APPENDIX C

HGL STANDARD OPERATING PROCEDURES
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1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide HydroGeoLogic, Inc. (HGL) employees specific guidance and procedures for the accountability and management of explosive materials. These procedures are established to ensure all explosive operations are conducted in compliance with the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Publication 5400.7, Federal Explosives Law and Regulations and the Department of Defense (DoD) Manual 6055.09-M, DoD Ammunition and Explosives Safety Standards.

2.0 SCOPE AND APPLICATION

This SOP applies only to those HGL employees who have been assigned to Military Munitions Program Response (MMRP) project-specific explosive operations. Only those individuals who are listed as “cleared” on the most recent ATF Federal Explosive Licensing Center (FELC) Notice of Clearance will be authorized direct physical access to explosive materials during explosive operations. The current FELC Notice of Clearance is held on file at the HGL Albuquerque Office if needed for verification of individual clearance status.

Personnel who use this procedure must provide written documentation to the Unexploded Ordnance (UXO) Safety Manager and project Senior UXO Supervisor (SUXOS) that they have read and understand this SOP by completing the Acknowledgement Sheet, Attachment 1. This documentation will be retained by the UXO Quality Control Specialist (UXOQCS) in the project file.

Any deviations from specified requirements will be justified and authorized by the MMRP Operations Manager and UXO Safety Manager, and discussed in the approved project plans. Deviations from these requirements will not compromise Federal Law and will be sufficiently documented to re-create the modified process.

3.0 DEFINITIONS

Responsible Person: An ATF “Responsible Person” (RP) is an employee under HGL’s explosive license who has the power to direct the management and policies pertaining to explosive materials.

Employee Possessor: An ATF “Employee Possessor” (EP) is any employee under HGL’s explosive license who has or will have actual physical possession (direct access) of explosive materials or who has or will have constructive possession of explosive materials. This includes HGL employees assigned to UXO Technician III, Us, level who directly handle explosive materials as part of the production process; employees who handle explosive materials in order to ship or transport them; and employees, such as blasters and their helpers who actually use explosive materials.
Constructive Possessor: A “Constructive Possessor” is any person who has access to explosive materials, without physically handling them. For example, a Demolition Supervisor providing munitions and explosives of concern (MEC) support during construction activities who keeps keys for storage magazines in which explosives are stored or who directs the use of explosive materials by other employees has constructive possession of explosives.

4.0 EXPLOSIVE ACCOUNTABILITY AND MANAGEMENT PROCEDURES

For the purpose of this SOP, the SUXOS position will also refer to all instances when a UXO Technician III is assigned the Demolition Supervisor responsibilities on HGL projects involving MEC support during construction activities. All explosive operations will be performed in a manner that is consistent with ATF Publication (ATFP) 5400.7, DoD 6055.09–M, and this SOP. All HGL project sites where explosive operations will be conducted will have a section within the work plan that provides specific procedures for accountability and management of explosive materials associated with that site.

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**WARNING**

Every HGL employee who transports, stores or uses explosive materials must clearly understand their responsibilities for properly safeguarding, securing, and storing explosive materials.

Any disregard of these procedures will result in being denied physical access to explosive materials and possible termination of employment.

Any violation of the Federal Explosive Law and Regulations could result in being charged with a criminal offence.

4.1 GENERAL

This section outlines the procedures that will be followed by HGL employees for maintaining proper accountability and management of explosives materials purchased, stored, transported, and used on HGL project sites. These procedures were developed using the following references:

- ATFP 5400.7 (27 CFR Parts 555 and 841 § A–K)
- ATFP 5400.14
- ATFP 5400.17
- ATFP 5400.20
- DoD 6055.09-M
- 49 CFR parts 146–149
4.2 EXPLOSIVE LICENSE

HGL holds an ATF Type 20–Manufacturer of High Explosives License to purchase and use explosives on project sites, Attachment 2. The original license is posted at the HGL Munitions Response Team (MRT) office, Albuquerque, New Mexico.

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4.3 HGL AUTHORIZED INDIVIDUALS

Only HGL employees who are listed on the FELC Notice of Clearance will be authorized to have direct access to explosive materials. The SUXOS will coordinate with the UXO Safety Manager in determining the project personnel who will be require to have direct access to explosive materials and confirm these individuals are listed on the FELC Notice of Clearance.

HGL is required to provide commercial explosives suppliers with a list of employees who are authorized to receive and issue explosives. For HGL projects this individual will be the SUXOS, and if the SUXOS is not available, it will be an identified and authorized UXO Technician.

4.3.1 Responsible Person

HGL employees who are designated by the HGL Chief Operating Officer to fill a “Responsible Person” position must complete and submit the following items/documents to the UXO Safety Manager:

- ATF E-Form 5400.28 Employee Possessor Questionnaire (EPQ).
- Completed FD–258 Fingerprint Card, and
- A 2-inch by 2-inch color photograph.

The UXO Safety Manager will verify all forms are properly completed and submitted to the FELC.

4.3.1.1 Employee Possessor

HGL employees who are required by their position to have direct access to explosive materials will complete and submit the ATF E-Form 5400.28 EPQ to the UXO Safety Manager. The UXO Safety Manager will verify this form is properly completed and submitted to the FELC. Once the EPQ is received by FELC, the employee will be authorized to have direct access to explosive materials unless denied by the ATF.
4.4 ACQUISITION OF EXPLOSIVE MATERIALS

All explosive materials acquisitions will be recorded on the day of the acquisition, manufacture, or receipt using the Manufacturer of Explosives Record of Acquisition (MERA) form, (refer to the example, Attachment 3) in accordance with (IAW) 27 CFR §555.123(b). Arrangements and coordination with the acquisition sources (commercial explosive supplier) will be coordinated in the project work plan. An electronic copy of this form will be submitted within 48 hours of the acquisition to the UXO Safety Manager.

4.4.1 Binary Explosives

When binary explosive materials are mixed together into a single solution and held for storage, this is considered “manufacturing explosives”. This action will be recorded as an “acquisition” within 24 hours of mixing on the MERA by following the procedures outlined in Section 4.4.

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**EXCEPTION**

IAW 27 CFR §555.123(d)(3) a licensed manufacturer is exempt from recordkeeping requirements if the explosive materials are manufactured (for example, mixing binary explosives) for their own use and used within a 24–hour period at the demolition shot site.

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4.4.2 Order Quantity

Each project site’s SUXOS will coordinate with the project manager to ensure an initial quantity of commercial explosives has been purchased and is on hand before commencing MEC demilitarization and disposal operations. Based on usage requirements and demand, the quantity in stock may increase, but at no time will the explosive weight (NEW) exceed the storage limit established by the project site’s DDESB-approved Explosive Safety Submission (ESS) or Explosive Site Plan (ESP).

4.4.3 Acquisition Source and Delivery

HGL will only purchase commercial explosives from ATF licensed explosive dealers who will deliver explosive materials to the project site. The SUXOS will coordinate with the UXO Safety Manager to ensure that:

- All project explosive materials acquisition sources are identified;
- A listing of explosive material requirements is developed during the project planning phase;
- Purchase orders are submitted to the explosive dealer(s) for the required amount of explosive materials;
- The explosive dealer receives a copy of the HGL Authorized Agent list for those site employees who are authorized to purchase and receive explosive materials,
• The explosive dealer receives a copy of the HGL Manufacturer of Explosive–Type 20 License with the original signature of an HGL “cleared” “Responsible Person”; and
• Explosive material delivery arrangements are established.

4.5 INITIAL RECEIPT OF EXPLOSIVE MATERIALS

Upon receipt of explosive materials at a project site the SUXOS will immediately check the lot number or manufacture’s marks and nomenclature/description of each explosive item against the explosive delivery manifest/invoice and will record this information on the MERA and the Daily Summary of Magazine Transactions (DSMT), Attachment 4.

A copy of the original delivery invoice/manifest receipt document will be maintained on site by the SUXOS. The completed DSMT record will remain in the magazine with the explosive materials and will be annotated and updated upon each issue, receipt, and weekly/yearly inventory. A duplicate DSMT record will be kept by the SUXOS in the project files. An electronic copy of the DSMT will be submitted within 48 hours of any transaction entry to the UXO Safety Manager.

4.5.1 Explosive Materials Accountability

All explosive material receipts, issues, turn-ins, and inventories will be properly documented and verified through physical count by the SUXOS and confirmed by the UXOQCS on the DSMT and the Explosive Material Disposition Record, Attachment 5.

4.5.2 Request for Explosives

The SUXOS will review all requests for explosives from the individual operating sites; only the sufficient amount of explosives for the day's operations will be issued. Explosive issues will be recorded using the Explosive Material Disposition Record; will be deducted from the DSMT record; and will be annotated in the UXO Team Leader’s daily field log. This procedure will ensure that all issued explosive materials are accounted for while they are in the possession of individual users.

The end user of explosive materials will certify by affixing their signature on the Explosive Material Disposition Record that the explosives were expended for their intended purpose. Entries made on the Explosive Material Disposition Record and the DSMT record will be verified through physical count by the Demolition Supervisor and SUXOS when drawing from or turning in the explosive materials. All explosive transactions will be verified for accuracy by the UXOQCS or the UXOSO.

4.5.3 Reconciling Receipt Records

When necessary, the SUXOS will reconcile the delivery shipping documentation with the requested amounts ordered and received. Any shortages or overages will be reported to the project manager immediately, who in turn will contact the explosives dealer and reconcile any differences.
At the end of each explosive demolition operation, the UXOQCS or the UXOSO and the Demolition Supervisor will reconcile the entries on the Explosive Material Disposition Record with the DSMT record, and will turn these records over to the SUXOS for final verification and acceptance.

4.6 STORAGE

4.6.1 Establishment of Explosive Storage Magazines

The establishment of explosive storage magazines at HGL project sites will be IAW 27 CFR, Subpart K–Storage, DoD 6055.09–M and the applicable DDESB-approved ESS/ESP. All explosive materials will be properly stored and secured when not in us in a Type 2 portable outdoor magazine(s) meeting the design specifications of 27 CFR §555.203(b) and ATFP and placarded with the appropriate Department of Transportation (DOT) hazard class/division and fire symbols, and emergency notification information clearly posted. Explosive materials stored on DoD facilities will comply with the local DoD components explosive safety, security and siting requirements. When site security conditions necessitate additional safeguarding of explosive materials, the explosive storage area will be fenced using a minimum 8-foot high fence with a lockable gate or a suitable intrusive detection system.

HGL will comply with all ATF, Federal, DoD, State and local storage and compatibility criteria and procedures when siting explosives storage magazines. This also includes locating, installing, and maintaining the magazine(s) to comply with the magazine criteria and quantity distance requirements established in 27 CFR, Subpart K–Storage and DoD Ammunition and Explosives Safety Standards, DoD 6055.9-M, Volume 3.

4.6.2 Physical Security of Explosive Materials

Strict physical security and safeguarding of explosive materials will be maintained at all times on HGL project sites where these materials are being used and stored. The SUXOS and UXOQCS will enforce access, control, transportation and security of all explosives materials on site. Explosive storage magazines will be placed in the most secure locations practical IAW:

- 27 CFR §555.207 and §555.208;
- ATFP 5400.15–Volunteer Security Checklist;
- DOD 6055.9-M; and
- HGL SOP 15.02–Explosive Storage Inspections and Security.

4.6.3 Physical Security of MEC

On known MR sites where intentional physical contact with MEC or chemical warfare material is planned, the physical security of all MEC discoveries will be in compliance with the DDESB-approved ESP or ESS, and recorded on the MEC Demilitarization/Disposal by Detonation Accountability Record, Attachment 6. On project sites where intentional physical contact is not planned, but MEC is discovered, the site supervisor will immediately notify the project manager who in turn will immediately notify the client to obtain safeguarding instructions. All discovered
MEC items will be recorded using the MEC Demilitarization/Disposal by Detonation Accountability Record, Attachment 6.

4.6.4 Required Notifications

The SUXOS will coordinate with the UXO Safety Manager to ensure the local ATF office is notified in writing five days in advance of an explosive storage magazine being added to the project location IAW 27 CFR §555.63. The following information will be included in the written notification:

- HGL’s Albuquerque office telephone number and address;
- HGL’s explosive license number;
- Explosive storage magazine address/location (latitude/longitude coordinates);
- The magazine identification number; and
- Emergency contact name, address and telephone number.

The SUXOS will notify local fire authorities orally before the end of the day on which storage of the explosive materials began and in writing within 48 hours from the time such storage began IAW 27 CFR §555.21. Both oral and written notifications will include the following information:

- Type(s) of explosive materials;
- Magazine capacity (NEW amount); and
- Location of each storage site where explosive materials are stored.

The SUXOS will notify the HGL MMRP Operations Manager and UXO Safety Manager when all notifications have been completed.

4.6.5 Access and Control

A key-control system will be established by the SUXOS and the UXOQCS. Keys to explosive storage magazines and trucks loaded with explosives will be issued only to authorized personnel who have been granted access by the MMRP Operations Manager. Keys not in use will be kept secured in an unmarked area located separately from other keys at the premises. Procedures for magazine key control, access restriction, and accountability are provided in HGL SOP 15.02—Explosives Storage Inspection and Security.

Only those HGL employees who are listed as “cleared” on the current FELC Notice of Clearance, and on the HGL Authorized Agent list will be permitted to purchase and receive explosive materials.

4.7 TRANSPORTATION

Transportation of explosive materials will comply with all DOT 49 CFR, Parts 171-173, 383 and 397, State and local regulations. Permits are not required when transporting explosive materials within the project site and off of public transportation routes (PTR). The most expeditious route
will be selected and used at all times when transporting explosive materials on or off a PTR. Procedures for transporting explosive materials to disposal locations and transportation vehicle requirements are described below.

4.7.1 Procedures for Transportation from Storage to Disposal Location

When transportation of explosive materials requires travel on public highways and transportation routes, the SUXOS and UXOSO will coordinate together to provide the explosive driver with a safe transportation route plan. Every effort will be made to take a route with the least public exposure. For transportation of demolition explosive materials, HGL will comply with the following:

- Initiating explosives, such as blasting caps, will remain separated from other explosives at all times. Blasting caps may be transported in the same vehicle as long as they are in a separate container (IME compliant ATF Type 3 day box) and secured away from other explosive items.
- ATF Type 3 day boxes will be used to transport blasting caps and donor explosives. The two containers will be placed in the bed of a vehicle, and blocked and braced separately using ratchet tie-down straps, bolts, or other suitable means to keep the containers from shifting. When placed in a vehicle, the ATF Type 3 day box will be secured using a locking system containing a chain or cable and a padlock.
- Compatibility requirements will always be observed.
- Only UXO-qualified personnel who are listed on the FELC Notification of Clearance will have direct access to explosive materials. The receiving party will sign the receipt documents.
- Explosive vehicle operators transporting explosives on public roads will be:
  - A UXO-qualified HGL employee;
  - Listed on the FELC Notice of Clearance, and
  - Possess a valid state driver’s license, and a commercial Class-C driver’s license with a hazardous material (HAZMAT) endorsement.
- Vehicle operators will comply with posted speed limits but will not exceed a safe and reasonable speed for road/field conditions. Vehicles transporting explosives off-road will not exceed 25 mph.
- Personnel will not ride in the cargo compartment of a vehicle transporting explosives.

4.7.2 Explosive Transportation Vehicle Requirements

Explosives will be transported in closed vehicles whenever possible. The load shall be braced using ratchet tie-down straps, bolts, or other suitable means to keep the containers from shifting. The load shall be covered with a fire-resistant tarpaulin or stored in an ATF Type 3 day box (if not in an enclosed vehicle). Minimum requirements for vehicles transporting explosives are listed below:
The HGL employee assigned to operate the motor vehicle transporting explosive material will be qualified IAW DOT 49 CFR Parts 387 and 391 and will possess a current state driver’s license and a valid commercial Class-C driver’s license with a hazardous material (HAZMAT) endorsement.

- Inspected using the Motor Vehicle Inspection-Hazardous Material, Attachment 7;
- Properly placarded on all sides and at each end per DOT 49 CFR;
- Equipped with a first aid kit, two 10–BC fire extinguishers, and a means of communication with the UXOSO;
- The engine will be shut off when loading or unloading of explosive materials;
- The wheels will be chocked during loading and unloading to prevent movement;
- At no time will any bare explosive come into contact with spark-producing metal. Vehicle cargo beds will have wooden or plastic liners, dunnage, or sand bags to protect the explosive materials from coming into contact with the metal bed and fittings;
- Explosives may be transported in vehicles with plastic bed liners if the explosives are in an authorized original shipping container.
- All explosive materials are properly segregated IAW their hazard/class division compatibility requirements.
- The vehicle operator will ensure all explosive materials being transported are properly recorded using the Bill of Lading, Attachment 5.

4.8 RECEIPT PROCEDURES AND AUTHORIZED ACCESS

The SUXOS will ensure strict accountability and control of all explosive materials from the time of initial receipt until expenditure, or returned to an authorized explosive dealer, or relieved of accountability by an authorized agent.

4.8.1 Procedures for Reconciling Inventory Discrepancies

If a discrepancy exists between inventoried and on-hand quantities of explosive materials, a review of the DSMT record and the Explosive Material Disposition Record will be completed by the SUXOS and UXOQCS to verify the accuracy of the inventory records. If the records review does not reconcile the discrepancy:

- The SUXOS will immediately report the discrepancy to the project manager and the UXO Safety Manager.
- The appropriate government representative will be notified when the project is under government contract. For example, on a U.S. Army Corps of Engineers (USACE) project, the Ordnance and Explosive Safety Specialist, or the Contracting Officer will be notified.
- The project manager will immediately initiate an investigation to determine the cause of the discrepancy.
• Discrepancies that cannot be reconciled within a 24-hour period will be reported IAW 27 CFR §555.30.

4.9 INVENTORY

4.9.1 Special Inventories

A true and accurate physical inventory of all explosive materials on hand at HGL project sites will be conducted by the SUXOS and the UXOQCS, or the UXOSO when the SUXOS or UXOQCS is not available. Special inventories are required under the following conditions:

- On initial physical receipt of explosive materials at a project site;
- When permanently changing location of the premises to another project site;
- When project field operations are temporarily suspended;
- When project field operations resume;
- Annually during July of each year;
- When required by the ATF or an HGL RP.

The purpose of these inventories will be annotated on the DSMT record. For example, the annual inventory will be annotated as “Annual Inventory”, and a project field season completion will be annotated as “Field Season Suspended”. Each special inventory will be prepared in duplicate. The original will be submitted to the UXO Safety Manager and will be forwarded to the ATF regional office located in Albuquerque, NM.

4.9.2 Physical Inventory

A true and accurate physical inventory of all explosive materials stored at HGL project sites will be conducted once every seven days by the SUXOS and the UXOQCS, or the UXOSO when the SUXOS or UXOQCS is not available. The results of this inventory will be recorded on the DSMT form by writing in “Weekly Inventory” through both the “Quantity Received” blocks. Complete inventories will also be conducted after any issues/turn-ins of demolition material. Inventory procedures and controls are described in the following subsections.

4.10 REPORTING LOSS OR THEFT OF EXPLOSIVE MATERIALS

Upon discovery of any theft or loss of explosive materials the SUXOS will immediately notify the following points of contact in the order listed below:
## STANDARD OPERATING PROCEDURE

### Accountability and Management of Explosive Materials

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<tbody>
<tr>
<td>1.</td>
<td>HGL UXO Safety Manager(^{1,2})</td>
<td>505-341-2010</td>
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<tr>
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<td></td>
<td>505-280-2036</td>
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<td>2.</td>
<td>ATF(^1)</td>
<td>1-800-461-8841</td>
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<td>1-800-800-3855</td>
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<td>3.</td>
<td>Local law enforcement office(^{1,2})</td>
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<td>4.</td>
<td>Project client representative(^1)</td>
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<tr>
<td>5.</td>
<td>ATF U.S Bomb Data Center (BDC)</td>
<td>1-866-927-4570 (fax)</td>
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<td><a href="mailto:USBDC@atf.gov">USBDC@atf.gov</a></td>
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**Notes:**
1. Notification will be made by telephone.
2. Fax or email the completed ATF Form 5400.5, Report of Theft or Loss-Explosive Materials within 24 hours from the item of the incident, refer to Attachment 8.

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### Notes

1. **Failure to report the theft or loss of any explosive materials missing from stock within 24 hours of discovery to the appropriate federal and local authorities is a felony offense.**
2. **For munitions response project’s under contract to the USACE, the USACE Contracting Officer will be notified by the project manager immediately by telephone and in writing within 24 hours of the discovery.**
3. **The completed Report of Loss or Theft-Explosive Materials form will be submitted to the BDC within 24 hours of discovery of any theft or loss of explosive materials. Submission of the report will be coordinated with UXO Safety Manager.**

An electronic fill in version of the Report of Theft or Loss–Explosive Material form can be downloaded from the HGL SharePoint site:


Additional reporting procedures are provided in ATF Safety and Security Information for Federal Explosive Licensees and Permittees, ATF Publication 5400.15.

Explosive materials that were issued for use but were not expended will be returned to the magazines at the completion of explosive demolition operations for that day (classified as “turn-ins”). The demolition team leader will return the unused explosives to the storage magazine and record the transaction on the Explosive Disposition/Usage Record and DSMT.
4.11 DISPOSAL OF REMAINING EXPLOSIVES

ATF requires an accurate accounting of all explosive materials purchased and used, therefore when work is completed or temporarily suspended at a project site all unused explosives will be either:

- Disposed of by detonation;
- Returned to the ATF licensed explosives dealer (original acquisition source) where the explosive materials were originally purchased; or
- Properly stored IAW 27 CFR § 555, the work plan and the ESS or ESP.

4.12 DISASTER PREPAREDNESS

Many natural disasters such as flood, forest fire, hurricane, or tornado occur with little or no warning, therefore it is critical to anticipate and prepare for response actions. When a natural disaster threatens a HGL project site, the SUXOS will take all necessary precautions to ensure the security of explosive materials from potential loss. The following preliminary measures will be taken to prepare for a pending natural disaster:

1. Develop a contingency plan for immediately relocating explosive materials to a compliant explosives magazine in an area less susceptible to weather-related damage if possible.

2. Notify the nearest ATF field office and provide the following information:
   - HGL project location;
   - Licensed premise, HGL Albuquerque Office telephone number and address;
   - Explosive license number;
   - Explosive storage magazine address/location (latitude/longitude coordinates);
   - Magazine identification number; and
   - Emergency contact name, address and telephone number.

3. In an emergency, the local ATF field supervisor may verbally authorize HGL to immediately move stored explosives to compliant storage magazine in an alternate location.

4. Ensure the back-up copies of critical records are collected and maintained in an off-site location when a significant risk or disaster is predicted for the project area.

