents that occur incidentally to an operation, project, or facility shall be investigated, reported, and analyzed.

D.12.14.1 Responsibilities

Employees and subcontractors are responsible for reporting all injuries or occupationally related illnesses as soon as possible to the SUXOS and the UXOSO. The SUXOS is responsible for notifying the on-site USACE Safety representative and the ATI Project Manager as soon as possible after learning of the incident. He shall immediately report to the ATI Project Manager any incident, which could bring adverse attention or publicity to the U.S. Army, the Corps of Engineers, or ATI. The UXOSO shall notify the ATI Safety office of all accidents within 24-hours. He shall initiate an investigation and document all information pertaining to the incident. The ATI Project Manager shall notify the CEHNC Contracting Officer telephonically as soon as possible after learning of the incident. He shall forward any reports required.

D.12.14.2 Accident/Incident Notification Procedures

D.12.14.2.1 On-site USACE Safety Representative

An accident with any of the consequences mentioned will be reported immediately to the on-site USACE Safety representative.

D.12.14.2.2 CEHNC Contracting Officer

Accidents/incidents, which result in a fatality, injury of employees, lost workdays, and/or property damage assessed at a cost of \$2,000 or more, shall be reported telephonically to the Governments Contracting Officer as soon as possible after learning of the incident. The report shall contain as much information as is known concerning the incident. An ENG Form 3394 (see Appendix F, page F-32) shall be completed in accordance with the instructions attached to the form and forwarded to the Governments Contracting Officer within 5 working days after the incident. The ENG Form 3394 shall be legible and signed by the supervisor of the person injured (or supervisor of the activity where property damage occurred) and by the ATI Project Manager.

D.12.14.2.3 Hawaii Occupational Safety and Health (HIOSH) Division

D.12.14.2.3.1 Within eight hours after the death of any employee from a work-relate incident, the inpatient hospitalization of three or more employees as a result of a work-related incident, or property damage in excess of \$25,000 as a result of a work-related incident, you must orally report the fatality/multiple hospitalization, or property

damage by telephone, (808) 586-9102, or in person at the HIOSH office in Honolulu in accordance with section 1904.39 of Title 12 of the Hawaii Administrative Rules. The nearest regional HIOSH office point of contact is provided in Table D-12.1.

D.12.14.2.3.2 A serious injury or illness is defined as Loss of a member of the body (e.g., amputation); or serious degree of permanent disfigurement (e.g., crushing or severe burn type injuries); or In-patient hospitalization in excess of 24 hours for other than observation,

D.12.14.2.3.3 Information required to report to the Regional office is:

1. The location of the incident;
2. The location of the incident;
3. The time of the incident;
4. The number of fatalities or hospitalized employees;
5. The names of any injured employees;
6. Your contact person and his or her phone number; and
7. A brief description of the incident.

D.12.14.2.4 ATI Safety Office

All accidents/incidents that occur at the project site shall be investigated, reported, and analyzed. The ATI Accident Report Form (see Appendix F, page F-2) shall be initiated by the site UXOSO and submitted to the ATI Safety Office within 20 calendar days after the incident. If the ENG Form 3394 is required, it shall be forwarded to the ATI Safety Officer for review, action, signature, and forwarding to the Government Contracting Officer.

Table D-12.1. Emergency Contact List
Ordnance and Explosives (OE) Removal Action at the
Opana Point Bombing Range & Makawao Gunnery Site in Maui, Hawaii

Service/Contact	Agency	Telephone Number
Ambulance Service		“911”
Emergency Medical Treatment	Maui Memorial Medical Center 221 Mahalami Street Wailuku, HI 96793	(911) or (808) 242 – 2343
Local Police (Emergency)	Maui County Police Department	(911) or (808) 244 – 6445
Local Fire Department (Emergency)	Fire Department	(911)
National Poison Control Center	American Association of Poison Control Centers	1 – 800 – 222 – 1222
Hawaii Poison Control	Hawaii Poison Center	1 – 800 – 941 – 4411
Centers for Disease Control http://www.cdc.gov/health/diseases.htm		(800) 311 – 3435 (404) 639 – 3534
Mr. James Roger VanHuss	ATI Project Manager	(808) 885 – 3435
Mr. Paul Duncan, ATI Safety Manager	ATI Safety Office	(865) 481 – 5337
Ms. Cheryl Riordan, CSP	ATI Safety Office	(757) 486 – 8567
Ms. Tammy Blasko	ATI Human Resources Manager	(865) 481 – 5357
Ms. Helene Takemoto	U.S. Army Corps of Engineers, Honolulu District Project Manager	(808) 438-6934
USACE Safety	U.S. Army Corps of Engineers, Honolulu District OE Safety Specialist	TBD
Ms. Lydia Tadesse	USAESCH, Contracting Officer	(256) 895 – 1169
Mr. Robert V. Nore	USAESCH, Project Manager	(256) 990 – 0888
Mr. Greg Parsons	USAESCH Safety	(256) 895 – 1598
CHEMTREC		(800) 424 – 9300
National Response Center		(800) 424 – 8802
EPA Environmental Response Team (ERT)		(800) 424 – 8802
Hawaii OSHA Report of fatalities and multiple hospitalization incidents to OSHA (Within 8 hours)	Hawaii Occupational Safety and Health (HIOSH) Division 830 Punchbowl Street, Room 423 Honolulu, Hawaii 96813	Telephone: (808) 586-9102 Or in Person
WC-1 Employer’s Report of Industrial Injury Accident Reporting	Hawaii OSHA	(808) 243-5322
U.S. Army EOD	706 TH Ordnance Company (EOD) Schofield Barracks, Hawaii	(808) 655 – 5282 / 5313

ATI = American Technologies Incorporated.

CHEMTREC = Chemical Transportation Emergency Center

CSP = Certified Safety Professional

EOD = Explosive Ordnance Disposal

EPA = Environmental Protection Agency

ERT = Environmental Response Team

OSHA = Occupational Safety and Health Administration

PM = Project Manager

USACE = U.S. Army Corps of Engineers

D.13 Confined Space Entry Procedures

Based on the SOW and planned activities for the OE Removal Action at the Opana Point Bombing Range & Makawao Gunnery Site, confined space entry will not be conducted. Therefore, related procedures are not applicable to this site.

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D.14 Spill Containment

There will be no large volume storage of fuels and oils at the project site; therefore, the probability of a spill is unlikely. However, the UXOSO will maintain and issue materials and equipment capable of containment and recovery of any spilled materials. Spill control materials and equipment will be staged at any location where fuel transfer will take place. Refer to appropriate Activity Hazard Analyses. In the event of a spill, the following procedures apply:

1. Notify the UXOSO and SUXOS immediately.
2. The SUXOS will notify the on-site USAESCH OE Safety Representative. The following relative information (location, time, chemical identity, quantity, and MSDSs), and any corrective actions/measures taken will be passed.
3. Locate the source and stop the leak/spill if it can be done safely, as dictated by the UXOSO.
4. Begin containment and recovery of spilled material, as directed by the UXOSO, using appropriate PPE and spill clean-up equipment and materials.

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D.15 Heat/Cold Stress Monitoring

D.15.1 General

D.15.1.1 The UXOSO will review conditions with site personnel that would modify an individual’s susceptibility to heat/cold-induced stress. He will ensure that such individuals have the opportunity to modify or refrain from activities that would put personnel at risk.

D.15.1.2 Prior to initiating site activities each day, and periodically throughout the day, the UXOSO will inspect the site personnel for evidence of heat-related illnesses. Evidence of extreme dehydration, illness, drug or alcohol use may require the UXOSO to restrict the worker’s activities until such time as the worker is fit for duty. Personnel identified as being at high risk for heat stress, who are allowed to participate in site operations, will be monitored frequently by the UXOSO.

D.15.2 Heat and Cold Stress Monitoring Protocols

D.15.2.1 Wet-Bulb, Dry-Globe Thermometer (WBGT) Monitoring Protocol

For site conditions where personnel are working in Level D PPE, and the ambient temperature is greater than 75°F, the UXOSO will conduct WBGT monitoring to assist in controlling the potential for site workers experiencing heat-related adverse health effects. The UXOSO will use an approved Heat Stress Data Logger periodically throughout the day to determine the WBGT readings and to determine the work/rest schedule to be implemented. The values outlined in Table D-15.1 are designed such that nearly all acclimatized, fully clothed workers with adequate water and electrolyte replacement liquids intake will be able to function without their body temperatures exceeding 100.4°F.

Table D-15.1. Permissible WBGT Heat Exposure Threshold Limit Values

Work-Rest Regime ^{nt}	Work Load		
	Light ^a	Moderate	Heavy
Continuous work	86°F (30.0°C)	80°F (26.7°C)	77°F (25.0°C)
75 Percent Work – 25 Percent Rest, each hour	87°F (30.6°C)	82°F (28.0°C)	78°F (25.9°C)
50 Percent Work – 50 Percent Rest, each hour	89°F (31.4°C)	85°F (29.4°C)	82°F (27.9°C)
25 Percent Work – 75 Percent Rest, each hour	90°F (32.2°C)	88°F (31.1°C)	86°F (30.0°C)

°C = degrees Celsius.

°F = degrees Fahrenheit.

^aConsult the ACGIH TLV booklet for definitions of Light, Moderate, and Heavy workloads. Values are given in °F and (°C) WBGT, and are intended for workers wearing single layer summer-type clothing. Use of semi- or totally impermeable clothing requires monitoring IAW the ATI Heat Stress Prevention Program. As workload increases, the heat stress impact on an unacclimatized worker is exacerbated. For unacclimatized workers performing a moderate level of work, the permissible heat exposure TLV should be reduced by approximately 2.5°C.

D.15.2.2 Cold Stress Monitoring Protocol

D.15.2.2.1 Cold temperature extremes can be made more dangerous by water and wind speed. A wind chill chart, Table D-15.2, should be used to monitor the cooling power of wind on exposed flesh. At temperatures below 32°F, the effects of wind speed become pronounced. The use of a tarp or other barrier should be considered as a contingency to reduce the effects of wind speed.

D.15.2.2.2 The UXOSO will also use meteorological data and Table D-15.2 to inform site personnel of the combined temperature/wind chill effect to be expected during the day’s activities.

D.15.2.2.3 To date, there are no federally mandated regulations related to work/rest schedules. The “15-minute break every 2 hours” is a recommended routine but may not be adequate for all cold environments. The ACGIH has published a work/rest schedule, which is provided in Table D-15.3. However, this table only applies to, and should be implemented for, temperatures below 0°F. Therefore, for temperatures above 0°F, workers will be encouraged to seek shelter and rest in a warm area whenever they exhibit signs or symptoms of cold stress, as discussed previously.

Table D-15.2. Cooling Power of Wind Chart (on Exposed Flesh Expressed as Equivalent Temperature)

Equivalent Temperature (°F)		Calm	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
W i n d		COLD																	
	5	32	27	22	16	11	6	0	-5	-10	-15	-21	26	-31	-36	-42	-47	-52	
		VERY COLD																	
S p e e d	10	22	16	10	3	-3	-9	-15	-22	-27	-34	-40	-46	-52	-58	-64	-71	-77	
		BITTER COLD																	
	15	16	9	2	-5	-11	-18	-25	-31	-38	-45	-51	-58	-65	-72	-78	-85	-92	
M P H	20	12	4	-3	-10	-17	-24	-31	-39	-46	-53	-60	-67	-74	-81	-88	-95	-103	
		EXTREME COLD																	
	25	8	1	-7	-15	-22	-29	-36	-44	-51	-59	-66	-74	-81	-88	-96	-103	-110	
H	30	6	-2	-10	-18	-25	-33	-41	-49	-56	-64	-71	-79	-86	-93	-101	-109	-116	
	35	4	-4	-12	-20	-27	-35	-43	-52	-58	-67	-74	-82	-89	-97	-105	-113	-120	
	40	3	-5	-13	-21	-29	-37	-45	-53	-60	-69	-76	-84	-92	-100	-107	-115	-123	
	45	2	-6	-14	-22	-30	-38	-46	-54	-62	-70	-78	-85	-93	-102	-109	-117	-125	
	WIND CHILL CHART																		

Table D-15.3. TLV Work/Rest Schedule (for 4-hour work shift*)

Air Temp. °F Approx.	No Wind		5 MPH Wind		10 MPH Wind		15 MPH Wind		20 MPH Wind	
	Max. Work Period	No. of Breaks								
-4° to -8°	Normal	1								
-9° to -13°	Normal	1	Normal	1	Normal	1	Normal	1	75 min.	2
-14° to -18°	Normal	1	Normal	1	Normal	1	75 min.	2	55 min.	3
-15° to -19°	Normal	1	Normal	1	75 min.	2	55 min.	3	40 min.	4
-20° to -24°	Normal	1	75 min.	2	55 min.	3	40 min.	4	30 min.	5
-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease					
-40° to -44°	30 min.	5	Non-emergency Work should cease							
-45° & Below	Non-emergency work should cease									

1. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up cycle in a warm location, and with an extended break in a warm location (e.g., lunch) at the end of the 4 hours. For light-to-moderate work: Apply the schedule one step lower.
 2. The following is suggested as a guide for estimating wind velocity if other, more accurate means are not available: 5 mph - light flag moves; 10 mph - light flag fully extended; 15 mph - raises newspaper sheet; and 20 mph - blowing and drifting snow.
 3. This table applies only to acclimatized workers with appropriate dry clothing for winter work.
- * Adapted from the "1993-1994 Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.

REFERENCES

1. NIOSH/OSHA/USCG/EPA. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. DHHS (NIOSH) 85-115. Cincinnati, Ohio.
2. American Conference of Governmental Industrial Hygienists (ACGIH). 1992-1993 Threshold Limit Values and Biological Exposure Indices. Cincinnati, Ohio.

D.15.3 Physiological Monitoring Protocols

D.15.3.1 Temperature extremes can affect on-site personnel and the use of PPE. Table D-15.4 identifies the heat and cold stress disorders, symptoms, and treatment.

D.15.3.2 Heat stress is one of the most common (and potentially serious) illnesses that affect UXO/OE site workers. When site personnel are engaged in operations involving hot environments, a number of physiological responses can occur which may seriously affect the health and safety of the workers. The amount and type of PPE worn directly, influence reduced work tolerance and the increased risk of excessive heat stress. PPE adds weight and bulk, severely reduces the body's access to normal heat exchange mechanisms (evaporation, convection, and radiation), and increases energy expenditure. Therefore, when selecting PPE, each item's benefit should be carefully evaluated in relation to its potential for increasing the risk of heat stress.

D.15.3.3 The effects experienced by site personnel when working in cold environments depend upon many environmental and personal factors, such as ambient air temperature, wind speed, duration of exposure, type of protective clothing and equipment worn, type of work conducted, level of physical effort, and health status of the worker. In cold environments, overexposure can cause significant stress on the body, which can lead to very serious and permanent injury. Cold may affect just the exposed body surfaces and extremities, or may affect the deeper body tissues and the body core.

D.15.3.4 Table D-15.5 will be used to determine the frequency of physiological monitoring of on-site personnel. The length of the work cycle will be governed by the frequency of the required physiological monitoring. For workers wearing permeable clothing (i.e., standard, cotton work clothes), follow recommendations for monitoring requirements and suggested work/rest schedules in the current ACGIH TLVs for Heat Stress, Table D-15.4. For workers in Tyvek™ suits, work/rest schedules will be adjusted in accordance with physiological monitoring requirements.

D.15.4 Prevention Protocols

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat exhaustion, that person may become predisposed to additional heat injuries. In order to avoid heat-related illnesses, proper preventive measures will be implemented whenever environmental conditions dictate. These preventive measures represent the minimal steps to be taken and will include the following procedures:

- D.15.4.1 Heat Stress Preventive Measures
- D.15.4.1.1 The UXOSO will examine each site worker prior to the start of daily operations to determine the individuals susceptible to heat-induced stress. Workers exhibiting factors, which make them susceptible to heat stress, will be closely monitored by the UXOSO.
 - D.15.4.1.2 Site workers will be trained to recognize and treat heat-related illnesses. This training will include the signs, symptoms, and treatment of heat-stress disorders.
 - D.15.4.1.3 In order to maintain workers' body fluids at normal levels, workers will be encouraged to drink, as a minimum, approximately 16 ounces of liquids prior to start of work in the morning, after lunch, and prior to leaving the site at the conclusion of the day's activities. Disposable, 4- to 12-ounce, cups and liquids will be provided on-site. Liquids to be provided will include water and an electrolyte replacement solution, with the intake of each being equally divided. Liquids containing caffeine are to be avoided.
 - D.15.4.1.4 When ambient conditions and site workload requirements dictate, as determined by the UXOSO, workers will be required to drink a minimum of 16 to 32 ounces of liquids during each rest cycle. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat. When heavy sweating occurs, workers will be encouraged to drink even though they may not be thirsty.
 - D.15.4.1.5 A shelter or shaded area will be provided where workers may be protected from direct sunlight during rest periods.
 - D.15.4.1.6 Monitoring of ambient or physiological heat stress indices will be conducted to allow prevention and/or early detection of heat-induced stress.
 - D.15.4.1.7 Site workers will be given time to acclimatize to site work conditions, temperature, protective equipment, and workload. Acclimatization is the adaptive process that results in a decrease of the physiological response produced by the application of a constant environmental stress.
 - D.15.4.1.8 On initial exposure to a hot environment, there is an impaired ability to work and evidence of physiological strain. If the exposure is repeated on several successive days, there is a gradual return of the ability to work and a decrease in physiological strain.
 - D.15.4.1.9 Acclimatization usually takes two to six days of continued work in hot environments, and allows the worker's body to become adjusted to this level and type of work. This process involves a gradual increase in the workload over the required period, the length of which depends upon the nature of the work performed, the ambient temperatures, and the individual's susceptibility to heat stress. The results of acclimatization include: subjective discomfort practically disappears; body

temperature and heart rate are lower; there is a more stable blood pressure; and the sweat is more profuse and dilute.

D.15.4.1.10 Work schedules will be adjusted as follows:

- Modify work/rest schedules according to monitoring requirements outlined in Table D-15.3.
- Mandate work slowdowns as needed.
- Rotate personnel: Alternate job functions to minimize overstress or overexertion at one task.
- Add additional personnel to work teams.
- Perform work during cooler hours of the day if possible.
- Workers will be encouraged to achieve and maintain an optimum level of physical fitness. Increased physical fitness will allow workers to better tolerate and respond to hot environments and heavy workloads. In comparison to an unfit person, a fit person will have less physiological strain, a lower heart rate and body temperature, and a more efficient sweating mechanism.
- Alcohol should not be consumed in a hot environment because the loss of body fluids increases the risk of heat stress.

Table D-15.4. Heat and Cold Disorders, Symptoms, and Treatment

Disorder	Symptoms	Treatment
<i>Heat Stress</i>		
Heat Rash. Caused by continuous exposure to heat and humid air and is aggravated by wet, chafing clothing. This condition can decrease a worker's ability to tolerate hot environments.	Mild red rash, especially in areas of the body that sweat heavily.	Decrease amounts of time in protective gear and provide powder, such as cornstarch or baby powder, to help absorb moisture and decrease chafing. Maintain good personal hygiene standards and change into dry clothes if needed.
Heat Cramps. Caused by a profuse rate of perspiration that is not balanced by adequate fluid and electrolyte intake. The occurrence of heat-related cramps is often an indication that excessive water and electrolyte loss has occurred, which can further develop into heat exhaustion or heat stroke.	Acute, painful spasms of voluntary muscles such as the back, abdomen, and extremities.	Remove victim to a cool area and loosen restrictive clothing. Lightly stretch and gently massage affected muscles to increase blood flow to the area. Have patient drink one to two cups of liquids immediately, and every 20 minutes thereafter. Consult with physician if condition does not improve. If available, an electrolyte replacement solution should be taken along with liquids.
Heat Exhaustion. Heat exhaustion is a state of weakness or exhaustion caused by stress on various organs to meet increased demands to cool the body. This condition leads to inadequate blood supply and cardiac insufficiency. Heat exhaustion is less dangerous than heat stroke, but nonetheless must be treated. If allowed to go untreated, heat exhaustion can quickly develop into heat stroke.	Pale or flushed, clammy, moist skin, profuse perspiration, and extreme weakness. Body temperature is basically normal or slightly elevated, the pulse is weak and rapid, and breathing is shallow. The individual may have a headache, be dizzy, or nauseated.	Remove the individual to a cool, air-conditioned place, loosen clothing, elevate feet, and allow individual to rest. Consult physician, especially in severe cases. Have patient drink one to two cups of liquids immediately, and every 20 minutes thereafter. Total liquid consumption should be about one to two gallons per day. If the signs and symptoms if heat exhaustion do not subside, or become more severe, immediate medical attention will be required.
Heat Stroke. An acute and dangerous reaction to heat stress caused by failure of the heat-regulating mechanisms of the body. The failure of the individual's temperature control system causes the perspiration system to stop working correctly. When this occurs, the body core temperature rises very rapidly to a point (105+°F) where brain damage and death will result if the person is not cooled quickly.	The victim's skin is hot, and may or may not be red and dry, due to the fact that the individual may still be wet from having sweated while wearing protective clothing earlier. Other symptoms include nausea, dizziness, confusion, extremely high body temperature, rapid respiratory and pulse rate, delirium, convulsions, unconsciousness, or coma.	Cool the victim immediately. If the body temperature is not brought down quickly, permanent brain damage or death may result. The victim should be moved to a shady area; he/she should lie down and the head be elevated. Cool the victim by either sponging or immersing the victim in very cool water to reduce the core temperature to a safe level (<102°F). If conscious, give the victim cool liquids to drink. Observe the victim and obtain immediate medical help. Do not give the victim caffeinated or alcoholic beverages. Medical help should be summoned

Table D-15.4. Heat and Cold Disorders, Symptoms, and Treatment (continued)

Disorder	Symptoms	Treatment
<i>Cold Stress</i>		
Immersion Foot or Trench Foot. Immersion foot usually results from prolonged exposure when air temperatures are above freezing, whereas trench foot normally occurs from shorter exposure at temperatures near freezing.	The symptoms for each disorder are similar and include tingling, itching, swelling, pain in some cases or numbness in others, lack of sweating, and blisters.	Bring the deep body core temperature back to its normal temperature of about 98.6°F slowly. Workers exhibiting symptoms should be brought to a warm area and allowed to rest and warm up. If a worker's clothing becomes wet, which reduces its insulation effect; it should be removed and replaced by dry clothing, or allowed to dry before resuming work. A warm, non-alcoholic, de-caffeinated drink (not coffee), or soup, may be given.
Hypothermia. Hypothermia results when the body loses heat faster than it can produce it. When this occurs, the blood vessels in the skin and extremities constrict, reducing the flow of warm blood to those areas, thereby reducing the rate of heat loss. This reduction in blood flow usually affects the peripheral extremities first.	Ears, fingers, and toes begin to experience chilling, pain, and then numbness due to loss of both blood flow and heat. Shivering begins as the body's core temperature begins to drop. The pain and numbness in the extremities is an indication that heat loss is increasing.	See above.
Frostbite. Frostbite occurs when there is actual freezing of the water contained in the body tissues. This usually occurs when temperatures are below freezing, but excessive wind can result in frostbite even at ambient temperatures that are above freezing.	Frostbite tissue damage can be superficial, near the surface of the skin, or extend to deeper body tissues, which can cause severe tissue damage. The skin may first have a prickly or tingling sensation and later become numb with cold, and the appearance may range from superficial redness of the skin to white, hard, frozen-looking tissues.	See above. Frostbite is considered to be a medical emergency beyond the capability of on-site personnel to address. Keep the victim warm and seek medical attention as soon as possible.
Frost Nip. Frost nip or incipient frostbite is the condition characterized by sudden blanching or whitening of the skin.	The skin has a waxy or white appearance and is firm to the touch, but the tissue beneath is resilient.	The victim should be sheltered from the wind and cold and given warm drinks. If the frostbite is superficial, the frozen part should be covered with extra clothing or blankets or warmed against the body. Do not use direct heat, and do not pour hot water over or rub the affected area. Warming should be gentle and gradual. If the frostbite is deep, i.e., the affected area is frozen and hard to the touch; immediate medical attention should be obtained. The safe thawing of deep frostbite is beyond the on-site expertise.