5. In the event explosives are missing or stolen, make the required notifications immediately IAW Section 4.10. If the missing or stolen explosives are found or recovered and returned, notify the USBDC, and any investigating agency personnel, of all recovered explosives. The BDC is responsible for tracking all stolen, lost, and recovered explosives. Prompt reporting of the recovery of explosives previously reported as missing or stolen saves valuable investigative time and resources.
6. If damaged explosive materials are an immediate threat to public safety, contact local law enforcement authorities and the ATF 24-hour hotline. ATF hotline personnel will notify the appropriate ATF Field Division, who will coordinate the ATF field response.

7. If the damaged explosive materials are not an immediate threat to public safety, contact the manufacturer for instructions on the appropriate means of destruction. Contact the local ATF office for any additional guidance.

8. If ATF required records have been damaged, lost or destroyed, explosive materials will be immediately inventoried and an effort made to reconstruct any records destroyed, lost, or rendered illegible. Additionally, the acquisition source/explosive dealer will be contacted to obtain copies of recent sales and acquisition records. Contact the local ATF office for assistance or further information.

5.0 QUALITY CONTROL

5.1 RESPONSIBILITIES

Proper and careful execution of explosive accountability and management is critical to the success and safety of all explosive operations involving HGL employees, the public and properties. Primary responsibility, accountability, and use of the explosives will rest with each project site’s assigned SUXOS. This section outlines the responsibility of those employees who have direct administrative and operational management responsibility on HGL projects involving the security, storage, transportation and use of explosive materials.

Since HGL could be engaged in multiple MR projects at any given time, the explosive accountability and management positions lines of authority and responsibility are outlined below:

5.1.1 Chief Operating Officer

The Chief Operating Officer is responsible for overseeing HGL’s accountability and management of explosive materials program and policy and ensuring all explosive operations are conducted in compliance with all Federal, state and local regulations under HGL’s Manufacturer of High Explosives License. This position is designated as a RP IAW 27 CFR §841(s).

5.1.2 Military Munitions Response Program Director

The Military Munitions Program Director responsible for directing and enforcing the accountability and management of explosive materials program to ensure all explosive material purchases, use, storage, and transportation operations are conducted IAW all Federal, state and local regulations. This position is designated as a RP IAW 27 CFR §841(s).

5.1.3 MMRP Operations Manager

The MMRP Operations Manager is responsible for implementing and executing the HGL accountability and management of explosive materials program and providing direct
administrative, operational, quality control, safety and security oversight on all munitions projects and explosive operations. The MMRP Operations Manager will coordinate all explosives logistical requirement through the UXO Safety Manager. This position is designated as a RP IAW 27 CFR §841(s).

5.1.4 UXO Safety Manager

The UXO Safety Manager is responsible for:

- The overall explosive accountability, administrative quality control, safety and security oversight of the accountability and management of explosive materials program;
- Communicating directly with the Military Munitions Response Director and MMRP Operations Manager on all matters concerning this program;
- Ensuring that all explosive operations procedures are in compliance with this SOP and applicable regulations;
- Coordinating with the project manager to stop any explosive operation deemed unsafe, and not allowing operations to resume until the unsafe condition is corrected; and
- Performing periodic quality assurance, safety and security audits at HGL MR project sites where explosive materials are used and stored.

This position is designated as a RP IAW 27 CFR §841(s).

5.1.5 Project Managers

Project managers are responsible for ensuring all munitions projects under their direction are conducted in compliance with this directive and the associated work plan and the requirements of this SOP. The project manager will provide direct oversight of all field activities involving explosive operations.

5.1.6 SUXOS

The SUXOS is directly responsible for safe and secure execution of all field activities involving explosive operations. All explosive operations will be carried out under the direct supervision of the SUXOS and in compliance with this SOP, work plan, and the applicable DDESB-approved ESP/ESS (when applicable). The SUXOS will act as the single point of contact for receipt and release of explosive materials to an authorized ATF licensed explosives dealer or agents, including safeguarding and the security of explosive material purchased and stored on the project site. The SUXOS will coordinate all explosive materials logistical support through the HGL Senior Operations Manager and UXO Safety Manager. This position is designated as an RP or EP position.

5.1.7 UXOSO

The UXOSO provides direct explosive safety and security oversight on the MR project site to which assigned. The UXOSO will communicate directly with the UXO Safety Manager, or, if
not readily available, the MMRP Operations Manager on all matters concerning explosive safety and security. The UXOSO is responsible for ensuring all explosive safety procedures and regulations are being performed IAW this directive, associated site SOPs, the work plan, and the approved ESP/ESS. The UXOSO has the authority to stop any explosive operation deemed unsafe and will not resume operations until the unsafe condition is corrected. This position is designated as an EP position.

5.1.8 UXOQCS

UXOQCS are directly responsible for maintaining explosive management quality control on the MR project assigned. The UXOQCS will liaise directly with the Site Managers and SUXOS concerning proper administration of the explosive management program. Additionally, the UXOQCS is responsible for the overall quality control of all site explosive operations procedures, inventories, stock cards and compliance with this directive, SOPs, the work plan, approved ESP/ESS, and all Federal, DoD, state and local regulations. This position is designated as an EP position.

5.1.9 Demolition Supervisor

The Demolition Supervisor is responsible for planning, directing and executing the project site explosive demolition operation for the destruction or demilitarization of MEC/MDEH. The Demolition Supervisor will ensure positive control, security of the explosive material, and the safe conduct of explosive operations. The SUXOS may delegate the Demolition Supervisor responsibilities to a UXO Technician III qualified individual. This position is designated as an EP position.

5.1.10 Explosives Driver

HGL employees assigned the responsibility for transporting explosive materials (explosives driver) on HGL project sites will possess a current state driver’s license, a valid DOT commercial Class-C driver’s license with a hazardous materials endorsement IAW CFR 49 Parts 383 and 397. Explosives drivers are responsible for ensuring compliance with all federal, state, local and HGL requirements when operating explosive laden vehicles. This position is designated as an EP position.

5.1.11 Demolition Team Members

Demolition team members will work under the direct supervision of an ATF RP or EP, the SUXOS or Demolition Supervisor. Employees are allowed to handle explosive materials without an ATF clearance when directly supervised by an ATF RP or EP.

6.0 SECURITY

Before establishing explosive storage or operations on an HGL project site, an explosive security survey will be conducted jointly by the SUXOS and UXOQCS IAW HGL SOP 15.0–Explosive
Storage Inspection and Security. The inspection, identification of any discrepancies, and their disposition will be documented in the SUXOS daily log and the UXOQC quality control daily report.

The local law enforcement or security agency closest to the project site WILL BE NOTIFIED when explosive materials are stored in magazines on-site. As an added security measure, the local law enforcement or security agency will be notified of the project site business hours.

7.0 RECORDS

7.1 PERMANENT RECORDS

As an explosive licensee HGL is required to keep permanent records of explosive materials for five years from the date of the transaction. These transactions include importation, production, shipment, receipt, sale, or other disposition, whether temporary or permanent, of explosive materials as regulated by 27 CFR §555.121. ATF officers may examine or inspect these records at any time.

7.2 RECORD MAINTENANCE

It is the SUXOS responsibility to ensure that all explosive recordkeeping is accurate and complete and information is properly document on all applicable explosive record forms. Attachment Maintaining accurate explosive recordkeeping is essential to preventing errors. Whenever an error does occur on any explosive record or transaction the individual making the error will:

1. Draw a single line through the error;
2. Write in the correct information in the adjacent space closest to the error;
3. Write in initials and date adjacent to the corrected error; and
4. Have an individual witness the correction by writing their initials and date next to the corrected error.

7.3 SPECIAL INVENTORY

Whenever a special inventory is required to be conducted as specified by 27 CFR §555.123(a), the UXO Safety Manager will prepare a record of the inventory in duplicate and submit the original to the ATF regional director’s office as specified by 27 CFR §555.123(a)(4). HGL will take a true and accurate physical inventory:

1. At the time of changing location of the business premises to another ATF region;
2. At the time of discontinuing business; and
3. Any time the ATF regional director may direct in writing.
7.4 RECORDKEEPING

All explosive material acquisitions, purchases, receipts, issuance, usage transaction and inventories records will be maintained on-site by the SUXOS and will be available for inspection by authorized agencies. Explosive items will be tracked by their respective lot number or manufacturer’s marks of identification until the items are expended, transferred to another ATF licensee, or are returned to the original explosive acquisition source. All documentation and records generated as a result of all explosive material transactions will be record and maintained using the forms list below. Attachment 9 provides additional instruction for using and maintaining explosives records.

7.4.1 Manufacturer of Explosives Record of Acquisition

The MERA will be completed by the SUXOS upon receipt of any explosive materials by HGL IAW 27 CFR §555.123. An electronic copy of this form will be submitted within 48 hours of the acquisition to the UXO Safety Manager.

7.4.2 Daily Summary of Magazine Transactions

All issues, returns, and inventories will be properly recorded using the DSMT and IAW 27 CFR §555.123, and 555.127. This record will to be kept with each explosive item stored at each magazine. A duplicate DSMT records will be maintained and updated at the same time as the original record and kept separately with the project files. DSMT records will be updated not later than the close of the next business day with the manufacturer’s name or brand name, the total quantity received in and removed from each magazine during the day of transaction, and the total remaining on hand at the end of the day. An electronic copy of the DSMT will be submitted within 48 hours of any transaction to the UXO Safety Manager.

7.4.3 Explosive Material Disposition Record – Bill of Lading

The Explosive Material Disposition Record–Bill of Lading serves two purposes, recording all explosive material:

1. Issued for demilitarization/demolition operations;
2. Expended by detonation;
3. Returned to the magazine for storage; and
4. Used as a Bill of Lading whenever explosive materials are being transported by vehicle on HGL project sites.

7.4.4 Munitions and Explosives of Concern/Unexploded Ordnance Accountability Record

The MEC Demilitarization/Disposal by Detonation Accountability Record will be used to record the demilitarization/disposal of all MEC items discovered on HGL project sites.
7.4.5 Motor Vehicle Inspection-Hazardous Materials

The Motor Vehicle Inspection-Hazardous Materials, Attachment 7 will be used when hazardous materials are transported by vehicle on HGL project sites and following the procedures shown in Section 4.6.2.

7.5 RECORDS DISTRIBUTION

Upon completion of project field operations all explosive material and MEC records will be distributed as indicated below:

--- NOTICE ---
As required by the ATF, an electronic copy of the most recent explosive record transaction will be sent to the HGL Albuquerque Office (premise location) within 24 hours from the time the transaction occurred.

1. Original records will be sent to the HGL MRT Albuquerque Office, Attention UXO Safety Manager and maintained on file or a period of five years from the time of the latest transaction IAW 27 CFR § 555.121(a)(2).

2. Records older than five years will be archived throughout the life of HGL’s Manufacturer of Explosives License.

3. Records will distributed as shown below:

<table>
<thead>
<tr>
<th>Record</th>
<th>Albuquerque Office</th>
<th>Project Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture of Explosive Record of Acquisition–Form 15.02</td>
<td>Original</td>
<td></td>
</tr>
<tr>
<td>DSMT–Form 15.03</td>
<td>Original</td>
<td></td>
</tr>
<tr>
<td>Explosive Material Disposition Record–Form 15.04</td>
<td>Original</td>
<td></td>
</tr>
<tr>
<td>Bill of Lading–Form 15.04</td>
<td>Original</td>
<td></td>
</tr>
<tr>
<td>MEC Demilitarization/Disposal Accountability Record–Form 15.05</td>
<td>Original</td>
<td>Copy</td>
</tr>
<tr>
<td>Report or Theft or Loss of Explosive Material</td>
<td>Original</td>
<td>Copy</td>
</tr>
</tbody>
</table>

8.0 REFERENCES


Bureau of Alcohol, Tobacco, Firearms and Explosives Publication 5400.19, 2011, Recordkeeping Requirements for Explosive Material Manufacturers, October.


Department of Transportation (DOT), 49 CFR Parts 100-199.


ATTACHMENT 1

SUPERVISOR’S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker’s statement for this purpose. I will ensure that the SOP contains current procedures. If a change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. Changes will require the submission of a Field Change Request (FCR) or Design Change Notice (DCN) by the HGL project team and receipt of Naval RPM approval prior to implementation. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_________________________  ____________________________
Senior UXO Supervisor                                   Date

WORKER’S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform IAW the SOP, I will stop the process and notify my immediate supervisor.

<table>
<thead>
<tr>
<th>Worker’s Name</th>
<th>Date</th>
<th>Supervisor’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
# Manufacturer of Explosives Record of Acquisition

## Site Name/Location:
Anniston Ammunition Depot, Anniston, Alabama

## Site Activity:
Recoilless Rifle Range Remedial Investigation

<table>
<thead>
<tr>
<th>Date of Manufacture or other Acquisition</th>
<th>Lot Number or Manufacturer’s Marks of Identification</th>
<th>Brand Name, Nomenclature or Description and Site (when mixing binary materials)</th>
<th>Quantity Acquired</th>
<th>Name, Address and License or Permit Number of Distributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/11/2012</td>
<td>10122836</td>
<td>Perforator 32 G 50/CS</td>
<td>9 ea</td>
<td>Dyno Nobel, Inc., 110 McLarty Road, Whitesburg, GA 30185 1-GA-045-20-21-00626</td>
</tr>
<tr>
<td>04/11/2012</td>
<td>20SE10G1</td>
<td>Primaline 2.1 (100gr/ft) 800ft/244M Spool</td>
<td>800 ft</td>
<td>Dyno Nobel, Inc., 110 McLarty Road, Whitesburg, GA 30185 1-GA-045-20-21-00626</td>
</tr>
<tr>
<td>04/11/2012</td>
<td>16FE09X1</td>
<td>Nonel MS 475 60ft/18M 50/CS</td>
<td>2 ea</td>
<td>Dyno Nobel, Inc., 110 McLarty Road, Whitesburg, GA 30185 1-GA-045-20-21-00626</td>
</tr>
<tr>
<td>04/11/2012</td>
<td>31OC11W1</td>
<td>Nonel Leadline 2500ft/762M 2/CS</td>
<td>2,500 ft</td>
<td>Dyno Nobel, Inc., 110 McLarty Road, Whitesburg, GA 30185 1-GA-045-20-21-00626</td>
</tr>
</tbody>
</table>

HGL MR Form 15.02 (Revised Apr 2012)
### Daily Summary of Magazine Transactions

**Magazine Data Card**

<table>
<thead>
<tr>
<th>Nomenclature/Brand Name of Manufacturer</th>
<th>Lot Number/Manufacturer Mark</th>
<th>Hazard Class/Division</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Location/Name</th>
<th>GPS Coordinate</th>
<th>HGL License Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5-NM-001-20-4F-00302</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Quantity In</th>
<th>Quantity Out</th>
<th>Current Balance</th>
<th>Action/Purpose (Receipt/Issue/Inventory)</th>
<th>Printed Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

[HGL MR Form 15.03 (Revised Apr 2012)]
### ATTACHMENT 5

#### Explosive Material Disposition Record / Bill of Lading

**Date:** 04/11/12  
**Site Name/Location:** Anniston Ammunition Depot, AL  
**Grid #/Area or GPS coordinate:** RRR A10/B16  
**Explosive License Number:** 5-NM-001-20-4F-00302

This form will be used as a Bill of Lading anytime explosives are transported in an HGL vehicle under DOT regulations and kept with the explosive driver in the vehicle until the explosives are issued, expended or returned to storage.

### SECTION I. Explosive Material Issued for Demilitarization/Demolition Operations:

<table>
<thead>
<tr>
<th>Lot Number/Manufacturer’s Marks of Identification</th>
<th>Brand Name, Nomenclature or Description</th>
<th>Quantity</th>
<th>Hazard/Class</th>
<th>Checked (initials)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10122836</td>
<td>Perforator 32 G 50/CS</td>
<td>9 ea</td>
<td>1.4S</td>
<td></td>
</tr>
<tr>
<td>20SE10G1</td>
<td>Primaline 21 (100GR/ft) 800ft/244M Spool</td>
<td>800 ft</td>
<td>1.1D</td>
<td></td>
</tr>
<tr>
<td>16FE09X1</td>
<td>Nonel MS 475 60FT/18M</td>
<td>2 ea</td>
<td>1.4B</td>
<td></td>
</tr>
<tr>
<td>310C11W1</td>
<td>Nonel Leadline 2500ft/762M 2/CS</td>
<td>2,500 ft</td>
<td>1.4S</td>
<td></td>
</tr>
</tbody>
</table>

Print Demolition Supervisor Name: [Name]  
Demolition Supervisor Signature: [Signature]  
Print Explosive Driver Name: [Name]  
Explosive Driver Signature: [Signature]

### SECTION II. Explosive Material Expended by Detonation:

<table>
<thead>
<tr>
<th>Lot Number/Manufacturer’s Marks of Identification</th>
<th>Brand Name, Nomenclature or Description</th>
<th>Quantity</th>
<th>Hazard/Class</th>
<th>Checked (initials)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10122836</td>
<td>Perforator 32 G 50/CS</td>
<td>9 ea</td>
<td>1.4S</td>
<td></td>
</tr>
<tr>
<td>20SE10G1</td>
<td>Primaline 21 (100GR/ft) 800ft/244M Spool</td>
<td>154 ft</td>
<td>1.1D</td>
<td></td>
</tr>
<tr>
<td>16FE09X1</td>
<td>Nonel MS 475 60FT/18M</td>
<td>2 ea</td>
<td>1.4B</td>
<td></td>
</tr>
<tr>
<td>310C11W1</td>
<td>Nonel Leadline 2500ft/762M 2/CS</td>
<td>160 ft</td>
<td>1.4S</td>
<td></td>
</tr>
</tbody>
</table>

Demolition Supervisor Signature: [Signature]

When "on-call" services are used and any purchased materials are returned to the dealer for holding, indicate the location where the material is being held, for example: "returned to Dyno Nobel Whitesburg Distribution Facility”.

### SECTION III. Explosive Material Returned to Magazine Storage:

<table>
<thead>
<tr>
<th>Lot Number/Manufacturer’s Marks of Identification</th>
<th>Brand Name, Nomenclature or Description</th>
<th>Quantity</th>
<th>Hazard/Class</th>
<th>Checked (initials)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20SE10G1</td>
<td>Primaline 21 (100GR/ft) 800ft/244M Spool</td>
<td>646 ft</td>
<td>1.1D</td>
<td></td>
</tr>
<tr>
<td>310C11W1</td>
<td>Nonel Leadline 2500ft/762M 2/CS</td>
<td>2,340 ft</td>
<td>1.4S</td>
<td></td>
</tr>
</tbody>
</table>

Demolition Supervisor Signature: [Signature]  
Explosive Driver Signature: [Signature]  
SUXOS Signature: [Signature]

HGL MR Form 15.04 (Revised Apr 2012)
# ATTACHMENT 6

## Munitions and Explosives of Concern Demilitarization/Disposal by Detonation Accountability Record

<table>
<thead>
<tr>
<th>Anomaly No.</th>
<th>Grid or GPS Coordinates Location</th>
<th>Depth Detected (feet)</th>
<th>Identification/Nomenclature (include DMM, MC, MEC or UXO)</th>
<th>Date Located</th>
<th>Date of Demil/Disposal</th>
<th>Method of Demil/Disposal</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

SUXOS review and acceptance (print name):  
SUXOS signature:                        

---

HGL MR Form 15.05 (Apr 2012)
Motor Vehicle Inspection—Hazardous Materials

Section 1 – Documentation and Instructions
1. This form applies to all vehicles which must be marked and placarded in accordance with DOT Title 49 CFR and will be retained in the cab of the vehicle with the driver operator.
2. This form will be completed in conjunction with the Vehicle Inspection Checklist and Bill of Lading forms.
3. Upon completion of explosive transportation operations this form will be retained in the project files and will be submitted to the HGL Albuquerque Office, attention UXO Safety Manager at the completion of field activities.

Company: __________________________
Date of inspection: ___________________
Time of inspection: ___________________
Location of inspection: ________________
Operator’s name: _____________________
Operator’s license number: ______________
Medical examination current: Yes □ No □
Valid CDL with Hazardous Materials endorsement: Yes □ No □
Route plan and map: Yes □ No □
Hazardous Materials Compliance Handbook in vehicle: Yes □ No □
Vehicle Inspection Checklist HGL MR Form 15.23 completed and retained in vehicle: Yes □ No □
Bill of Lading HGL MR Form 15.05 completed and retained in vehicle: Yes □ No □

Section 2 – Mechanical Inspection (place “X” in the applicable box, if rejected, explain in block 3):

<table>
<thead>
<tr>
<th>Horn operative</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tires, wheels and rims</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steering system</td>
<td>Wheel chocks</td>
<td></td>
</tr>
<tr>
<td>Windshield/wipers</td>
<td>Tailgate and doors</td>
<td></td>
</tr>
<tr>
<td>Mirrors</td>
<td>Cargo space clear</td>
<td></td>
</tr>
<tr>
<td>Warning signals</td>
<td>Non-sparking bed liner</td>
<td></td>
</tr>
<tr>
<td>Spare fuses</td>
<td>Tarpaulin and straps</td>
<td></td>
</tr>
<tr>
<td>Electrical wiring</td>
<td>Two 10-lb fire extinguishers</td>
<td></td>
</tr>
<tr>
<td>Lights and reflectors</td>
<td>Properly placarded on all sides</td>
<td></td>
</tr>
<tr>
<td>Fuel system</td>
<td>Detonator box</td>
<td></td>
</tr>
<tr>
<td>Exhaust system</td>
<td>Type 3 daisy box (IME 122)</td>
<td></td>
</tr>
<tr>
<td>Brake system</td>
<td>Explosives properly segregated</td>
<td></td>
</tr>
<tr>
<td>Suspension</td>
<td>Other (explain in Block A.)</td>
<td></td>
</tr>
</tbody>
</table>

Inspection result (If rejected provide reason in block 3): ACCEPTED □ REJECTED □

A. Remarks:

B. Inspector signature (origin):

C. Driver signature (origin):

D. Inspector signature (destination):

E. Driver signature (destination):

HGL MR Form 15.06 (Jul 2010)

HGL—Standard Operating Procedure
# ATTACHMENT 8

Report of Theft or Loss-Explosive Materials

For ATF Use Only

<table>
<thead>
<tr>
<th>Date/Received</th>
<th>Date Faxed to JSOC &amp; Field Division</th>
<th>Unique Identifier</th>
<th>Case Number</th>
</tr>
</thead>
</table>

**To Be Completed By Person Making Report**

Upon discovery of any theft or loss of any of your explosive materials:
- First, contact ATF toll free at 1-800-461-8841 between 8:00 a.m. - 5:00 p.m. EST or after hours and weekends contact ATF at 1-800-385-3855 to report the theft or loss;
- Second, contact your local law enforcement office to report the theft or loss to obtain a police report; and
- Third, complete this form and attach any additional reports, sheets or invoices necessary to provide the required information, and fax the form with additional material(s) to the ATF U.S. Bomb Data Center (USBDC) at 866-927-4570 or email to USBDC@just.gov.