Table D-15.5. Suggested Frequency of Physiological Monitoring (for Fit and Acclimatized Workers)

Adjusted Temperature^a	Normal Work Ensemble^b	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-28.1°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

^aC = degrees Celsius.

^bF = degrees Fahrenheit.

Note: For work levels of 250 kilo calories/hour.

^aCalculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 × % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 Percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

^bA normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

D.15.4.2 Cold Stress Preventive Measures

During work in the winter months, the UXOSO will use the tailgate safety briefing to inform site personnel of the measures to be utilized in the prevention and control of cold stress. The UXOSO will also use meteorological data and current site conditions to inform site personnel of the expected weather effect to be expected during the day's activities. Prevention methods, which site personnel shall utilize include:

1. Use the "Buddy System" to keep aware of each team-members physical condition.
2. Eat well-balanced meals and maintain adequate intake of non-alcoholic, decaffeinated fluids.
3. Wear adequate, appropriately layered clothing, including a water-repellent outer layer, if precipitation is forecasted.
4. Wear a hat and gloves to help retain body heat. (When working with static sensitive materials, 100% cotton is recommended.)
5. Remove outer layers of clothing during breaks in a sheltered location to prevent excessive sweating.
6. In windy, cold conditions, cover all exposed skin.
7. Protect clothing from getting wet. This includes keeping clothing from getting wet with sweat, so remove outer layers if work activities cause excessive sweating. Change socks during breaks or as necessary to keep feet from becoming wet with sweat.

8. Seek shelter in a warm, protected area when signs and symptoms of cold stress become evident.
9. ATI will assist in the prevention of cold stress by providing sheltered, dry areas where site personnel can rest and regain body heat during breaks.
10. To date, there are no federally mandated regulations related to work/rest schedules. The “15-minute break every 2 hours” is a recommended routine but may not be adequate for all cold environments. For temperatures above 0°F, workers will be encouraged to seek shelter and rest in a warm area whenever they exhibit signs or symptoms of cold stress, as discussed previously.

D.15.5 **Heat/Cold Stress Documentation**

The UXOSO will be responsible for recording all heat/cold stress-related information. This will include training sessions and monitoring data. Training sessions will be documented on the “Documentation of Training” form, and WBGT data and other information will be recorded in the Safety Log.

D.16 Standard Operating Procedures, Engineering Controls, and Work Practices

The procedures and guidelines detailed in this Appendix are to be adhered to by all personnel performing project activities at the Sierra Army Depot East Shore BRAC Parcels. These procedures and guidelines are provided to ensure a safe work environment for all workers on-site.

D.16.1 As Low As Reasonably Achievable (ALARA) Policy

The ATI policy is to maintain exposures to hazardous UXO, and chemical, physical, or biological hazards at levels that are as low as reasonably achievable (ALARA). ALARA is achieved through proper training of employees, adequate work procedures, adequate engineering controls, good personal hygiene practices, and, when required, use of protective equipment. Each individual working in a restricted area is required to adhere to established ALARA rules, regulations, and concepts outlined in this SSHP. ALARA applies to all phases of the operation and should be considered from the planning phase through to the project's completion. ALARA policies will be re-evaluated and updated by the SUXOS, UXOSO and Safety Manager, as required by changes in site conditions.

D.16.2 Standard Operating Procedures

D.16.2.1 Personnel Practices

Safe practices can reduce hazards due to normal site activities. Personnel must keep the prudent guidelines listed below in mind when conducting field activities. General personnel requirements include:

1. Horseplay or fighting is prohibited.
2. Eating, drinking, smoking, chewing gum, tobacco, or any other hands-to-face activities are prohibited on-site, except in designated areas after both face and hands have been washed.
3. Wearing contact lenses is prohibited in the EZ.
4. When required to sit or kneel on the ground, avoid contaminated surfaces.
5. Placing equipment on contaminated surfaces should be avoided.
6. Climbing on or over obstacles is prohibited. Stacks of materials can be unstable and could cause injury.
7. Open flames of any type are prohibited on-site.
8. Bringing defective or unsafe equipment on-site is prohibited.

9. Only authorized employees may enter the work site. Visitors must check in with the UXOSO, receive an appropriate safety briefing, and be escorted by UXO/qualified personnel at all times while on-site.
10. Hazard assessment is a continuous process. Personnel must be aware of their surroundings and constantly be aware of the UXO, chemical, and physical hazards that are, or may be, present.
11. The number of personnel in the EZ will be the minimum number necessary to perform work tasks in a safe and efficient manner.
12. Team members will be familiar with the physical characteristics of each site including wind direction, site access, and the location of communication devices and safety/emergency equipment.
13. The location of overhead power lines and underground utilities must be established.
14. Detection or appearance of unusual liquids, odors, or discolored soil could indicate the presence of contaminants and should be reported to the UXOSO immediately.
15. Site personnel are to report any other unusual or potentially hazardous condition to the UXOSO for investigation and/or corrective action.

D.16.2.2 Buddy System Protocol

The buddy system is a safety practice in which each individual is concerned with the health and well being of co-workers. The buddy system will be implemented during all on-site activities and will be incorporated whenever workers may be isolated or as determined by the UXOSO. The SUXOS will assign “buddies” to ensure accounting of all site personnel. Additional procedures include:

1. A minimum of two personnel, with one being a UXO qualified person, will be present during all OE operations so that one person will always act as a safety observer. During all OE operations, only the minimum number of personnel required to safely perform the task will be allowed on-site. All others will evacuate to a pre-designated assembly point.
2. At no time will an individual desert his “buddy” unless his “buddy” goes down, and it is considered too hazardous to render assistance. “Buddies” will enter and exit EZ together and frequently monitor one another for signs of fatigue, heat stress, and any other problems. In such cases, the worker in danger may not even be aware he/she is having a problem. The “buddy” must always be alert to changes in the behavior of his “buddy” so that he can remove him from the situation immediately.

3. “Buddies” should inspect each other’s equipment, including PPE, to ensure that it is adequate and in proper working order.

D.16.2.3 Equipment Use Procedures

Equipment use will be subject to the following procedures:

1. Heavy equipment utilized on-site will be operated under strict adherence to the applicable OSHA regulations found in OSHA 29 *CFR* 1910; OSHA 29 *CFR* 1926; the requirements of USACE EM 385-1-1, Section 16; and the ATI Safety Program.
2. The requirements outlined in USACE EM 385-1-1, Section 13, will be observed when using hand tools.
3. To control the hazards associated with power tool operation, the requirements outlined in USACE EM 385-1-1, Section 13, and the safe work practices will be observed.

D.16.2.4 Material Handling Procedures

Many types of objects are handled in normal day-to-day operations. Care will be taken in lifting and handling heavy or bulky items because they are the cause of many joint and back injuries. The following fundamentals address the proper lifting of materials to avoid joint and back injuries:

1. The size, shape, and weight of the object to be lifted must be considered. Site personnel will not lift more than they can handle comfortably.
2. A firm grip on the object is essential; therefore, the hands and object will be free of oil, grease, and water, which might prevent a firm grip.
3. The hands, and especially the fingers, will be kept away from any points that cause them to be pinched or crushed, especially when setting the object down.
4. The item will be inspected for metal slivers, jagged edges, burrs, rough or slippery surfaces, and pinch points, and gloves will be used, if necessary, to protect the hands.
5. The feet will be placed far enough apart for good balance and stability.
6. Personnel will ensure that solid footing is available prior to lifting the object.
7. When lifting, get as close to the load as possible, bend the legs at the knees, making sure that the back is kept as straight as possible.
8. To lift the object, the legs are straightened from their bending position.
9. Never carry a load that cannot be seen over or around.

10. When placing an object down, the stance and position are identical to that for lifting, with the back kept straight, the legs bent at the knees, and the object lowered.
11. If the item to be lifted is too large, bulky, or heavy (over 50 lb) for one person to safely lift, ask a co-worker for assistance. If a piece of material handling equipment is available that can do the job, the employee should use the equipment instead of trying to lift the object himself/herself.
12. When two or more people are required to handle an object, coordination is essential to ensure that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each person, if possible, will face the direction in which the object is being carried.

D.16.2.5 Drum/Container Handling Procedures

ATI does not anticipate the use of drums/containers during activities under the SOW.

D.16.2.6 Hot Work, Sources of Ignition, Fire Protection/Prevention, and Electrical Safety Procedures

Under the SOW and activities anticipated for this tasking, there are no requirements for hot work. All site personnel, to eliminate the hazards from ignition sources, will utilize the general, fire safety precautions and procedures outlined in Section D.12.4 of the Work Plan.

D.16.2.7 Lockout/Tagout Procedures

The SOW for this project is to safely locate, identify, and make final disposition of all OE and OE-related scrap from the site. There will be no activities involving the servicing or maintenance on a system where the unexpected energizing, start-up, or release of kinetic or stored energy could occur and cause injury or damage to workers.

D.16.2.8 Fall Protection Procedures

The SOW for this project is to safely locate, identify, and make final disposition of all OE and OE-related scrap from the site. There will be no activities performed, which meet the requirement for fall protection.

D.16.2.9 Container Labeling Procedures

The UXO Safety Officer will inspect all on-site chemicals to ensure that they are properly labeled with a National Fire Protection Association (NFPA) label, or equivalent information, during the duration of their use at the job site. Any

containers, which are missing labels or are transferred into other containers for use, will be labeled with a NFPA label or equivalent information.

D.16.2.10 Illumination Procedures

Conducting UXO/OE operations in poorly illuminated conditions is inherently dangerous. There will be no UXO/OE operations conducted during the hours of darkness.

D.16.2.11 Housekeeping and Waste Disposal Procedures

Specific procedures are defined as:

1. A clear path of ingress/egress to the work site will be prepared and maintained.
2. All equipment and working surfaces will be cleaned and decontaminated after contact with blood or other potentially infectious materials.
3. Contaminated work surfaces and equipment will be decontaminated with an appropriate disinfectant immediately after they become contaminated in accordance with the decontamination section of this program.
4. Regulated waste will be placed in containers, which are capable of being sealed, constructed to contain all contents and prevent leakage, properly labeled or color-coded, and closed prior to removal or replacement. Labels or color-coding will be fluorescent orange or orange-red and display the biohazard symbol in a contrasting color.
5. Contaminated clothing, equipment, and other materials will be handled as little as possible and with minimum agitation. Bags containing contaminated materials will not be carried or handled from the bottom.
6. All regulated waste will be disposed of in accordance with applicable federal, state, and local regulations.

D.16.2.12 Sanitation Procedures

D.16.2.12.1 Adequate sanitation facilities will be provided at each work site to ensure proper personal hygiene. Site sanitation will be established and maintained in accordance with OSHA 29 *CFR* 1910.120(n) and USACE EM 385-1-1, Section 2. In particular:

D.16.2.12.2 Temporary toilet facilities will be provided in the work areas of the site. Chemical toilets will be used in these locations and will be serviced every week. Each temporary toilet will be naturally lighted, have a toilet seat with a seat cover, have a urinal, have ventilation with vents screened, and be lockable from the inside. There will be at least one toilet for every 15 workers at the work site.

- D.16.2.12.3 Hand and face washing facilities will be set up at the ATI work site and will be utilized by all personnel exiting the EZ prior to eating, drinking, tobacco use, or other hand-to-face activities. Paper towels will be provided for drying. A trash receptacle will be provided for discarded paper towels. In accordance with ANSI Z358.1-1998, eye-wash facilities will be available on the work site where operations in any of the work zones involve handling substances, which could be hazardous to the eyes. An eyewash kit will also be located in each site vehicle.
- D.16.2.12.4 An adequate supply of potable (drinkable) water will be provided on-site at all times. As there are no drinking water facilities on most areas of the site, drinking water will be available in the ATI office, and water will be brought in coolers to the work areas of the site and supplied in accordance with the following provisions: Containers used for potable water will be capable of being tightly closed, equipped with a tap, and maintained in a clean and sanitary condition. A container used for distribution of drinking water will be clearly labeled as to its contents and not used for any other purpose. Water will not be dipped from the container, and use of a common cup will not be allowed. Where single service cups are provided, separate sanitary containers will be provided for the storage of the unused cups and for the disposal of the used cups.
- D.16.2.12.5 Outlets and storage containers for non-potable water, such as water for fire fighting or decontamination, will be clearly labeled to indicate that the water is not suitable for drinking, washing, or cooking. There will, at no time, be a cross-connection or open potential between a system furnishing potable water and a system furnishing non-potable water.

D.16.3 **Engineering Controls**

Engineering controls will be used, whenever possible, to eliminate or reduce the potential for employee exposure and will be periodically examined, maintained, or replaced to ensure their effectiveness.

D.16.4 **Work Practices**

D.16.4.1 General Work Practices

General work practices include the following:

1. Safe work practices will be implemented whenever possible to eliminate or reduce the potential for employee exposure.
2. Employees will wash their hands immediately or as soon as feasible after removal of gloves or other PPE.
3. Employees will wash hands and any other skin with soap and water, or flush mucous membranes with water immediately following contact with blood or potentially infectious materials.

4. If potentially contaminated sharps are encountered, the item will immediately be disposed of in an appropriate container or decontaminated.
5. Eating, drinking, smoking, applying cosmetics or lip balm, handling of contact lenses, or storage/handling of food are prohibited in all areas where potentially infectious materials are present.
6. Equipment that has become contaminated will be decontaminated prior to servicing or storage, unless decontamination is not feasible, in which case the equipment will be disposed of properly.

D.16.4.2 UXO Safety Work Practices

D.16.4.2.1 All UXO/OE operations will be conducted in accordance with the requirements of the U.S. Army Corps of Engineers, EP 385-1-95a, *Basic Safety Concepts and Considerations for Ordnance and Explosives (OE) Operations* (29 June 2001).

D.16.4.2.2 Plans are to be based upon the minimum number of personnel, exposed for the minimum amount of time, to the minimum amount of UXO consistent with efficient operations and maximum safety. Only those personnel absolutely necessary to the operation will be allowed in the EZ during UXO activities.

D.16.4.2.3 All personnel engaged in UXO operations will be thoroughly trained in explosives safety and be capable of recognizing hazardous explosive exposures. Only personnel who are U.S. citizens and graduates of one of the schools or courses outlined in DID OE-025.01 are authorized to handle UXO.

D.16.4.2.4 All non-UXO qualified personnel will follow the safe work practices listed below:

1. Non-UXO qualified personnel will receive site-specific UXO recognition training prior to participation in site activities.
2. No soil-penetrating activities will be allowed without the area first being cleared by UXO qualified personnel.
3. Non-UXO qualified personnel will be escorted on-site by UXO qualified personnel, until such time as the area is cleared.
4. Non-UXO qualified personnel will not touch or disturb any fused object that could potentially be UXO/OE related, and will immediately notify the nearest UXO qualified person of the presence of the object.
5. The greatest hazard to a UXO technician is complacency. It is imperative that team members are constantly reminded of the inherent dangers associated with UXO. This will be accomplished at the Tailgate Safety Briefings.
6. No UXO will be destroyed until it has been positively identified.

7. If an unidentifiable OE is found, or suspected toxic chemical munitions are found, the on-site USACE OE Safety Specialist will request EOD support.
8. Do not handle, use, or remain near explosives during the approach or progress of an electrical storm, sandstorm, dust storm, snowstorm, or during any limited-visibility condition. All personnel should retire to the enclosed ATI site vehicles until the storm has passed or the ATI site office.
9. Intrusive activities must be preceded by a magnetometer survey to ensure the safety of the crew.
10. Use sand to smother incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture. Sand will be available on-site for this purpose.

D.16.4.3 Demolition Operations

Demolition operations procedures will be accomplished in accordance with the Demolition and Post Demolition Operations Procedures outlined in Chapter 2.0 of the Work Plan and the safety precautions listed below:

1. The demolition and post-demolition operations procedures will be readily available in work areas involved in demolition operations. Supervisory personnel are responsible for the enforcement of its provisions.
2. In the event of an electrical storm, action will be taken to cease all demolition range operations and evacuate the area.
3. All personnel are responsible for reporting all injuries, accidents, and near-miss incidents to their supervisors. The supervisor is, in turn, responsible for reporting all injuries, accidents, and near-miss incidents to the UXOSO. These incidents will be reported, by the UXOSO, to the Safety Manager and the PM. All such events will be thoroughly investigated by the Supervisor and the UXOSO to determine the root cause(s) and appropriate actions to be taken to prevent recurrence.
4. In the event of a fire or unplanned explosion, if possible, put out the fire if no UXO or OE is involved. Fire extinguishers are to be available at each site for this purpose. If unable to do so, notify the police and fire department POC in Table D-12.1 or Appendix C.
5. Employees will not tamper with any safety devices or protective equipment.
6. Any defect or unusual condition noted that is not covered by this procedure will be reported immediately to supervisory personnel.
7. All safety regulations applicable to specific materials involved will be observed.

8. The demolition activities will be under the direct control of an experienced and trained UXO supervisor with responsibility for all activities within the demolition area.
9. Fire extinguishers and first aid equipment will be readily available during all demolition and post-demolition operations.
10. Personnel who will be handling OE items will not wear outer or inner garments having static-electricity-generating characteristics. Material made of 100-percent polyester, nylon, silk, and wool is highly static producing.
11. Observers will be stationed at locations where there is a good view of the air, rail, and surface approaches to the demolition area before material is detonated. It will be the responsibility of the observers to order the Supervisor to suspend firing if any aircraft, trains, vehicles, or personnel are sighted approaching the general demolition area.
12. Special safety requirements for demolition activities include:
 - Fragmentation range for this site will be based upon the MPM anticipated on the site. The SUXOS will designate a fragmentation range for each item based on technical publication recommendations for distance requirements on the item in question. This will be coordinated with the USACE on-site Safety Specialist prior to the demolition operation.
 - Material awaiting destruction will be staged at not less than intra-line distance, based on the largest quantity involved, from adjacent explosive materials and from explosives being destroyed. The material will be protected against accidental ignition or explosion from fragments, grass fires, burning embers, or detonating impulse originating in materials being destroyed.
 - Blasting or demolition operations will not be conducted during an electrical storm or when a storm is approaching. All operations will be suspended, detonator wires and lead wires will be short-circuited, and all personnel must be removed from the demolition area to the ATI site office when an electrical storm approaches within 10 miles of the site. A security person will be staged at a safe distance from any charge left in place, to maintain security and prevent unauthorized personnel from going near explosive materials.
 - Detonations will be counted to ensure detonation of all pits. After a series of detonations, a search will be made of the surrounding area for kick-outs. Items such as lumps of explosives may be picked up and prepared for the next shot. Fused munitions or items that may have internally damaged components will be detonated in place, if possible.

- In excavating the pits, contour the ground so that runoff water is kept out of the pits.
- Upon completion of the project, the disturbed ground will be thoroughly inspected for UXO/OE. At a minimum, the holes/pits will be filled in and contoured.

D.17 Accident Prevention

D.17.1 Plan for the Prevention of Alcohol and Drug Abuse

D.17.1.1 Introduction

D.17.1.1.1 The Drug-Free Workplace Act of 1988 set as a goal the elimination of the effects of illegal drugs in the workplace. Due to the inherently hazardous nature of the work performed by ATI personnel, the importance of creating and maintaining a safe drug-free working environment is paramount. The performance of every employee must, at all times, support the company's mission to conduct site operations with a high level of productivity, reliability, judgment, and safety.

D.17.1.1.2 American Technologies, Incorporated (ATI) maintains a commitment to provide reliable service to customers, and a safe and healthy work environment for its employees. While the vast majority of employees are not involved with illegal drugs or alcohol abuse, those who are involved in usage or trafficking, on or off the job, have an adverse impact on the work place and impair our ability to maintain a safe work environment that is free from the effects of drugs or alcohol. While ATI understands employees under a physician's care are required to use prescription drugs, abuse of prescribed medications will be dealt with in the same manner as the abuse of illegal substances.

D.17.1.1.3 As a term of employment, maintenance of these standards is expected of all employees, and all employees will refrain from the use, distribution, possession, manufacture, or dispensing of a controlled substance, and drug and/or alcohol abuse. Violation of this policy will result in administrative action to include the possible termination of employment.

D.17.1.1.4 Recognizing that there may be employees who have a drug or alcohol problem, the Company stands willing, to assist in the resolution of that problem and encourages employees to seek help through the Employee Assistance Program (EAP). This program may be of assistance to employees in the following ways:

Self-Referral - The employee recognizes the need for professional help and refers them self. It is the responsibility of each employee to seek assistance from the EAP before alcohol or drug problems lead to disciplinary actions. Once a violation of this policy occurs, subsequently using the EAP on a voluntary basis will not necessarily lessen disciplinary action.

OR

Supervisory Referral - The supervisor recognizes an employee's need for professional help through behavioral or job performance changes and refers employer to the EAP.

D.17.1.2 Substance Use and Abuse Policy

Employee drug or substance use or abuse testing/screening conducted by ATI in support of this policy will be conducted at no expense to the employee. The drug or substance use for which ATI may conduct testing includes, but are not limited to: amphetamines, barbiturates, cocaine metabolites, methadone opiates phencyclidine (PCP), and ethyl alcohol. As a matter of policy, ATI will strictly implement and enforce the policies listed below:

1. The illegal use, possession, sale, distribution, or manufacture of illegal drugs, narcotics, or controlled substances while on or off the job is strictly prohibited.
2. Illegal drug usage, whether on or off the job, may adversely affect an employee's job performance, jeopardize the safety of other employees, the public, and/or the reliability of the Company's operations, and is just cause for disciplinary action up to and including termination of employment.
3. If an employee reports to work in a condition giving a supervisor reasonable cause to suspect the influence of alcohol, the employee may be required to submit to a blood and/or urine exam, and if the test reveals that the employees under the influence of alcohol, the employee may be subject to disciplinary action up to and including termination of employment.
4. If an employee reports to work in a condition giving a supervisor reasonable cause to suspect the influence of drugs, the employee may be required to submit to a blood and/or urine exam, and if the test reveals that the employee has illegal drugs or other hallucinogens in his or her body, the employee may be subject to disciplinary action up to and including termination of employment.
5. Any employee who may be undergoing medically prescribed treatment with a controlled substance, which may limit the employee's ability to perform on the job, must report this treatment to the Human Resource Manager prior to beginning work or when the person begins treatment with the controlled substance. Failure to report this to the Human Resources manager shall be just cause for appropriate disciplinary action.

D.17.1.3 Prescription Medications

D.17.1.3.1 ATI project personnel may possess and use prescription medications and "over-the-counter" medications provided that all of the following apply:

1. The prescription medication has been prescribed by an authorized medical practitioner for the current use (within the past 12 months) of the employee in possession of the medication, and the medication is in its original container with a valid pharmacy label including the employee's name and the physician's name.

2. The employee does not consume the prescribed, or over-the-counter, medication in quantities greater than, or more frequently than that prescribed by the container label.
3. Employees in possession of prescribed medications shall not allow any other person to consume any amount of their prescribed medication.
4. In the event that the prescribed medication could cause adverse side effects, or where the medication indicates warnings relevant to side effects affecting the operation of equipment or machinery, the employee shall inform the SUXOS and/or UXOSO prior to engaging in project operations while under the influence of the medication (i.e., having taken the medication within the past 12 hours).

D.17.1.3.2 While the on-site use of prescription and over-the-counter medications is authorized, under the requirements listed above, ATI reserves the right to have a licensed physician determine if the employee's use of the medication could adversely affect the individual or could increase the potential for injury or illness to the employee or other site personnel. If consumption of the medication could lead to adverse safety or health effects, the ATI Safety Office may, on the advice of the licensed physician, limit or suspend the employee's work activities for as long as the licensed physician indicates that the medication may adversely affect the employee. Any employee who has been limited or suspended from work activities may seek from the prescribing physician a substitute medication that will not adversely affect the potential for injury or illness to the employee or other site personnel. If a suitable substitute can be prescribed, and is approved, the ATI Safety Office may lift the work activity suspension or limitation.

D.17.1.4 Suspicion Inspections and Testing

The intent of the guidelines is to provide managers, supervisors and employees the necessary education, training and information to administer the policy fairly, consistently, and in accordance with this policy. If questions arise, the ATI Human Resources Manager should be contacted for guidance.

D.17.1.4.1 Suspicion Inspections

For the purposes of ensuring compliance with the prohibition against the unauthorized possession of controlled substances, employees will be subject to random and reasonable suspicion inspections and testing. An employee's company clothing, locker, closet, work area, desk files, company motor vehicle, and similar areas are subject to inspection. Similarly, an employee's privately owned vehicle, lunch box, and like containers are subject to such inspections when brought to any work site. At no time will an employee be physically touched during an inspection, and only outer clothing required to be removed for inspection or search. No person or property search (except for searches of ATI-owned, rented, or leased properties), urine drug test, or Breathalyzer test will be

conducted without the employee's consent. Refusal to submit to a legal inspection, or request for testing, will result in employee removal from participation in site activities until further inspection or testing can determine the potential for prohibited drug or substance use or abuse.

D.17.1.4.2 Drug/Alcohol Screening

- D.17.1.4.2.1 Only a qualified laboratory or an approved physician may administer Drug Alcohol screens. Random testing will be administered primarily to those employees in sensitive positions, but reasonable suspicion is grounds for any employee to be tested.
- D.17.1.4.2.2 The employee may request that a steward be present to witness the screening process to insure the employee's specimen and to insure the chain of custody of the specimen. Employees may request independent testing of the same sample by another laboratory approved by the State Department of Health and Mental Hygiene in order to verify the test results, but the cost of such tests will be borne by the employee.
- D.17.1.4.2.3 Drug screens may also be administered with any company Physical.
- D.17.1.4.2.4 Refusal to take a drug screen will result in discharge.
- D.17.1.4.2.5 A positive drug test will result in the Human Resources Manager informing, the employee that there is a confirmed positive test. The employee will be given a phone number to call immediately for a counseling appointment at no cost to the employee. If the employee has failed to make an appointment within two working days, appropriate disciplinary action will be taken up to and including termination.
- D.17.1.4.2.6 The counseling and referral service will determine during the initial appointment if a substance problem exists and the extent of the problem. A determination will be made to refer the employee to an outpatient, inpatient treatment, or no treatment indicated.
- D.17.1.4.2.7 Employee will be allowed to use available accrued sick leave or authorized leave of absence while undergoing treatment.
- D.17.1.4.2.8 Treatment programs are covered to a limited degree through the Company's health plan. Disability insurance may be applied for during the period of treatment. Both kinds of insurance coverage apply to fully benefited employees only.
- D.17.1.4.2.9 The Human Resources Manager will be provided periodic updates on the treatment progress of the employee.
- D.17.1.4.2.10 If the employee is referred to the inpatient treatment facility, their position (job) may be held open pending their return at the completion of the treatment program.

D.17.1.4.2.11 If the employee is referred to an outpatient program, and allowed to remain on the job while undergoing, rehabilitation, dependent upon the severity and depth of the substance dependency, as determined by initial assessment counseling, and upon advice of the counseling professional, the Human Resources Manager may, in consultation with the Program Manager order the employee to be placed in administrative duties until sufficient rehabilitation has occurred as specified by the treating agency in writing.

D.17.1.4.2.12 Following rehabilitation, treatment, and the employee's return to full duties, the employee may be subject to random testing by the employer based on reasonable suspicion.

D.17.1.4.2.13 A second positive test result during the term of employment.

D.17.1.5 Voluntary Treatment

Nothing in this program shall prohibit employees from voluntarily seeking counseling and treatment.

D.17.1.6 Drug Convictions

Any employee convicted of violating a criminal drug or alcohol statute will report in writing the facts surrounding the conviction and sentence to their immediate supervisor within five calendar days of the conviction. The supervisor will forward the written results immediately to the ATI Safety Office, ATI Human Resources and PM, via the supervisory chain, and a written report of the conviction will be made within ten calendar days to all government agencies with which the company has contracts. Upon notification of conviction, the ATI Safety Office, ATI Human Resources, PM, and SUXOS will review the report and will, within thirty days after being informed, determine the disciplinary action to be taken. The disciplinary action taken may range from termination of employment to mandatory assignment to a rehabilitation program.

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D.18 Emergency Equipment and First Aid Requirements

D.18.1 General

Table D-18.1 lists emergency equipment, which will be maintained on site and available for use during site operations. Emergency equipment shall be maintained in proper working order and checked by assigned personnel daily. It will be the responsibility of the UXOSO to maintain the site emergency equipment in good working order. The UXOSO will inspect all emergency equipment at least weekly to ensure completeness and proper working condition. Any time that emergency equipment is used, will be reported to the UXOSO so that those items used can be replaced immediately. Site operations shall not be allowed to continue if the required emergency equipment is not immediately available on site.

D.18.2 First Aid Kits

First aid kits are assigned by the ATI Safety Office and approved by the Occupational Health Physician. The size and number of first aid kits shall be sufficient to accommodate the maximum number of people on site at any given time. First aid kits will be located in all operational vehicles, each team, and the site office. A large medical kit, with trauma supplies, will be located with the UXOSO.

D.18.3 Biohazard Spill Kit

Biohazard kits will be available in each operational vehicle and with each team working inside the Exclusion Zone. The kit will be used any time an injury occurs or where there is the release of body fluids.

D.18.4 Eyewash Kit

Portable kits of eyewash will be available during operations at the site where the potential for hazardous materials may contact the eyes. Portable eyewash bottles will be used while the injured person is being transported to the site eye wash station or medical attention.

D.18.5 Portable Fire Extinguishers

D.18.5.1 The fire extinguishers listed below will be positioned at the locations specified to ensure their availability to fight fires on site. Fire extinguishers will be stored where they are well marked and readily accessible. Fire extinguishers shall be protected from the damaging affects of environmental elements. The UXOSO is responsible to ensure that all fire extinguishers are visually inspected monthly and that these inspections are documented. All site personnel will be familiar with the locations of fire extinguishers and will be trained in their use.

- D.18.5.2 All vehicles shall be equipped with a fire extinguisher rated at not less than 2A; 10B:C.
- D.18.5.3 All vehicles used in the transportation of flammable and/or explosives materials shall be equipped with two fire extinguishers rated at not less than 2A; 20B:C or higher. One fire extinguisher shall be mounted or placed inside the cab of the vehicle and one mounted outside, by the driver's door.
- D.18.5.4 The UXOSO will have at least one portable fire extinguisher having a rating of not less than 2A; 20B for use inside the Exclusion Zone.
- D.18.5.5 Flammable/Combustible liquid and/or Explosive material storage areas will have at least one 4A: 20B:C fire extinguisher located within 30 meters (100 feet) of the storage area.
- D.18.5.6 The site office and support locations shall be equipped with a fire extinguisher rated at not less than 2A; 10B:C.

Table D-18.1. Emergency Equipment

EMERGENCY EQUIPMENT	QTY	LOCATION USED/STORED	OPERATION REQUIREING EQUIPMENT
16-unit First Aid Kit	1	Each Vehicle Each Team Site Office	All operations
Biohazard Kit	1	Each Vehicle Each Team Site Office	All operations
Portable Eye Wash Kit	1	Each Vehicle Each Team	All operations
Large Medical Kit with Trauma supplies	1	In the UXOSO's Vehicle	All operations
Portable Stretcher	1	In the UXOSO's Vehicle	All operations
Fire Extinguisher, 2A; 10B:C	1	Each Vehicle	All operations
Fire Extinguisher, 2A; 20B:C	2	Each Vehicle involved	All operations
Fire Extinguisher, 2A;0B	1	UXOSO's Vehicle	All operations
Fire Extinguisher, 2A; 10B:C	1	Each Team	All operations
Fire Extinguisher, 2-A; 10B:C	1	Site Office	All operations
Fire Extinguisher, 4A; 20B:C	1	Flammable/Explosive Storage area	All operations
Spill Containment Supplies	1	Field equipment storage	Operations involving Hazardous Materials

D.19 Logs, Reports and Record keeping

D.19.1 Logs

The Safety Log and records will be completed and retained by the PM for the duration of the project. At the close of the project, they will be turned over to the Program Manager as part of the official project file.

D.19.1.1 Safety Log

D.19.1.1.1 The ATI UXOSO will maintain a daily safety log of all safety-related activities. When safety and health deficiencies are noted during daily inspections, the measures, timetable, and individual responsible for correcting the deficiencies will be noted in the safety log. The UXOSO will also annotate the log when deficiencies have been corrected.

D.19.1.1.2 The following information will be addressed at a minimum in the daily Safety Log:

- Date and recorder of log;
- Significant site events relating to safety;
- Accidents;
- Stop-work actions due to safety;
- Safety audits/deficiencies noted/corrective actions;
- Signature of the UXOSO;
- Signature of the SUXOS indicating his review;
- Training logs;
- A record of all individual training qualifications, of on-site personnel, will be maintained on-site; and
- Records of Site-specific Training, Visitor Training, and Daily Safety Briefings will be prepared on an ATI “Document of Training” form, (See Appendix F, page F-18), and retained in the project files.

D.19.1.2 Equipment Maintenance Logs

Records of maintenance for equipment used on-site will be performed and maintained as part of the project files.

D.19.1.3 Employee/Visitor Registration Records

A record of all employees and visitors coming onto the site will be recorded on the “Visitor’s Log” (See Appendix F, page F-20) and retained in the project files.

D.19.1.4 Environmental and Personal Exposure Monitoring

D.19.1.4.1 The SOW for this project includes performing OE removal action activities at the Sierra Army Depot East Shore BRAC Parcels.

D.19.1.4.2 The site characteristic of this site reflects no anticipated toxic, chemical, or radiological hazards are expected during activities under the SOW. The requirements for this section are not required.

D.19.2 **Reports**

D.19.2.1 Safety Reports

The following safety reports will be submitted as required by applicable USAESCH and OSHA regulations:

- Medical Monitoring Records of employee(s) obtained after site investigations begin.
- Accident Investigation Report (ENG Form 3394). See Appendix F, Page F-32.
- When a reportable injury/illness/accident occurs at the job site, the Accident Investigation Report form (ENG Form 3394) will be completed and forwarded within 48 hours to ATI and USAESCH.
- If a near-miss occurs, the accident form will be completed and retained for the record. The PM will inform the USAESCH PM of any accidents.
- If an OSHA reportable accident occurs, the PM will report all required information to the USAESCH PM within 8 hours.
- When any injury/illness/accident occurs at the job site, the ATI Accident Investigation Report form (see Appendix F, page F-2) will be completed and forwarded within 48 hours to ATI.
- This accident report form will be used by ATI to report incidents and as a basis of re-evaluation of procedures and controls for personnel protection.

D.19.2.2 Monthly Safety Exposure Report

D.19.2.2.1 The UXOSO will report project safety exposure information to the ATI Safety Office no later than the second working day following the last day of a reporting month.

D.19.2.2.2 The following information shall be reported in accordance with Data Item Description (DID) OE-080.01.

1. Field labor hours in direct support of the contract, and cumulative.
2. Total number of lost workday accidents during the reported month, and cumulative.
3. Total number of lost workdays due to on-the-job accidents during the reported month, and cumulative.
4. Number of property damage accidents (includes vehicles) with property value of \$2,000 or more, during the reported month and cumulative.

D.19.2.2.2 The ATI Safety Office will provide this information to the ATI Project Manager to be incorporated into the Monthly Status report submitted to the USAESCH Contracting Officer.

D.19.2.2.2 The Monthly Status report will be submitted, in accordance with DID OE-080.01, no later than 10 calendar days following the reporting cut-off date.

D.19.3 **Record keeping**

D.19.3.1 All record keeping will be in accordance with applicable OSHA and USAESCH standards and regulations.

D.19.3.2 "Documentation of Training" form (See Appendix F, page F-18) will be prepared for the daily Tailgate Safety Briefing, as well as for any additional safety training performed on-site. This form will include the following information:

- Date of training;
- Nature of training (time conducted, subjects covered, and by whom);
- Morning Tailgate Safety Briefing (time conducted, subjects covered, and by whom);
- Visitor training (time conducted, subjects covered, and by whom); and
- Signature of the SUXOS and UXOSO indicating concurrence.

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APPENDIX E

Environmental Sampling and Analysis Plan

(NOT USED)

APPENDIX F

Site Forms

FORM INVENTORY

FORM TITLE	PAGE NUMBER
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EXPLOSIVE LICENSE/EXPLOSIVE DELIVERY RECORD	7
ATI CHEMICAL INVENTORY FORM	9
DAILY ACTIVITY REPORT	10
PHOTOGRAPHIC LOG	12
NOTES OF TELEPHONE CONVERSATION	13
CUSTOMER ACTION REQUEST (CAR) RECORD	14
QUALITY CONFORMANCE INSPECTION (QCI) RECORD	16
DOCUMENTATION OF TRAINING	18
WEEKLY SAFETY CHECKLIST	19
SITE VISITOR'S LOG	20
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GEOPHYSICAL DIG SHEET AND TARGET HISTORY	37

AMERICAN TECHNOLOGIES, INC.
REPORT OF OCCUPATIONAL ACCIDENT, INJURY, OR ILLNESS INVESTIGATION

Office or Site Location		Date of Report		
Employee's Name		Sex	Birth Date	
Employee's Home Address (Street)		Employee No.	Soc.Sec.No.	
(City,	State,	Zip)		Home Telephone Number
Employee's Job Title		Wage Rate	Hrs Per Wk	

Date of Hire _____

Date of Accident: _____ Time of Accident: _____
Location _____ of _____ Accident: _____

Description of Events of Accident: _____

Type of injury or illness: _____

Part(s) of body affected (be specific): _____

Date injury or illness was reported: _____

Was this a fatality? Yes _____ No _____

Was employee admitted to hospital? Yes _____ No _____

Date employee returned to work: _____

Days lost from work: _____ Date Treated: _____

Name and Address of Treating Physician: _____

Name and Address of Hospital: _____

Diagnosis: _____

Treatment: _____

Was employee performing his normal job duties at the time of the accident? (If not, explain)

Was employee trained in task being performed? _____

Type of training received by employee:

Is training current? _____

Years experience in present job: _____

Years with ATI: _____

Hours of sleep prior to work: _____

Environmental conditions contributing to accident: _____

Unsafe conditions contributing to accident:

Unsafe acts contributing to accident: _____

Were any other employees involved in accident? Explain: _____

Property _____ Damaged:

Was employee wearing all required PPE? (If not, explain): _____

Were there any deviations from operating procedures? (If so, explain): _____

Will operating procedures be revised as a result of this accident? (If so, explain)

Actions taken to prevent recurrence: _____

Witness(es): _____

Witness Statements (Attach separate sheets if necessary): _____

Is injured party an ATI employee? _____

Did accident occur on ATI Property or ATI-controlled site? _____

Project Name and Number _____

Type of Accident: Near Miss ____ Injury ____ Illness ____ Property Damage ____

Accident Costs (If not known, estimate and update later when exact figures are known. This section is to be completed by the Site Supervisor):

Transportation to treatment facility _____

Medical costs for initial treatment _____

Follow-up or long-term medical costs _____

Injured employee's lost time _____

Time lost from work stoppage, at time of accident _____

Time lost of employees involved in investigation _____

Cost of hiring/training replacement employee _____

Property Damage Amount _____

Cost of Replacement Equipment _____

Cost of Rental Equipment while repairs are made _____

Cost of training employees to use new equipment _____

Other accident related costs (Specify): _____

TOTAL ACCIDENT COSTS: \$ _____

Other comments or applicable information: _____

Employee Signature

Date

Site Safety and Health Officer

Date

Supervisor's Signature

Date

Site Supervisor's Signature

Date

Project Manager's Signature

Date

EXPLOSIVE LICENSE/EXPLOSIVE DELIVERY RECORD



DEPARTMENT OF THE TREASURY - BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

LICENSE/PERMIT (18 U.S.C. CHAPTER 40, EXPLOSIVES)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 55), you may engage in the activity specified in this license/permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. See "WARNING" and "NOTICES" on back.

DIRECT ATF CORRESPONDENCE TO	CHIEF, NATIONAL LICENSING CENTER ATF, P.O. Box 2994 Atlanta, GA 30301-2994	LICENSE/ PERMIT NUMBER	1-TN-001-20-4L-12360
		EXPIRATION DATE	November 1, 2004
NAME	OES & ATI	Premises Address	142 FAIRBANKS RD OAK RIDGE, TN 37830-0000
TYPE OF LICENSE OR PERMIT	20-MANUFACTURER OF HIGH EXPLOSIVES		
CHIEF, NATIONAL LICENSING CENTER			
PURCHASING CERTIFICATION I certify that this is a true copy of a license/permit issued to me to engage in the activity specified.		LICENSEE OR PERMITEE MAILING ADDRESS-	
 (SIGNATURE OF LICENSEE/PERMITEE)		ORDNANCE EXPLOSIVES ENVIRONMENTAL SERVICES OES & ATI 142 FAIRBANKS RD OAK RIDGE, TN 37830-0000	
The licensee/permittee named herein shall use a reproduction of this license/permit to assist a transferor of explosives to verify the identity and status of the licensee/permittee as provided in 27 CFR Part 55. The signature on each reproduction must be an ORIGINAL signature.			

ATF F 5400.14/5400.15, Part 1 (8/89)

Please include your license/permit number on all correspondence with the Bureau.

WARNING

This license/permit does not confer the right or privilege to conduct explosives related activities contrary to State or of any other law. No person may ship, transport, or receive any explosive materials covered by Title XI of the Organized Crime Control Act of 1970 in interstate or foreign commerce who (1) is under indictment for, or has been convicted in any court of, a crime punishable by imprisonment for a term exceeding 1 year, (2) is a fugitive from justice, (3) is an unlawful user of, or addicted to, marijuana or any depressant or stimulant drug, or narcotic drug (as these terms are defined in the Controlled Substances Act; 21 U.S.C. 802), or (4) has been adjudicated as a mental defective or has been committed to a mental institution.

NOTICE

Any changes in name, trade name, address, or control of this business or activity must be PROMPTLY reported to the Chief, National Licensing Center from whom this license/permit was received. Failure to do so may result in administrative action against the licensee/permittee for failure to comply with applicable regulations.