1. **Date**
2. **Type of Report (Check one):**
   - Theft
   - Loss
   - Attempted Theft/Suspicious Activity
   - Supplement
3. **Full Name of Person Making the Report (Last, First, Middle)**
4. **Licensee or Permitee Name**
4a. **Federal Explosives License or Permit Number**
4b. **Office Address (Street Address, City, State, and Zip Code)**
5. **Telephone Number**
5a. **Telephone Number**
5b. **E-mail Address**
6. **Actual Location of Theft or Loss (If different from item 5a)**

7. **Theft or Loss**
   - a. Discovered
   - b. When Was the Magazine Last Checked
   - c. Occurred (Show approximate if exact not known)
   - d. Reported to ATF by Telephone
   - e. Reported to Local Authorities

8. **Name of Local Law Enforcement Officer to Whom Reported**
9. **Name and Address of Local Authority to Whom Reported**
10. **Telephone Number**
11. **Police Report Number**

12. **Explosive Materials Lost or Stolen (Attach invoices or additional sheets, if necessary)**
   - a. Manufacturer and/or Importer
   - b. Brand Name
   - c. Date Shift Code
   - d. Size (Length & Diameter)
   - e. Quantity (Pounds of Explosives, Number of Rounds, etc.)
   - f. Type and Description (Dynamite, Blasting Agents, Detonators, etc. Include for each type size, MS design or length of lever, if applicable)

---

**HGL—Standard Operating Procedure**

27
ATTACHMENT 8

13. Theft or Loss Occurred from (Check applicable box on each row)
   a. Magazine Type:
      - [ ] 1
      - [ ] 2
      - [ ] 2 Det. Box
      - [ ] 3 Day Box
      - [ ] 4
      - [ ] 5
      - [ ] Outdoor
      - [ ] Indoor
      - [ ] Permanent
      - [ ] Portable
      - [ ] Mobile Truck
      - [ ] Mobile Trailer
      - [ ] Overnight Storage
      - [ ] Day Storage
   b. Types of Locks (Check all that apply):
      - [ ] Padlock
      - [ ] Mortise
      - [ ] 3-Point
      - [ ] Push Lock
      - [ ] Other (Explain)
   c. Location Description/Type:
      - [ ] Licensed/Permitted
      - [ ] Premises
      - [ ] Remote Storage
      - [ ] Work Site
      - [ ] In Transit
      - [ ] During Operations

14. Method of Entry:
   - [ ] Door
   - [ ] Wall(s)
   - [ ] Roof
   - [ ] Floor/Bottom
   - Was a Key Used? [ ] Yes [ ] No
   - Suspected Employee-Involved Theft? [ ] Yes [ ] No
   - Lock(s) Defeated? (If yes, check additional appropriate boxes)
      - [ ] Yes [ ] No
      - Lock Shackle Cut (How?):
      - Lock Pried, Twisted or Levered
      - Lock Picked or Shimmed
      - Lock Body Drilled Out or Cut
      - Other (Explain)

15. Hood Defeated? (If yes, check all applicable)
   - [ ] Yes [ ] No
   - Hood Cut
   - Hood Removed
   - Hood Broken
   - Other (Explain)
   - Hood Width (Inches) __________________________
   - Hood Length (Inches) __________________________
   - Hood Depth (Inches) ____________________________
   - Hood Thickness (Inches) _________________________

16. Other Information Pertinent to the Theft, Loss or Suspicious Activity (Any details you can provide)

16a. Was Theft or Loss Disclosed During an ATF Inspection or Being Reported as a Result of Inspection? [ ] Yes [ ] No

16b. Additional Security Measures in Place?
   - [ ] Alarm
   - [ ] Security System/Service
   - [ ] Fencing
   - [ ] Lighting
   - [ ] Other (Explain)

17. Signature and Title of Person Making Report

18. Date

HGL—Standard Operating Procedure

ATF Form 5400.3
Revised July 2012
## ATTACHMENT 9

### EXPLOSIVE RECORD MAINTENANCE AND USE INSTRUCTIONS

<table>
<thead>
<tr>
<th>RECORD</th>
<th>USE</th>
<th>ELECTRONIC RECORD</th>
<th>ORIGINAL RECORD</th>
</tr>
</thead>
</table>
| Explosive material delivery invoice – Form 15.02 | Verify actual invoice receipt for accuracy and legibility. | All explosive acquisitions or transactions occurring during a work week will be submitted via email to the Albuquerque office on the last work day of the week to the UXO Safety Manager, email: rmendenhall@hgl.com | 1. Retain original record on file during field activities.  
2. On completion of field activities submit to Albuquerque office |
| Manufacturer of Explosives Record of Acquisition – Form 15.03 | 1. Record all On-Call delivery acquisitions.  
2. Record all to on site storage delivery acquisitions.  
3. Verify each item recorded on this form matches each item listed on the delivery invoice. |  |  |
| Daily Summary of Magazine Transaction (Magazine Data Card) – Form 15.03 | 1. Record all explosive material acquisitions, receipts, issues and turn-ins on the day of occurrence.  
2. Record all explosive material inventory activities. |  |  |
| Explosive Material Disposition Record / Bill of Lading – Form 15.04 | Record upon occurrence all explosive materials:  
1. Issued for demil/demolition operations.  
2. Expended by detonation.  
3. Turned-in for return to storage. | Not required | On completion of field activities |

All forms are located on HGL SharePoint at: [https://hglcentral.hgl.com/sites/Teams/ABQ/SitePages/Home.aspx?RootFolder=%2Fsites%2FTeams%2FABQ%2FMunitions%20Response%2FUXO%20Personnel%20Folder&CTID=0x012000DE2B3E7BAD6F7F43A1ABB450B7EA551A&View={5434E1BF-49B0-4B8F-8DFE-C2A63D03B78F}](https://hglcentral.hgl.com/sites/Teams/ABQ/SitePages/Home.aspx?RootFolder=%2Fsites%2FTeams%2FABQ%2FMunitions%20Response%2FUXO%20Personnel%20Folder&CTID=0x012000DE2B3E7BAD6F7F43A1ABB450B7EA551A&View={5434E1BF-49B0-4B8F-8DFE-C2A63D03B78F}), or may be requested from the HGL UXO Safety Manager.
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1.0 PURPOSE

This standard operating procedure (SOP) establishes the overall safe practices and procedures for conducting explosive demolition operations (demolition operations) on HydroGeoLogic, Inc. (HGL) projects involving military munitions response program (MMRP) actions.

2.0 SCOPE

This SOP applies to all HGL employees assigned to perform explosive demolition operation on HGL project sites. All HGL employees who are tasked with performing munitions and explosives of concern (MEC)-related activities will be qualified in accordance with the Department of Defense Explosive Safety Board (DDES) Technical Paper (TP) 18 and the requirements specified by HGL SOP 15.00, Section 5.0. This SOP also applies to all instances when public safety may be affected by site conditions. This SOP will be used in conjunction with approved work plans and the HGL SOPs cited in Section 9.0 of this SOP.

3.0 GENERAL REQUIREMENTS

All work will be performed in a manner that is consistent with Occupational Safety and Health Administration established standards and requirements. Refer to the site- or project-specific health and safety plan for relevant health and safety requirements. All explosive activities will be conducted in conformance with the Explosive Safety Submission (ESS)/Explosives Site Plan (ESP) and Site Safety and Health Plan (SSHP) and HGL SOP 15.00. Procedures for packaging and disposing of all munitions waste generated during field activities will be described in the project-specific work plan and processed in accordance HGL SOP 15.03 Material Potentially Presenting an Explosive Hazard (MPPEH) Inspection and Management.

Personnel who use this procedure must document evidence to the site manager/Senior Unexploded Ordnance Supervisor and the Unexploded Ordnance Quality Control Specialist (UXOQCS) that they have read and understand this procedure by completing the SOP acknowledgement form, Attachment 1. This documentation will be retained in the project file.

Any deviations from the procedures specified in this SOP will be approved by the HGL Senior UXO Operation Manager and UXO Safety Manager before implementing. Deviations from requirements will be sufficiently documented to re-create the modified process.

4.0 DEFINITIONS AND ABBREVIATION

4.1 DEFINITIONS

**Exclusion Zone (EZ):** A safety zone established around a MEC work area. Only project personnel and authorized, escorted visitors are allowed within the EZ. Examples of EZs are...
safety zones around MEC intrusive activities and safety zones where MEC is intentionally detonated. For recovered chemical warfare munitions project sites, it is the area within the No Significant Effects (NOSE) zone.

**Minimum Separation Distance (MSD):** – The minimum safe distance for non-essential personnel to be present during unexploded ordnance (UXO) operations. Generally, the maximum fragmentation distance-horizontal (MFD-H) is to be used for all UXO items as the MSD for all non-essential personnel for both intentional and unintentional detonations. The MSD during demolition operations includes the area from the planned detonation site and the MFD-H for the MEC item(s) and donor explosives being detonated.

**Material documented as safe (MDAS):** MPPEH that has been assessed and documented as not presenting and explosive hazard and for which the chain of custody has been established and maintained. This material is no longer considered MPPEH.

**Material documented as an explosive hazard (MDEH):** (Formerly referred to as material documented as hazardous, or MDAH). MPPEH that cannot be documented as MDAS, that has been assessed and documented as to the maximum explosive hazards the material is known or suspected to present, and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH. (The MDEH characterization addresses only the explosives safety status of the material.)

**Material Potentially Presenting an Explosive Hazard (MPPEH):** Material potentially containing explosives or munitions (for example, munitions containers and packaging material; munitions debris (MD) remaining after munitions use, demilitarization, or disposal; and range-related debris) (RD); or material potentially containing a high enough concentration of explosives that the material presents and explosive hazard.

**Military Munitions:** All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense (DoD), the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives; pyrotechnics; chemical and riot control agents; smokes; and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed [10 U.S.C. 2710(e)(3)(A)].

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_HGL—Standard Operating Procedure_

2
**STANDARD OPERATING PROCEDURE**

**Explosive Demolition Operations**

**SOP No.: 15.01**

**SOP Category: MMRP**

**Revision No.:**

**Date: December 2011**

---

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

**Munitions and Explosives of Concern (MEC):** This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (1) UXO, as defined in 10 U.S.C. 101(e)(5)(A) through (C); (2) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (3) Munitions constituents (such as TNT and RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

**Munitions Debris (MD):** Remnants of munitions (for example, fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal. Inert munitions-related material recovered during an MEC removal.

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

**UXO-Qualified Personnel:** Personnel who meet the training requirements for UXO Technician and Personnel and have performed successfully in military Explosives Ordnance Disposal (EOD) positions or are qualified to perform in the following service contract act contractor positions: UXO Technician II, UXO Technician III, and UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), and Senior UXO Supervisor (SUXOS).

### 4.2 ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATF</td>
<td>U.S. Department of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives</td>
</tr>
<tr>
<td>DDESB</td>
<td>Department of Defense Explosive Safety Board</td>
</tr>
<tr>
<td>DMM</td>
<td>discarded military munitions</td>
</tr>
<tr>
<td>DoD</td>
<td>Department of Defense</td>
</tr>
<tr>
<td>DS</td>
<td>Demolition Supervisor</td>
</tr>
<tr>
<td>EM</td>
<td>Engineering Manual</td>
</tr>
<tr>
<td>ESP</td>
<td>Explosive Site Plan</td>
</tr>
<tr>
<td>ESS</td>
<td>Explosives Safety Submission</td>
</tr>
<tr>
<td>EZ</td>
<td>exclusion zone</td>
</tr>
<tr>
<td>HE</td>
<td>high-explosive</td>
</tr>
<tr>
<td>HFD-H</td>
<td>hazardous fragmentation distance-horizontal</td>
</tr>
<tr>
<td>HGL</td>
<td>HydroGeoLogic, Inc.</td>
</tr>
</tbody>
</table>
5.0 PROCEDURES

This section deals with the administrative, training, and logistical aspects of conducting explosives demolition.

5.1 DEMOLITION TEAM PERSONNEL

All employees are required to meet the minimum requirements listed in this procedure, but may request a variance if these procedures are unsafe, or are not compatible with contract or site-specific requirements. Permission to vary from this procedure must be obtained from the Project Manager and the HGL UXO Safety Manager. All employees are encouraged to submit comments and/or recommendations to improve this procedure.

All personnel engaged in demolition operations must be thoroughly trained in explosive safety and demolition procedures, be capable of recognizing hazardous situations, and be able to take prompt corrective action. All UXO demolition team personnel must meet the minimum requirements specified by DDESB TP 18 and HGL SOP 15.00, Section 5.7.1 to perform tasks covered by this SOP. Demolition operations will not be conducted without client authorization, approved plans/SOPs, qualified and trained UXO Technicians, and proper demolition and safety equipment is available.
5.2 DEMOLITION TEAM ASSIGNMENTS AND RESPONSIBILITIES

HGL demolition operations require specific organizational roles and personnel assignments, specifically:

1. **SUXOS (Demolition Supervisor):**
   a. The SUXOS will normally perform the responsibilities of the Demolition Supervisor (Demo Supervisor), but may delegate this responsibility to a UXO Technician III level qualified individual.
   
   b. Responsible for planning, directing, and executing all demolition operations.
   
   c. When employing the services of a “certified blaster” from a licensed explosive dealer, ensure that only UXO Technicians are allowed to place donor charges next to MEC/UXO.
   
   d. Will maintain explosive accountability and security of all explosive materials issued for use during execution of demolition operations.
   
   e. Will maintain positive communications at all times with the Demolition Team and the UXOSO.
   
   f. Will inspect the detonation site after each explosive detonation or any misfire and ensure no one is allowed within the MSD from the detonation site until the area is declared safe.

2. **UXOSO** will ensure:

   a. All demolition operations are performed safely and in accordance with the approved site-specific plans (ESP or ESS) and this SOP.
   
   b. Reliable primary and secondary communications are established before commencing demolition operations.
   
   c. In collaboration with the SUXOS that all roadways and access points to the MSD area is secure and all personnel are evacuated and not allowed with the MSD from the detonation site before initiating any explosive charges.
   
   d. The detonation site is inspected after each explosive detonation or misfire. No one will be allowed within the MSD until the area is declared safe.

3. **Demolition Team** will consist of a minimum of three personnel or as required by the approved work plan:

   a. Demo Supervisor.
   
   b. A UXO Technician II or above to assist the DS during demolition operations.
   
   c. A UXO Technician I or above.
5.3 REFERENCE DOCUMENTS

Before commencing demolition operations the SUXOS and UXOSO will read and have a good working knowledge of the following documents, as well as ensuring these approved documents and publications are on-site during all Demolition operations:

2. DDESB-approved ESP or ESS
3. SSHP
4. Work Plan or Technical Management Plan

5.4 COORDINATION AND NOTIFICATIONS

A coordination meeting will be conducted by the SUXOS to establish roles and responsibilities before demolition operations begin. The meeting will address specific elements of planning and organizational responsibilities and will include, but not be limited to, the following topics:

1. Who is assigned ultimate responsibility for demolition operations
2. Demolition team assignments and responsibilities
3. Primary and secondary communications
4. On remote sites verification of reliable communications
5. Explosive handling, storage, and transportation
6. Required support services, fire, medical, security, etc.
7. Emergency procedures
8. Notification process
9. Maintaining and controlling exclusion zones:
   a. Safety guard positions
   b. Road barricades
   c. Exclusion zone clearance prior initiation of demolition shot
   d. Demolition team rally point
   e. Post operation “all clear” procedures
10. Community impact
5.4.1 Public Meeting

A public meeting will be held prior to demolition operations being conducted when Demolition operations potentially impact the local civilian community. The HGL project manager, site manager or Senior UXO Supervisor (SUXOS will conduct a briefing outlining the scheduled operation. Topics will include:

1. Daily hours of operation
2. Requirements for evacuation of occupied residences and road closures
3. Exclusion zones/MSD boundaries
4. Community impact

5.4.2 Notifications

The SUXOS will ensure the agencies responsible for emergency response are notified as far in advance as possible that disposal activities will be taking place. The notifications should address scheduling, evacuations, road closures, EZs, and any other required support. As a minimum, the following agencies should be notified and be prepared to respond, as applicable:

1. Public utility companies (electric, gas and water)
2. Paramedic/Emergency Medical Technician Squad, (as applicable)
3. Local fire department
4. Local law enforcement/police department
5. Security agency

5.4.3 Public Utility Services

When there is a potential for demolition operations to impact public utilities, the SUXOS will notify the appropriate utility company official. When situations mandate the demolition of a MEC hazard near public utilities, precautions will be taken to prevent damage or disruption of these services, either by using protective measures (engineering controls) or by relocating the MEC hazard to a safe distance when the SUXOS and UXOSO have jointly determined the MEC hazard is acceptable-to-move.

5.5 EXCLUSION ZONES, EVACUATIONS, AND ROAD CLOSURES

The exclusion zone for all demolition operations will be based on the munition with the greatest fragmentation distance (MGFD) as identified in the project work plan and/or ESP/ESS. Before initiating explosive demolition operations to demilitarize, destroy or dispose of MEC hazards, all personnel will be evacuated to a safe location beyond the MSD as determined by DDESB TP 16
calculation methodologies. When a single MEC item undergoes explosive demolition, the hazardous fragment distance-horizontal (HFD-H) for that munition will be observed.

Every attempt will be made to post the necessary warnings and safety controls prior to explosive operation. In some cases posters or flyers or may be suitable, however, positive site control must be maintained at all times during any explosive operation. Posters or flyers will identify the location of operations, time operations commence and cease, contact person for verifying if area is safe for passage. To ensure the highest degree of public safety is maintained barricades will be placed at residential streets and roads access points with the appropriate number of safety guards posted at key locations to prevent access to the EZ prior to conducting explosive operations.

Once demolition operations are in progress the public and other non-essential personnel will not be allowed into the EZ under any circumstances. Re-entry into the EZ will be granted only under the following conditions:

1. Essential personnel have been granted an “all-clear” by the SUXOS.
2. The UXO Safety Officer (UXOSO) has completed a post-detonation assessment of the EZ and determined the area safe to access.

5.6 TWO-PERSON RULE

The Two-Person Rule is a safety concept that requires two knowledgeable individuals to perform potentially hazardous operations. These individuals must be trained and be capable of recognizing safety hazards and improper procedures. The Two-Person Rule will apply whenever explosives are handled or transported during demolition operations. No one will handle or assemble explosives alone.

5.7 DEMOLITION OPERATIONS BRIEF

Before beginning any explosive operations, all personnel assigned to or working with disposal teams will attend a demolition operation briefing. The purpose of the briefing will be to review MEC explosive demolition and emergency response procedures. Using attachments 1, 2, 3, 4, 5, 6, and 7 the following topics will be covered during the briefing, but are not limited to:

1. Review of the Accident Prevention Plan (APP)/SSHP
2. Review of this SOP
3. Review of demolition firing systems and components
4. Review of disposal charge placement
5. Review of explosives transportation
6. Site munitions brief
STANDARD OPERATING PROCEDURE

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7. Type and condition of MEC
8. Emergency response equipment
9. Emergency procedures
10. Two-person rule
11. Team assignments

5.8 EQUIPMENT, MATERIAL AND VEHICLE REQUIREMENTS

The DS will be responsible for ensuring that all required equipment and materials are available. The checklists in the attachments to this procedure will be used to ensure and document equipment and material availability. As a minimum, the following will be checked prior to commencing each disposal operation:

1. Demolition equipment (Attachment 3)
2. Safety Equipment (Attachment 4)
3. Explosive vehicles (HGL SOP 15.02, Section 5.6.2)
4. Range vehicle
5. Safety vehicle(s)
6. Designated personnel accountability and assembly location/rally point

5.9 COMMUNICATIONS

Primary communications will be accomplished through the use of field handheld portable radios. The contact information for emergency services, including telephone numbers for the project personnel, is provided in the APP/SSHP. Secondary communication will be via cellular telephones, with the phone numbers for the HGL key personnel posted in the APP. The explosive demolition team SUXOS, UXOSO and DS cellular numbers will be recorded on Attachment 1.

Radio communication between the demolition team and site management team will be maintained at all times. In a location where cellular telephone service is restricted, air horns will be used for communicating as a backup emergency notification system. The following air horn signals will be used to communicate with personnel if the radio is not operable:

1. One Long Blast — Evacuate Area
2. Two Short Blasts — All Clear
3. Three Short Blasts — Emergency Help Required

The location of assembly points, emergency evacuation points, and evacuation routes will be discussed during the demolition operation planning meeting. Throughout the operation,
emergency and range vehicles will be positioned to allow the most expedient evacuation means in case an emergency evaluation of the site is necessary.

5.10 EXPLOSIVE VEHICLE TRANSPORTATION

Vehicles that are used to transport explosive materials will comply with the regulations specified by the Department of Transportation, Code of Federal Regulations, Title 49, Parts 171, 173 and 177 and HGL SOP 15.00, Section 5.5.

5.11 WEATHER AND ENVIRONMENTAL CONSIDERATIONS

Before beginning Demolition operations the SUXOS will obtain a local weather report. Demolition operations will not be conducted when electrical storms are within 10 miles of the site operations, when visibility restricts positive control of the exclusion zone, or when weather conditions impact safety.

5.12 EMERGENCY MEDICAL SUPPORT

The telephone number of the responding medical facility will be prominently posted at the site office. Emergency medical personnel will be notified of the location and duration of demolition operations each day. At least two UXO personnel on each demolition team will be trained in first aid and CPR. A first-aid kit, portable eyewash, and bloodborne pathogen kit will be on site at all times. The first-aid kit will contain dressings capable of treating traumatic injuries that could result from an explosion.

5.13 FIRE PREVENTION PLAN

The telephone number of the nearest fire department is posted in the work plan/APP. The fire department will be notified of the location and duration of demolition operations each day. Fire extinguishers and shovels will be on site to fight small fires. Personnel must evacuate the area if the fire approaches munitions or explosives. Do not fight grass fires in areas where there may be munitions or kick-outs.

5.14 PERSONAL PROTECTIVE EQUIPMENT

Demolition operations will normally be conducted in Level "D" personal protective equipment (PPE). This will consist of cotton, Gortex or other non-static producing clothing and foul weather gear, gloves, safety glasses and composite or steel-toed boots. The UXOSO will ensure that the proper PPE is procured, issued, and utilized by project personnel and that daily checks are performed to ensure continued availability and use.
5.15 EXPLOSIVE OPERATIONS

Only HGL UXO–qualified personnel will be allowed to conduct demolition operations on HGL munitions response project sites to demilitarize or destroy MEC/UXO using open detonation methods. The following general safety guidelines that will be followed at all times during all Demolition operations:

1. MEC items found requiring demolition that is deemed *unacceptable-to-move* by the SUXOS and UXOSO will be blown-in-place.
2. MEC items will only be deemed *acceptable-to-move* by the SUXOS and UXOSO jointly.
3. MEC items that are *acceptable-to-move* by the SUXOS and UXOSO may be moved to a single item location in within the munitions response site for destruction when approved in accordance with the ESS or ESP.
4. MPPEH/MDEH items will be perforated to facilitate 100 percent inspection of all surfaces.
5. Demolition operations will not be conducted without proper authorization.
6. This SOP will be used as guidance for demolition procedures.
7. Engineering control using sandbag mitigation will be employed to reduce blast and fragment hazards.