Any person who fails to make application for renewal of this license/permit prior to the expiration date shown on the front is prohibited from engaging in the activity authorized at the time of issuance. If a renewal application is not received 30 days before the expiration date, the licensee/permittee should contact the Chief, National Licensing Center. Note, however, that the User-Limited permits are not renewable.

Explosive materials must be stored in conformance with requirements set forth in 27 CFR, Part 55. It is unlawful for any person to store any explosive materials in a manner not in conformity with these regulations.

This license/permit is conditional upon your compliance with the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. § 1341 (a).

TO REPORT LOST OR STOLEN EXPLOSIVES, YOU MUST IMMEDIATELY NOTIFY ATF:
CALL TOLL FREE - (800) 800-3855

LICENSE MUST BE POSTED AND KEPT AVAILABLE FOR INSPECTION (27 CFR 55.101)

ATF F 5400.14/5400.15, Part 1 (8-89)

Form Approved: OMB 1512-0133 (10/31/96)

DEPARTMENT OF THE TREASURY — BUREAU OF ALCOHOL, TOBACCO AND FIREARMS			
EXPLOSIVES DELIVERY RECORD			
INSTRUCTIONS			
1. When a person accepts explosive materials at a distributor's premises on behalf of the buyer, the distributor must identify the person before releasing the explosive materials.		3. The receiver of explosive materials completes Section A.	
2. Employees of licensees, permittees, nonlicensees, nonpermittees, and employees of carriers who wish to transport explosive materials to the buyer must complete this form before each transaction at a distributor's premises.		4. The distributor (seller) completes Section B.	
5. Distributors are required to maintain this record with their disposition records.			
SECTION A — STATEMENT OF EMPLOYEE OF BUYER OR EMPLOYEE OF CARRIER HIRED BY THE BUYER TO TRANSPORT EXPLOSIVE MATERIALS TO THE BUYER			
1. NAME <i>(Last, First, Middle)</i>	2. HEIGHT	3. WEIGHT	4. RACE
	5. SOCIAL SECURITY NO. <i>(Mandatory)*</i>	6. DATE OF BIRTH	7. PLACE OF BIRTH
8. RESIDENT ADDRESS <i>(Number, Street, City, State, Zip Code)</i>		9. EMPLOYER'S NAME AND ADDRESS <i>(Distributtee (buyer) or Carrier)</i>	
I CERTIFY THAT THE ANSWERS TO THE ABOVE ARE TRUE AND CORRECT:			
10. SIGNATURE		11. DATE	
SECTION B — STATEMENT OF DISTRIBUTOR (SELLER)			
12. THE PERSON DESCRIBED IN SECTION A <input type="checkbox"/> IS KNOWN TO ME, OR <input type="checkbox"/> HAS IDENTIFIED HIMSELF TO ME IN THE FOLLOWING MANNER:			
13. TYPE OF IDENTIFICATION <i>(Driver's license, etc. Positive identification is required — a social security card is not positive identification)</i>		14. NUMBER ON IDENTIFICATION	
THE EXPLOSIVE MATERIALS DELIVERED TO THE ABOVE PERSON ARE FOR DISTRIBUTION TO THE FOLLOWING BUYER:			
15. NAME AND ADDRESS OF BUYER		16. LICENSE NO., PERMIT NO. OR ATF Form 4710 (5400.4) TRANSACTION SERIAL NUMBER	
		17. TRANSACTION DATE	
PRIVACY ACT INFORMATION			
*The following information is provided pursuant to Section 7(b) of the Privacy Act of 1974: The disclosure of the individual's social security number is mandatory. Under 18 U.S.C. Section 842(f), ATF has authority to solicit an individual's social security number. The number may be used to verify an individual's identity.			
PAPERWORK REDUCTION ACT NOTICE			
The purpose of this information collection is to determine whether the person receiving explosives is eligible to do so under federal law. The information is subject to inspection by ATF officials. This information request is mandatory by statute. (18 U.S.C. 843).			

ATF F 4721 (5400.8) (5-83)

ATI CHEMICAL INVENTORY FORM

Site Name: _____

Site Safety Officer: _____

Work Area: _____

Date Prepared: _____

Storage Area: _____

Chemical Name	CAS# / Product#	Manufacturer	Supplier	Total Quantity Stored	Intact Label	MSDS on File

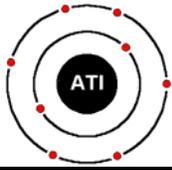
PHOTOGRAPHIC LOG

CONTRACT / DO #: _____ NAME OF PHOTOGRAPHER: _____

WORK SITE: _____ FILM TYPE: _____

LOCATION: _____ NO. OF PRINTS: _____

DATE	SUBJECT / DESCRIPTION	LOCATION	PHOTO NUMBER	REMARKS
			1	
			2	
			3	
			4	
			5	
			6	
			7	
			8	
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			34	
			35	
			36	



CUSTOMER ACTION REQUEST (CAR) RECORD

See Reverse for Completion Instructions

DATE: _____ **PROJECT SITE:** _____

CUSTOMER: _____

ACTION REQUESTED: _____

REQUEST RECEIVED VERBALLY: YES () NO ()

IF YES, HAVE THE CUSTOMER READ THE ABOVE 'ACTION REQUESTED' AND INITIAL TO CONFIRM WHAT HAS BEEN WRITTEN, IS IN FACT, WHAT IS DESIRED.

IF NO, ATTACH WRITTEN DOCUMENT TO THIS CAR.

DETERMINE VALIDITY OF THE REQUESTED ACTION:

>REQUESTED ACTION WILL CORRECT A CUSTOMER OBSERVED NONCONFORMANCE:

YES () NO ()

>REQUESTED ACTION IS WITHIN THE SCOPE OF WORK: YES () NO ()

DISCUSS REQUESTED ACTION: _____

DETAIL CORRECTIVE ACTION TO BE APPLIED: _____

FOLLOW-UP TO BE CONDUCTED BY QC SPECIALIST:

DATE: _____ **CUSTOMER REPRESENTATIVE:** _____

CORRECTIVE ACTION HAS BEEN APPLIED: YES () NO ()

➤ **IF YES, IS THE CUSTOMER SATISFIED WITH THE CORRECTIVE ACTION(S) THAT HAVE BEEN APPLIED: YES () NO ()**

➤ **IF NO, DETERMINE WHY CORRECTIVE ACTION(S) HAVE NOT BEEN APPLIED AND DOCUMENT SAME.**

Instructions for Completion

A CAR will be completed, by OES's senior person on-site, every time a Customer expresses dissatisfaction with on-site activities.

Date: Enter the date the customer's request was received.

Project Site: Enter the project site's name.

Customer: Enter the organization and the individual's name making the request.

Action Requested: Enter *specific, detailed* remarks about the requested action.

Request Received Verbally: Check appropriate (). Self-explanatory.

Determine Validity: Check appropriate ().

Discuss Requested Action: Enter the background relative to the request. If this is in response to an observed nonconformance, detail why the nonconformance occurred. A root cause analysis will be conducted. If the space provided here is insufficient, attach plain bond paper and number pages consequentially.

Detail Corrective Action to be Applied: Enter the results of the root cause analysis and the corrective action that will prevent the nonconformance from reoccurring.

Follow-up by the QC Specialist:

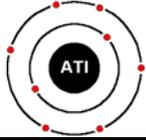
Date: Enter date follow-up conducted.

Customer Representative: Enter individual's name.

Corrective Action Applied: Marked appropriate (). If the response is “NO”, document on plain bond paper and attach to this report.

Distribution of completed form:

- 1 - Project Manager
- 1 - Quality Manager
- 1 - On-site contract file
- 1 - QC Specialist (active QC file)



QUALITY CONFORMANCE INSPECTION (QCI) RECORD
See Reverse for Completion Instructions

DATE: _____ **PROJECT SITE:** _____

QC SPECIALIST: _____

TASK INSPECTED: _____

SCHEDULED INSPECTION () **REINSPECTION** ()
DAILY () **WEEKLY** () **OTHER** () _____

RESULTS:

() **TASK IS BEING ACCOMPLISHED IN CONFORMANCE TO WP/SSHP.**
() **TASK IS NOT BEING ACCOMPLISHED IN CONFORMANCE TO WP/SSHP.**

THE NOTED NONCONFORMANCE IS AS FOLLOWS: _____

REINSPECTION:

TASK AND DATE OF NONCONFORMANCE BEING REINSPECTED:

RESULTS:

() **TASK IS BEING ACCOMPLISHED IN CONFORMANCE TO THE WP/SSHP.**
() **TASK IS NOT BEING ACCOMPLISHED IN CONFORMANCE TO WP/SSHP.**

THE RE-OCCURRING NONCONFORMANCE IS AS FOLLOWS:

INSTRUCTIONS FOR COMPLETION

A QCI record will be completed on each task inspected.

Date: Enter the date the inspection took place.

Project Site: Enter the project site's name.

QC Specialist: Name of the QC Specialist conducting the QCI.

Task Inspected: Enter the name of the task being inspected as per the QCI Schedule.

Scheduled Inspection: Place a "X" in the appropriate (). If Other is applicable, note the reason for the QCI.

Results:

Enter a "X" in the appropriate ().

If the task is in conformance, no other information is required on this form.

If the task is not in conformance, continue with the explanation in space provided.

Reinspection:

Date and Task being reinspected: Enter the date and pertinent task.

Results: Enter a "X" in the appropriate ().

If the task is still not in conformance, continue with the explanation in space provided.

Distribution of completed forms:

Conformances: 1- Project Manager
1 - On-site QC File (Inactive)

Nonconformances: 1 - Project Manager
1- Quality Manager
1 - On-site QC File (Active)

Reinspections: 1 - Project Manager
1 - Quality Manager
1 - On-Site QC File (Inactive) (if compliant)
(Active) (if noncompliant)

**AMERICAN TECHNOLOGIES, INC.
DOCUMENTATION OF TRAINING**

Training Course Name: _____
(General, UXO Equipment, Visitor, Special)

Presented By: _____ **Date:** _____

Topics Discussed

Work Plan/SSHP/APP: _____

UXO/OE Hazards: _____

Chemical Hazards: _____

Physical Hazards: _____

Emergency Procedures: _____

Other: _____

Attendees

Printed Name

Signature

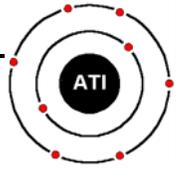
Date

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Trainer: _____ **Date:** _____

WEEKLY SAFETY CHECKLIST

Location: _____ Site: _____		
Description	Findings	Remarks
1. Personal Protection (PPE) per SSHP/APP	Pass/Fail	
2. Work Practices Follow SSHP/APP	Pass/Fail	
3. Site Control/Decon per SSHP/APP	Pass/Fail	
4. Eyewash Station(s)	Pass/Fail	
5. First Aid Kit(s)	Pass/Fail	
6. Fire Extinguisher(s)	Pass/Fail	
7. Monitoring Equipment	Pass/Fail	
8. Calibration	Pass/Fail	
9. Communications	Pass/Fail	
10. Overall Cleanliness of Site	Pass/Fail	
11. Other _____	Pass/Fail	
Printed Name: _____ Signature: _____ Date: _____ REMARKS: _____ _____ _____ _____		



MOTOR VEHICLE INSPECTION FOR TRANSPORTING EXPLOSIVE MATERIALS

DATE: _____

VEHICLE #: _____

VEHICLE OPERATOR: _____

1	No part of the fuel system shall project beyond the overall width of the motor vehicle.	GO	NO GO
2	The fuel line sediment trap shall be made of metal or plastic.	GO	NO GO
3	The exhaust pipe shall be effectively shielded or remote from the fuel tank and cargo floor.	GO	NO GO
4	Only hot water heater and defrost systems with fresh air circulation shall be used.	GO	NO GO
5	Rear view mirror shall be mounted on each side of the cab.	GO	NO GO
6	Two electric or air operated windshield wipers and washers shall be provided.	GO	NO GO
7	Only life long antifreeze shall be used.	GO	NO GO
8	The carburetor air filter element shall be noncombustible and designed to diminish and deflect back-fire flame.	GO	NO GO
9	Tow hooks or towing connections should be provided at the front and the rear of the vehicle.	GO	NO GO
10	Other than in the cab and engine compartment, wiring shall be run in loom or shall be protected by enclosure in a sheath or tube. There should be no wiring or lights within the cargo compartment.	GO	NO GO
11	Storage battery, unless located in the engine compartment, shall be covered by a fixed part of the motor vehicle, or protected by a ventilated cover or enclosure. Protective boots shall be used over the terminals.	GO	NO GO
12	No attachments, such as spare tire carriers, shall be located where they will obstruct the entrance to, or exit from, either door of the cab.	GO	NO GO
13	Vehicle shall be fitted with lights, full-flash turn signals and markers, conforming with DOT regulations and state and local requirements.	GO	NO GO
14	Tires with inner tubes shall be fitted with a valve stem lock.	GO	NO GO
15	All electric circuits shall be equipped with DOT approved reflector type warning kits.	GO	NO GO
16	Recapped tires must not be used on the front wheels. May be used on dual rear wheels.	GO	NO GO
17	Equipped with fire extinguishers as follows: Less than 14,000 GVW - minimum of two fire extinguishers with total fire rating of at least 4-A:20-B:C.	GO	NO GO
18	Fire extinguishers located where they are accessible for immediate use.	GO	NO GO
19	Vehicle equipped with three bi-directional reflective triangles.	GO	NO GO
20	Vehicle is appropriately placarded on all four sides. Appropriate placard for this trip is _____	GO	NO GO
21	Complete First Aid Kit located in passenger compartment of vehicle.	GO	NO GO

INSTRUCTIONS FOR COMPLETION

This Inspection Checklist will be completed by the vehicle operator before every trip in which explosive materials are transported.

Date: Enter the date of the trip/inspection.
 Vehicle #: Enter the VIN
 Vehicle Operator: Enter the name of the operator/inspector.

GO NO GO: Circle appropriate response.
NOTE: A NO GO requires repair/replacement prior to departure.

Distribution of completed form:
 (1) - Stays with the Vehicle
 (1) - Senior UXO Supervisor

COMPLETION INSTRUCTIONS:

EXAMPLE:

ID #	GRID LOCATION	NOMENCLATURE	FUZE DESCRIPTION	FUZE CONDITION	ALIGNMENT	PLACEMENT	COMMENTS
0001	3567 5379	155mm, HE, M107	PD, M235	Unarmed	NW	ME	For Disposal
0002	3567 5370	75mm, TP, M309	Dummy, M73	Inert	N	BS	For Venting

Grid Location: EAD – G001 (Grids will be identified on the south-east corner stake of each grid.)

FUZE CONDITION: Enter the fuze condition (Armed, Unarmed or Unknown).

UXO Team: Each team leader will identify, by UXO Team One or UXO Team Two, the grids which they have completed.

ALIGNMENT: The “Longitudinal Axis Orientation”, Nose-to-Tail direction, of the item recovered.
(N, NE, E, SE, S, SW,W, NW)

ID # : UXO/OE and Sub-surface Anomalies will be identified, by numbers, starting from 0001 through 9999.
(Note: Individual fragments and UXO related scrap items will not be recorded, but the type of scrap located within the grid will be noted in the remarks section below.)

PLACEMENT: Placement refers to the items surface location. Enter one of the following
ME- Mostly Embedded, in the dirt or sand.
AS – Above Surface (Above the current high water level.).
BS - Bottom Surface (Below the current high water level).

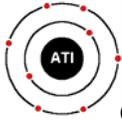
GRID LOCATION: The eight digit GPS coordinate will be entered.

COMMENTS: Any additional comments regarding the item (i.e. Separated for demil, round not fired, etc.).

NOMENCLATURE: Enter the full nomenclature, if known.

FUZE DESCRIPTION: The type/model of fuze, if known.

REMARKS: Any additional remarks regarding the grid, scrap recovered or conditions



OPERATOR MAINTENANCE CHECKLIST FOR GARRETT SEA HUNTER MK II

Instrument Serial Number _____ Operator _____ Date _____

Pre-Operational Check

Step	Activity
1	Check Storage Case for physical damage.
2	Open the Storage Case and inspect the instrument for damage.
3	Remove battery cover at the back of the unit housing by unscrewing the battery cap by hand. Install eight (8) alkaline AA batteries in the battery holders.
4	Replace battery cover and secure by screwing in the battery cap by hand.
5	Turn instrument on with the ON-OFF switch. The batteries are check automatically each time the detector is turned on. Four or more tones indicate the batteries are very good, two tones indicate the batteries are adequate. One tone or no tone indicates the batteries should be replaced.
6	Set instrument on Standard Operating mode, which is considered the "Normal Operating Range".
7	Adjust Volume with the volume control knob.
8	Verify extra set of batteries in storage case.
9	Take instrument to test grid for daily pre-op check.
10	Set elimination control to zero and calibrate to eliminate the effects of the local geology.
11	Verify the instrument is functioning by sweeping the test item.

Test Grid Results: Pass Fail (Circle appropriate response)

During Use Maintenance

During use, the operator is responsible for keeping the instrument as clean and dry as possible.

Post Use Maintenance

Step	Activity
1	Verify instrument is turned off.
2	Clean and wipe off instrument.
3	Open Electronic Unit Cover and remove batteries. See above note.
4	Properly store batteries.
5	Replace the Electronic Unit Cover.
6	Place the instrument in the storage case.
7	Return storage case to proper storage area.

List any problems associated with the instrument: _____

DD FORM 1348-1A ISSUE RELEASE/RECEIPT DOCUMENT

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

27. ADDITIONAL DATA 28. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-58) UP (74-80)	25. NATIONAL STOCK NO. & ADD (8-22)	24. DOCUMENT NUMBER & SUFFIX (30-44)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;">1</td><td style="width: 20px;">2</td><td style="width: 20px;">3</td><td style="width: 20px;">4</td><td style="width: 20px;">5</td><td style="width: 20px;">6</td><td style="width: 20px;">7</td><td style="width: 20px;">8</td><td style="width: 20px;">9</td><td style="width: 20px;">0</td><td style="width: 20px;">A</td><td style="width: 20px;">B</td><td style="width: 20px;">C</td><td style="width: 20px;">D</td><td style="width: 20px;">E</td><td style="width: 20px;">F</td><td style="width: 20px;">G</td><td style="width: 20px;">H</td><td style="width: 20px;">I</td><td style="width: 20px;">J</td><td style="width: 20px;">K</td><td style="width: 20px;">L</td><td style="width: 20px;">M</td><td style="width: 20px;">N</td><td style="width: 20px;">O</td><td style="width: 20px;">P</td><td style="width: 20px;">Q</td><td style="width: 20px;">R</td><td style="width: 20px;">S</td><td style="width: 20px;">T</td><td style="width: 20px;">U</td><td style="width: 20px;">V</td><td style="width: 20px;">W</td><td style="width: 20px;">X</td><td style="width: 20px;">Y</td><td style="width: 20px;">Z</td> </tr> <tr> <td colspan="10"></td> <td colspan="2" style="text-align: center;">QUANTITY</td> <td colspan="10"></td> </tr> <tr> <td colspan="10"></td> <td colspan="2" style="text-align: center;">SUPPLY ADDRESS</td> <td colspan="10"></td> </tr> <tr> <td colspan="10"></td> <td colspan="2" style="text-align: center;">DIS-TRIBUTION</td> <td colspan="10"></td> </tr> <tr> <td colspan="10"></td> <td colspan="2" style="text-align: center;">PRO-JECT</td> <td colspan="10"></td> </tr> <tr> <td colspan="10"></td> <td colspan="2" style="text-align: center;">RDD ELEV</td> <td colspan="10"></td> </tr> <tr> <td colspan="10"></td> <td colspan="2" style="text-align: center;">RI</td> <td colspan="10"></td> </tr> <tr> <td colspan="10"></td> <td colspan="2" style="text-align: center;">O C M</td> <td colspan="10"></td> </tr> <tr> <td colspan="10"></td> <td colspan="2" style="text-align: center;">P N D</td> <td colspan="10"></td> </tr> </table>	1	2	3	4	5	6	7	8	9	0	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z											QUANTITY																						SUPPLY ADDRESS																						DIS-TRIBUTION																						PRO-JECT																						RDD ELEV																						RI																						O C M																						P N D											
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PerFORM (DLA)

PREVIOUS EDITION MAY BE USED

MOTOR VEHICLE INSPECTION

MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)											
<i>(Read Instructions before completing this form.)</i>											
This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.						1. GOVERNMENT BILL OF LADING/TRANSPORTATION CONTROL NUMBER					
SECTION 1 - DOCUMENTATION						ORIGIN a.			DESTINATION b.		
2. CARRIER/GOVERNMENT ORGANIZATION											
3. DATE/TIME OF INSPECTION											
4. LOCATION OF INSPECTION											
5. OPERATOR(S) NAME(S)											
6. OPERATOR(S) LICENSE NUMBER(S)											
7. MEDICAL EXAMINER'S CERTIFICATE*											
8. <i>(X if satisfactory at origin)</i>						9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*					
a. MILITARY HAZMAT ENDORSEMENT			d. ERG OR EQUIVALENT COMMERCIAL:			YES		NO		9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*	
b. VALID LEASE*			e. DRIVER'S VEHICLE INSPECTION REPORT*							a. TRUCK/TRACTOR	
c. ROUTE PLAN			f. COPY OF 49 CFR PART 397							b. TRAILER	
SECTION II - MECHANICAL INSPECTION											
<i>All items shall be checked on empty equipment prior to loading. Items with an asterisk shall be checked on all incoming loaded equipment.</i>											
10. TYPE OF VEHICLE(S)						11. VEHICLE NUMBER(S)					
12. PART INSPECTED <i>(X as applicable)</i>		ORIGIN (1)		DESTINATION (2)		ORIGIN (1)		DESTINATION (2)		COMMENTS (3)	
		SAT		UNSAT		SAT		UNSAT			
a. SPARE ELECTRICAL FUSES						k. EXHAUST SYSTEM					
b. HORN OPERATIVE						l. BRAKE SYSTEM*					
c. STEERING SYSTEM						m. SUSPENSION					
d. WINDSHIELD/WIPERS						n. COUPLING DEVICES					
e. MIRRORS						o. CARGO SPACE					
f. WARNING EQUIPMENT						p. LANDING GEAR*					
g. FIRE EXTINGUISHER*						q. TIRES, WHEELS, RIMS					
h. ELECTRICAL WIRING						r. TAILGATE/DOORS*					
i. LIGHTS AND REFLECTORS						s. TARPULIN*					
j. FUEL SYSTEM*						t. OTHER <i>(Specify)</i>					
13. INSPECTION RESULTS <i>(X one)</i> ACCEPTED						REJECTED					
<i>(If rejected give reason under "Remarks". Equipment will be approved if deficiencies are corrected prior to loading.)</i>											
14. SATELLITE MOTOR SURVEILLANCE SYSTEM: <i>(X one)</i> ACCEPTED						REJECTED					
15. REMARKS											
16. INSPECTOR SIGNATURE <i>(Origin)</i>						17. INSPECTOR SIGNATURE <i>(Destination)</i>					
SECTION III - POST LOADING INSPECTION											
<i>This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.</i>											
		ORIGIN (1)		DESTINATION (2)		ORIGIN (1)		DESTINATION (2)		COMMENTS (3)	
		SAT		UNSAT		SAT		UNSAT			
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR											
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT											
20. SEALS APPLIED TO CLOSED VEHICLE; TARPULIN APPLIED ON OPEN EQUIPMENT											
21. PROPER PLACARDS APPLIED											
22. SHIPPING PAPERS/DD FORM 836 FOR GOVERNMENT VEHICLE SHIPMENTS											
23. COPY OF DD FORM 626 FOR DRIVER											
24. SHIPPED UNDER DOT EXEMPTION 868											
25. INSPECTOR SIGNATURE <i>(Origin)</i>						26. DRIVER(S) SIGNATURE <i>(Origin)</i>					
27. INSPECTOR SIGNATURE <i>(Destination)</i>						28. DRIVER(S) SIGNATURE <i>(Destination)</i>					

INSTRUCTIONS

SECTION I - DOCUMENTATION

General Instructions.