5.15.1 Engineering Controls

Engineering controls will be employed in accordance with the DDESB-approved ESP for this project.

5.15.2 Initiation sequence

The SUXOS or DS will ensure that the following actions are completed before initiating any demolition shot:

1. Ensure all required notifications have been made.
2. Set up EZ and post guards at the barricades.
3. Visually inspect EZ and surrounding area for unauthorized personnel.
4. Announce on the handheld/mobile radio that air-horn demolition warnings will follow.
5. **Five-minute warning.** The DS will give the five-minute warning on the radio, followed by a 15-second series of long blasts on the air or vehicle horn, or siren before the demolition shot(s).

6. **One-minute warning.** The DS will give the one-minute warning on the radio, followed by a 15-second series of short blasts on the air or vehicle horn, or siren before the demolition shot(s).

7. Before initiating the demolition shot the SUXOS/DS will give three, loud "Fire in the Hole!" warnings and then give the “fire” command on the radio.

8. When the area has been cleared (post-blast), the SUXOS will sound a prolonged blast on the air-horn.

9. The SUXOS/DS will announce on the radio that Demolition operations have ceased.

5.15.3 **Initiation Systems**

The following applies to the initiation systems used in explosives operations:

1. The primary firing system will use the Remote Firing Device with Nonel®.
2. The alternate primary firing system will use the Remote Firing Device with electric blasting caps.
3. The secondary system will use the Scorpion Electronic Blasting Machine with electric or Nonel® initiation.
4. In areas of high electromagnetic radiation, or a high fire index, a Nonel® system should be used.

5.15.4 **Blow in Place (BIP) Operations**

MEC that is discovered and jointly deemed *unacceptable-to-move* by the SUXOS and UXOSO will be blown in place (BIP). The SUXOS will notify the client when a MEC item is deemed as *unacceptable-to-move* and will be BIP. MEC items that are *acceptable-to-move* may be relocated within the site investigation area away from residences and public buildings as necessary. The following verifications must be completed before a MEC item is BIP:

1. Authorization has been granted by the client to conduct the disposal operation.
2. An appropriate EZ for the MEC encountered has been established and evacuation of the area has been confirmed.
3. When applicable, the appropriate engineering controls are in place for the reduction of the fragmentation hazard.
4. Emergency support services have been notified and are standing by in position:

5. Emergency services (when required)
6. Fire department
7. Law enforcement.

8. Every effort has been made to establish the firing point in a location where the SUXOS and the UXOSO can visually observe the entire EZ.

9. All BIP operations will be fired by positive control methods; Nonel® or direct command remote control firing device initiation to maintain positive control up to the point of detonation.

5.15.5 Phosphorus Munitions

When munitions containing Plasticized White Phosphorus (PWP), Red Phosphorus (RP) or White Phosphorus (WP) fillers are encountered, the following procedures will be observed in conjunction with HGL SOP 15.08 Phosphorus Munitions:

1. Protective clothing, to include helmets with full-face shields, a welder’s apron, and gloves will be worn when handling suspected Phosphorus munitions.

2. Ensure medical support personnel know they are supporting Phosphorus munitions demolition operations and have first-aid treatment materials on hand.

3. If an accident occurs in the field, irrigate Phosphorus wounds with water, pick out visible pieces of Phosphorus (with knife or tweezers), and apply saline soaked dressing. Keep dressing wet until arrival of medical personnel.

4. Ensure an ample supply of water and sand are readily available when handling suspected Phosphorus-filled munitions.

5. Phosphorus munitions will be counter-charged bottom centerline (CCBC) to disperse the Phosphorus in the air for complete combustion.

6. Care must be taken when returning to the disposal site after detonation of Phosphorus munitions to ensure that all Phosphorus was consumed.

7. Do not approach the area until all smoke has cleared and the SUXOS has declared the area safe.

8. Do not conduct phosphorus filled munitions handling or demolition operations when the ambient temperature is above 95°F.
5.15.6 MPPEH

All potential munitions-related items are considered to be MPPEH until they have undergone a 100 percent inspection by a UXO Technician II and a 100 percent re-inspection by a UXO Technician III. If an item is determined to contain high explosives (HE) or energetic material, it will be classified as MEC and then categorized as either UXO, or as DMM, or as MC as defined in Section 4.1 above. Items determined to contain HE or energetic material, or cannot be 100 percent visually inspected will be designated as material documented as an explosive hazard (MDEH) in accordance with DoD 4140.62. MDEH will be treated as Hazards Class/Division 1.1 material and until it has undergone the proper treatment process specified by the work plan and the DDES-approv ed ESP/ESS. MDEH will not be commingled with any other material until it has undergone the required treatment process and a second 100 percent UXO Technician II and a 100 percent re-inspection by a UXO Technician III and met the designation requirement of MDAS.

Upon completion of the demolition shot UXO Technicians will conduct a thorough inspection of the surrounding area. All MD will be picked up and inspected to determine its designation as either MDEH or MDAS before final disposition is accomplished in accordance with the DDES-Approved ESS/ESP and HGL SOP 15.03.

6.0 SAFETY

The SUXOS and UXOSO are responsible for ensuring all demolition operations on HGL MR project sites are conducted in the safest possible manner for protection of project personnel, the public, and project equipment assets. The SUXOS and the UXOSO are responsible for ensuring Attachments 2, 4, and 5 of this SOP are briefed and acknowledged by all demolition team members before the execution of any explosive operation.

7.1 RECORDKEEPING

The SUXOS and DS will use the forms and checklists identified by this SOP and HGL SOP 15.00, Explosive Accountability and Management for all HGL demolition operations. The following checklists will be used to ensure all demolition operations personnel assignments and functions, and explosive expenditures are properly documented and recorded:

1. Disposal Operations Checklist (Attachment 2)

2. Post Demolition Operations Checklist (Attachment 8)
STANDARD OPERATING PROCEDURE

Explosive Demolition Operations

7.1.1 Required Documents

In conjunction with this SOP, the following documents are required to be on site during disposal operations:

1. Approved Work Plan
2. Approved site safety and health plan
3. Approved ESP or ESS
4. Range certification (when applicable)
5. HGL SOP 15.00 Explosives Accountability and Management Program
6. HGL SOP 15.02 Explosives Storage Inspection and Security
7. HGL SOP 15.03 Material Potentially Presenting and Explosive Hazard Inspection, Management and Processing
8. HGL SOP 15.03 Phosphorus Munitions Safe Practices

8.0 REFERENCES


Code of Federal Regulation, Title 49 Parts 171, 173 and 177, U.S. Department of Transportation, Other Regulations Relating to Transportation.


Explosive Demolition Operations


HydroGeoLogic, Inc., HGL MMRP SOP 15.00, Revision 2, 2011, Explosives Accountability and Management Program, June.


9.0 ATTACHMENTS

Attachment 1  Supervisor/Workers Statements
Attachment 2  Demolition Operations Checklist
Attachment 3  Demolition Equipment Checklist
Attachment 4  Safety Equipment Checklist
Attachment 5  General Safety Precautions
Attachment 6  Explosive Systems Configuration
Attachment 7  Rothenbuhler Engineering 1670 Remote Firing Device Procedures
Attachment 8  Post Demolition Operations Checklist
Attachment 9  Three Phase Quality Control Checklist Explosive Demolition Operations (Demolition operations) (HGL SOP 15.01)
ATTACHMENT 1
SUPERVISOR’S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker’s statement for this purpose. I will ensure that the SOP contains current procedures. If a change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. Changes will require the submission of a Field Change Request (FCR) or Design Change Notice (DCN) by the HGL project team and receipt of Naval RPM approval prior to implementation. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

________________________________________________________________________

Senior UXO Supervisor Date

WORKER’S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

<table>
<thead>
<tr>
<th>Worker’s Name</th>
<th>Date</th>
<th>Supervisor’s Name</th>
<th>Date</th>
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</table>

HGL—Standard Operating Procedure
## ATTACHMENT 2

### DEMOLITION OPERATIONS CHECKLIST

<table>
<thead>
<tr>
<th>FUNCTION CHECK</th>
<th>DATE/TIME</th>
<th>INITIALS</th>
</tr>
</thead>
</table>

### 1.0 SENIOR UXO SUPERVISOR:

1. **Assign Demolition Team:**
   - a. SUXOS: __________________________
   - b. Demolition Supervisor: ________________
   - c. Demo Team Assistant: __________________
   - d. Demo Team Member: _____________________
   - e. Demo Team Member: _____________________
   - f. UXOSO: ____________________________
     - 1) Safety Position #1: ________________
     - 2) Safety Position #2: ________________
     - 3) Safety Position #3: ________________
     - 4) Safety Position #4: ________________
   - g. Other: ______________________________

2. **Communications:**
   - a. Radio call signs / cellular numbers:
     - 1) SUXOS: ___________ / ___________
     - 2) DS: ___________ / ___________
     - 3) UXOSO: ___________ / ___________
     - 4) Safety Position-1: ___________ / ___________
     - 5) Safety Position-2: ___________ / ___________
     - 6) Safety Position-3: ___________ / ___________
     - 7) Safety Position-4: ___________ / ___________

3. **Brief Demolition Team:**
   - b. Discuss MEC/MC/UXO to be disposed.
   - c. Describe Disposal procedures.

4. **Inspect Range/Exclusion zone upon completion of operations.**

### 2.0 DEMOLITION SUPERVISOR

1. Verify roads are closed.
2. Verify exclusion zone boundaries in place.
3. Complete health and safety and equipment checklists.
4. Ensure command center has completed the verification.
### ATTACHMENT 2
#### DEMOLITION OPERATIONS CHECKLIST

<table>
<thead>
<tr>
<th>FUNCTION CHECK</th>
<th>DATE/TIME</th>
<th>INITIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>checklist:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Responsible activity.</td>
<td></td>
<td></td>
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<tr>
<td>b. Medical Facility.</td>
<td></td>
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<tr>
<td>c. Fire Department.</td>
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<tr>
<td>d. Security/Police Department.</td>
<td></td>
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<tr>
<td>5. Disposal Supervisor tailgate safety brief:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Designate emergency vehicles.</td>
<td></td>
<td></td>
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<tr>
<td>b. Designate emergency evacuation route.</td>
<td></td>
<td></td>
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<tr>
<td>c. Review emergency response procedures.</td>
<td></td>
<td></td>
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<tr>
<td>6. Verify daily equipment inspection.</td>
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<tr>
<td>7. Verify detonators are separated from explosives.</td>
<td></td>
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<tr>
<td>8. Verify area has been evacuated.</td>
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<tr>
<td>9. Notify command center operations are commencing.</td>
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<tr>
<td>10. Start disposal activities.</td>
<td></td>
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<tr>
<td>11. UXOSO ensures detonation site insected after designated wait time.</td>
<td></td>
<td></td>
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<tr>
<td>12. Collect all metal fragments for later disposal.</td>
<td></td>
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<tr>
<td>13. QC check performed.</td>
<td></td>
<td></td>
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<tr>
<td>14. Stop disposal activities.</td>
<td></td>
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<tr>
<td>15. QA check (if required).</td>
<td></td>
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<tr>
<td>16. HGL notification upon completion of demolition operations:</td>
<td></td>
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<tr>
<td>a. Notify Client:</td>
<td></td>
<td></td>
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<tr>
<td>b. Responsible Activity:</td>
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<tr>
<td>c. Medical Facility:</td>
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<tr>
<td>d. Fire Department:</td>
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<tr>
<td>e. Local Police/Security:</td>
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<td></td>
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<tr>
<td>f. Public Utility Company:</td>
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<tr>
<td>17. Complete HGLForm 15.04 MEC/UXO Accountability Log.</td>
<td></td>
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<tr>
<td>18. Demobilize (when applicable)</td>
<td></td>
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</tbody>
</table>

Demolition supervisor signature:  
Date:
## ATTACHMENT 3
### DEMOLITION EQUIPMENT CHECKLIST

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Quantity</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Explosive Vehicle(s)</td>
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<td></td>
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<tr>
<td>Personnel Vehicle(s)</td>
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<td></td>
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<tr>
<td>Camcorder/Digital Camera</td>
<td></td>
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<tr>
<td>Air Horn</td>
<td></td>
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<tr>
<td>Handheld Radios</td>
<td></td>
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<tr>
<td>Electronic Firing Device</td>
<td></td>
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<tr>
<td>Radio Controlled Firing Device</td>
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<tr>
<td>Ruler, 24-inch</td>
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<td></td>
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<tr>
<td>Shovel, round point, long handle</td>
<td></td>
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<tr>
<td>Blasting Machine</td>
<td></td>
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<tr>
<td>Duct tape</td>
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<tr>
<td>Plastic tape</td>
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<tr>
<td>Measuring tape, 50- or 100-meter</td>
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<tr>
<td>Toolbox, general hand tools</td>
<td></td>
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<tr>
<td>Galvanometer</td>
<td></td>
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<tr>
<td>Firing Wire</td>
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<tr>
<td>Demolition Kit</td>
<td></td>
<td></td>
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<tr>
<td>Knife</td>
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<td></td>
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<tr>
<td>Magnetometer</td>
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</table>

### 3.0 CHECKLIST VERIFICATION

Disposal Supervisor Signature: 

<table>
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<th>Date:</th>
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*HGL—Standard Operating Procedure*
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<th>1.0 EQUIPMENT</th>
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<th>COMMENTS</th>
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<tr>
<td>Air Horn, emergency</td>
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<tr>
<td>Burn Blanket</td>
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<tr>
<td>Burn Kit</td>
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<tr>
<td>Emergency Eye Wash</td>
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<tr>
<td>Fire Blanket</td>
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<td>Fire Extinguisher, 10-pound ABC</td>
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<tr>
<td>Bloodborne Pathogen Kit</td>
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<td>First Aid Kit</td>
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<tr>
<td>Leather gloves</td>
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<td>Goggles</td>
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<td>Face Shield(s)</td>
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<td>Welder’s Gloves</td>
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<td>Welder’s Apron(s)</td>
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<td>Rain Suit(s)</td>
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<td>Safety Vest(s)</td>
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<tr>
<td>Stretcher</td>
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<td>Water, 5-gal bottle (emergency shower)</td>
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<tr>
<td>Water, drinking – 1 liter per person</td>
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<td>Other:</td>
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<td>Other:</td>
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2.0 CHECKLIST VERIFICATION

<table>
<thead>
<tr>
<th>Disposal Supervisor Signature:</th>
<th>Date:</th>
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**ATTACHMENT 5**  
**GENERAL SAFETY PRECAUTIONS**

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

2. Do not work with electric blasting caps or other electro-explosive devices while wearing clothing prone to producing static electricity such as nylon, silk, synthetic hair, etc.

3. Do not use explosives or accessory equipment that is obviously deteriorated or damaged. They may cause premature detonation or fail completely.

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

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

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

7. Do not use improvised methods for initiating blasting caps.

8. Do not bury blasting caps. Use detonating cord to transmit the explosive wave from the blasting caps, on the surface, to a buried/tamped explosive charge. Buried blasting caps are subject to unobserved pressures and movement, which could lead to premature firing or misfires.

9. Test electric-blasting caps for continuity at least 50 feet downwind from any other explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be shunted by twisting the bare ends of the wires together. The wires will remain shunted until ready to be connected to the firing circuit.

10. In the event of a misfire when disposing of explosives by detonation, do not approach the disposal site for at least 30 minutes after the expected detonation time, when firing electrically. When conducting non-electric procedures, the wait time will be at least one hour from the expected time of detonation.

11. Items with lugs, strong backs, tail-booms, base plates, etc., should be oriented away from personnel locations.

12. Consideration should be given to tamping the UXO to control fragments, if the situation warrants. Fragments will be minimized not only to protect personnel but also property, such as buildings, trees, etc.

13. Avoid inhaling the smoke, dust, or fumes of burning pyrotechnic or incendiary materials. The smoke, dust and fumes from many of these materials are irritating and/or toxic if inhaled.

14. Do not use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.

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

16. Inert munitions will not be disposed of, or sold for scrap, until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture, or air to expand and burst the sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to pressure from being confined. All requirements of the UXO Procedure for the Management and Disposition of Material Potentially Presenting an Explosive
Hazard (MPPEH) will be met prior to releasing any inert munitions material.

17. Maintain minimum safe distances between electromagnetic-radiating sources and electro-explosive devices (IAW EODB/TM-TO 60A-1-1-12).

18. Do not conduct blasting or Demolition operations during an electrical, dust, sand, or snowstorm severe enough to produce atmospheric static electrical charges, or when such a storm is nearby (within 10 miles). Under such conditions, all operations will be suspended or terminated, cap and lead wires shunted, and personnel removed from the demolition area. Demolition operations will also be terminated if visibility becomes less than 600 feet.

19. Loose initiating explosives: lead azide, mercury fulminate, lead styphnate, and tetracene. These explosives manifest extreme sensitivity to friction, heat, and impact. Extra precautions are required when handling these types of explosives. Keep initiating explosives in a water-wet condition at all times until ready for final preparation for detonation. Sensitivity of these explosives is greatly increased when dry.

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

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

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

23. MEC containing white phosphorus will not be detonated into the ground. White phosphorus munitions will be counter-charged on the bottom centerline (CCBC) when possible.

24. A search of the detonation site, after the demolition operation, will be conducted to assure complete disposal was accomplished.

25. Do not abandon any explosives.

26. Do not leave explosives, empty cartridges, boxes, liners or other materials used in the packing of explosives lying around where children, unauthorized persons or livestock can get at them.

27. Do not allow any wood, paper or other materials used in packing explosives to be burned in a stove, fireplace, or other confined space, or be re-used for any other purpose. Such materials will be destroyed by burning at an isolated location out of doors, with no one allowed within 100 feet of the burning operation.

28. Do not fight fires involving explosive material. Evacuate all personnel to a safe location and secure the area.

29. Know and observe federal, state, and local laws/regulations that apply to the transportation, storage, and use of explosives.

30. Do not permit metal, except approved metal truck bodies, to contact explosive containers.

31. Do not transport metal, flammable, or corrosive substances with explosives.

32. Do not allow smoking, or the presence of unauthorized personnel, in vehicles transporting explosives.

33. Carefully load and unload explosives from vehicles. Never throw or drop explosives from the vehicle.

34. Assure the load is blocked and braced to prevent it from movement and displacement.

35. Do not drive vehicles containing explosives over public highways until all permits and certifications

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have been obtained from the state enforcement agencies.

36. All routes must be approved in writing prior to transporting explosive materials over public highways.

37. Licensed commercial carriers will conduct the shipment of explosive materials over public highways unless HGL UXO personnel have been specifically licensed and certified to make the shipment.

38. Never leave a vehicle that is loaded with explosives unattended.

39. Do not store blasting caps, detonators, or other items containing initiating explosives in the same box, container, or magazine with other explosives.

40. Store explosive materials in military or BATF-approved magazines only. Ensure the magazines used for the storage comply with quantity distance requirements, for the class of explosive material they contain. Reference documents include: Explosives Law and Regulation, BATF P 5400.7, and 49 CFR.

41. Do not store spark-producing metal/tools in an explosive magazine.

42. Do not permit smoking, matches, or any source of fire or flame within 100 feet of an explosive magazine.

43. Do not allow leaves, grass, brush, or debris to accumulate within 50 feet of an explosive magazine.

44. Do not permit the discharge of firearms within 300 feet of an explosive magazine.

45. Do not use any alkaline material such as lye, washing soda, or soap to remove TNT exudate. Alkaline materials will react with TNT to render it more sensitive.

46. Do not permit smoking, matches, or other sources of fire or flame within 100 feet of an area in which explosives are being handled.

47. Do not expose explosives or devices containing explosive to prolonged exposure to direct sunlight. Such exposure can increase sensitivity and deterioration.

48. Ensure all unused explosives are returned to their proper containers and the container closed after use.

49. Do not carry explosives or explosive components in pockets or on the body.

50. Do not insert anything but time fuse or detonating cord into the open end of a blasting cap.

51. Do not strike, tamper with, or attempt to remove or investigate the contents of an electric/non-electric blasting cap, detonator, or other explosive initiating device. A detonation may occur.

52. Do not pull on the electrical lead wires of electric blasting caps, detonators, or their electro-explosive devices. A detonation may occur.

53. Do not attempt to remove an unfired or misfired primer or blasting cap from a base coupling. There is a high risk of an explosion.

54. Do not allow unauthorized or unnecessary personnel to be present when explosives are being handled.

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

56. Do not use pull rings or safety pins to lift or handle explosive devices.
ATTACHMENT 6
EXPLOSIVE SYSTEMS CONFIGURATION

1.0 REMOTE FIRING DEVICE

1. Perform system pre-operational test and set up using the Rothenbuhler Operator's Manual. Remove key from controller unit until ready to fire.

2. Place the remote near the detonation site with the antenna in the vertical position. If using electric caps the remote should be within 100 feet of the shot. Use the unit blast shield, sandbags, or natural cover to protect the remote.

3. Ensure the remote indicates a READY condition for the selected initiation method (green READY LED on steady, red ARMED LED off).

4. If using Nonel®/shocktube, connect the shock tube to the igniter tip. The tube should be wrapped around through holes in the tip's molded casing to keep it from falling out. Prime the shot and return to the safe area.

5. If using electric caps, cut off a length of firing wire that will reach between the remote and the charges (100 feet or less).

6. Conduct a continuity check of the firing wire with a galvanometer. Shunt the free ends of the wire to prevent an electric charge from building up in the firing wire.

7. Test each electric blasting cap 50 feet downwind of other explosives with a galvanometer.

8. Place blasting caps in a hole, behind a barricade, or under a sandbag before removing the shunt and testing for continuity.

9. Fully extend the leg wires and ensure the cap is pointing away from the person conducting the continuity test.

10. Secure the leg wires to prevent the cap from moving during the test.

11. Use only a special silver-chloride dry cell battery in the testing galvanometer. Other type batteries may provide sufficient voltage to fire the blasting cap.

12. Upon completion of testing, re-shunt the leg wires. The wires will remain shunted until ready to connect to the firing circuit.

13. For dual priming connect blasting caps in a parallel circuit to the extension wires.

14. Test the circuit with the galvanometer, and then connect extension wires to the remote.

15. Retrieve caps from barricade, prime shot, and return to safe area.

16. Retrieve caps from barricade, prime shot, and return to safe area.

2.0 FIRING THE REMOTE FIRING DEVICE

1. The SUXOS will verify that the exclusion zone is clear and barricades are in place.

2. The SUXOS will give a "five-minute warning" blast on either the air/vehicle horn, vehicle horn, or siren, and on the and radio.

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25
3. The SUXOS will give a "one-minute warning" blast on either the air/vehicle horn, or siren, and on the radio.

4. Install the key and engage the "POWER" switch on the controller to the right until the BATTERY LED illuminates.

5. Momentarily depress the controller STATUS button. The yellow TRANSMIT LED will flash for approximately one second. At the end of this time a green READY LED will come on steady, indicating that the remote is on and in the standby mode. The steady green LED also indicates the remote is within range of the controller.

6. Push the ARM/DISARM switch to the left and hold for one second. The red ARMED LED will flash for approximately 18 seconds and then come on steady. The remote is now armed.

7. UXO Demolition Supervisor gives three loud "Fire-in-the-Hole" warnings.

8. SUXOS gives fire command on the radio.

9. SUXOS gives permission to fire the shot.

10. Lift the safety cover on the FIRE switch and push the FIRE switch forward.

**3.0 PREPARATION OF THE SCORPION ELECTRONIC BLASTING MACHINE**

1. Perform pre-operational check as per instructions on blasting machine.

2. Lay out firing wire or Nonel®/shocktube.

3. Conduct a continuity check of the firing wire with a galvanometer. Shunt the free ends of the wire to prevent an electric charge from building up in the firing wire.

4. Test each blasting cap with a galvanometer 50 feet away from other explosives.

5. Place blasting caps in a hole, behind a barricade, or under a sandbag before removing the shunt and testing for continuity.

6. Fully extend the leg wires and ensure the cap is pointing away from the person conducting the continuity test.

7. Secure the leg wires to prevent the cap from moving during the test.

8. Use only a special silver-chloride dry cell battery in the testing galvanometer. Other type batteries may provide sufficient voltage to fire the blasting cap.

9. Upon completion of testing, re-shunt the leg wires. The wires will remain shunted until ready to connect to the firing circuit.

10. For dual priming, connect blasting caps in a parallel circuit to the firing wire.

11. Retrieve caps from barricade, prime shot, and return to safe area.

**4.0 FIRING THE SCORPION ELECTRONIC BLASTING MACHINE**

1. The SUXOS will verify that the exclusion zone is clear and barricades are in place.

2. The SUXOS will give a "one-minute warning" blast on either the air or vehicle horn, or siren, and on the radio.

3. The SUXOS will give a "one-minute warning" blast on either the air or vehicle horn, or siren.
4. If firing electric check firing wire with a galvanometer.
5. Connect the firing leads to the terminal posts of the blasting machine.
6. For Nonel®/shocktube, plug in the shock tube adapter and attach Nonel®/shocktube.
7. UXO Demolition Supervisor gives three loud "Fire-in-the-Hole!" warnings.
8. SUXOS gives fire command on the radio.
9. SUXOS gives permission to fire the shot.
10. Degrees and hold CHARGE button (keep depressed throughout sequence).
11. Press DETONATE button when green ready light comes on. For non-electric shots, hold DETONATE button down for one second and release.

5.0 MISFIRE PROCEDURES FOR THE REMOTE FIRING DEVICE
1. Make three successive attempts to fire.
2. Turn off the controller and remove the key.
3. Wait 30 minutes from the last initiation attempt.
4. After the wait time has elapsed, the Demolition Supervisor and a safety observer will proceed down range to inspect the firing system.
5. If Nonel®/shocktube was used, do not remove the caps from the charge. Disconnect Nonel®/shocktube from the igniter tip on the remote. Place a new, primed explosive charge next to the misfired charge.
6. If electric caps were used, remove the old blasting caps from charge and disconnect from extension wires. Shunt cap leg wires.
7. If detonating cord was used, cut detonating cord between cap and charge, and disconnect cap from extension wires. Shunt cap leg wires.
8. Set up new firing system.

6.0 MISFIRE PROCEDURES FOR THE SCORPION ELECTRONIC BLASTING MACHINE
1. Make three successive attempts to fire.
2. If using firing wire and still unsuccessful, disconnect wires and check continuity.
3. If continuity is good, reconnect to blasting machine and make three more attempts to fire.
4. If still unsuccessful, check connections of firing wires to terminals and make three more attempts to fire.
5. Change blasting machine after third unsuccessful attempt.
6. If unsuccessful with new blasting machine, disconnect and shunt firing leads.
7. If using Nonel®/shocktube, disconnect from blasting machine.
8. Wait 30 minutes from the last initiation attempt.
9. After the wait time has elapsed, the Demolition Supervisor and a safety observer will proceed down range to inspect the firing system.

10. If electric caps were used, remove old blasting caps from charge and disconnect from firing wire. Shunt cap leg wires.

11. If detonating cord was used, cut detonating cord between cap and charge and disconnect cap from fire wire. Shunt cap leg wires.

12. If Nonel®/shocktube was used, do not remove the caps from the charge. Place a new, primed explosive charge next to the misfired charge (FM-5-250).

13. Set up new firing system.

**7.1 SHOCK TUBE FIRING SYSTEMS**

Shock tube is a thin plastic tube of extruded polymer with a layer of special explosive dust deposited on its interior surface. The special explosive dust propagates a detonation wave, which is normally contained within the plastic tubing. Shock tube offers the instantaneous action of electric initiation without the risk of accidental initiation of the blasting cap by radio transmitters in the area or by static electricity discharge. The shock tube medium is extremely reliable.

**7.2 SHOCK TUBE SPlicING**

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

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

2. Loosely tie the two shock tube ends to be spliced together in a SQUARE KNOT. Leave at least 2 inches free at the end of each shock tube beyond the knot.

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

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

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

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

7. Secure splice with electrician's tape.

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

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

*HGL—Standard Operating Procedure*
10. Secure the shock tube remaining on the spool by tying a tight overhand knot in the loose end.

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

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

8.0 SHOCK TUBE SET-UP

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

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

3. Attach only a maximum of six additional leads per bunch block. Use additional bunch blocks, if necessary.

9.1 DONOR EXPLOSIVES

The primary donor explosives used for MEC disposal will be the 1-pound pentolite booster, plastic explosives, jet perforators, or binary explosives.

9.2 ONE-POUND PENTOLITE BOOSTER

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

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

9.3 PLASTIC EXPLOSIVES

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

9.4 JET PERFORATOR

1. Use the detonating cord clip provided to secure detonating cord to the Jet Perforator.
2. Place the Jet Perforator on the MEC item using tape or other suitable methods to prevent it from moving.
3. For tamped shots, use a box or other suitable material to provide soil from getting between the perforator and MEC item.

### 9.5 BINARY EXPLOSIVES

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

### 9.6 POST-DEMOLITION PROCEDURES

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

2. The Demolition Supervisor and one other UXO technician will return to the detonation site and check the results of the shot. If the procedure was successful the Demolition Supervisor will call in additional personnel to clean up the site. UXO personnel will conduct a visual sweep of the detonation site and the immediate area to gather fragments and explosive residue, if present.

3. Explosive residue will be collected and detonated.

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

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

6. After area is swept and cleared the Demolition Supervisor will notify the SUXOS and the “all clear’ will be given.
ATTACHMENT 7

ROTHENBUHLER ENGINEERING 1670

REMOTE FIRING DEVICE (RFD)

PROCEDURES
SAFETY WARNINGS

1) Always follow your local safety regulations. This manual and its procedures are secondary to governmental regulations, local regulations or company safety regulations and procedures. The operation procedures in this manual are only suggestions and should be checked against the above safety regulations and procedures. Company training should include the proper use of this machine and only trained personnel should use it.

2) Never rely on this equipment or any equipment totally for your safety. All mechanical and electronic equipment can fail. Always have a safety procedure that will protect you and minimize hazards of such failure.

3) High power radio transmissions can cause electric blasting caps to detonate. Keep the high powered Controller 25 or more feet (8 meters) from electric detonators.

4) The Shock Tube Initiator on the Remote Unit can develop up to 3,000 Volts. Do not touch this tip or tip jacks while arming or firing the unit.

5) Do not connect electric detonator wires or shock tube to the Remote Unit unless the green READY light is on, the red ARMED light is off, and the battery light is on steady.

6) Do not use the system if any of the units show damage to the point that failure is suspected. Thoroughly test the system prior to use.

7) Never approach the Remote Unit if it is attached to live explosives unless you have a confirmed READY status back to the Controller AND you have waited at least 2 minutes for the automatic disarm AND you have followed proper safety wait times.

8) It is MANDATORY that the Protective Cover is installed on the Charge Connector of the Remote unit at all times unless charging. There is the potential presence of voltage on some of the pins of the Charge Connector. For models produced after March 2009 (Serial Numbers 371+), the maximum current available from any pin is limited to 14.3 milliamperes.
3. PREOPERATIONAL PROCEDURES

3.1. PHYSICAL INSPECTION

3.1.1. Inspect all components for physical damage.

3.1.2. Remove the antenna dust caps and ensure the antenna jacks on the Controller Unit and Remote Unit are not damaged. Ensure they are clean and dry. Replace the antenna dust caps.

3.1.3. Ensure that the Remote and Controller Unit antennas are clean and free of damage. Ensure the electrical contacts are clean and dry.

3.1.4. Examine the shock tube igniter jacks on the left sides of the Remote Units. The jacks should be clean and dry.

3.1.5. Examine the Remote Unit’s shock tube igniter tips. They should be clean and dry. If more than 200 shots have accumulated on either tip, replacement is recommended to ensure reliable shot initiation.

3.1.6. Press the two electric detonator binding posts located on the left sides of the Remote Units. Ensure they compress and return to their normal position (Dual Output Model only).

3.1.7. Ensure the key receptacles on the Controller Unit and Remote Units are clean and dry. Ensure they operate smoothly and show no signs of physical damage.

3.2. CHARGING THE BATTERIES

3.2.1. Ensure all units are turned off (The Remote Unit will not charge unless deactivated).

3.2.2. Ensure the ambient air temperature is between 32 and 86 °F (0 to 30 °C). When the ambient temperature is above 80 °F (27 °C), best results are obtained when the Remote lids are opened and air is allowed to circulate over the Remote display panels.

3.2.3. Remove the protective covers on the charge connectors. Line the key on the charger adapter plugs with the slot on the top of charge connectors mounted on each unit. Insert the plugs and turn clockwise until locked in place.
**WARNING** It is MANDATORY that the Protective Cover is installed on the Charge Connector of the Remote unit at all times unless charging. There is the potential presence of voltage on some of the pins of the Charge Connector. For models produced after March 2009 (Serial Numbers 371+), the maximum current available from any pin is limited to 14.3 milliamperes.

3.2.4. Insert the supplied charger adapters into suitable power outlets (100-240 VAC, 50/60 Hz).

3.2.5. As the units begin charging, the green SLOW lights will come on briefly, then the red FAST lights will blink for about 5 seconds and come on steady. The red FAST lights indicate the units are fast charging. Table 3-1 shows the charge indicator modes.

3.2.6. When charging is complete, the FAST lights will turn off, and the green SLOW lights will come on steady. Typical recharge time is 3-4 hours. For maximum battery life, avoid leaving the charger connected for more than 24 hours when possible.

<table>
<thead>
<tr>
<th>Light</th>
<th>Blink Mode</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAST</td>
<td>On steady</td>
<td>Fast Charging</td>
</tr>
<tr>
<td>FAST</td>
<td>Blinks at startup</td>
<td>Pre-testing</td>
</tr>
<tr>
<td>FAST</td>
<td>Blinks continuous</td>
<td>Battery Error</td>
</tr>
<tr>
<td>SLOW</td>
<td>On steady</td>
<td>Charge Complete</td>
</tr>
<tr>
<td>SLOW</td>
<td>Blinks continuous</td>
<td>Pack Temperature Range Exceeded</td>
</tr>
</tbody>
</table>

Table 3-1 RFD Charge Indicator Modes

3.2.7. When charging is complete, disconnect the charger adapters and reinstall the covers on the charge connectors.

**WARNING** It is MANDATORY that the Protective Cover is installed on the Charge Connector of the Remote unit at all times unless charging. There is the potential presence of voltage on some of the pins of the Charge Connector. For models produced after March 2009 (Serial Numbers 371+), the maximum current available from any pin is limited to 14.3 milliamperes.
3.3. BATTERY USAGE AND TESTING

3.3.1. To check the Controller’s battery level, activate the unit by pressing the ON switch. The battery level will be shown as a percentage of full charge.

![Controller Battery Level](image1)

Figure 3-1 Controller Battery Level

![Remote Battery Voltage](image2)

Figure 3-2 Remote Battery Voltage

3.3.2. To test the Remote’s battery voltage, turn the unit on and hold the PRESS TO TEST switch for 10 seconds. A fully charged battery will stabilize with a reading of 13.5 V or more. The Remote Unit should be charged when the battery is less than 12.0 V. At 11.7 V, the yellow POWER light will flash to show the battery is too low.

3.3.3. When freshly charged, the Remote Units will run for up to 16 hours at an ambient temperature of 68 °F or 20 °C. Allow for reduced run times for hot or cold temperatures, or when the Safety Poll® mode of operation is used (Safety Poll® mode is explained in Section 5.1). Each unit can be fired approximately 100 times before recharging is required. Allow 15 minutes less run time, for each firing event.

3.3.4. When freshly charged, the Controller Unit will run in standby for up to 12 hours at an ambient temperature of 68 °F or 20°C. Allow for reduced run times for hot or cold temperatures, or when the Safety Poll® mode of operation is used (Safety Poll® mode is explained in Section 5.1).

3.3.5. The batteries will self-discharge at a rate of approximately 1% per day. This rate will increase as the temperature increases.

3.3.6. The RFD battery cells are reasonably resistant to developing a memory. For best results, allow the RFD to become mostly discharged before recharging, and allow the unit to fully charge without interruption.

3.3.7. The RFD’s internal battery packs can be recharged up to 500 times before replacement is required. A decrease in run time may be noticed at the end of the battery pack’s life cycle.
Return the RFD to an authorized service shop for replacement when required, or change your packs during the recommended 2-year servicing. Do not attempt field replacement.

3.3.8. Always turn the units off when not in use to conserve the battery charge.

3.3.9. The battery meter test switch can be pushed to check the battery level even if the power switch is in the off position. If the accessories bag in the lid gets excessively stuffed with tips or other items the possibility exists that the battery test button could be held down and consequently drain the battery.

3.4. TESTING THE RFD

3.4.1. This test procedure must be conducted in an area that is at least 100 feet from the nearest electric detonators or wires connected to electric detonators.

3.4.2. All RFD system components are described in detail in Section 2.

3.4.3. Ensure all units are sufficiently charged according to procedures 3.2 and 3.3.

3.4.4. Position the Controller and Remote Units at least 5 feet (1.5 meters) apart, in a position where all units can be observed while testing.

3.4.5. Install the antennas on the Remote and Controller Units.

3.4.6. On the Remotes, insert the enable keys and turn the POWER switches to the ON positions. Observe that the READY, ARMED, and POWER lights blink briefly on power up. The yellow light next to the ENABLE KEY should blink continuously to show the key is installed. The POWER light should remain on steady.

3.4.7. On the Remote Units, place the SELECT switch to the SHOCK TUBE position (Dual Output Model only). Observe the green SHOCK TUBE READY lights are on, and the red ARMED lights are out. Install a shock tube tip into the jacks located on the side of each Remote Unit.

3.4.8. On the Controller Unit, insert the Controller’s key and press the ON switch. Observe the yellow POWER and KEY lights are on steady.

3.4.9. On the Controller, press the STATUS switch. After a short time the green READY lights for the Remote Units that were previously prepared for use, will come on steady to show they are disarmed and communicating two-way. The select lights will automatically be turned on for Remote Units that answered back to the Status request if the Auto Select option is enabled.

3.4.10. If Auto Select option is not enabled, on the Controller, press the SELECT switches to select the Remote Units to be tested. The yellow SELECT lights for the selected units will turn on.
3.4.11. On the Controller, press the ARM switch. The ARMED lights for the selected Remote Units will blink for up to 15 seconds and come on steady.

3.4.12. On the Remote Units, the red ARMED lights will come on steady. The system is armed.

3.4.13. On the Controller, before 2 minutes have elapsed, press the DISARM switch. All Remotes will disarm within 3 seconds.

3.4.14. Re-arm the Controller Unit and wait 2 minutes. After the 2 minutes, all Remotes will return to the disarmed state. The red ARMED lights will go out, and the green READY lights will come on steady.

3.4.15. Re-arm the Controller Unit, and before the two minutes have expired, press both FIRE switches together and hold for \( \frac{1}{2} \) second. You should notice that all Remote Units developed sparks at the shock tube tip electrodes. All units subsequently return to the disarmed state.

*Note: 3.4.16 through 3.4.19 applies to the Dual Output Model only.*

3.4.16. On the Remote Units, place the SELECT switches to the ELECTRIC DETONATOR position and observe the green ELECTRIC DETONATOR READY lights are on, and the ARMED lights are out.

3.4.17. On the Remotes, depress the two spring loaded binding posts and insert the leads of the test lamps.

3.4.18. Repeat procedures 3.4.11 through 3.4.14. The test lamps should remain extinguished through out this portion of the procedure.

3.4.19. Re-arm the Controller Unit, and before the two minutes have expired, press both FIRE switches together and hold for \( \frac{1}{2} \) second. You should notice that all test lamps light briefly. All units subsequently return to the disarmed state.

3.4.20. If any units did not work as described in this section, return to a service shop for repair. Never use a unit that is damaged or suspected of being damaged.

3.4.21. Turn off all units. Restore antennas, tips, and test lamps as required. The system is now operationally ready for use.
4. RFD OPERATIONAL PROCEDURES

4.1. SETTING UP THE RFD

**WARNING** It is MANDATORY that the Protective Cover is installed on the Charge Connector of the Remote unit at all times unless charging. There is the potential presence of voltage on some of the pins of the Charge Connector. For models produced after March 2009 (Serial Numbers 371+), the maximum current available from any pin is limited to 14.3 milliamperes.

4.1.1. Select the number of Remotes required for the operation. Ensure all units are sufficiently charged and tested according to Chapter 3.

![Figure 4-1 Installing the Controller Antenna](image)

4.1.2. Ensure the Controller Unit key is removed. Position the Controller Unit at the intended firing position and install the antenna.

4.1.3. To place the RFD in Safety Poll® mode, press and hold the STATUS switch while also pressing the ON switch (Details of Safety Poll® mode in Section 5.1).

4.1.4. Select a position for the first Remote Unit close to the blast area, but far enough to ensure the Remote is safe from direct air blasts and falling rocks.
4.1.5. Install the antenna on the Remote Unit. Ensure the antenna is free of obstruction.

4.1.6. Turn the POWER switch to the ON position. Observe the yellow POWER light is on and not flashing. Ensure the battery voltage is above 12.0V.

4.1.7. For underground operation, ensure the green RECEIVE light is on steady to indicate the Remote is in receiving range of the leaky feeder radio signal.

4.1.8. For surface operation, the green RECEIVE light suggests there may be an interfering
radio signal or noise present. The RECEIVE light is similar to breaking squelch on a handheld radio and does not necessarily indicate operation is degraded.

Figure 4-4 Select the Initiator

4.1.9. Place the SELECT switch to the desired initiation method (Dual Output Model only). Verify the green READY light is on, while the red ARMED light remains off.

4.1.10. If using non-electric shock tube, install the tube into the RFD Tip, and install the tip into the jacks on the left side of the Remote as described in Section 2.8.

4.1.11. If using electric detonators, install the two-wire firing cable into the spring loaded binding posts located on the left side of the Remote Unit (Dual Output Model only).
4.1.12. Install the enable key into the Remote Unit and observe the yellow light next to the ENABLE KEY begins flashing. If the Controller is in Safety Poll® mode, this light will turn on steady within 15 seconds to show that full 2-way communications are working.

4.1.13. Close the lid on the Remote for protection. Repeat Sections 4.1.4 to 4.1.13 for the remaining Remote Units to be used in the operation.

4.2. FIRING THE RFD

4.2.1. Activate the Controller Unit on pressing the ON switch. Observe the yellow POWER light is on. The Controller should be recharged when the BATTERY indicator reads 20% or less.
4.2.2. When the area is clear and all shots are prepared, insert the key into the Controller Unit as shown in Figure 4-6. The yellow KEY light will turn on.

4.2.3. Press the SELECT switches to select the Remote Units to be fired. The yellow SELECT lights will illuminate as the corresponding Remotes are selected.
4.2.4. Press the STATUS switch and observe the green READY lights will light for each selected Remote Unit that is operational and within range.

4.2.5. Shown in Figure 4-9 are the results of our STATUS check for Unit #3. The steady green READY light indicates Unit #3 is disarmed. The steady yellow BATTERY light indicates Unit #3’s battery is not low.
4.2.6. Wait for the appropriate warning sirens. About 30 seconds from firing, press and hold the ARM switch for ½ second. The red ARMED lights will blink for up to 15 seconds and come on steady.

4.2.7. For systems configured in 1-way mode: If any of the ARMED lights continue to blink, those units are not within 2-way range and confirmation cannot be received. The Remote(s) may or may not fire depending on range, local interference, and the Controller radio’s power setting.

4.2.8. For systems configured for 2-way only mode, units that are not within 2-way range will not be armed.
4.2.9. When ready to fire, press the two FIRE switches together at the same time and hold for \( \frac{1}{2} \) Second as shown in Figure 4-11. Shot initiation should be detected.

4.2.10. After a short time, the green READY lights should be on steady to show that each Remote Unit has fired and is now disarmed as shown in Figure 4-12. Any lights that continue to blink indicate the Controller did not receive a confirming message and a manual STATUS check is required to ensure all units are disarmed.
4.2.11. To manually check status, press the STATUS switch at any time. The updated status of the SELECTED Remotes will be reported on the faceplate enunciator panel. You may alternately press DISARM and STATUS until all Remotes have reported they are confirmed READY.

4.2.12. With all deployed Remote Units having reported steady READY status, deactivate the Controller by pressing the OFF switch.
4.2.13. Remove the Controller Unit's key.

4.2.14. Wait an additional 2 minutes, and following standard safety procedures, you may approach and retrieve the Remote Units.

4.2.15. Turn OFF the Remote Units. Remove and store the enable keys, antennas, and shock tube tips.

4.2.16. Inspect all units for physical damage. Close the lids and restore dust caps.
**I. Project Information**

Site Name: ____________________________  Date: ____________

Site Location: ____________________________  Grid Number: ____________

Demolition Team Leader: ____________________________

**II. Explosive and MEC/UXO Accountability (Donor explosives)**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
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<td></td>
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</tr>
</tbody>
</table>

(a) All unused explosive materials returned to magazine and properly stored?

(b) Explosive Usage Record (HGL Form 15.05) completed and submitted to SUXOS?

(c) All destroyed/demiled MPPEH, MEC and UXO accounted for and verified by SUXOS?

(d) MEC/UXO Accountability Record (HGL Form 15.04) completed and filed?

(e) Magazine Data Card–Daily Summary of Magazine Transaction (HGL Form 15.02) completed?

(f) Magazine locked and secured (two-locks)?