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

Items 1 through 5. Self explanatory.

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

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

Item 8.a. APPLIES TO MILITARY OPERATORS ONLY. Military Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials.

b. *Valid Lease. Shipper will ensure a copy of the appropriate contract of lease is carried in all leased vehicles and is available for inspection. (Defense Transportation Regulation (DTR) requirement.)

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

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

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

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

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

SECTION II - MECHANICAL INSPECTION

General Instructions.

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

SECTION II (Continued)

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

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

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

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

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

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

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

h. Electrical Wiring: Electrical wiring must be clean and properly secured. Insulation must not be frayed, cracked or otherwise in poor condition. There shall be no uninsulated wires, improper splices or connections. Wires and electrical fixtures inside the cargo area must be protected from the lading. (49 CFR 393.28, 393.32, 393.33)

INSTRUCTIONS

SECTION II (Continued)

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83 and 396 Appendix G)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83 and 396 Appendix G)

l. Brake System (to include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 396 Appendix G)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 396 Appendix G)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFT 396 Appendix G)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 177.815(e)(1) and 398.94)

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

SECTION II (Continued)

q. Tires, Wheels and Rims: Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 396 Appendix G)

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

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

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

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. Shipper will instruct the driver to send a "test" emergency message to DTTS by having the driver activate the "emergency (panic) button". Shipper will contact DTTS at 1-800-826-0794 to verify that test message was received. Message must be received by DTTS for system to be considered operational.

SECTION III - POST LOADING INSPECTION

General Instructions.

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

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

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

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

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR Part 172 Subpart F.

Item 22. Check to ensure operator has been provided shipping papers that comply with 49 CFR Part 172 Subpart C. For shipments transported by Government vehicle, shipping paper will be DD Form 836.

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

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

EMERGENCY TELEPHONE NUMBERS
(TO BE POSTED IN EACH VEHICLE AND AT EACH WORK SITE)

ACCIDENT/INJURY:

FIRE/EXPLOSION:

WORK SITE ACCESS

LOST, STOLEN, or UNAUTHORIZED USE OF EXPLOSIVE MATERIALS

SPILL and DISCHARGE RESPONSE PROCEDURES

In the event of a spill, all steps necessary to contain the spill will be taken until clean up is finished. Spills will be contained using shovels or other means to scoop up the spill and place in on plastic sheeting or in plastic bags. Immediately notify the Sr. UXO Supervisor.

USACE ACCIDENT INVESTIGATION REPORT

(For Safety Staff only)	REPORT NO.	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT <i>(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)</i>			REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)
1. ACCIDENT CLASSIFICATION						
PERSONNEL CLASSIFICATION		INJURY/ILLNESS/FATAL		PROPERTY DAMAGE		
GOVERNMENT <input type="checkbox"/> CIVILIAN <input type="checkbox"/> MILITARY		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		
<input type="checkbox"/> CONTRACTOR		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		
<input type="checkbox"/> PUBLIC		<input type="checkbox"/> FATAL <input type="checkbox"/> OTHER		X		
2. PERSONAL DATA						
a. Name (Last, First, MI)		b. AGE	c. SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE		d. SOCIAL SECURITY NUMBER	
f. JOB SERIES/TITLE		g. DUTY STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ON DUTY <input type="checkbox"/> TDY <input type="checkbox"/> OFF DUTY		h. EMPLOYMENT STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ARMY ACTIVE <input type="checkbox"/> ARMY RESERVE <input type="checkbox"/> VOLUNTEER <input type="checkbox"/> PERMANENT <input type="checkbox"/> FOREIGN NATIONAL <input type="checkbox"/> SEASONAL <input type="checkbox"/> TEMPORARY <input type="checkbox"/> STUDENT <input type="checkbox"/> OTHER (Specify)		
3. GENERAL INFORMATION						
a. DATE OF ACCIDENT (month/day/year)	b. TIME OF ACCIDENT (Military time) hrs	c. EXACT LOCATION OF ACCIDENT			d. CONTRACTOR'S NAME	
e. CONTRACT NUMBER <input type="checkbox"/> CIVIL WORKS <input type="checkbox"/> MILITARY <input type="checkbox"/> OTHER (Specify)		f. TYPE OF CONTRACT <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> SERVICE <input type="checkbox"/> A/E <input type="checkbox"/> DREDGE <input type="checkbox"/> OTHER (Specify)		g. HAZARDOUS/TOXIC WASTE ACTIVITY <input type="checkbox"/> SUPERFUND <input type="checkbox"/> DERP <input type="checkbox"/> IRP <input type="checkbox"/> OTHER (Specify)		
d. CONTRACTOR'S NAME (1) PRIME: (2) SUBCONTRACTOR:						
4. CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see help menu)						
a. CONSTRUCTION ACTIVITY (CODE) #			b. TYPE OF CONSTRUCTION EQUIPMENT (CODE) #			
5. INJURY/ILLNESS INFORMATION (Include name on line and corresponding code number in box for items e, f & g - see help menu)						
a. SEVERITY OF ILLNESS/INJURY (CODE) #		b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY		
e. BODY PART AFFECTED (CODE) # PRIMARY SECONDARY		g. TYPE AND SOURCE OF INJURY/ILLNESS TYPE (CODE) # SOURCE (CODE) #				
f. NATURE OF ILLNESS / INJURY (CODE) #						
6. PUBLIC FATALITY (Fill in line and correspondence code number in box - see help menu)						
a. ACTIVITY AT TIME OF ACCIDENT (CODE) #			b. PERSONAL FLOATATION DEVICE USED? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			
7. MOTOR VEHICLE ACCIDENT						
a. TYPE OF VEHICLE <input type="checkbox"/> PICKUP/VAN <input type="checkbox"/> AUTOMOBILE <input type="checkbox"/> TRUCK <input type="checkbox"/> OTHER (Specify)		b. TYPE OF COLLISION <input type="checkbox"/> SIDE SWIPE <input type="checkbox"/> HEAD ON <input type="checkbox"/> REAR END <input type="checkbox"/> BROADSIDE <input type="checkbox"/> ROLL OVER <input type="checkbox"/> BACKING <input type="checkbox"/> OTHER (Specify)		c. SEAT BELTS USED NOT USED NOT AVAILABLE		
				(1) FRONT SEAT		
				(2) REAR SEAT		
8. PROPERTY/MATERIAL INVOLVED						
a. NAME OF ITEM		b. OWNERSHIP		c. \$ AMOUNT OF DAMAGE		
(1)						
(2)						
(3)						
9. VESSEL/FLOATING PLANT ACCIDENT (Fill in line and correspondence code number in box from list - see help menu)						
a. TYPE OF VESSEL/FLOATING PLANT (CODE) #			b. TYPE OF COLLISION/MISHAP (CODE) #			
10. ACCIDENT DESCRIPTION (Use additional paper, if necessary)						
See attached page.						

11. CAUSAL FACTOR(S) (Read Instruction Before Completing)					
a. (Explain YES answers in item 13)	YES	NO	a. (CONTINUED)	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	<input type="checkbox"/>	<input type="checkbox"/>	CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	<input type="checkbox"/>	<input type="checkbox"/>
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	<input type="checkbox"/>	<input type="checkbox"/>	OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	<input type="checkbox"/>	<input type="checkbox"/>
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	<input type="checkbox"/>	<input type="checkbox"/>	SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	<input type="checkbox"/>	<input type="checkbox"/>
OPERATING PROCEDURES: Were operating procedures a factor?	<input type="checkbox"/>	<input type="checkbox"/>	PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	<input type="checkbox"/>	<input type="checkbox"/>
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	<input type="checkbox"/>	<input type="checkbox"/>	DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident?	<input type="checkbox"/>	<input type="checkbox"/>
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	<input type="checkbox"/>	<input type="checkbox"/>	b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?		
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES (If yes, attach a copy.)	<input type="checkbox"/> NO	
12. TRAINING					
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?		b. TYPE OF TRAINING.		c. DATE OF MOST RECENT FORMAL TRAINING.	
<input type="checkbox"/> YES <input type="checkbox"/> NO		<input type="checkbox"/> CLASSROOM <input type="checkbox"/> ON JOB		(Month) (Day) (Year)	
13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)					
a. DIRECT CAUSE					
See attached page.					
b. INDIRECT CAUSE(S)					
See attached page.					
14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).					
DESCRIBE FULLY:					
See attached page.					
15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.					
a. BEGINNING (Month/Day/Year)			b. ANTICIPATED COMPLETION (Month/Day/Year)		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT		d. DATE (Mo/Da/Yr)	e. ORGANIZATION IDENTIFIER (Div, Br, Sect)	f. OFFICE SYMBOL	
CORPS _____					
CONTRACTOR _____					
16. MANAGEMENT REVIEW (1st)					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS					
SIGNATURE		TITLE		DATE	
17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS					
SIGNATURE		TITLE		DATE	
18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS					
SIGNATURE		TITLE		DATE	
19. COMMAND APPROVAL					
COMMENTS					
COMMANDER SIGNATURE				DATE	

10.	ACCIDENT DESCRIPTION <i>(Continuation)</i>
13a.	DIRECT CAUSE <i>(Continuation)</i>

13b.	INDIRECT CAUSES <i>(Continuation)</i>
14.	ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) <i>(Continuation)</i>

APPENDIX G

MGFD Calculation Sheets

Minimum Separation Distances
Opana Point
AN-MK23 & AN-MK5 3lb Practice Bombs
13 January 2004

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) EM 1110-1-4009, the minimum separation distance for unintentional detonations shall be the largest of the maximum fragment range, the K50 ($50W^{1/3}$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft. In accordance with (IAW) EM 1110-1-4009, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for unintentional detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

IAW EM 1110-1-4009, the minimum separation distance for intentional detonations shall be the largest of the maximum fragment range, the K328 ($328W^{1/3}$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft.

NAVWEPS OP 2216 describes this round as a 10-gage shotgun shell of extra length. It contains an expelling charge of smokeless powder and is primed with commercial primer. A pyrotechnic or inert marker load is separated from the expelling charge by a disc and cardboard gun-wad. The end of the shell is closed by felt gun-wads which are secured by a cemented cover.

CALCULATED FRAGMENT DISTANCES

Maximum Fragment Range = N/A ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = N/A ft

CALCULATED OVERPRESSURE DISTANCES BASED ON OE ITEM'S EXPLOSIVE WEIGHT ONLY (i.e. NO DONOR CHARGE)

Range to 0.9 psi Overpressure (K50) = 12 ft
K328 Overpressure Range = 77 ft (based on munition NEW only, no donor)

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW DDESB Technical Paper 16. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW DDESB Technical Paper 16.

SIGNATURES:

Michelle Crull 1/13/04 Shuene Opichka 1/15/04
Subject Matter Expert Date QA Reviewer Date

Minimum Separation Distances
Opana Point
4.5in Barrage Rocket
13 January 2004

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) EM 1110-1-4009, the minimum separation distance for unintentional detonations shall be the largest of the maximum fragment range, the K50 ($50W^{1/3}$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft. In accordance with (IAW) EM 1110-1-4009, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for unintentional detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

IAW EM 1110-1-4009, the minimum separation distance for intentional detonations shall be the largest of the maximum fragment range, the K328 ($328W^{1/3}$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft.

CALCULATED FRAGMENT DISTANCES

Maximum Fragment Range = 1759 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 290 ft

CALCULATED OVERPRESSURE DISTANCES BASED ON OE ITEM'S EXPLOSIVE WEIGHT ONLY (i.e. NO DONOR CHARGE)

Range to 0.9 psi Overpressure (K50) = 99 ft
K328 Overpressure Range = 650 ft (based on munition NEW only, no donor)

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW DDESB Technical Paper 16. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW DDESB Technical Paper 16.

NOTE THAT ALL MITIGATION METHODS FOR INTENTIONAL DETONATIONS ARE BASED ON THE USE OF COMMERCIAL SHAPED CHARGES FOR INITIATION. IF ANY OTHER DONOR CHARGE IS TO BE USED THIS INFORMATION MUST BE PROVIDED TO CEHNC WITH A REQUEST FOR NEW CALCULATIONS!

Minimum Separation Distances
Opana Point
4.5in Barrage Rocket
13 January 2004

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 36 in. with 6" standoff between munition and sandbags

Sandbag Throw Distance = 220 ft

Minimum Separation Distance = 220 ft

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site.

WATER MITIGATION FOR INTENTIONAL DETONATIONS

Water Containment System (see HNC-ED-CS-S-00-3)	Minimum Separation Distance (ft)
1100 gallon tank	275

The water containment system and the minimum separation distance were determined IAW HNC-ED-CS-S-00-3. A copy of HNC-ED-CS-S-00-3, "Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site.

MINIMUM SEPARATION DISTANCES WHILE USING OFB DURING INTRUSIVE ACTIVITIES

Design of the Open Front Barricade (OFB) is in accordance with HNC-ED-CS-S-99-1, "Open Front and Enclosed Barricades". A copy of this report must be available on site. DDESB has placed certain restrictions on the approved usage of the OFB. These are listed in the approval letter in the front of the report.

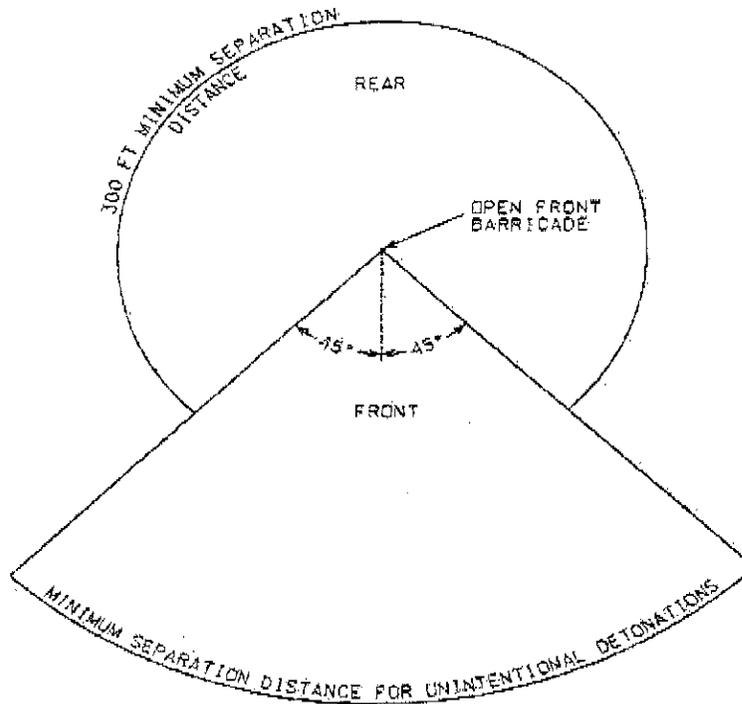
Thickness of Aluminum Required to Prevent Perforation = 2.05 in
Thickness of Steel Required to Prevent Perforation = 0.97 in

The OFB is designed to defeat fragments to the rear and sides of the OFB in the case of an accidental/unintentional detonation during intrusive activities. The fragment distances to the front of the OFB are the same as the fragment distances without the OFB (see figure). The OFB is not designed to reduce the effects of blast overpressure. The OFB may not be used for intentional detonations. The minimum separation distances to the rear and sides of the

Minimum Separation Distances
Opana Point
4.5in Barrage Rocket
13 January 2004

OFB must be maintained based on the expected throw distance of the OFB itself.

Minimum Separation Distance to sides and rear = 300 ft
Minimum Separation Distance to front = 1759 ft
K50 distance = 99 ft



MINIMUM SEPARATION DISTANCE FOR UNINTENTIONAL DETONATIONS
USING OPEN FRONT BARRICADE DURING INTRUSIVE ACTIVITIES

SIGNATURES:

Michelle Luedt
Subject Matter Expert

1/13/04
Date

Sherene Opichka 1/15/04
QA Reviewer | Date

Minimum Separation Distances
Opana Point
60mm M49A2
13 January 2004

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) EM 1110-1-4009, the minimum separation distance for unintentional detonations shall be the largest of the maximum fragment range, the $K50 (50W^{1/3})$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft. In accordance with (IAW) EM 1110-1-4009, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for unintentional detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

IAW EM 1110-1-4009, the minimum separation distance for intentional detonations shall be the largest of the maximum fragment range, the $K328 (328W^{1/3})$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft.

CALCULATED FRAGMENT DISTANCES

Maximum Fragment Range = 1127 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 200 ft

CALCULATED OVERPRESSURE DISTANCES BASED ON OE ITEM'S EXPLOSIVE WEIGHT ONLY (i.e. NO DONOR CHARGE)

Range to 0.9 psi Overpressure (K50) = 37 ft
K328 Overpressure Range = 243 ft (based on munition NEW only, no donor)

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW DDESB Technical Paper 16. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW DDESB Technical Paper 16.

NOTE THAT ALL MITIGATION METHODS FOR INTENTIONAL DETONATIONS ARE BASED ON THE USE OF COMMERCIAL SHAPED CHARGES FOR INITIATION. IF ANY OTHER DONOR CHARGE IS TO BE USED THIS INFORMATION MUST BE PROVIDED TO CEHNC WITH A REQUEST FOR NEW CALCULATIONS!

Minimum Separation Distances
Opana Point
60mm M49A2
13 January 2004

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 20 in. with 6" standoff between munition and sandbags

Sandbag Throw Distance = 125 ft

Minimum Separation Distance = 200 ft

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site.

WATER MITIGATION FOR INTENTIONAL DETONATIONS

Water Containment System (see HNC-ED-CS-S-00-3)	Minimum Separation Distance (ft)
Inflatable pool	200
5 gallon carboys	264

The water containment system and the minimum separation distance were determined IAW HNC-ED-CS-S-00-3. A copy of HNC-ED-CS-S-00-3, "Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site.

MINIMUM SEPARATION DISTANCES WHILE USING MOFB DURING INTRUSIVE ACTIVITIES

Design of the Miniature Open Front Barricade (MOFB) is in accordance with HNC-ED-CS-S-98-8, "Miniature Open Front Barricade". A copy of this report must be available on site. DDESB has placed certain restrictions on the approved usage of the MOFB. These are listed in the approval letter in the front of the report.

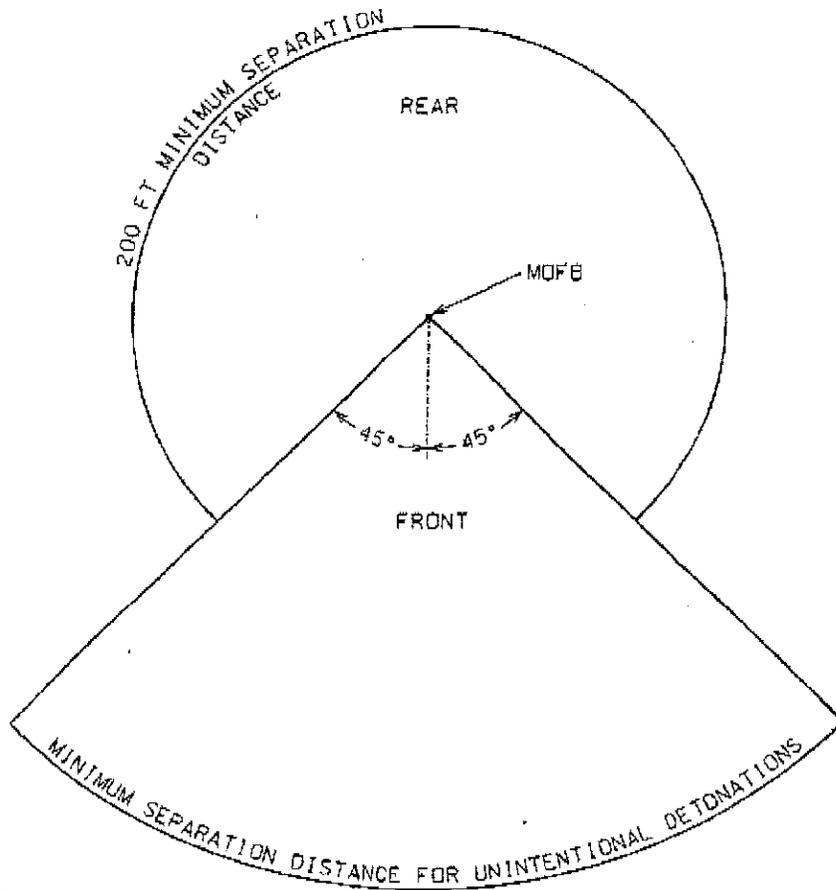
Thickness of Aluminum Required to Prevent Perforation = 1.25 in

The MOFB is designed to defeat fragments to the rear and sides of the MOFB in the case of an accidental/unintentional detonation during intrusive activities. The fragment distances to the front of the MOFB are the same as the fragment distances without the MOFB (see figure). The MOFB is not designed to reduce the effects of blast overpressure. The MOFB may not be used for intentional detonations. The minimum separation distances to the rear and sides of the

Minimum Separation Distances
Opana Point
60mm M49A2
13 January 2004

MOFB must be maintained based on the expected throw distance of the MOFB itself.