(g) Detonator box locked and secured (two-locks)?

(h) Magazine fence gate locked and secured?

(i) Magazine keys returned and properly secured?

**III. Remarks**

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<table>
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</tbody>
</table>

**IV. Approval (signature)**

Demolition Supervisor: ____________________________

Senior UXO Supervisor: ____________________________
## ATTACHMENT 9
### Three Phase Quality Control Checklist
#### Demolition operations (HGL SOP 15.01)

<table>
<thead>
<tr>
<th>Team:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</table>

**Personnel Present:**

**Phase of Inspection (Circle):** PREPARATORY (P); INITIAL (I); FOLLOW-UP (F)

### CHECKLIST

<table>
<thead>
<tr>
<th>Item</th>
<th>Reference</th>
<th>Inspection Point</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>DDES B TP 18</td>
<td>All demolition team members meet the UXO-qualified personnel requirements</td>
<td></td>
<td></td>
<td></td>
<td>(P)</td>
</tr>
<tr>
<td>2.</td>
<td>Work Plans, ESP or ESS</td>
<td>Have all demolition team members reviewed the current work plan, ESP or ESS? Check Dates/Record of training.</td>
<td></td>
<td></td>
<td></td>
<td>(P)</td>
</tr>
<tr>
<td>3.</td>
<td>SOP 15.01 Sec 5.1</td>
<td>Do the provisions of SOP 15.01 meet procedural and safety requirements for performing demolition operations for all personnel selected to participate in the procedures meet the requirements specified in Para. 5.1?</td>
<td></td>
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<td>(P), (I), (F)</td>
</tr>
<tr>
<td>4.</td>
<td>SOP 15.01 Sec 5.2</td>
<td>Was the <strong>Coordination Meeting</strong> held prior to commencing Demolition operations?</td>
<td></td>
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<td>(P)</td>
</tr>
<tr>
<td>5.</td>
<td>SOP 15.01 Sec 5.4.1</td>
<td>Was a <strong>Public Meeting</strong> held prior to commencing Demolition operations?</td>
<td></td>
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<td>(P)</td>
</tr>
<tr>
<td>6.</td>
<td>SOP 15.01 Sec 5.4.2</td>
<td>Has the SUXOS completed the mandatory notifications in advance of the conduct of Demolition operations (i.e. Medical, Fire, Security)</td>
<td></td>
<td></td>
<td></td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>7.</td>
<td>SOP 15.01 Sec 5.5</td>
<td>Has the Explosive Safety Quantity Distance arc for the largest munition that will be detonated been used to calculate the EZ prior to the conduct of Demolition operations?</td>
<td></td>
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<td>(P), (I), (F)</td>
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<tr>
<td>8.</td>
<td>SOP 15.01 Sec 5.5</td>
<td>Are proper visitor access and control procedures known and followed?</td>
<td></td>
<td></td>
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<td>(P), (I), (F)</td>
</tr>
<tr>
<td>9.</td>
<td>SOP 15.01 Sec 5.5</td>
<td>Does the integrity of the EZ remain intact until Demolition operations are complete?</td>
<td></td>
<td></td>
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<td>(P), (I), (F)</td>
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<tr>
<td>10.</td>
<td>SOP 15.01 Sec 5.1, 5.2</td>
<td>Are appropriate personnel requirements met/achieved for the proper conduct of Demolition operations?</td>
<td></td>
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<td>(P), (I), (F)</td>
</tr>
<tr>
<td>11.</td>
<td>SOP 15.01 Sec 5.6</td>
<td>Is the two man rule concept religiously followed whenever explosives are transported or handled during explosive operations?</td>
<td></td>
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<td>(P), (I), (F)</td>
</tr>
<tr>
<td>12.</td>
<td>SOP 15.01 Sec 5.7</td>
<td>Does a demolition procedures review occur prior to the conduct of Demolition operations in accordance with the requirements of SOP 15.01?</td>
<td></td>
<td></td>
<td></td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>13.</td>
<td>SOP 15.01 Sec 5.8 ATT 1, ATT 2</td>
<td>Is all the equipment and materials required for Demolition operations available and checked prior to operation conduct in accordance with the provisions of SOP 15.01?</td>
<td></td>
<td></td>
<td></td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>14.</td>
<td>TMP, SOP 15.01 Sec 5.1.2</td>
<td>Is a current copy of SOP 15.01, Project TMP, Explosive Safety Submission, Range Certification (when applicable) and EOD Publications (minimum TM 60A-1-1-31) available to the Team when conducting Demolition operations? Check dates.</td>
<td></td>
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<td>(P), (I), (F)</td>
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<tr>
<td>15.</td>
<td>SOP 15.01 Sec 5.3</td>
<td>Have sufficient communications been established to enable team/field personnel to communicate with the Site Field Office and emergency response agencies prior to the conduct of operations?</td>
<td></td>
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*HGL—Standard Operating Procedure*
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<thead>
<tr>
<th>No.</th>
<th>Document</th>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>16</td>
<td>SOP 15.01 Sec 5.9</td>
<td>Has a backup emergency communication system (air horns) been established in accordance with SOP 15.01 in the event that radios are inoperative in the EZ?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>17</td>
<td>SOP 15.01 Sec 5.8, 5.10, ATT 2, ATT 5</td>
<td>Are there sufficient range vehicles available, with appropriate safety devices installed, to transport and support Explosive Demolition Operation Personnel?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>18</td>
<td>SOP 15.01 Sec 5.8</td>
<td>Are all vehicle safety requirements of SOP 15.01 known and strictly observed?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>19</td>
<td>SOP 15.01 Sec 5.11</td>
<td>Does the SUXOS obtain a weather report prior to the conduct of Demolition operations?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>20</td>
<td>SOP 15.01 Sec 5.11</td>
<td>Are Demolition operations denied or cancelled when electrical storms are within 5 miles of the disposal site or when other severe weather conditions exist that would have a negative impact on safety?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>21</td>
<td>SOP 15.01 Sec 5.12</td>
<td>Are emergency medical support administrative, notification, training, and equipment requirements observed for Demolition operations in accordance with SOP 15.01?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>22</td>
<td>SOP 15.01 Sec 5.13</td>
<td>Are fire support administrative, notification, training, and equipment requirements observed for Demolition operations in accordance with SOP 15.01?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>23</td>
<td>SOP 15.01 Sec 5.14</td>
<td>Are the PPE items required for Demolition operations present and serviceable in accordance with SOP 15.01?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>24</td>
<td>SOP 15.01 Sec 5.1, 5.2</td>
<td>Are Demolition operations only performed by qualified UXO Personnel following the requirements specified in SOP 15.01?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>25</td>
<td>SOP 15.01 Sec 5.15.1</td>
<td>Are engineering control specifications available and employed when it becomes necessary to reduce detonation effects?</td>
<td>(P), (I), (F)</td>
</tr>
<tr>
<td>26</td>
<td>SOP 15.01 Sec 5.13</td>
<td>Does the SUXOS or Demolition Supervisor take the appropriate actions as specified in SOP 15.01 prior to initiating a demolition shot?</td>
<td>(I), (F)</td>
</tr>
<tr>
<td>27</td>
<td>SOP 15.01 Sec 5.15.2</td>
<td>Are explosive initiation systems chosen in accordance with SOP 15.01 provisions?</td>
<td>(I), (F)</td>
</tr>
<tr>
<td>28</td>
<td>SOP 15.01 Sec 7.4</td>
<td>Are only Blow-in-Place (BIP) operations performed for MEC/MPPEH determined to be unsafe to move in accordance with the provisions of SOP 15.01?</td>
<td>(I), (F)</td>
</tr>
<tr>
<td>29</td>
<td>SOP 15.01 Sec 7.5</td>
<td>Is the appropriate disposal procedures followed for munitions containing Phosphorus-filled in accordance with the provisions of SOP 15.01?</td>
<td>(I), (F)</td>
</tr>
<tr>
<td>30</td>
<td>Phosphorus-filled munitions SOP 15.01 Sec 7.6</td>
<td>Following the performance of disposal operations does an inspection occur for MPPEH and is MPPEH inspected, collected, and certified in accordance with TMP requirements?</td>
<td>(I), (F)</td>
</tr>
<tr>
<td>31</td>
<td>SOP 15.01 Sec 9.0 and ATT 8</td>
<td>Are Disposal Operations Checklists and Explosive Disposal Logs prepared and completed in accordance with this SOP 15.00 and SOP 15.01 Attachments 4 and 8?</td>
<td>(I), (F)</td>
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**PUNCH LIST ITEMS**

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<th>Conducted by:</th>
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1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide HydroGeoLogic, Inc. (HGL) employees with procedures for material potentially presenting and explosive hazard (MPPEH) inspection, management, safety, security and chain of custody (CoC) certification during munitions response activities.

2.0 SCOPE AND APPLICATION

This SOP applies to all HGL employees involved in the inspection and management process for certifying MPPEH as either material documented safe (MDAS) or as material documented as an explosive hazard (MDEH) before transfer within or release from Department of Defense (DoD) control. All HGL employees who are tasked with performing these procedures will be qualified in accordance with the Department of Defense Safety Board (DDESB) Technical Paper 18 and Department of Defense Instruction (DoDI) 4140.62.

3.0 GENERAL REQUIREMENTS

All work will be performed in a manner that is consistent with Occupational Safety and Health Administration established standards and requirements. Refer to the site- or project-specific health and safety plan for relevant health and safety requirements. All activities will be conducted in conformance with the Explosive Safety Submission/Explosives Site Plan and Site Safety and Health Plan (SSHP). Procedures for packaging and disposing of all waste generated during field activities will be described in the project-specific work plan.

Personnel who use this procedure must document evidence to the Senior Unexploded Ordnance Supervisor and the Unexploded Ordnance Quality Control Specialist (UXOQCS) that they have read and understand this procedure by completing the SOP acknowledgement form, Attachment 1. This documentation will be retained in the project file.

Any deviations from specified requirements will be justified to and authorized by the project manager and/or the relevant program manager and discussed in the approved project plans. Deviations from requirements will be sufficiently documented to re-create the modified process.

4.0 DEFINITIONS

Exclusion Zone (EZ): A safety zone established around a MEC work area. Only project personnel and authorized, escorted visitors are allowed within the EZ. Examples of EZs are safety zones around MEC intrusive activities and safety zones where MEC is intentionally detonated.
**STANDARD OPERATING PROCEDURE**

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*Fuze:* (1) A device with explosive components designed to initiate a train of fire or detonation in a munition. (2) A non explosive device designed to initiate an explosion a munition. Devices that initiate the detonation sequence in munitions. Fuzes are typically associated with munitions (for example, mortars and bombs), but they are occasionally found separately. They may contain a charge large enough to cause injury. Magnetic and proximity fuzes are the most sensitive and, depending on other factors (for example, fuze location and arming), greatly influence the likelihood of detonation.

*Minimum Separation Distance (MSD):* The minimum safe distance for non-essential personnel to be present during unexploded ordnance (UXO) operations. Generally speaking, the maximum horizontal fragmentation distance is to be used for all UXO items as the MSD for all non-essential personnel for both intentional and unintentional detonations.

*Material documented as safe:* MPPEH that has been assessed and documented as not presenting and explosive hazard and for which the CoC has been established and maintained. This material is no longer considered MPPEH.

*Material documented as an explosive hazard:* (Formerly referred to as material documented as hazardous, or MDAH). MPPEH that cannot be documented as MDAS, that has been assessed and documented as to the maximum explosive hazards the material is known or suspected to present, and for which the CoC has been established and maintained. This material is no longer considered to be MPPEH. (The MDEH characterization addresses only the explosives safety status of the material.)

*Material Potentially Presenting an Explosive Hazard:* Material potentially containing explosives or munitions (for example, munitions containers and packaging material; munitions debris (MD) remaining after munitions use, demilitarization, or disposal; and range-related debris) (RD); or material potentially containing a high enough concentration of explosives that the material presents and explosive hazard.

*Military Munitions:* All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of DoD, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives; pyrotechnics; chemical and riot control agents; smokes; and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed [10 U.S.C. 2710(e)(3)(A)].
STANDARD OPERATING PROCEDURE

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Military Munitions Response Program (MMRP): The MMRP addresses the potential explosives safety, health, and environmental issues caused by past DoD munitions related activities. MMRP is a relatively new (2002) element of the Secretary of Defense's Defense Environmental Restoration Program. The program addresses the potential explosives safety hazards presented by MEC, which includes UXO, discarded military munitions (DMM), and munitions constituent concentrations high enough to pose an explosive hazard and potential environmental contamination.

Munitions and Explosives of Concern (MEC): This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) UXO, as defined in 10 U.S.C. 101(e)(5)(A) through (C); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (such as TNT and RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Debris (MD): Remnants of munitions (for example, fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal. Inert munitions-related material recovered during an MEC removal.

Transferred within or released from DoD control: A receiver has acknowledgment of MDEH or MDAS material by signed documentation (DD Form, 1348–1A “Issue Release/Receipt Document,” or an equivalent document) and has taken physical custody of the MDEH or MDAS from the Department of Defense.

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

UXO-Qualified Personnel: Personnel who meet the training requirements for UXO Technician and Personnel and have performed successfully in military Explosives Ordnance Disposal (EOD) positions or are qualified to perform in the following service contract act contractor positions: UXO Technician II, UXO Technician III, and UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), and Senior UXO Supervisor (SUXOS).

5.0 PROCEDURES

5.1 MANAGERS AND SUPERVISORS

Project Managers and field supervisors are responsible for ensuring all site personnel read, understand, and follow this SOP. If any discrepancies are found with procedural steps or safety issues pertaining to this SOP, discrepancies will immediately be brought to the attention of the responsible supervisor for corrective action.
The Senior Unexploded Ordnance Supervisor (SUXOS or senior UXO-qualified individual assigned is responsible for ensuring that all MPPEH activities are conducted in accordance with DoD 6055.09-M, Volume 7, DoD Ammunition and Explosives Safety Standards: Criteria for Unexploded Ordnance, Munitions Response, Waste Military Munitions, and Material Potentially Presenting an Explosive Hazard, DoDI 4140.62 Material Potentially Presenting and Explosive Hazard, USACE EM 1110-1-4009, Military Munitions Response Actions and EM 385-1-97 Explosives Safety and Health Requirements Manual and all other references shown in Section 8.0 of this SOP.

HGL employees assigned by the field level UXO Technicians will comply with these procedures for processing MPPEH for final disposition. Only UXO-qualified personnel are authorized to perform MPPEH processing.

### 5.2 UXO TECHNICIAN RESPONSIBILITIES AND PROCEDURES

The objective of the following procedures is to ensure that an inspection of the exterior and interior surfaces of all recovered MPPEH is safely conducted to ensure these items do not present and explosive hazard.

1. **Unexploded Ordnance Sweep Personnel (UXOSP)** will only mark suspected items and will not be allowed to perform any assessment of a suspect item to determine its status.

2. **UXO Technician I** can tentatively identify a located item as MPPEH confirmation by a UXO Technician II or III.

3. **UXO Technician II** will:
   a. Perform a 100 percent inspection of each item as it is recovered and determine the following:
      1. Is the item a UXO, a DMM, munitions debris, or range-related debris?
      2. Does the item contain explosives hazards or other dangerous fillers?
      3. Does the item require detonation?
      4. Does the item require demilitarization or venting to expose dangerous fillers?
      5. Does the item require removal of batteries, mercury seals or switches, the draining of engine fluids, illuminating dials and other visible liquid hazardous, toxic or radiological waste (HTRW) materials?
   b. Segregate material items requiring demilitarization or venting procedures from those items ready for certification.
   c. Items found to contain explosives hazards or other dangerous fillers will be processed in accordance with applicable procedures.
4. **UXO Technician III** will:
   a. Perform a 100 percent re-inspection of all recovered items to determine if free of explosives hazards or other dangerous fillers and engine fluids, illuminating dials and other visible liquid HTRW materials?
   b. Supervise detonation of items found to contain explosive hazards or other dangerous fillers and venting/demil procedures.
   c. Supervise the consolidation of MPPEH for containerization and sealing. MD and RD will be segregated.

5. **UXO Quality Control Specialist (UXOQCS)** will:
   a. Conduct daily audits of the procedures used by UXO teams and individuals for processing MPPEH.
   b. Perform and document random sampling (by pieces, volume or area) of all MPPEH collected from the various teams to ensure no items with explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials are identified as munitions debris or range-related debris as required for completion of DD Form 1348–1A–Issue Release/Receipt Document, Attachment 3.

6. **UXO Site Safety Officer (UXOSO)** will:
   a. Ensure the specific procedures and responsibilities for processing MPPEH for certification as munitions debris or range-related debris specified in the work plan are being followed.
   b. Ensure all procedures for processing MPPEH are being performed safely and consistent with applicable regulations.

7. **SUXOS** will:

   **– N O T E –**

   *When a SUXOS is not assigned to a project site where MPPEH is being processed, the UXOSO will be responsible for performing the procedures outlined this section.*

   a. Be responsible for ensuring work and Quality Control (QC) Plans specify the procedures and responsibilities for processing MPPEH for final disposition as munitions debris or range-related debris.
   b. Ensure a Requisition and Turn-in Document DD Form 1348–1A is completed for all munitions debris and range-related debris to be transferred for final disposition.
c. Perform or witness the initial 100-percent inspection or DDESB-approved processing of the material to satisfy that the munitions debris and range-related debris is free from explosive hazards necessary to complete the DD Form 1348–1A.

d. Certify all munitions debris and range-related debris as free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials.

e. Be responsible for ensuring that inspected debris is secured in a closed, labeled and sealed container and documented as follows:

(1) The container will be closed and clearly labeled on the outside with the following information: The first container will be labeled with a unique identification that will start with either USACE or other applicable DoD component/Installation Name/HGL’s Name/0001/Seal’s unique identification and continue sequentially.

(2) The container will be closed in such a manner that a seal must be broken in order to open the container. A seal will bear the same unique identification number as the container or the container will be clearly marked with the seal’s identification if different from the container.

(3) A documented description of the container will be provided by HGL with the following information for each container; contents, weight of container; location where munitions or range-related debris was obtained; name of contractor, names of certifying and verifying individuals; unique container identification; and seal identification, if required. HGL, in a separate section of the final report, will also provide these documents.

f. Establish a secure location for collection, processing and storage of DMM, MPPEH, MD and RD until transferred off site.

g. Using the MPPEH, Munitions Debris and Range Debris Processing and Storage Area Inspection Checklist, Attachment 2 ensure:

(1) Exclusion zones are maintained during MPPEH inspection and processing activities.

(2) Adequate warning signs and boundary markers are in place during MPPEH inspection and processing activities.

(3) Storage containers, drums, pallets and tarpaulins are in good repair.

(4) Storage containers and drums are properly labeled and legible.

(5) Un-inspected material is properly segregated from inspected material to prevent comingling.
(6) Storage containers or drums in active use are locked to prevent un-inspected material from being comingled with inspected material until seals are installed.

(7) Demilitarized items are secured.

5.3 MPPEH CERTIFICATION AND VERIFICATION:

MPPEH procedures will be in accordance with DoDI 4140.62 and EM 1110-1-4009. All MPPEH will be assessed and its explosive safety status determined and documented prior to transfer within the DoD or release from DoD control. Prior to release to the public, MPPEH will be documented by authorized and technically qualified personnel as Material Documented as Safe after a 100% inspection and an independent 100% re-inspection to determine that it is safe from an explosive perspective. The following certification and verification procedures will be followed for material suspected or determined as MPPEH:

1. The SUXOS will certify that the debris is free of explosives hazards.

2. The USACE Ordnance and Explosive Safety Specialist (OESS) or similarly trained individual will verify that the debris is free of explosive hazards. When an USACE OESS is not assigned a similarly trained UXO-qualified person will perform this step.

3. DD Form 1348–1A Issue Release/Receipt Document will be used as the certification/verification documentation. The DD Form 1348–1A must clearly show the names of the SUXOS and the USACE OESS or similarly trained UXO-qualified individual:
   a. Typed or printed or typed name
   b. Organization
   c. Signature
   d. HGL Albuquerque office addresses and telephone number.
   e. HGL unique identification number for each container
   f. Container seal number.
   g. Basic material content (Type of metal, such as steel or mixed), block 17.
   h. Estimated weight, block 20.
   i. Origin of where munitions debris or range-related debris was obtained, site name, city and state.

4. The following certification/verification will be entered on each DD Form 1348–1A (refer to example, Attachment 3) for MD or RD transferred within or release from DoD control and will be signed by the SUXOS and the USACE OESS if present or a similarly trained UXO-qualified individual if the OESS is not on site/assigned. This
STANDARD OPERATING PROCEDURE

Material Potentially Presenting an Explosive Hazard Inspection and Management

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statement will be used on any ranges where range related-debris is be processed along with MD:

“This certifies that the material listed has undergone a 100-percent inspection and an independent 100-percent reinspection, and to the best of our knowledge and belief, is free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials.”

5. The following certification/verification will be entered on each DD Form 1348–1A (refer to example, Attachment 3) for turnover of MD and will be signed by the SUXOS and the USACE OESS if present or a similarly trained individual if the OESS is not on site on properties where only munitions debris is being processed:

“This certifies and verifies that the material listed has undergone a 100-percent inspection and an independent 100-percent reinspection, and to the best of our knowledge and belief, is inert and/or free of explosives or related materials.”

5.4 MAINTAINING CHAIN OF CUSTODY AND FINAL DISPOSITION

HGL in coordination with the appropriate DoD agency will arrange for maintaining the CoC and final disposition of the certified and verified materials. The certified and verified material will only be released to qualified recycler that will:

1. Upon receiving the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued CoC, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agreeing with the provided documentation that the sealed containers contained no explosive hazards when received. This will be signed on the Qualified Recycler company letterhead (see example, Attachment 4) which will state the following:

“Upon receiving the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued chained of custody, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agreeing with the provided documentation that the sealed containers contained no explosive hazards when received. The contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content”.

2. Send notification and supporting documentation to the sealed container-generating contractor documenting the sealed containers have been smelted and are now only identifiable by their basic content.

3. This document will be incorporated into the final report as documentation for supporting the final disposition of munitions debris and range-related debris. If the CoC is broken, the affected MPPEH must undergo a second 100 percent inspection,
then 100 percent re-inspection, and be documented to verify its explosives safety status (identified as either munitions debris or range-related debris).

4. MDAS is no longer considered MPPEH as long as the CoC remains intact. A legible copy of inspection, re-inspection, and documentation must accompany the material through final disposition and be maintained for a period of 3 years thereafter. This documentation will be maintained as directed in Section 7.0 of this SOP.

5. MDAS being transferred within or released from DoD control will be documented on Inert, Demilitarization/Destruction and CoC Certification for Non-Hazardous Ammunition, Explosives and other Dangerous Articles (AEDA) and Range Scrap, Attachment 5.

6. The Project Manager will contact the receiving agent/recycler to obtain MDAS final demilitarization certification documentation.

5.5 MDEH MANAGEMENT

The following procedures must be accomplished before release of MDEH:

1. Ensure that MDEH is only transferred or released to those entities that:
   a. Have the licenses and permits required to receive, manage, or process the materials.
   b. Have technical experts about the known or suspected explosive hazards associated with the MDEH.
   c. Are qualified to receive, manage, and process MDEH in accordance with DoDI 4140.62.
   d. Have personnel who are:
      (1) Experienced in the management and processing of hazardous materials equivalent to the MDEH.
      (2) Trained and experienced in the identification and safe handling of used and unused military and/or any potential explosive hazards that may be associated with the specific MPPEH.

2. The receiver must be advised of all of the potential hazards associated with the MPPEH and agree to receive and process the material in accordance with (IAW) with DoD Instruction 4140.62.

3. All MPPEH shipments over public transportation routes must comply with DoD guidance that implements hazardous material transportation regulations.

4. Ensure that CoC and accountability records are maintained through final disposition of MPPEH. A legible copy of inspection, re-inspection, and documentation must
accompany MPPEH through final disposition and be maintained for a period of 3 years thereafter and IAW Section 7.0 of this SOP.

5.6 INSPECTION

An inspection of the MPPEH processing and MD/RD storage area containers will be conducted weekly by the UXOQCS and a periodic spot-check by the SUXOS to ensure the security, integrity and good housekeeping of the storage area is maintained. This inspection will be documented in the project Daily Quality Control Report (DQCR). Attachment 2 will be used to conduct and record this inspection.

--- NOTE ---

It is paramount that these inspections enforce all safeguarding and security control measures required for preventing potential comingling of processed material and ensuring the integrity of this process is properly maintained.

5.7 PROJECT START-UP AND ROUTINE INSPECTIONS

Prior to the establishment of the MPPEH processing, munitions- and range-related debris storage areas, a joint inspection will be conducted by the UXOQCS and UXOSO. The inspection, identification of any discrepancies and their disposition will be documented in the project DQCR.

5.7.1 Weekly Inspections

Weekly inspections will commence immediately on acquisition of explosive materials following mobilization to the site. The weekly inspection is necessary to determine if there has been an attempted or unauthorized entry into the container, or unauthorized removal of the contents. MPPEH Processing and Munitions Debris and Range Debris Storage Area Inspection Checklist (Attachment 2) will be used for conducting and documenting weekly storage area inspections. Upon completion of this inspection, the checklist will be signed by the individual conducting the inspection. The SUXOS will also sign the inspection checklist upon completion of their review of this form. This report will be maintained with the project site office files. This inspection includes the following:

1. Are exclusion zones properly maintained?
2. Are adequate hazard warning signs and boundary markers in place?
3. Are storage containers and drum pallet in fair condition?
4. Are containers properly labeled and labels intact?
Material Potentially Presenting an Explosive Hazard Inspection and Management

5. Are containers seal and locked?
6. Are un-inspected items segregated from inspected items?
7. Are demilitarized items secured?
8. Are any materials missing, evidence of tamping or unauthorized entry?

6.1 QUALITY CONTROL

The HGL Senior UXO Operation Manager is responsible for ensuring this SOP is reviewed annually for completeness, accuracy and safety. The HGL UXO Safety Manager is responsible for the maintenance, management and annual review of this SOP for procedural, quality control and safety issues. All questions, comments or recommendations regarding this SOP should be directed to the UXO Safety Manager.

Project Managers and supervisors are responsible for ensuring all site personnel read, understand, and follow this SOP. If any discrepancies are found with procedural steps or safety issues pertaining to this, it will be brought to the attention of the responsible supervisor for corrective action. When there is the potential to encounter MEC during HTRW-related activities a UXO Team must be assigned to provide anomaly avoidance support.

All personnel involved in the MPPEH inspection, process and management are responsible for ensuring all safe guards and security control measures are carefully followed to prevent comingling of processed material. Whenever there is any suspicion that comingling has occurred, the SUXOS and the UXOQCS will be notified immediately, and the suspect material will be re-inspected and processed in accordance with this SOP.

6.2 TRAINING

All UXO-qualified personnel will be trained in the recognition and safe handling of used and unused military munitions and specific types of MPPEH in accordance with DoDI 4140.62, Material Potentially Presenting and Explosive Hazard and shall be qualified in accordance with DDESB Technical Paper 18.

7.0 RECORDS

All project personnel are responsible for documenting in detail all reports, logs and certification and inspection forms based on their assigned level of technical responsibility. The following forms list in Section 9.0 will be utilized for documenting the MPPEH inspection, certification, storage and transfer and release of material process.
7.1 TRANSFER, RELEASE AND CHAIN OF CUSTODY DOCUMENTS

Prior to the transfer within DoD or release from DoD all accessed and certified materials will be documented as follows:

1. The SUXOS will prepare 2 original copies of:
   (a) DD Form 1348–1A Issue Release/Receipt Document, refer to the 2 examples provided as Attachment 3.
   (b) Inert, Demilitarization/Destruction CoC Certification for Non-Hazardous AEDA and Range Residue Scrap.
   (c) Ensure signatures are obtained in the appropriate blocks on all documents as shown on the Attachments 3, 4 and 5.

2. Distribute copies of the DD Form 1348–1A Issue Release/Receipt Document and Inert, Demilitarization/Destruction CoC Certification for Non-Hazardous AEDA and Range Residue Scrap as follows:
   (a) **Copy 1:** Issued to the receiver (for example, transporter, demilitarization facility or recycler).
   (b) **Copy 2:**
      - The original will be mailed to the HGL Albuquerque office repository, attention: UXO Safety Manager for retention.
      - This copy will be scanned to portable document format (PDF) and submitted electronically to the subcontracted qualified recycler manager and the HGL UXO Safety Manager.

3. The project manager and SUXOS will coordinate together:
   (a) Notifying the receiver agent/qualified recycler in advance of any pickups and shipments to their facility.
   (b) Forwarding advanced electronic copies of all completed CoC and DD Form 1348–1A documents to the receiving agent/recycler.
   (c) Follow up with the receiving agent/recycler to obtain final (signed) destruction certification documents.
   (d) Ensure either hard or electronic copies of the final demilitarization certification documents are forwarded to the HGL Albuquerque office, attention UXO Safety Manager.

---

**NOTE**

*It is the responsibility of the project manager to coordinate with the UXO Safety Manager to ensure final closeout of all material demilitarization/destruction certification records.*
8.0 REFERENCES


U.S. Code of Federal Regulations, Title 29, Part 1926, Occupational Safety and Health Standards.


U.S. Code of Federal Regulations, Title 49, Parts 100-199, Transportation.

9.0 ATTACHMENTS

Attachment 1 Acknowledgment Form

Attachment 2 Material Potentially Presenting and Explosive Hazard, Munitions Debris and Range Debris Processing and Storage Area Inspection Checklist, HGL MR Form 15.28

Attachment 3 DD Form 1348–1A Issue Release/Receipt Document (MD and RD release of transfer) and DD Form 1348–1A Issue Release/Receipt Document (MD release only)
<table>
<thead>
<tr>
<th>Material Potentially Presenting an Explosive Hazard Inspection and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachment 4 Sample Certificate of Destruction and Blanket Certificate of Destruction letters</td>
</tr>
<tr>
<td>Attachment 5 Inert, Demilitarization/Destruction and CoC Certification for Non-Hazardous AEDA and Range Residue Scrap, HGL MR Form 15.07</td>
</tr>
</tbody>
</table>
ATTACHMENT 1

STANDARD OPERATING PROCEDURE ACKNOWLEDGEMENT

SUPERVISOR’S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker’s statement for this purpose. I will ensure that the SOP contains current procedures. If a change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. Changes will require the submission of a Field Change Request (FCR) or Design Change Notice (DCN) by the HGL project team and receipt of Naval RPM approval prior to implementation. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

____________________________  _________________________
Senior UXO Supervisor                      Date

WORKER’S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

<table>
<thead>
<tr>
<th>Printed Name</th>
<th>Company</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
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</table>

HGL—Standard Operating Procedure
15
Material Potentially Presenting an Explosive Hazard, Munitions and Range Debris Processing and Storage Area Inspection Checklist

Site (name, city and state):

<table>
<thead>
<tr>
<th>Inspection conducted by:</th>
<th>Signature:</th>
<th>Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Reviewed by Senior UXO Supervisor:</th>
<th>Signature:</th>
<th>Date:</th>
</tr>
</thead>
</table>

I. INSPECTION ITEM

A. MPPEH and MD Storage Areas

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
<th>Explain Discrepancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are exclusion zones maintained during processing?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>2. Are adequate warning signs and boundary markers in place?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>3. Are containers/drums in fair condition?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>4. Are drum pallets in fair condition?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>5. Are containers properly labeled and labels intact?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>6. Are un-inspected items segregated from inspected items to prevent comingling?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>7. Are containers sealed or locked?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>8. Are MDEH items properly segregated and secure?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>9. Are demilitarization items secure?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>10. Is the plastic tarpaulin intact?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>

B. RD Storage Area

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
<th>Explain Discrepancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are there any pieces or parts of targets missing?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>2. Is there evidence of any disturbance to the pile?</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>

HGL—Standard Operating Procedure
ATTACHMENT 3

NOTICE: This form will be used when Munitions Debris (MD) and Range Debris (RD) are processed together.

“This certifies that the material listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials.”

DoD Contractor Title: Senior UXO Supervisor (SUXOS)

Print Name: ____________________________

Signature: ____________________________
Company: HydroGeoLogic, Inc., Munitions Response Team
Address: 8202 Louisiana Blvd NE, Albuquerque, NM 87113
Telephone #: (505) 341-2010

DoD Agency Representative or USACE Ordnance and Explosive Safety Specialist

Print Name: ____________________________

Signature: ____________________________
Address: ______________________________
Telephone: ____________________________

Sign here

Sign and date here

Container No. HGL-00 ____________________________

Seal No: ____________________________

Origin of the Material: (Site Name/City/State):
__________________________

PREVIOUS EDITION MAY BE USED
NOTICE: This form will be used for the release of munition debris (MD) ONLY.

"This material does not present an explosive hazard and is consequently safe for release. This certifies and verifies that the material listed has been 100 percent inspected and to the best of my knowledge and belief is inert and/or free of explosives related materials."

DoD Contractor Position Title: Senior UXO Supervisor

Print Name: [Signature]
Company: HydroGeoLogic Inc., Munitions Response Team
Address: 8202 Louisiana Blvd NE, Albuquerque, NM 87113
Telephone #: (505) 341-2010

DoD Contractor Position Title: UXO Safety Officer

Print Name: [Signature]
Company: HydroGeoLogic Inc., Munitions Response Team
Address: 8202 Louisiana Blvd NE, Albuquerque, NM 87113
Telephone #: (505) 341-2010

Container No. HGL-00

Seal No: ________________________________

Origin of the Material: (Site Name/City/State: ________________________________

Sign and date here

Sign here
ATTACHMENT 4

SAMPLE

CERTIFICATE OF DESTRUCTION

To: Mr./Mrs. ________________________,
    Project Manager,
    HydroGeoLogic, Inc.
    (Applicable HGL office address)

From: Mr./Mrs. Debris,
    President/Owner
    American EOD Services, Inc.
    1206 East Park Avenue
    Anaconda, MT 59711-0878

Re: Demilitarization and Recycling of Material Documented as Safe (MDAS) for the Remedial Investigation at Munitions Response Site ANAD-001-R-01, Recoiless Rifle Range, Anniston Army Depot, AL, U.S. Army Corp of Engineer Contract Number W912DY-10-D-0023, Delivery Order Number 002

Upon receiving the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued chained of custody, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agreeing with the provided documentation that the sealed containers contained no explosive hazards when received. The contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content.

I hereby certify that the material received/shipped from Anniston Army Depot, AL was demilitarized by means of shredding and smelting by the Bonetti Explosives, LLC, Columbus, TX and were only identifiable by their basic contents; furthermore, recycling was accomplished by smelting. The material was recycled by smelting into new steel products by at Lone Star Foundries, Inc., Austin, TX an are only identifiable by their basic content.

This certification is made in accordance with and subject to penalties of law under the United States Code, Title 18, Section 1001, Crimes and Criminal Procedures.

SIGNATURE: ____________________________

NAME: ________________________________

DATE: ________________________________

TITLE: President/Owner

AGENCY: American EOD Services, Inc.
SAMPLE

BLANKET END USE CERTIFICATION

ANNISTON ARMY DEPOT, AL
REMEDIAL INVESTIGATION AT MUNITIONS RESPONSE SITE ANAD-001-R-01,
RECOILESS RIFLE RANGE,
U.S. ARMY CORP OF ENGINEER CONTRACT NUMBER W912DY-10-D-0023,
DELIVERY ORDER NUMBER 002

It is hereby certify that Bonetti Explosives, LLC, Columbus, TX will comply with all applicable federal, state and local ordinances, and regulations with respect to the care, handling, storage, shipment, resale, export, and other use of the material hereby purchased or received, and that he/she as a user in said materials is capable of complying with all applicable federal, state and local laws. It is further certified that the material will be recycled into new steel and products by means of smelting within the continental United States of America and that the material will only be identifiable by its basic content. This certification is made in accordance with and subject to the penalties of the United States Code, Title 18, Section 1001, Crimes and Criminal Procedures.

SIGNATURE:

NAME:

DATE:

TITLE:

AGENCY: American EOD Services, Inc.
### ATTACHMENT 5

#### Section I – Generator Release

<table>
<thead>
<tr>
<th>Inert, Demilitarization/Destruction Certification Chain of Custody (CoC) for Non-Hazardous Munitions and Range-related Debris</th>
<th>1a. Project location and contract number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b. Generator name and mailing address:</td>
<td>Telephone number:</td>
</tr>
<tr>
<td>HydroGeoLogic, Inc. Munitions Response Team 8202 Louisiana Blvd NE Albuquerque, NM 87107-2105</td>
<td>(505) 341-2010 or (505) 348-3362</td>
</tr>
<tr>
<td>1c. Project site name and location:</td>
<td>Telephone number:</td>
</tr>
<tr>
<td>1d. Container Number:</td>
<td>1e. Unique Seal Identification Number:</td>
</tr>
<tr>
<td>1f. Gross weight (lbs):</td>
<td>1g. Net weight (lbs):</td>
</tr>
<tr>
<td>1h. Tare weight (lbs):</td>
<td>1i. Material description:</td>
</tr>
<tr>
<td>1j. Material type:</td>
<td>1k. Units (weight/volume):</td>
</tr>
<tr>
<td>1l. Inert certification:</td>
<td></td>
</tr>
</tbody>
</table>

> "I certify and verify that the ammunition, explosives and other dangerous article (AEDA) residue, range residue and/or explosive contaminated property listed have been 100 percent inspected and to the best of my knowledge and belief is free of AEDA and other dangerous articles."

<table>
<thead>
<tr>
<th>1m. Generator Inspector/Certifier—Unexploded Ordnance Quality Control Specialist:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Print or type name:</td>
<td>Signature:</td>
</tr>
<tr>
<td>Month/Day/Year:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1n. Generator Inspector/Certifier—Site Senior Unexploded Ordnance Supervisor or Site UXO Supervisor:</th>
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</thead>
<tbody>
<tr>
<td>Print or type name:</td>
<td>Signature:</td>
</tr>
<tr>
<td>Month/Day/Year:</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>1o. Generator Release—I am the Project Site Supervisor and acknowledge release of this material:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Print or type name:</td>
<td>Signature:</td>
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<td>Month/Day/Year:</td>
<td></td>
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</tbody>
</table>

#### Section II – Transporter

<table>
<thead>
<tr>
<th>2a. Transporter company name and mailing address:</th>
<th>Telephone Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispatcher Name:</td>
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</table>

<table>
<thead>
<tr>
<th>2b. Transporter Receipt—I acknowledge receipt of this material and have verified that each container is sealed and intact:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Print or type name:</td>
<td>Signature:</td>
</tr>
<tr>
<td>Month/Day/Year:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2c. Transporter Release— I acknowledge release of this material:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Print or type name:</td>
<td>Signature:</td>
</tr>
<tr>
<td>Month/Day/Year:</td>
<td></td>
</tr>
</tbody>
</table>
3b. Qualified Receiver Storage Manager Receipt Acknowledgement:

I acknowledge receipt of the unopened labeled container(s) listed herein each with its unique identified and unbroken seal ensuring a continued chain of custody, and after reviewing and agreeing with all the provided supporting documentation, I sign for having received the provided documentation that the sealed containers contained no explosive hazards when received.

Print or type name: __________________________  Signature: __________________________  Month/Day/Year: __________________________

3c. Demilitarized/Destruction Process Acknowledgement:

I acknowledge receipt of this material and certify and verify that each item or items listed herein were demilitarized and/or destroyed so as to no longer resemble AEDA beyond the requirement listed in DoD 4160.21-M-1 and is only identifiable by its basic content.

Print or type name: __________________________  Signature: __________________________  Month/Day/Year: __________________________

3d. Qualified Receiver Manager Demilitarized/Destruction Certification:

I acknowledge this material has undergone demilitarization/destruction in accordance with DoD 4160.21-M Land Engineer Manual 1110-1-4009 and that the contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content.

Print or type name: __________________________  Signature: __________________________  Month/Day/Year: __________________________

4a. Special Instructions:

1. The SUXOS will produce the required number of the original CoC certification copies for distribution in accordance with HGL MMRP SOP 15.03.
2. The Transporter will be provided this original CoC certification copy and complete Section II, blocks 2a. through 2c. with signature.
3. The Transporter will turn over this CoC certification copy to the Qualified Recycler Manager upon delivery.
4. The Qualified Recycler Manager upon receipt of the material will verify and certify the CoC certification document information is complete and accurate by completing Section III. 3a. through 3e. with signatures.
5. The Qualified Recycler Manager after completing the demilitarization/destruction of the material listed on this CoC certification document will provide the Generator with a signed company letterhead stating: “Upon receiving the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued chain of custody, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agreeing with the provided documentation that the sealed containers contained no explosive hazards when received. The contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content”.
6. The Qualified Recycler Manager will complete the attached DD FORM 1348–Issue Release/Transfer Document, blocks 22 and 23 and return this form along with this CoC certification document and Certificate of Destruction letter to the Generator address shown in block 1b.

4b. Discrepancies.
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1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish standard safe practices for performing anomaly and munitions and explosives of concern (MEC) subsurface clearance operations during munitions response projects conducted by HydroGeoLogic, Inc. (HGL) unexploded ordnance-qualified (UXO) personnel.

2.1 SCOPE AND APPLICATIONS

This SOP applies to all HGL employees involved in anomaly and MEC subsurface clearance operations. All HGL employees who are tasked with performing MEC-related activities will be qualified in accordance with the Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 18.

All work will be performed in a manner that is consistent with Occupational Safety and Health Administration established standards and requirements. Refer to the site-specific health and safety plan for relevant health and safety requirements. All activities will be conducted in conformance with the project-specific Accident Prevention Plan (APP) and Site Health and Safety Plan (SSHP). Procedures for packaging and disposing of all waste generated during field activities will be described in the project-specific work plan.

Personnel who use this procedure must provide documented evidence to the Senior UXO Supervisor (SUXOS) and UXO Quality Control Specialist (UXOQCS) that they have read and understand this procedure by completing the SOP Acknowledgement Form, Attachment 1. This documentation will be retained in the project file.

Any deviations from specified requirements or procedures will be justified to and authorized by the project manager and the Military Munitions Response Program Manager and discussed in the approved project plans. Deviations from requirements or procedures will be sufficiently documented to re-create the modified process.

2.2 DEFINITIONS

**Essential Personnel:** Essential Personnel are defined as DoD and contractor project personnel necessary for the safe and efficient completion of field operations conducted in an exclusion zone (EZ). Examples are: contractor work team members including the UXO Safety Officer (UXOSO), UXOQCS, SUXOS, and a U.S. Army Corps of Engineers Ordnance (USACE) and Ordnance and Explosives Safety Specialist, and geophysical equipment operators.

**Exclusion Zone:** A zone in which unauthorized personnel are not allowed to be present during MEC clearance or disposal activities.

**Intentional Detonations:** The greater of the K328 overpressure distance based on the total NEW of the demolition hot, or the maximum fragment range - horizontal distance (MFR-H), will be used, as identified in DDESB TP 16. These distances may be reduced using DDESB-approved engineering controls.
Minimum Separation Distance (MSD): The minimum safe distance for non-essential personnel to be present during MEC operations. Generally speaking, the maximum horizontal fragmentation distance is to be used for all UXO items as the MSD for all non-essential personnel for both intentional and unintentional detonations.

Team Separation Distance: Project teams have been determined to be essential personnel to the project execution, they will maintain the minimum team separation distance (TSD), normally the K-40 distance of the munition with greatest fragmentation distance (MGFD) for the munitions response site (MRS) where the work is taking place from other teams working in the area, this includes the UXO teams.

3.0 PROCEDURES

HGL employees performing the activities addressed by this SOP are responsible for meeting the requirements detailed herein. HGL employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

3.1 SENIOR UXO SUPERVISOR

The SUXOS has ultimate responsibility for ensuring all subsurface clearance operations are performed in accordance with this SOP, the work plan and APP/SSHP.

3.2 UXO TEAM LEADER

The UXO team leader will direct all subsurface clearance operations.

3.3 NOTIFICATIONS

In accordance with 29 CFR 1926.651(b)(2), utility companies or property owners will be contacted during regular local business hours; advised of the proposed work; and asked to establish the location of the utility underground installations prior to the start of any excavations. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used.

3.4 SITE LAYOUT PROCEDURES

Site layout and search grids will be established using global positioning system (GPS), licensed professional land surveyor, or compass and measuring tape. If applicable, survey crews will be escorted in the field by a UXO Technician II or above who will provide MEC anomaly avoidance including checking the intended survey stake locations with a magnetometer before driving stakes into the ground. This will prevent driving stakes into buried MEC hazards.
3.5 DIGITAL GEOPHYSICAL SURVEY REACQUISITION

Reacquisition personnel will reacquire and mark anomalies (for example, pin flag) to be excavated. The UXO intrusive team leader will be provided with data containing the coordinates and a grid map of the targeted geophysical anomalies to be investigated that day.

The UXO intrusive team will use the pin flags left by the reacquisition team to reacquire anomalies. A geophysical instrument (identified by the project work plan) will then be used to pinpoint the anomaly. The area of the target anomaly will be searched using a geophysical instrument to determine the exact location of any anomalies in proximity to the interpreted target coordinates. According to the site specific work plan, a specified radius around coordinate location will be searched in order to locate the anomaly. Once an anomaly is sufficiently cleared with the geophysical instrument, the appropriate geophysical detection equipment will be used to verify the millivolt (mV) reading is below the minimum threshold established by the Geophysical Verification Strip/Instrument Verification Strip.