Minimum Separation Distance to sides and rear = 200 ft
Minimum Separation Distance to front = 1127 ft
K50 distance = 37 ft



MINIMUM SEPARATION DISTANCE FOR UNINTENTIONAL DETONATIONS
USING MINIATURE OPEN FRONT BARRICADE DURING INTRUSIVE ACTIVITIES

SIGNATURES:

Michelle Crowell
Subject Matter Expert

1/13/04
Date

Sherone Opichka
QA Reviewer

1/15/04
Date

Minimum Separation Distances
Opana Point
81mm M375 WP
13 January 2004

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) EM 1110-1-4009, the minimum separation distance for unintentional detonations shall be the largest of the maximum fragment range, the $K50 (50W^{1/3})$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft. In accordance with (IAW) EM 1110-1-4009, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for unintentional detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

IAW EM 1110-1-4009, the minimum separation distance for intentional detonations shall be the largest of the maximum fragment range, the $K328 (328W^{1/3})$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft.

CALCULATED FRAGMENT DISTANCES

Maximum Fragment Range = 729 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 200 ft

CALCULATED OVERPRESSURE DISTANCES BASED ON OE ITEM'S EXPLOSIVE WEIGHT ONLY (i.e. NO DONOR CHARGE)

Range to 0.9 psi Overpressure (K50) = 16 ft
K328 Overpressure Range = 106 ft (based on munition NEW only, no donor)

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW DDESB Technical Paper 16. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW DDESB Technical Paper 16.

NOTE THAT ALL MITIGATION METHODS FOR INTENTIONAL DETONATIONS ARE BASED ON THE USE OF COMMERCIAL SHAPED CHARGES FOR INITIATION. IF ANY OTHER DONOR CHARGE IS TO BE USED THIS INFORMATION MUST BE PROVIDED TO CEHNC WITH A REQUEST FOR NEW CALCULATIONS!

Minimum Separation Distances
Opana Point
81mm M375 WP
13 January 2004

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Not Applicable.

WATER MITIGATION FOR INTENTIONAL DETONATIONS

Not Applicable.

MINIMUM SEPARATION DISTANCES WHILE USING MOFB DURING
INTRUSIVE ACTIVITIES

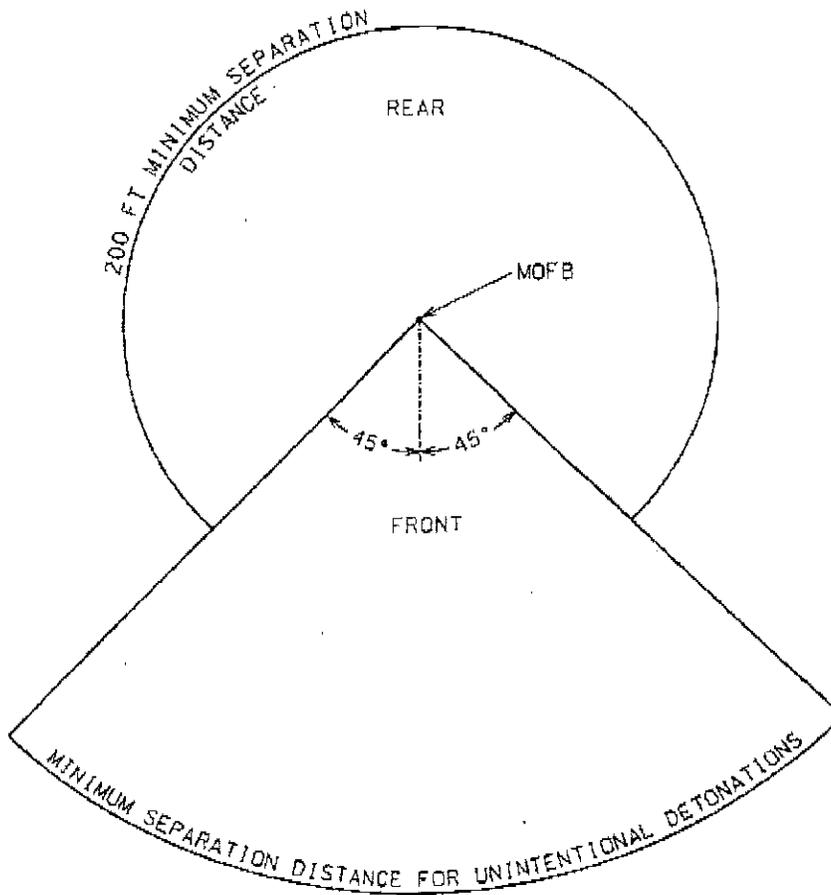
Design of the Miniature Open Front Barricade (MOFB) is in accordance with HNC-ED-CS-S-98-8, "Miniature Open Front Barricade". A copy of this report must be available on site. DDESB has placed certain restrictions on the approved usage of the MOFB. These are listed in the approval letter in the front of the report.

Thickness of Aluminum Required to Prevent Perforation = 0.24 in

The MOFB is designed to defeat fragments to the rear and sides of the MOFB in the case of an accidental/unintentional detonation during intrusive activities. The fragment distances to the front of the MOFB are the same as the fragment distances without the MOFB (see figure). The MOFB is not designed to reduce the effects of blast overpressure. The MOFB may not be used for intentional detonations. The minimum separation distances to the rear and sides of the MOFB must be maintained based on the expected throw distance of the MOFB itself.

Minimum Separation Distance to sides and rear = 200 ft
Minimum Separation Distance to front = 729 ft
K50 distance = 16 ft

Minimum Separation Distances
Opana Point
81mm M375 WP
13 January 2004



MINIMUM SEPARATION DISTANCE FOR UNINTENTIONAL DETONATIONS
USING MINIATURE OPEN FRONT BARRICADE DURING INTRUSIVE ACTIVITIES

SIGNATURES:

Michelle Creed
Subject Matter Expert

1/13/04
Date

Sherene Opichka
QA Reviewer

1/15/04
Date

Minimum Separation Distances
Makawao
105mm M1
10 March 2004

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) EM 1110-1-4009, the minimum separation distance for unintentional detonations shall be the largest of the maximum fragment range, the $K50$ ($50W^{1/3}$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft. In accordance with (IAW) EM 1110-1-4009, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for unintentional detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

IAW EM 1110-1-4009, the minimum separation distance for intentional detonations shall be the largest of the maximum fragment range, the $K328$ ($328W^{1/3}$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft.

CALCULATED FRAGMENT DISTANCES

Maximum Fragment Range = 1939 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 341 ft

CALCULATED OVERPRESSURE DISTANCES BASED ON OE ITEM'S EXPLOSIVE WEIGHT ONLY (i.e. NO DONOR CHARGE)

Range to 0.9 psi Overpressure ($K50$) = 97 ft
 $K328$ Overpressure Range = 636 ft (based on munition NEW only, no donor)

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW DDESB Technical Paper 16. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW DDESB Technical Paper 16.

NOTE THAT ALL MITIGATION METHODS FOR INTENTIONAL DETONATIONS ARE BASED ON THE USE OF COMMERCIAL SHAPED CHARGES FOR INITIATION. IF ANY OTHER DONOR CHARGE IS TO BE USED THIS INFORMATION MUST BE PROVIDED TO CEHNC WITH A REQUEST FOR NEW CALCULATIONS!

Minimum Separation Distances
Makawao
105mm M1
10 March 2004

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 24 in. with 6" standoff between munition and sandbags

Sandbag Throw Distance = 135 ft

Minimum Separation Distance = 200 ft

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site.

WATER MITIGATION FOR INTENTIONAL DETONATIONS

Water Containment System (see HNC-ED-CS-S-00-3)	Minimum Separation Distance (ft)
1100 gallon tank	200

The water containment system and the minimum separation distance were determined IAW HNC-ED-CS-S-00-3. A copy of HNC-ED-CS-S-00-3, "Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site.

MINIMUM SEPARATION DISTANCES WHILE USING OFB DURING INTRUSIVE ACTIVITIES

Design of the Open Front Barricade (OFB) is in accordance with HNC-ED-CS-S-99-1, "Open Front and Enclosed Barricades". A copy of this report must be available on site. DDESB has placed certain restrictions on the approved usage of the OFB. These are listed in the approval letter in the front of the report.

Thickness of Aluminum Required to Prevent Perforation = 1.87 in

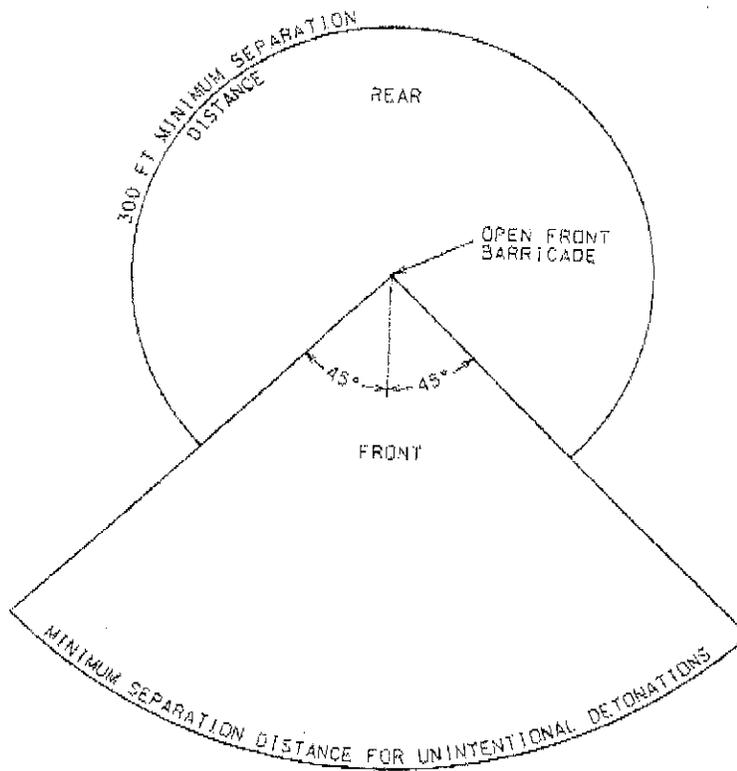
Thickness of Steel Required to Prevent Perforation = 0.90 in

The OFB is designed to defeat fragments to the rear and sides of the OFB in the case of an accidental/unintentional detonation during intrusive activities. The fragment distances to the front of the OFB are the same as the fragment distances without the OFB (see figure). The OFB is not designed to reduce the effects of blast overpressure. The OFB may not be used for intentional detonations. The minimum separation distances to the rear and sides of the

Minimum Separation Distances
Makawao
105mm M1
10 March 2004

OFB must be maintained based on the expected throw distance of the OFB itself.

Minimum Separation Distance to sides and rear = 300 ft
Minimum Separation Distance to front = 1939 ft
K50 distance = 97 ft



MINIMUM SEPARATION DISTANCE FOR UNINTENTIONAL DETONATIONS
USING OPEN FRONT BARRICADE DURING INTRUSIVE ACTIVITIES

SIGNATURES:

Michelle Crull 3/10/04
Subject Matter Expert Date

Sharon Opicna 3/10/04
QA Reviewer Date

APPENDIX H

Resumes

RESUMES OF KEY PERSONNEL

The following personnel are proposed as key personnel for the activities on this site and resumes are enclosed in Appendix H:

James R. Van Huss	Project Manager	CEHNC # 0364
Brian D. Stepp	SUXOS	CEHNC # 0799
John S. Wilson	UXOSO/QC	CEHNC # 0123
Benjamin M. Konshak	Site Geophysicist	

JAMES R. VAN HUSS

UXO #0364

PROJECT MANAGER

DATE ATTENDED BASIC EOD SCHOOL: MARCH 1981

EDUCATION; B.A., ANTHROPOLOGY, U of AZ: 1996

OTHER PERTINENT TRAINING: USACE COR CERTIFICATION 4/03
USACE QUALITY MANAGEMENT FOR
CONTRACTORS COURSE 6/01
HAZARDOUS WASTE/HAZMATERIAL
HANDLERS CERTIFICATION-09/00
ASQ CERTIFIED QUALITY AUDITOR 6/99
HAZWOPER REFRESHER -5/03
RADIATION SAFETY COURSE - 11/98
HAZWOPER BASIC 40 HOURS-1995
BLASTING AND EXPLOSIVE SAFETY CSE - 8/93
HAZARDOUS WASTE MANAGEMENT CSE -6/93
TRANSPORTATION OF HAZMAT CSE - 9/93

EOD/UXO ASSIGNMENTS:

NOV 03 – MAY 04 PROJECT MANAGER, ATI, BIG ISLAND, HI.
Performing on-site Project Manager responsibilities for the 5-year/
50 million dollars Waikoloa UXO Removal Project. Responsible for
controlling all contractual costs and productions output. Direct all areas
of financial reporting from budget preparation, operational cost analysis
and accountability. Define and implement long and short-term
objectives; oversee and control all daily operations and policy
implementation of over 45 onsite employees and 4 major subcontractors.

AUG 00- NOV 03 PROJECT MANAGER, ATI, FORT IRWIN, CA
Performing On-Site project management functions for Range
Maintenance Contract with an annual budget of over 5.6 million dollars.
Overseeing the Overall performance of over 40 full time employees on
the project team. Coordinated all contract and subcontract work, and
resolving all project issues and problems. Responsible for the
accountability, maintaining and procuring over \$500,000.00 worth of
onsite equipment.

DEC 97- AUG 00 QUALITY CONTROL SPECIALIST, ATI, FORT IRWIN, CA
Perform QC duties on Range Maintenance contract at the National
Training Center. Planned, directed and supervised the compliance
program for all range maintenance activities, resulting in a no-deficiency
rating for a period of over 34 months. Monitored corrective action
implementation and ensured timeliness and effectiveness.

JUL 97 - DEC 97 UXO SUPERVISOR, ATI/OES, FORT IRWIN. CA.
Team Leader on Range Maintenance contract at the National Training
Center, responsible for supervising UXO team in locating and
identifying various types of Explosive Ordnance.

**FEB 95 - JAN 96 SENIOR EOD SUPERVISOR, RANGE SAFETY OFFICER, 70TH
EOD, U.S. NAVY SUB BASE, SAN DIEGO, CA**

MAR 94 - JAN 95 Coordinated and participated in major range clearance operations on Ft Irwin, CA., Yuma Proving Grounds, AZ., and San Clemente Island, CA Managed unit Hazardous Material Program ensuring compliance with Local, State and Federal Environmental Protection Agency regulations.
SENIOR EOD SUPERVISOR, 8TH EOD, CAMP RED CLOUD, KOREA
Supervised live land mine clearance operations within the DMZ; Land mines encountered; M15, M19, M3 & M16. Work party member on MIA recovery mission in LAOS; worked range clearance operations on Korean and U.S. Artillery and Tank firing ranges. Ordnance encountered; Current mortars artillery projectiles, High Explosive Anti Tanks projectiles, Hellfire, Copperhead, and Foreign ordnance of various types

MAR 90 - FEB 94 **OPERATIONS NCO, SENIOR EOD SUPERVISOR, 94TH EOD, FT CARSON, CO**
Performed duties as Range Safety Officer, Coordinated and participated in Range clearance operations on Ft Carson Artillery and Tank firing ranges. Senior evaluator on inspection team that coordinated evaluation exercises inspecting various EOD Detachments technical proficiency on correct identification and procedures in dealing with all types of explosive ordnance.

MAR 89 - MAR 90 **EOD TEAM LEADER, OPERATIONS NCO, 8TH EOD, CAMP RED CLOUD, KOREA.**
Worked clearance operations on all major ranges within the Republic of Korea. Ordnance encountered: ICMS (all varieties), numerous Rocket and Missile systems, projectiles (20MM - 175MM) with associated fuzes, mortars (60MM-4.2”), and land mines of U.S. and Foreign origin.

MAR 81 - MAR 89 **EOD TEAM LEADER, OPERATION NCO, 47TH EOD, FT HOOD, TX.**
Coordinated and participated in over 25 major range clearance operations at Ft Hood, TX., Ft Sill, OK, and Air Force bombing ranges. Ordnance encountered: current projos, mortars, bombs, submunitions, and land mines.

BRIAN D. STEPP

UXO#0799

SENIOR UXO SUPERVSIOR

DATE ATTENDED BASIC EOD SCHOOL: JANUARY 1979

OTHER PERTINENT TRAINING: HAZWOPER 40 HOUR CRS – JAN 1999
HAZWOPER 8 HOUR Refresher: DEC 2003
HAZWOPER Supervisor: DEC 2003
USAF Supervisor Safety Course: 1987
EOD Advanced Course (Refresher): 1998
EOD Advanced Access & Disablement: 1998
American Society for Quality (ASQ) Certified Quality Auditor
National Assn of Safety Professionals (NASP) Certified Certified Environmental Health and Safety Officer

EOD/UXO ASSIGNMENTS:

JAN 04 – MAY 04 **UXO QUALITY CONTROL SPECIALIST, AMERICAN TECHNOLOGIES, INC., WAIKALOA, HI.**
Quality Control Specialist responsible for ensuring the quality of UXO clearance service to the customer. Conduct QC of all areas, ranging from product inspection, to safety, and to administrative processes. Conduct specialized training, validate UXO items, and oversee explosive procedures.

APR 02 – MAY 03 **UXO SAFETY COORDINATOR, KAHO'OLAWE ISLAND RESERVE COMMISSION (KIRC), WAILUKU, HI.**
The Safety Officer and Operations Supervisor for all KIRC activities on Kaho'olawe Island. Responsible for ensuring the safety of over 100 personnel on an active HAZWOPER CERCLA site. Versed in UXO operations and safety.

AUG 00 – APR – 02 **UXO QUALITY CONTROL (QC) MANAGER, UXB INTERNATIONAL, VA.**
Worked on the Kaho'olawe Island Reserve Clean-up Project. Started as a UXO Technician on an evacuation team and worked through UXO Team Leader to become the Quality Control Manager. Performed ordnance identification, recommended disposition, and later led six quality assurance teams to validate all operations conducted in accordance with established criteria.

JUN 97 – JUL 99 **SUPERINTENDENT, EOD INSPECTIONS, LANGLEY AB, VA**
Responsible for validating range clearance and ordnance remediation procedures, environmental compliance, OSHA conformity, and explosive and demolition safety practice adherence at 21 active duty and Air National Guard installations. Also, developed the range clearance plan for surface and subsurface UXO and residue remediation at Balboa Range, Panama.

NOV 94 – MAY 97 **SUPERINTENDENT EOD FLIGHT, OSAN AB, REPUBLIC OF SOUTH KOREA**
Responsible for US and multinational range clearance and disposal operations at Pilsung, Nightmare and Koon-ni Ranges. Directed 25

personnel international teams with three to five personnel per work party. Performed impact/demolition range clearance operations to include the search, detection, access, identification, and disposal of air and ground ordnance. Ordnance encountered included: live old style and new style bombs, aircraft egress components, pyrotechnics, dispensers, submunitions, bomb fuzes, mortars, projectiles, rockets, small arms, foreign munitions, chemical ordnance (mustard), missiles, and placed munitions.

DEC 90 – NOV 94

**USAF PACIFIC EOD RESOURCES AND PROGRAM
MANAGER, HICKAM AFB, HI**

Responsible for oversight and quality control of clearance and disposal operations on 11 ranges in four countries. Oversaw funding, manning support, training, explosives authorizations and shipment, vehicular requirements, environmental compliance, and international agreements for routine and excess range clearance operations. Oversaw the operations of 122 personnel at 11 installations. Additionally, orchestrated all USAF support for US Navy Kaho'olawe Island clearance operations. Participated in the clearance of Ripsaw Range, Misawa, Japan. Ordnance encountered included: small arms and various types of practice bombs.

NOV 88 – NOV 90

**NONCOMMISSIONED OFFICER IN CHARGE, EOD BRANCH,
SUWON AB, REPUBLIC OF SOUTH KOREA.**

Responsible for US and multinational range clearance and disposal operations at Pilsung and Nightmare Ranges. Directed multiple teams with three to five personnel per team. Performed impact/demolition range clearance operations to include the search, detection, access, identification, and disposal of air and ground ordnance, ordnance encountered included: live old style and low drag bombs, aircraft egress components, pyrotechnics, dispensers, submunitions, bomb fuzes, mortars, projectiles, rockets, small arms, foreign munitions, chemical ordnance (mustard and phosgene), missiles, and placed munitions.

JUN 84 – SEP 88

EOD INSTRUCTOR, INDIAN HEAD NOS, MD.

Taught and evaluated reconnaissance, identification, safety and render safe, and disposal procedures for all service and foreign student personnel. Additionally, instructed advanced students at the EOD Advanced Refresher Course. Ordnance taught: live and practice old style and low drag bombs, aircraft egress components, pyrotechnics, dispensers, submunitions, bomb fuzes, projectiles, experimental ordnance, foreign munitions, chemical ordnance, and missiles.

JAN 82 – MAY 84

EOD TECHNICIAN AND SUPERVISOR, LUKE AFB, AZ.

Directed 25 personnel teams with three to five personnel per work party. Performed impact/demolition range clearance operations to include the search, detection, access, identification, and disposal of air and ground ordnance. Ordnance encountered included: mortars, rockets, live and practice bombs (M and MK series), aircraft egress components, pyrotechnics, firing systems, small arms and missiles.

JAN 79 – JAN 82

EOD SPECIALIST, EGLIN AFB, FL.

Performed impact/demolition range clearance operations to include the search, detection, access, identification, and disposal of air and ground

ordnance. Ordnance encountered included: live and practice old M-series and new style MK-series drag bombs, aircraft egress components, pyrotechnics, dispensers, submunitions, bomb fuzes, mortars, projectiles, rockets, experimental ordnance, foreign munitions, chemical ordnance, missiles, placed munitions, missiles, small arms. Also worked in UXO clearance operations on the Nellis AFB range complex.

JOHN S. WILSON (SAM)

UXO #0123

UXO SAFETY / UXO QC

DATE ATTENDED U.S. NAVAL EOD SCHOOL: 1974

OTHER PERTINENT TRAINING: **HAZWOPER 40-Hour Course: 1991**
 HAZWOPER 8-Hour Super. Course: 1997
 HAZWOPER 8-Hour Refresher Course: 11/02
 Corporate Safety/QC Training: 9/93

EOD/UXO ASSIGNMENTS:

**JAN 04 – MAY 04 SITE SAFETY AND HEALTH OFFICER, WAIKOLOA
MANEUVER AREA, WAIMEA, HI.**
Responsible for all safe geophysical and UXO operations, and ensuring
all local, state and federal regulations are observed.

**OCT 03 – DEC 03 UXOSO/QC SPECIALIST, PAPOHAKU RANGLANB
BOMBING AND GUNNERY RANGE, MOLOKAI, HI.**
Responsible for all safety matters and quality control matters for
removal
action at the former bombing and gunnery range.

SEP 02 – SEP 03 SENIOR UXO SUPERVISOR, ATI, FORT IRWIN, CA.
Responsible for performing inspection, demilitarization, and processing
of all OE scrap collected during range maintenance operations at the
National Training Center

**JUN 02 – AUG 02 SENIOR UXO SUPERVISOR, ATI, FORMER ERIE
ORDNANCE DEPOT, OH**
Supervised all facets of work during a surface clearance of UXO from a
former artillery range.

**MAR 02 – MAY 02 SENIOR UXO SUPERVISOR, ATI, FORMER H RANGE,
SANDWICH, MA**
Responsible for supervision of all tasks during an EE/CA and a removal
action on a former mortar range.

DEC 01 – MAR 02 SENIOR UXO SUPERVISOR, ATI, FORT IRWIN, CA.
Responsible for performing inspection, demilitarization, and processing
of all OE scrap collected during range maintenance operations at the
National Training Center.

**JUL 01 – NOV 01 UXO TECHNICIAN III, ATI, FORMER SHUMAKDER NAD,
CAMDEN, AR.**
Responsible for supervision of a UXO team conducting intrusive
investigation in support of an EE/CA.

AUG 00 – JUN 01 UXOQC SPECIALIST, ATI, FT. IRWIN, CA
Responsible for performing quality control duties on range maintenance
contract at the National Training Center.

APR 00 – AUG 00 SENIOR UXO SUPERVISOR, ATI-OES, FT. IRWIN, CA.
Responsible for all day-to-day UXO operations. Managed six UXO
teams during a range maintenance contract.

**NOV 99 – FEB 00 UXO TECHNICIAN, LEVEL III, ATI-OES, SOUWESTERN
PROVING GROUND, HOPE, AR.**
Supervised a UXO team during a project comparing mag and flag

technology to geophysical investigations. Plotted UXO and grid locations using Trimble GPS System.

OCT 99 - OCT 99 **SITE SAFETY AND HEALTH OFFICER, ATI-OES, SAVANNA ARMY DEPOT, SAVANNA, IL**
Responsible for all UXO safety and health issues during a UXO avoidance project. Performed training, visitor briefings, visitor escorts, inspections and record keeping.

AUG 99 – SEP 99 **SITE SAFETY AND HEALTH OFFICER, ATI-OES, SAVANNA ARMY DEPOT, SAVANNA, IL**
Responsible for all UXO safety and health issues during a UXO avoidance project. Performed training, visitor briefings, visitor escorts, inspections and record keeping.

JUL 99 - JUL 99 **SITE SAFETY AND HEALTH OFFICER, ATI-OES, NAMSEMOND ORDNANCE DEPOT, SUFFOLK, VA.**
Responsible for all safety and health issues during all UXO operations on site investigation project. Performed training, visitor briefings, visitor escorts, inspections and record keeping.

OCT 98 – FEB 99 **SITE SAFETY AND HEALTH OFFICER, ATI-OES, HASTINGS NE.**
Responsible for all safety and health issues during all UXO operations on EE/CA contract. Performed training, visitor briefings, visitor escorts, inspections and record keeping.

APR 98 – SEP 98 **SENIOR UXO SUPERVISOR, ATI-OES, FT. IRWIN, CA.**
Responsible for all day-to-day UXO operations. Managed four UXO teams during a range maintenance contract.

JUN 97 – APR 98 **SITE SAFETY & HEALTH OFFICER, ATI-OES, FT. IRWIN, CA.**
Responsible for all safety and health issues during all UXO operations on range maintenance contract. Performed training, visitor briefings, visitor escorts, inspections and record keeping.

APR 97 – JUN 97 **SITE SAFETY & HEALTH OFFICER, ATI-OES, DICK'S AUTO WORKS', FONTANA, CA.**
Responsible for all safety and health issues during all UXO operations at two commercial scrap yards. Performed visitor briefings and escorted visitors during site visits including CAL-OSHA personnel and various other governmental agencies.

NOV 95 – JAN 96 **UXO SPECIALIST, ATI/OES, SAVANNA ARMY DEPOT, IL.**
Member of UXO team involved in a soil remediation project.

OCT 95 – NOV 95 **UXO SPECIALIST, CAMP CROFT, SPARTANBURG, SC.**
Member of UXO team involved in a surface and subsurface investigation.

OCT 94 – MAR 95 **SITE SAFETY/HEALTH OFFICER, SWPG, HOPE, AR**
Site safety for UXO/OE detection, identification and disposal project.

MAR 94 – AUG 94 **UXO SPECIALIST CAMP SIBERT, AL.**
Member of UXO team involved in a surface and subsurface investigation.

MAY 93 – SEP 93 **UXO SUPERVISOR, U.S. ARMY RESERVE CENTER, KINGSBURY, IN**
Supervised UXO team involved in a surface and subsurface removal

JAN 93 – MAY 93 action.
SENIOR UXO SUPERVISOR, FORMER RARITAN ARSENAL, EDISON, NJ.
Supervised multiple UXO teams involved in a surface and subsurface removal action.

SEP 92 – DEC 92 **UXO SUPERVISOR, FORMER U.S. ARMY DEPOT, PORT CLINTON, OH.**
Supervised UXO team involved in a surface and subsurface removal action.

MAY 91 – DEC 91 **SENIOR UXO SUPERVISOR, FORMER RARITAN ARSENAL, EDISON, NJ.**
Supervised multiple UXO teams involved in a surface and subsurface removal action.

JAN 85 – MAR 91 **SENIOR EOD SUPERVISOR (ORDNANCE CHIEF) 2ND MARINE DIVISION, USMC, CAMP LEJEUNE, NC.**
Supervised multiple EOD response teams involved in responding to EOD incidents and range clearance operations. RETIRED

JUN 82 – DEC 85 **EOD SPECIALIST, EOD TEAM, MARINE CORPS AIR STATION, BEAUFORT, SC.**
Member of EOD team involved in responding to EOD incidents and conducting range clearance operations.

MAY 81 – MAY 82 **EOD SPECIALIST, EOD TEAM, MAG-12, MARINE CORPS AIR STATION, IWAKUNI, JAPAN.**
Member of EOD team involved in responding to EOD incidents and conducting range clearance operations.

JAN 79 – APR 81 **EOD SPECIALIST, EOD TEAM, MAG-29, MARINE CORPS AIR STATION, NEW RIVER, NC.**
Member of EOD team involved in responding to EOD incidents and conducting range clearance operations.

DEC 76 – DEC 78 **EOD SPECIALIST, EOD TEAM, MAG-36, MARINE CORPS AIR STATION, IWAKUNI, JAPAN.**
Member of EOD team involved in responding to EOD incidents and conducting range clearance operations.

OCT 74 – NOV 76 **EOD SPECIALIST, 1ST EOD PLATOON, CAMP PENDLETON, CA.**
Member of EOD team involved in responding to EOD incidents and conducting range clearance operations.

BENJAMIN M. KONSHAK

SITE GEOPHYSICIST

EDUCATION: **Western Washington University, Bellingham, WA 98225**
Bachelor of Science, Geology: 1995

JOB SKILLS:

- Adept at field management of Geophysical and UXO field crews.
- Proven ability to complete field UXO cleanups including complex multi-client sites.
- Proficient in UXO survey techniques including operation of the EM-61 MKII, Geometrics 858, and various handheld metal detectors.
- Skilled at site assessment, data collection and documentation in a grid environment.
- Experienced in the installation and utilization of Leica & Trimble RTK GPS systems.
- Able to compose or edit technical plans, reports and charts in a succinct manner.
- Working knowledge of Microsoft Word, Excel and PowerPoint.
- Fundamental knowledge of Geosoft Oasis Montaj with UX Detect application.

CURRENT CERTIFICATION & TRAINING COURSES:

- Certified Quality Auditor, American Society for Quality.
- DOT Hazardous Waste Worker Physical
- 8-Hour Refresher Hazardous Waste and Emergency Response Operations
- Industrial First Aid & CPR
- Unexploded Ordnance Safety, Kaho'olawe/Adak Site Workers Course
- Basic Helicopter Safety, Federal Office of Aviation Safety
- Basic Firefighter, S-110, S-130, S-190, National Park Service
- Macromedia Dreamweaver (Web Page Creation)

PERSONAL ACCOMPLISHMENTS:

- Eagle Scout Award
- Private Pilot License – Rotorcraft

RELEVANT WORK EXPERIENCE:

Geophysicst

American Technologies, Inc.
Waikoloa Manuever Area Cleanup
Dates Employed: 2/2004 – 5/2004

Site Coordinator/Field Geophysicist

Blackhawk Geoservices
Honk Kong Disneyland Site, Numerous Domestic UXO Projects
Dates Employed: 10/2002 – 2/2004

Field Team Leader/Interim Quality Control Geophysicist

Parsons Infrastructure and Technology

Fort Ord UXO Cleanup
Dates Employed: 4/2002 – 10/2002

Technical Writer & Consultant
Environmental Chemical Corporation
UXO Investigation/Remediation at Former NAF ADAK
Dates Employed: 10/2001 – 3/2002

Field Geophysical Quality Control
Environmental Chemical Corporation
UXO Investigation/Remediation at Former NAF ADAK
Dates Employed: 6/2001 – 10/2001

Geophysical Detector Personnel
Parson Infrastructure & Technology
Kaho'olawe Island UXO Cleanup
Dates Employed: 7/2000 – 6/2001

Park Ranger
Haleakala National Park, Lake Chelan National Recreation Area
Dates Employed: 7/1995 – 6/2000

APPENDIX I

Geophysical Prove-Out Report

**Geophysical Prove-Out Results
Will be added after the completion of the GPO**

APPENDIX J

MSDS

ATI CHEMICAL INVENTORY FORM

Site Name: _____

Site Safety Officer: _____

Work Area: _____

Date Prepared: _____

Storage Area: _____

Chemical Name	CAS# / Product#	Manufacturer	Supplier	Total Quantity Stored	Intact Label	MSDS on File

FARMLAND INDUSTRIES PETROLEUM DIV ...IUM UNLEADED - GASOLhttp://MSDS.PDC.CORNELL.EDU/msds/siri/q191/q398.htm

FARMLAND INDUSTRIES PETROLEUM DIV -- REGULAR, PREMIUM & MIDGRADE PREMIUM UNLEADED - G
MATERIAL SAFETY DATA SHEET
NSN: 9130001487102
Manufacturer's CAGE: 6G072
Part No. Indicator: A
Part Number/Trade Name: REGULAR, PREMIUM & MIDGRADE PREMIUM UNLEADED
=====

General Information
=====

Item Name: GASOLINE, AUTOMOTIVE
Company's Name: FARMLAND INDUSTRIES INC. PETROLEUM DIVISION
Company's Street: C/O BULK PETROLEUM PRODUCTS DIVISION
Company's P. O. Box: 7305
Company's City: KANSAS CITY
Company's State: MO
Company's Country: US
Company's Zip Code: 64116-0005
Company's Emerg Ph #: 316-251-4000/800-424-9300 (CHEMTREC)
Company's Info Ph #: 316-251-4000
Record No. For Safety Entry: 044
Tot Safety Entries This Stk#: 053
Status: SE
Date MSDS Prepared: 21FEB91
Safety Data Review Date: 11AUG93
Supply Item Manager: CD
MSDS Serial Number: BPHGK
Specification Number: VV-G-1690C
Spec Type, Grade, Class: CL:A/B/C/D/E GR:SPEC
Hazard Characteristic Code: F2
Unit Of Issue: GL
Unit Of Issue Container Qty: BULK
Type Of Container: NOT KNOWN
Net Unit Weight: NOT KNOWN
=====

Ingredients/Identity Information
=====

Proprietary: NO
Ingredient: GASOLINE CONTAINING THE FOLLOWING INGREDIENTS
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: LX3300000
CAS Number: 8006-61-9
OSHA PEL: 300 PPM/500 STEL
ACGIH TLV: 300 PPM/500 STEL; 9293
Other Recommended Limit: NONE RECOMMENDED
=====

Proprietary: NO
Ingredient: XYLENES (O-, M-, P- ISOMERS) (SARA III), <20%
Ingredient Sequence Number: 02
Percent: SEE # 1
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150 STEL; 9293
Other Recommended Limit: NONE RECOMMENDED
=====

Proprietary: NO
Ingredient: TOLUENE (SARA III), <20%
Ingredient Sequence Number: 03
Percent: SEE # 1
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL
ACGIH TLV: 50 PPM; 9293
=====

FARMLAND INDUSTRIES PETROLEUM DIV ...IUM UNLEADED - GASOLhttp://MSDS.PDC.CORNELL.EDU/msds/siri/q191/q398.html

Proprietary: NO
Ingredient: BENZENE (SARA III), <6%
Ingredient Sequence Number: 04
Percent: SEE # 1
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: 1,2,4-TRIMETHYLBENZENE (SARA III), <5%
Ingredient Sequence Number: 05
Percent: SEE # 1
NIOSH (RTECS) Number: DC3325000
CAS Number: 95-63-6
OSHA PEL: 25 PPM
ACGIH TLV: 25 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III), <3%
Ingredient Sequence Number: 06
Percent: SEE # 1
NIOSH (RTECS) Number: DA0700000
CAS Number: 100-41-4
OSHA PEL: 100 PPM/125 STEL
ACGIH TLV: 100 PPM/125STEL 9293
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: REDDISH GOLDEN BROWN LIQUID - GASOLINE ODOR
Boiling Point: 80.0F,26.7C
Melting Point: NOT KNOWN
Vapor Pressure (MM Hg/70 F): 400 @ 68F
Vapor Density (Air=1): 4
Specific Gravity: 0.72
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: <1 (ETHER=1)
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: 100
Corrosion Rate (IPY): UNKNOWN
Autoignition Temperature: 495F

Fire and Explosion Hazard Data

Flash Point: -40F,-40C
Flash Point Method: TCC
Lower Explosive Limit: 1.4
Upper Explosive Limit: 7.6
Extinguishing Media: USE CARBON DIOXIDE, FOAM, DRY CHEMICAL AND VAPORIZING LIQUID TYPE EXTINGUISHERS. WATER MAY BE INEFFECTIVE.
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT & A FULL FACED SELF CONTAINED BREATHING APPARATUS/SUPPLIED-AIR RESPIRATOR.COOL FIRE EXPOSED CONTAINERS WITH WATER SPRAY.
Unusual Fire And Expl Hazrds: HIGHLY VOLATILE MATERIAL. FLOWING GASOLINE CAN BE IGNITED BY SELF-GENERATING STATIC ELECTRICITY (BOND & GROUND CONTAINERS). VAPORS CAN GET TO IGNITION SOURCES.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HIGH HEAT, SPARKS, OPEN FLAMES AND OTHER.

FARMLAND INDUSTRIES PETROLEUM DIV ...IUM UNLEADED - GASOLhttp://MSDS.PDC.CORNELL.EDU/msds/siri/q191/q398.htm

SOURCES OF IGNITION

Materials To Avoid: STRONG OXIDIZING AGENTS, HALOGENS, STRONG ACIDS AND ALKALIES

Hazardous Decomp Products: FUMES, CARBON MONOXIDE, CARBON DIOXIDE AND OTHER DECOMPOSITION PRODUCTS

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: TLV FOR BENZENE IS 10 PPM.

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: NO

Health Haz Acute And Chronic: ACUTE- INHALATION OF VAPORS MAY CAUSE CNS DEPRESSION, CONVULSION, LOSS OF CONSCIOUSNESS. INGESTION HAS SYMPTOMS SIMILAR TO INHALATION & ASPIRATION HAZARD. EYE/SKIN CONTACT CAUSES IRRITATION. CHRONIC- DERMATITIS, NERVOUS SYSTEM, KIDNEY, LIVER & BLOOD DISORDERS INCLUDING ANEMIA & LEUKEMIA. KIDNEY CANCER IN LAB ANIMALS.

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: YES

Explanation Carcinogenicity: CONTAINS BENZENE. MAY CAUSE BLOOD DISEASES INCLUDING LEUKEMIA. VAPORS MAY CAUSE KIDNEY CANCER IN MALE RATS.

Signs/Symptoms Of Overexp: HEADACHE, NASAL & RESPIRATORY IRRITATION, NAUSEA, DROWSINESS, FATIGUE, EYE & SKIN IRRITATION, PULMONARY EDEMA, CONVULSION & LOSS OF CONSCIOUSNESS

Med Cond Aggravated By Exp: BENZENE- INDIVIDUALS WITH LIVER, KIDNEY AND BLOOD DISEASES. HEXANE- INDIVIDUALS WITH NEUROLOGICAL DISEASES. PETROLEUM SOLVENT- THOSE WITH EXISTING DERMATITIS.

Emergency/First Aid Proc: CALL A PHYSICIAN IN ALL CASES. EYES: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES, HOLDING EYELIDS OPEN. SKIN: WASH WITH SOAP & WATER. INHALED: REMOVE TO FRESH AIR & PROVIDE CPR/OXYGEN IF NECESSARY. ORAL: DO NOT INDUCE VOMITING UNLESS INSTRUCTED BY A PHYSICIAN. CALL A PHYSICIAN IMMEDIATELY. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: WEAR PROTECTIVE EQUIPMENTS. ELIMINATE ALL SOURCES OF IGNITION. USE EXPLOSION-PROOF TOOLS. SHUT OFF FUEL SOURCE. DIKE SPILL. PREVENT LIQUID FROM ENTERING SEWERS/WATERWAYS. RECOVER FREE LIQUID. ADD SAND, EARTH OR OTHER ABSORBENT MATERIAL. TRANSFER TO CONTAINER.

Neutralizing Agent: NOT APPLICABLE

Waste Disposal Method: RECYCLE AS MUCH AS POSSIBLE. TREATMENT, STORAGE, TRANSPORTATION AND DISPOSAL MUST BE IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS.

Precautions-Handling/Storing: STORE IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION REGULATIONS. KEEP CONTAINERS CLOSED.

Other Precautions: "EMPTY" CONTAINERS RETAIN RESIDUE AND CAN BE DANGEROUS. DO NOT PRESSURIZE, CUT, WELD, SOLDER, DRILL OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS. THEY MAY EXPLODE AND CAUSE INJURY/DEATH. AVOID REPEATED OR PROLONGED CONTACT WITH SKIN.

Control Measures

Respiratory Protection: NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS OR ORGANIC VAPOR RESPIRATOR OR SUPPLIED-AIR RESPIRATOR, IF NEEDED.

Ventilation: LOCAL/MECHANICAL (GENERAL) VENTILATION - EXPLOSION PROOF, WELL GROUNDED EQUIPMENTS

Protective Gloves: RUBBER RECOMMENDED

Eye Protection: CHEMICAL SPLASH GOGGLES & FACE SHIELD

Other Protective Equipment: IMPERVIOUS CLOTHING TO AVOID SKIN AND EYE CONTACT. EYE WASH STATION & SAFETY SHOWER.

Work Hygienic Practices: AVOID CONTACT WITH EYES, SKIN, OR CLOTHING. WASH

FARMLAND INDUSTRIES PETROLEUM DIV ...IUM UNLEADED - GASOLhttp://MSDS.PDC.CORNELL.EDU/msds/siri/q191/q398.htm

HANDS AFTER USING PRODUCT. AVOID BREATHING VAPORS OR MISTS.
Suppl. Safety & Health Data: NONE

=====
Transportation Data
=====

Trans Data Review Date: 93223
DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: RNE
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Basic Pac Ref: 7-7
N.O.S. Shipping Name: UNLEADED GASOLINE
Additional Trans Data: SPECIAL GRADE UNLEADED GASOLINE.

=====
Disposal Data
=====

=====
Label Data
=====

Label Required: YES
Technical Review Date: 13NOV92
Label Status: F
Common Name: UNLEADED GASOLINE AND PREMIUM UNLEADED GASOLINE
Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Moderate: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: EYES AND SKIN CAN BE IRRITATED. PROLONGED SKIN CONTACT CAN CAUSE DERMATITIS. SHOULD NOT BE USED AS A CLEANING AGENT. SMALL QUANTITIES MUST BE STORED IN PPROVED CONTAINERS. DRUMS SHOULD BE PROPERLY GROUNDED. FIRST AID: REMOVE CONTAMINATED CLOTHING. WASH EXPOSED SKIN AREA WITH SOAP AND WATER. EYES SHOULD BE FLUSHED WITH LARGE AMOUNTS OF WATER. IF BREATHED, REMOVE VICTIM TO FRESH AIR. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION, KEEP WARM AND GET MEDICAL ATTENTION. IF MATERIAL IS SWALLOWED, DO NOT INDUCE VOMITING. KEEP WARM AND GET MEDICAL ATTENTION.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: FARMLAND INDUSTRIES INC
Label Street: C/O BULK PETROLEUM PRODUCTS DIVISION
Label P.O. Box: 7305
Label City: KANSAS CITY
Label State: MO
Label Zip Code: 64116-0005
Label Country: US
Label Emergency Number: 316-251-4000

FARMLAND INDUSTRIES PETROLEUM DIV ...UR), #2 DIESEL FUEL, - Dhttp://MSDS.PDC.CORNELL.EDU/msds/siri/q294/q335.htm

FARMLAND INDUSTRIES PETROLEUM DIV -- PREMIUM DIESEL FUEL (LOW SULFUR), #2 DIESEL FUE
MATERIAL SAFETY DATA SHEET
NSN: 9140900000185
Manufacturer's CAGE: 6G072
Part No. Indicator: A
Part Number/Trade Name: PREMIUM DIESEL FUEL (LOW SULFUR), #2 DIESEL FUEL,
FUEL OIL

General Information

Item Name: DIESEL FUEL
Company's Name: FARMLAND INDUSTRIES INC. PETROLEUM DIVISION
Company's P. O. Box: 7305
Company's City: KANSAS CITY
Company's State: MO
Company's Country: US
Company's Zip Code: 64116-0005
Company's Emerg Ph #: 816-251-4000/800-424-9300(CHEMTEC)
Company's Info Ph #: 800-523-3774
Record No. For Safety Entry: 011
Tot Safety Entries This Stk#: 015
Status: SE
Date MSDS Prepared: 21OCT93
Safety Data Review Date: 26JUL94
Supply Item Manager: CX
MSDS Serial Number: BTSC1
Specification Number: VV-F-800
Spec Type, Grade, Class: GRADE DF-1 LOW SULFR
Hazard Characteristic Code: F4
Unit Of Issue: GL

Ingredients/Identity Information

Proprietary: NO
Ingredient: PETROLEUM MID-DISTILLATE
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: 1004302PE
CAS Number: 68476-34-6
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: CLEAR TO SLIGHT GREENISH YELLOW LIQUID, HYDROCARBON
ODOR
Boiling Point: 340F, 171C
Melting Point: N/A
Vapor Pressure (MM Hg/70 F): <50 MMHG
Vapor Density (Air=1): >1
Specific Gravity: 33.5-39.0
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: <1 (ETHER=1)
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: NIL
pH: N/A
Corrosion Rate (IPY): UNKNOWN

Fire and Explosion Hazard Data

Flash Point: 145F, 63C
Flash Point Method: TCC
Lower Explosive Limit: 0.6
Upper Explosive Limit: 7.5

FARMLAND INDUSTRIES PETROLEUM DIV ...UR), #2 DIESEL FUEL, - Dhttp://MSDS.PDC.CORNELL.EDU/msds/siri/q294/q335.htm

Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, OR DRY CHEMICAL.
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A
FULL FACED SELF CONTAINED BREATHING APPARATUS. EVACUATE AREA. COOL FIRE
EXPOSED CONTAINERS WITH WATER SPRAY.
Unusual Fire And Expl Hazrds: VAPORS ARE HEAVIER THAN AIR, MAY SETTLE AT
LOW AREAS OR TRAVEL SOME DISTANCE ALONG THE GROUND TO IGNITION SOURCES
WHERE THEY MAY IGNITE & FLASH BACK.

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Reactivity Data
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Stability: YES
Cond To Avoid (Stability): HIGH HEAT, OPEN FLAMES AND OTHER SOURCES OF
IGNITION
Materials To Avoid: STRONG OXIDIZING AGENTS
Hazardous Decomp Products: TOXIC CARBON MONOXIDE AND CARBON DIOXIDE,
SULFUR DIOXIDE AND OTHER HYDROCARBONS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

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Health Hazard Data
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LD50-LC50 Mixture: ORAL LD50 (RAT) IS UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: EYES:IRRITATION. SKIN:IRRITATION.
INHALATION:LUNG IRRITATION, CNS EFFECTS. INGESTION: MODERATELY TOXIC;
HOWEVER, IF ASPIRATED INTO LUNGS IT MAY CAUSE CHEMICAL PNEUMONITIS WHICH
CAN BE FATAL. CHRONIC:DERMATITIS. TARGET ORGANS: SKIN, CNS.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: WHOLE DIESEL ENGINE EXHAUST IS LISTED AS A
PROBABLE CARCINOGEN BY IARC AND NIOSH.
Signs/Symptoms Of Overexp: EYES:IRRITATION. SKIN:IRRITATION, DRYING EFFECT.
INHALATION: HEADACHE, DIZZINESS, NAUSEA, VOMITING, LOSS OF COORDINATION.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES:FLUSH WITH FRESH WATER FOR 15 MINUTES.
SKIN: REMOVE CONTAMINATED CLOTHING. WASH SKIN THOROUGHLY WITH SOAP AND
WATER. SEE A DOCTOR IF SYMPTOMS DEVELOP. INHALATION: REMOVE TO FRESH AIR.
INGESTION: GIVE WATER OR MILK TO DRINK AND GET IMMEDIATE MEDICAL ATTENTION.
DO NOT INDUCE VOMITING. CALL PHYSICIAN IMMEDIATELY.

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Precautions for Safe Handling and Use
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Steps If Matl Released/Spill: THIS MATERIAL IS CONSIDERED TO BE A WATER
POLLUTANT AND RELEASES OF THIS PRODUCT SHOULD BE PREVENTED. ELIMINATE ALL
OPEN FLAMES. STOP SOURCE OF THE LEAK. DIKE TO CONTAIN LIQUID. RECOVER BY
PUMPING OR ABSORB WITH INERT ABSORBENT MATERIALS.
Neutralizing Agent: NONE
Waste Disposal Method: SEND FOR RECYCLING OR DISPOSE OF IN ACCORDANCE WITH
LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions-Handling/Storing: STORE IN A COOL AREA. KEEP CONTAINERS
TIGHTLY CLOSED.
Other Precautions: EMPTY CONTAINERS RETAIN RESIDUE. DO NOT PRESSURIZE,
CUT, WELD OR EXPOSE TO HEAT, FLAME, STATIC ELECTRICITY, OR OTHER SOURCES OF
IGNITION; THEY MAY EXPLODE AND CAUSE INJURY.

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Control Measures
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Respiratory Protection: NONE NORMALLY REQUIRED. USE NIOSH APPROVED SELF-
CONTAINED BREATHING APPARATUS IF TLV IS EXCEEDED, OR WHEN SPRAYING OR USING
IN CONFINED SPACES.
Ventilation: USE THIS MATERIAL ONLY IN WELL VENTILATED AREAS.
Protective Gloves: PVC

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Eye Protection: GOGGLES
Other Protective Equipment: WEAR PROTECTIVE CLOTHINGS.
Work Hygienic Practices: WASH HANDS THOROUGHLY AFTER HANDLING THIS
PRODUCT.
Suppl. Safety & Health Data: NONE

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Transportation Data
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Trans Data Review Date: 94207
DOT PSN Code: GTF
DOT Proper Shipping Name: GAS OIL OR DIESEL FUEL OR HEATING OIL, LIGHT
DOT Class: 3
DOT ID Number: UN1202
DOT Pack Group: III
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRR
IMO Proper Shipping Name: GAS OIL
IMO Regulations Page Number: 3375
IMO UN Number: 1202
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: MTX
IATA UN ID Number: 1202
IATA Proper Shipping Name: GAS OIL
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MTX
AFI Prop. Shipping Name: GAS OIL OR DIESEL FUEL OR HEATING OIL, LIGHT
AFI Class: 3
AFI ID Number: UN1202
AFI Pack Group: III
AFI Basic Pac Ref: 7-7
N.O.S. Shipping Name: ALIPHATIC PETROLEUM DISTILLATE
Additional Trans Data: ITEM IS NOT REGULATED IF CONTAINER IS LESS THAN 110
GALLONS.

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Disposal Data
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Label Data
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Label Required: YES
Technical Review Date: 26JUL94
Label Status: F
Common Name: PREMIUM DIESEL FUEL (LOW SULFUR), #2 DIESEL FUEL,
FUEL OIL
Signal Word: WARNING!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-Moderate: X
Reactivity Hazard-None: X
Special Hazard Precautions: COMBUSTIBLE LIQUID! FUEL OIL (PETROLEUM
DISTILLATES) ACUTE-EYES:IRRITATION. SKIN:IRRITATION. INHALATION:LUNG
IRRITATION, CNS EFFECTS. INGESTION: MODERATELY TOXIC; HOWEVER, IF ASPIRATED
DERMATITIS. TARGET ORGANS: SKIN, CNS. STORE IN A COOL AREA. KEEP CONTAINERS
TIGHTLY CLOSED. FIRST AID: EYES:FLUSH WITH FRESH WATER FOR 15 MINUTES.
SKIN: REMOVE CONTAMINATED CLOTHING. WASH SKIN THOROUGHLY WITH SOAP AND
WATER. SEE A DOCTOR IF SYMPTOMS DEVELOP. INHALATION: REMOVE TO FRESH AIR.
INGESTION: GIVE WATER OR MILK TO DRINK AND GET IMMEDIATE MEDICAL ATTENTION.
DO NOT INDUCE VOMITING.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: FARMLAND INDUSTRIES INC. PETROLEUM DIVISION
Label P.O. Box: 7305

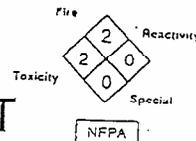
FARMLAND INDUSTRIES PETROLEUM DIV ...UR), #2 DIESEL FUEL, - Dhttp://MSDS.PDC.CORNELL.EDU/msds/siri/q294/q335.htm

Label City: KANSAS CITY
Label State: MO
Label Zip-Code: 64116-0005
Label Country: US
Label Emergency Number: 816-251-4000/800-424-9300 (CHEMTREC)
Year Procured: 1993



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WD-40



MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Manufacturer: WD-40 Company Address: 1061 Cudahy Place (92110) P.O. Box 80607 San Diego, California 92138-9021	Emergency Telephone: (619) 275-1400 Chemical Name: Organic Mixture Trade Name: WD-40 Aerosol
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II. HAZARDOUS INGREDIENTS

Chemical Name	CAS Number	%	Exposure Limit ACGIH/OSHA
Aliphatic Petroleum Distillates	8052-41-3	50	100 ppm (PEL)
A-70 Hydrocarbon Propellant	68476-85-7	25	1000 ppm (PEL)
Petroleum Base Oil	8012-95-1	> 15	5 mg/M ³ (TWA)
Corrosion Inhibitor	Proprietary Mixture	< 10	5 mg/M ³ (TWA)
Wetting Agent	Proprietary Mixture	< 5	500 ppm (PEL)
Fragrance	Proprietary Mixture	< 5	NDA

III. PHYSICAL DATA

Boiling Point:	NA	Evaporation Rate:	Not determined
Vapor Density: (air = 1)	Greater than 1	Vapor Pressure:	50 PSI @ 70°F
Solubility in Water:	Insoluble	Appearance:	Light amber
Specific Gravity (H ₂ O = 1)	.710 @ 70°F	Odor:	Characteristic odor
Percent Volatile (volume):	80%		

IV. FIRE AND EXPLOSION

Flash Point:	NA to aerosol cans
Flammable Limits:	(propellant portion) [Le] 1.3% [Ue] 9.5%
Extinguishing Media:	CO ₂ , Dry Chemical
Special Fire Fighting Procedures:	None
Unusual Fire and Explosion Hazards:	Considered "extremely flammable" under Consumer Product Safety Commission regulations.

V. HEALTH HAZARD INFORMATION

Threshold Limit Value	
Aliphatic Petroleum Distillates (Stoddard solvent) lowest TLV (ACGIH 100 ppm.)	
Symptoms of Overexposure	
Inhaled Vapor:	May cause anesthesia, headache, dizziness, nausea and upper respiratory irritation.
Skin Contact:	May cause drying of skin and or irritation.
Eye Contact:	May cause irritation, tearing and redness.
Swallowed:	May cause irritation, nausea, vomiting and diarrhea.
Inhalation into Lungs:	May cause chemical pneumonitis.
First Aid Emergency Procedures	
Swallowed:	Do not induce vomiting, seek medical attention.
Eye Contact:	Immediately flush eyes with large amounts of water for 15 minutes.
Skin Contact:	Wash with soap and water.
Inhaled:	Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give



Material Safety Data Sheet

TO: MSDS USERS

Please find below the material safety data sheet as per your request.

The information presented in these forms is believed to be correct and sufficient to meet the requirements of OSHA Hazard Communication standard (29 CFR 1910.1200) concerning worker's right to know. In order for the information contained in the MSDS to be most helpful we recommend that these forms be made available to all those who handle or may otherwise be exposed to the product.

The following material safety data sheet covers the hazardous ingredients associated with more than one color aerosol spray paint. As per 29 CFR 1900.1200 paragraph (g), when ever the hazards associated with similar mixtures are the same, then one MSDS may be prepared to cover several products.

This MSDS covers the following AerVOE-Pacific aerosol spray paints.

200 CLEAR	222 CRANGE (Fluorescent)	267 WHITE (Invert-A-Cap)
201 RED	224 GREEN (Fluorescent)	270 FLUCRESCENT RED (Invert-A-Cap)
202 YELLOW	226 YELLOW (Fluorescent)	272 FLUCRESCENT CRANGE (Invert-A-Cap)
203 BLUE	227 BLUE (Fluorescent)	274 FLUCRESCENT GREEN (Invert-A-Cap)
204 GREEN	228 MAGENTA (Fluorescent)	275 FLUCRESCENT RED/CRANGE (Invert-A-Cap)
205 CRANGE	229 PINK (Fluorescent)	279 FLUCRESCENT PINK (Invert-A-Cap)
206 BLACK	230 RED/CRANGE (Fluorescent)	281 RED (High Delivery)
207 WHITE	261 RED (Invert-A-Cap)	282 YELLOW (High Delivery)
210 SILVER	262 YELLOW (Invert-A-Cap)	283 BLUE (High Delivery)
211 ROYAL BLUE	263 BLUE (Invert-A-Cap)	285 CRANGE (High Delivery)
212 PURPLE	264 GREEN (Invert-A-Cap)	287 RED (Fluorescent High Delivery)
213 BROWN	265 CRANGE (Invert-A-Cap)	288 CRANGE (Fluorescent High Delivery)
220 RED (Fluorescent)	266 BLACK (Invert-A-Cap)	289 PINK (Fluorescent High Delivery)

PRODUCT NAME: (17A) MARKING PAINT - ALL COLORS
 PRODUCT USE: GROUND TRAFFIC <55% V.C.C.

PRODUCT CODE: 17 A

CODES: H F R P
 2 4 1 X

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: AerVOE-Pacific Company, Inc.
 ADDRESS: 1198 Sawmill Rd., Gardnerville, NV 89410
 EMERGENCY PHONE: 1-800-424-9300
 DATE REVISED: 08-19-97

INFORMATION PHONE: (702) 782-0100
 NAME OF PREPARER: Mike A. Traquina
 REASON REVISED: Updated

SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION OCCUPATIONAL EXPOSURE LIMITS

HAZARDOUS COMPONENTS	WEIGHT PERCENT	OSHA PEL	ACGIH TLV	OTHER	LC50 SPECIES & ROUTE	LC50 SPECIES & ROUTE
SS 12 XYLENE (CAS 1330 20 7)	1.3	100 PPM	100 PPM		4300mg/kg RAT ORAL	8700 PPM; 4hr RAT INHA.
SS 9 PETROLEUM NAPHTHA (CAS 647 42 89 8)	20	400 PPM	400 PPM	N/A	25ml/kg (RAT)	14,000-16,000 PPM/4hr rat
SS 01. MINERAL SPIRITS (CAS 8052 41 3)	<5.0%	100 PPM	100 PPM	N/A	N/A	N/A
PR 01A PROPANE (CAS 74 98 6)	15	1000 PPM	1000 PPM		N/A	520000PPM/2 hr Mouse Exp
PR 01B ISOBUTANE (CAS 75 28 5)	<5.0%	800 PPM	800 PPM	<ESTIMATE	N/A	658mg/L; 4hr RAT INHA
PR 01C NORMAL BUTANE (CAS 106 97 8)	5	800 PPM	800 PPM		N/A	

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.
 NOTE: N/A applies to not available or not applicable

VI. REACTIVITY DATA

Stability:	Stable <u>X</u>	Unstable _____
Conditions to avoid:	NA	
Incompatibility:	Strong oxidizing materials	
Hazardous decomposition products:	NA	
Hazardous polymerization:	May occur _____	Will not occur <u>X</u>

VII. SPILL OR LEAK PROCEDURES

Spill Response Procedures
Spill unlikely from aerosol cans. Leaking cans should be placed in plastic bag or open pail until pressure has dissipated.

Waste Disposal Method
Empty aerosol cans should not be punctured or incinerated; bury in land fill. Liquid should be incinerated or buried in land fill.

VIII. SPECIAL HANDLING INFORMATION

Ventilation:	Sufficient to keep solvent vapor less than TLV.
Respiratory Protection:	None required.
Protective Gloves:	None required.
Eye Protection:	None required.
Other Protective Equipment:	None required.

IX. SPECIAL PRECAUTIONS

Keep from sources of ignition, do not take internally. Avoid excessive inhalation of spray particles. Do not puncture, incinerate or store container above 120°F.

X. TRANSPORTATION DATA

Domestic Surface
Description: Consumer Commodity
Hazard Class: ORM-D
ID No.: NONE
Label Required: Consumer Commodity (ORM-D)

Domestic Air
Description: Consumer Commodity (Flammable Gas-Aerosol products)
Hazard Class: ORM-D
ID No.: NONE
Label Required: Consumer Commodity (ORM-D-AIR)

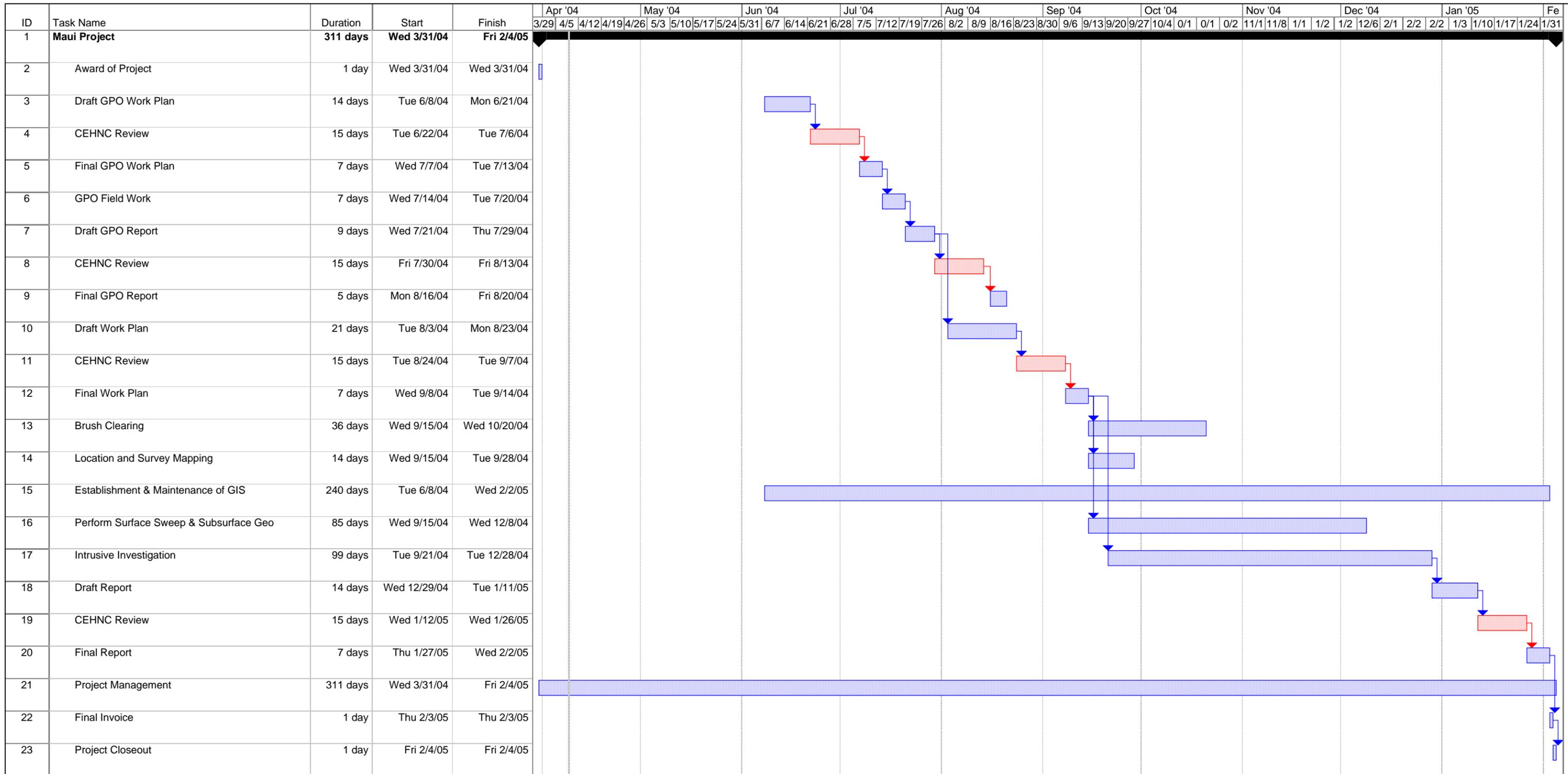
SIGNATURE: R. Miles *R. Miles* TITLE: Technical Director
REVISION DATE: April 1985 SUPERSEDES: December 1985

NA = Not applicable NDA = No data available < = Less than > = More than

This data is provided without warranty.

APPENDIX K

Project Schedule



Project: Proposed Maui
 Date: Fri 4/9/04

Task [Blue Box] Milestone [Black Diamond] Rolled Up Task [Blue Box] Rolled Up Progress [Black Bar] External Tasks [Grey Box] Group By Summary [Black Arrow]
 Progress [Black Bar] Summary [Black Arrow] Rolled Up Milestone [White Diamond] Split [Dotted Line] Project Summary [Grey Arrow]

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