3.6 INTRUSIVE INVESTIGATION PROCEDURES

UXO teams will deploy to the area(s) as directed by the SUXOS for intrusive, subsurface investigations. The following actions will take place during the subsurface investigation:

1. Each anomaly will be excavated from the side of anomaly location and evaluated by carefully removing all debris to expose anomaly features.

2. Once clearly visible, a UXO Technician II and UXO Technician III (team leader) will determine the items condition and classification. The SUXOS will be notified immediately if item is determined to be MEC.

3. All MPPEH will be further classified as either munitions documented as an explosive hazard (MDEH) or munitions documented as safe (MDAS):
   a. Once MPPEH is classified as MDEH, it can be further classified as UXO, DMM or munition constituent (MC) (this is MC that is both an explosive and is present in sufficient concentrations to present an explosive hazard).
   b. MDAS is classified as either MC (this is MC that is not an explosive [for example lea, beryllium, and cadmium] or an explosive, but not present in sufficient concentrations to present an explosive hazard.), range-related debris (RD), munitions debris (MD) or cultural debris (CD).

4. Once classified, anomalies will be removed, collected/stored (as required) pending final disposition.
   a. If a recovered anomaly is classified as MEC, the SUXOS/UXOSO will then make the determination of whether the item is safe to move.
b. If the item can be safely moved, the item will be removed and relocated pending further disposition (consolidated destruction or destruction in grid depending on guidance of the WP.)

c. If the item cannot be safely moved, it will be blown-in-place (BIP). No MEC designated as BIP will be moved for any reason. If needed, protective works will be used to decrease the possibility of damage to personnel or property.

d. If the anomaly is classified as MD, CD or RD, it will be collected with items of same classification and stored for further inspection.

5. Characterization data for all items and MEC will be recorded in accordance with the work plan and the UXO team leader field log as required by HGL SOP 15.23 UXO Field Logbook Procedures.

6. The SUXOS will account for MEC items using the grid maps provided by the team leaders and MEC accountability logs/spreadsheets.

7. All MEC, MC, MD, and RD will be disposed of in accordance with the approved procedures in the project work plan.

8. All appropriate documentation for data collection and MEC discovery will be completed and filed/saved in applicable project folders.

3.7 EARTH-MOVING MACHINERY INTRUSIVE INVESTIGATION PROCEDURES

All earth-moving machinery operations will be conduct in accordance with HGL SOP 15.15, EMM Operations and this SOP.

1. Start all excavations from the side of the anomaly. Carefully dig until the location of the anomaly is found. Excavation operations, whether by hand or using earth-moving machinery (EMM), will employ a step-down or offset access method. Under no circumstances will any EMM excavation be made directly over suspected military munitions.

2. Clear debris/dirt from the anomaly only enough to permit identification and to apply necessary MEC procedures. When the excavated hole is of sufficient size, the team will utilize geophysical instruments and dig tools to pinpoint and unearth the anomaly.

3. The hole will be backfilled, following quality control verification, and the condition preventing investigation (e.g., water in the hole) will be recorded in the field either digitally or manually on the MEC Investigation Field Log (Attachment 5) as an abandoned dig.
3.8 DATA COLLECTION AND RECORDING

Three types of data will be collected during MEC subsurface clearance activities: MEC, photographic, and location coordinates.

3.8.1 MEC Anomaly Data Collection

MEC anomaly data includes all descriptive data regarding the nature and condition of MEC items as listed on the MEC Investigation Log. All observations and measurements collected during the subsurface investigation will be recorded in the field either digitally, manually, or both, on the MEC Investigation Field Log. When digitally recorded in the field, subsurface clearance investigation observations and measurements will be recorded into an electronic version of the MEC Investigation Field Log on a portable personal computer/hand-held device by the UXO team leader. When recorded manually in the field, the subsurface clearance investigation observations and measurements will be hand entered on hard copies of the MEC Investigation Field Log by the team leader.

The upper portion of the accountability log will be completed by the UXO team leader in the field. The lower portion of the log will be prepared by the SUXOS based upon reference materials providing detailed information on MEC characteristics, such as fuze type, filler, and filler weight.

The UXO team leader will record all data on the MEC Investigation Field Log at the time MEC item is discovered. The UXO team leader will submit the MEC Investigation Field Logs to the SUXOS at the end of each day. The SUXOS will provide a copy to the Data Manager who will enter the data into the database (if the Data Manager position is being used on the project, otherwise, the SUXOS will track MEC information in a spreadsheet). The SUXOS will identify and correct errors in the forms and explain the errors to the team leader to avoid making the same mistakes again.

3.8.2 Photographic Data Collection

Digital photographs will be taken of all MEC items found during subsurface clearance investigation activities. Team leaders will log photo data in their logbooks. The date, time, and subject of each photograph will be recorded at the time the photograph is taken. The digital camera data and copies of the photo logs will be given daily to the SUXOS for entry into tracking spreadsheet. All digital photos will be downloaded and saved daily. Digital photos will be uploaded to the project files on-line on a weekly basis and will serve as a backup.

3.8.3 Location Coordinate Data

The location coordinates of MEC items will be recorded in accordance with the work plan. Location coordinates will be provided in the same format by all teams as required by the
statement of work, or other applicable directives. Data will be downloaded from the GPS units to the project laptop computer at the end of each work day.

All electronic and manual data, including MEC Investigation Field Logs, digital photographs, and checklists, will be turned over to the specified manager/technician at the end of each working day without exception. It is critical that data not be lost or compromised through loss or improper handling. Data must be entered into the database and quality checked as soon as possible.

4.0 EQUIPMENT

4.1 GENERAL EQUIPMENT

Equipment for subsurface clearance operations will be provided by HGL, subcontractors, and vendors offering equipment for lease or purchase. All equipment, regardless of the source, will be inspected and its functionality checked to ensure operational readiness. Any equipment found to be damaged or defective will be tagged as “unserviceable” and returned to the source for repair or replacement. All instruments and equipment that require routine maintenance and/or calibration will be inspected initially upon arrival and then periodically as required in the manufacturers’ equipment manual. Equipment required for daily use shall be calibrated twice daily (before operations begin and when all operations are finished). This system ensures that the on-site equipment is functioning properly. If an equipment function check indicates that any piece of equipment is not operating correctly and field repair cannot immediately be accomplished, the equipment will be removed from service until it can be repaired. Alternately, the equipment may be replaced with a like model or an approved substitute. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

4.2 EARTHMOVING EQUIPMENT

EMM may be used to excavate large anomalies (for example, pits) or those deeper than two feet if required (for example, to confirm the anomaly is not a MEC). Any decision to use EMM to excavate these anomalies will be made by the SUXOS. Excavation will proceed slowly to ensure that the item is not broached by the EMM. If the excavated material is considered to be a MEC, it shall be uncovered sufficiently by hand to obtain a positive identification of the item. If the item is identified as MEC, a determination will subsequently be made as to whether it is or is not fuzed.

While excavating using EMM, a UXO technician will be assigned to observe the process and stationed in a position that is out of the reach of the excavation equipment but affords a view of the excavation site. This observer will ensure that the next lift is visually free of UXO. The excavated soils/spoils will be placed onto the ground within a screening area that has been surface swept and the boundaries recorded. The soil spoils will be spread across the screening
area using the excavator bucket. The excavated material will be screened for range related debris, munitions debris, and MEC items. UXO Technicians will recover all pieces of munitions debris or range related debris and any MEC items. All DMM, MPPEH, MEC will be inspected, processed, stored and disposed of in accordance with HGL SOP 15.03 MPPEH Inspection and Processing. After screening, the soil spoils will be stockpiled to the side of the screening area pending final disposition.

4.3 GEOPHYSICAL INVESTIGATION EQUIPMENT

The use of geophysical investigation equipment (magnetometer) will depend on the local area of the sweep and the intended work to be conducted in that area. For the purpose of subsurface clearance operations, the following geophysical investigation equipment is authorized for use:

- Flux-gate magnetometers:
  - Schonstedt GA 52-CX
  - Schonstedt GA 72-CD
  - Forester FEREX 4.032
  - Ebinger MAGEX 120 LW
  - Vallon EL 1302D1 or 1303D
  - Chicago Steel Tape (magna-trak 102)

- Frequency-Domain Electromagnetic Induction Metal Detectors:
  - White’s All Metals Detector
  - Fisher 1266X
  - Garrett
  - Geophex GEM3
  - Foerster Minex
  - Minelabs Explorer II

- Additional equipment items that may be required for marking hazards are:
  - Spooled polypropylene line for marking sweep lanes
  - Non-metallic shaft pin flags
  - Brightly colored surveyors tape
  - High visibility biodegradable spray paint

4.4 EQUIPMENT FUNCTION CHECKS

Daily equipment function checks will be performed on all geophysical instruments. These checks will consist of using the instrument in a designated function check area to verify response to known target anomalies. Upon completion of the function check the geophysical instrument type, serial number and results will be recorded using the Equipment/Instrument
STANDARD OPERATING PROCEDURE

Anomaly and Munitions and Explosives of Concern
Subsurface Clearance

Calibration/Maintenance-HGL MR Form 15.16, Attachment 2. This function check will include the following steps:

1. Turn instrument on;
2. Set gain level;
3. Set gain control; and

5.0 SAFETY

Before entering a munitions site to perform subsurface clearance operations, the UXO team leader must conduct a daily tailgate safety meeting covering various emergency procedures, operations, MEC and all other hazards associated with the work site, using the Tailgate Safety Meeting Log.

5.1 MEC SAFETY PRECAUTIONS

If MEC is encountered during any phase of work the SUXOS and UXOSO will be immediately notified. In general, the following MEC safety precautions and protocols are:

- Remain alert at all times for MEC and related scrap or MPPEH hazards;
- It is most important to limit the exposure to a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material consistent with a safe and efficient operation during construction activities involving ordnance, explosives, ammunition, severe fire hazards, or toxic materials;
- is to Always assume MEC hazards contain a live charge until determined otherwise;
- Remember, death or injury can occur from MEC and explosive related accidents;
- The age or condition of a MEC hazard does not decrease the effectiveness. MEC that has been exposed to the elements for an extended period of time becomes more sensitive to shock, movement, and friction because the stabilizing agent in the explosives may be degraded;

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- NOTE -

Use the Whites factory program, EEPROM (Electrical, Erasable, Programmable, Read Only Memory) HI-PRO for calibration and testing if available. This program works best to establish the initial "find" noise, which is very loud when pulling and holding the trigger (pinpoint mode) when the search-head is precisely over the target. This program is preferred over the standard UXO process.
• Consider MEC that has been exposed to fire as extremely hazardous. Chemical and physical changes to the contents may have occurred that render it more sensitive than in its original state;
• **DO NOT** touch, move or jar any ordnance items regardless of the markings or apparent condition. Under no circumstances will any MEC be handled during avoidance activities or moved in an attempt to make a positive identification;
• **DO NOT** touch, pickup up, kick or move anything that is unfamiliar or unknown;
• **DO NOT** roll an unknown item over or scrape the item to identify markings;
• **DO NOT** approach or enter a munitions site if an electrical storm is occurring or approaching. If a storm approaches during site operations, leave the site immediately and seek shelter;
• **DO NOT** transmit radios or cellular phones in the vicinity of suspect MEC hazards;
• **DO NOT** walk across an area that the ground surface cannot be seen that has not been cleared of MEC hazards by the UXO Technician;
• **DO NOT** rely on color codes for positive identification of ordnance items nor their contents;
• **DO NOT** drive vehicles into a suspected MEC area; use clearly marked lanes;
• **DO NOT** carry matches, cigarettes, lighters or other flame-producing devices into a MEC site;
• **DO NOT** be misled by markings on the MEC item stating “practice,” “dummy,” or “inert.” Practice ordnance can have explosive charges that are used to mark and/or spot the point of impact; or the item could be marked incorrectly;
• Clearly mark the location of any ordnance item found so it can be easily located and avoided in the future; and
• Follow the procedures of the WP and SSHP; and upon locating any MEC hazards immediately notify the UXO Technician so appropriate measures can be taken.

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**WARNING**

*Removing or taking any munitions, explosive or unexploded ordnance or munitions related debris from the site by any employee is strictly prohibited.*

5.2 OTHER HAZARDS

Hazards that may be present during the anomaly and MEC subsurface clearance operations may include sharp metal, industrial chemicals, and other hazards as described below:
• **Cultural Debris:** Debris, other than munitions debris, that is located during the clearance will be documented in the logbook maintained by the UXO team leader. Cultural Debris will be processed in accordance with site specific requirements.

• **Chemicals:** Locating industrial-type chemicals is a possibility during MEC clearance activities. If any evidence of chemical contamination is detected, all activities will cease, and the SUXOS will notify the Project Manager using established notification procedures. Any phosphorous munitions or residue encountered will be handled in accordance with HGL SOP 15.08, *Phosphorous Filled Munitions Safe Practices*. Work will not continue in the area where the chemical was discovered until the SUXOS and UXOSO evaluate the situation and confer with the Project Manager and HGL’s Corporate Health and Safety Director (CHSD), and all agree it is safe to proceed.

• **Other Hazards:** If sealed drums, contaminated soils, or other suspect conditions that indicate a potential health or safety hazard are encountered during the subsurface clearance, work efforts will stop, and the proper notification procedures will be followed. Work will not continue in the area where the hazard was discovered until the SUXOS and UXOSO evaluate the situation and confer with the project manager, and HGL’s CHSD and all agree it is safe to proceed.

### 5.3 EXCLUSION ZONES AND MINIMUM SEPARATION DISTANCES

#### 5.3.1 EXCLUSION ZONES

On munitions response to MEC projects, it is the responsibility of the UXOSO to establish the EZ for each MRS. During intrusive excavation operations only essential project personnel may be within the EZ.

EZ’s will be established and marked with clearly identifiable markers, such as traffic cones, sandwich boards, signs, etc. The signs will be placed at the entrance to the EZ or at accesses leading to the EZ. The EZ will remain intact until clearance operations are complete. If a MEC, larger than the identified MGFD, is encountered, proper notifications will be made and an EZ appropriate for that munition will be used. The EZ distance can be reduced by implementing engineering controls, such as use of sand bags and open front barricades.

#### 5.3.1.1 Essential Personnel

Only project personnel necessary for the safe and efficient completion of the field operations will be allowed in an EZ. Tasks which are not necessary to the operation will be prohibited within the immediate area of the hazard. Multiple UXO teams performing tasks required to execute the project may be in the same EZ while MEC operations are being performed if the specified TSD is maintained. Team locations must be closely coordinated with the UXOSO. Personnel will not be allowed to work in the EZ without the following:
STANDARD OPERATING PROCEDURE

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Subsurface Clearance

- Briefing on the use of the buddy system;
- personnel protective equipment (PPE) requirements in accordance with the SSHP;
- medical authorization;
- applicable training and certifications;
- understanding of the SSHP; and
- approval of SUXOS.

5.3.2 MINIMUM SEPARATION DISTANCE

MSDs will be established for all MEC operations involving intrusive excavation, access and identification of MEC, MEC recovery, and MEC destruction. During these operations, all non-essential personnel will be moved beyond the EZ/MSD for the MEC item(s) being detonated in accordance with the DDESB TP 16, Fragmentation Database.

5.3.2.1 Unintentional Detonations

All non-essential personnel will be evacuated from within the EZ/MSD during intrusive operations in areas with known or suspected MEC. The MSD for unintentional detonations is the MGFD hazardous fragmentation distance (HFD): no more than one fragment per 600 square feet as calculated by the DDESB TP 16 Fragmentation Data Review Form.

5.3.2.2 Intentional Detonations

All personnel will be evacuated from within the MSD during intentional detonation of MEC items. The MSD for intentional detonations is the maximum fragment fragmentation distance, horizontal per the DDESB TP 16 Fragmentation Data Review Form, the Buried Explosive Module and the Generic Equations Calculators as applicable to the munition(s) being detonated and its donor explosives when calculated.

6.0 MEC DISPOSITION

All MEC will undergo final disposition in accordance with the project work plan and the DDESB-approved ESP/ESS. Specific procedures for the demilitarization or destruction of MEC are detailed in HGL SOP 15.01 Explosive Demolition Operations.

6.1 MPPEH PROCESSING

All MPPEH will be processed in accordance with the project work plan, the DDESB-approved ESP/ESS and HGL SOP 15.03 MPPEH Inspection, Management and Processing.

6.2 MEC DISPOSAL

All MEC disposal procedures will be conducted in accordance with the project specific work plan, the DDESB-approved ESP/ESS and HGL SOP 15.01 Explosive Demolition Operations.
7.0 QUALITY CONTROL

Shouldn’t this section be QC of MEC Clearance rather than QC of this procedure? Otherwise it seems out of place here. The HGL Senior UXO Operation Manager is responsible for ensuring this SOP is reviewed annually for completeness, accuracy and safety. The HGL UXO Safety Manager is responsible for the maintenance, management and annual review of this SOP for procedural, quality control and safety issues. All questions, comments or recommendations regarding this SOP will be directed to the UXO Safety and Quality Manager.

The project manager, SUXOS and UXOQCS are responsible for ensuring all site personnel read, understand, and follow this SOP. If any discrepancies are found with procedural steps or safety issues pertaining to this SOP, it will be brought to the attention of the UXOSO for corrective action.

7.1 ANOMALY RESOLUTION

After a grid, or other area, has been geophysically mapped, multiple "anomalies" may have been located. For projects using analog geophysical surveys, anomalies will be marked and excavated as each subsurface anomaly is detected in accordance with HGL SOP 15.04, Analog Detection and Anomaly Removal (Mag-and-Dig) Operations. For projects where digital geophysical methods are used, the geophysicist will pick and evaluate anomalies with the help of analytical software. In each instance, UXO-qualified personnel will excavate the anomalies in order to determine if the anomaly represents MEC, or some other feature. Once a grid or area has been cleared of all anomalies, the UXOQCS will check 10% (or more or less depending on the requirements of the WP) of the total anomalies to ensure the subsurface investigation was completed satisfactorily.

8.0 RECORDS

Project participants are responsible for documenting information in sufficient detail to meet the requirements of this SOP. Such documentation shall be retained with the project record files. Documentation generated as a result of this procedure will be collected and maintained utilizing the following forms listed in Section 10.

9.0 REFERENCES


STANDARD OPERATING PROCEDURE

Anomaly and Munitions and Explosives of Concern

Subsurface Clearance

SOP No.: 15.05
SOP Category: MMRP
Revision No.: 0
Date: August 2012


10.0 ATTACHMENTS

Attachment 1    Supervisor and Workers Statement
Attachment 2    Equipment/Instrument Calibration/Maintenance Log
**ATTACHMENT 1**

**SUPERVISOR’S STATEMENT**

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker’s statement for this purpose. I will ensure that the SOP contains current procedures. If a change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. Changes will require the submission of a Field Change Request (FCR) or Design Change Notice (DCN) by the HGL project team and receipt of client approval prior to implementation. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

_________________________________________  _________________________________________
Senior UXO Supervisor                      Date

**WORKER’S STATEMENT**

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

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HGL—Standard Operating Procedure
# Equipment/Instrument Calibration/Maintenance Log

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HGL MR Form 15.16 (Oct 2007)
1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to describe the procedures for performing munitions and explosives of concern (MEC) anomaly avoidance support during field operations on environmental projects where there is a potential for encountering MEC hazards.

2.0 SCOPE AND APPLICATIONS

This MEC SOP discusses surface and subsurface anomaly avoidance procedures and techniques to be used while conducting hazardous, toxic, radioactive waste (HTRW)-related activities during investigative, design, and remedial actions. These procedures were developed using the U.S. Department of Defense (DoD) Manual 6055.09-M DoD Ammunition and Explosive Safety Standard, DoD Explosive Safety Board (DDESB) Technical Paper 18 Minimum Qualifications for UXO Technicians and Personnel, U.S. Army Corps of Engineers (USACE) EM 385-1-97 Explosives Safety and Health Manual, USACE EP 75-1-2 Munitions and Explosives of Concern (MEC) Support During HTRW and Construction Activities, USACE ER 385-1-92 Safety and Occupational Health Requirements for HTRW Activities and USACE ER 385-1-95 Safety and Health Requirements for MEC Operations. These procedures will be performed and adhered to by all HGL and subcontractor personnel during HTRW field activities. HGL and its subcontractors will work closely together to ensure a safe working environment and to ensure the equipment, supplies, and other resources needed to provide MEC anomaly avoidance support are present on site.

No intrusive work will be allowed during investigative phases where physical contact is NOT planned or intended; for example, during Preliminary Assessments/Site Inspections (PA/SI). Intrusive work also will not occur when a determination is made that the probability of encountering MEC is moderate to high; specifically, current or previous land use leads to a determination that MEC was employed or disposed of in the parcel of concern, such as open burn and open detonation areas, impact areas, maneuver areas, and similar locations. Intrusive anomaly investigation and/or MEC removal is not authorized unless stated in the current Performance Work Statement (PWS) or Scope of Work (SOW). If a MEC removal action is authorized at a later date, the policies and procedures for a MEC removal action will be contained in a separate MEC Removal Action Work Plan (WP) and when in support of HTRW remedial action phase (construction) the HGL SOP 15.13 MEC Construction Support will be implemented.

3.0 GENERAL REQUIREMENTS

All work will be performed in a manner that is consistent with Occupational Safety and Health Administration established standards and requirements. Refer to the site- or project-specific health and safety plan for relevant health and safety requirements. All activities will be conducted in conformance with the Site Health and Safety Plan.
Personnel who use this procedure must provide documented evidence to the Site Manager, Project Manager, or Senior Unexploded Ordnance Supervisor (SUXOS) that they have read and understand this procedure by completing the SOP acknowledgment (Attachment 1). This documentation will be retained in the project file.

Any deviations from specified requirements will be justified to and authorized by the project manager and/or the relevant program manager and discussed in the approved project plans. Deviations from requirements will be sufficiently documented to re-create the modified process.

4.0 DEFINITIONS AND ABBREVIATIONS

4.1 DEFINITIONS

Anomaly Avoidance: These are techniques employed on property known to contain or suspected of containing MEC or other munitions, regardless of configuration, in high enough concentrations to pose an explosive hazard, or munitions that contain chemical agent (CA). Examples of munitions include discharged military munitions (DMM) and munitions constituents (MC). The avoidance techniques focus on avoiding contact with potential surface or subsurface explosives or CA hazards, which will then allow entry into the area for the performance of the required operations. Anomaly avoidance techniques are implemented to avoid any potential surface MEC or MPPEH and any subsurface anomalies. Anomaly avoidance techniques are primarily implemented during Hazardous, Toxic, and Radioactive Waste (HTRW) project activities; for example, in support of soil sampling or well installation activities where the specific site of the activity can be moved to another location.

Hazardous, Toxic, and Radioactive Waste Activities (HTRW): HTRW activities include those activities undertaken for the U.S. Environmental Protection Agency’s (EPA) Superfund program, the Defense Environmental Restoration Program (DERP), including Formerly Used Defense Sites (FUDS), and Installation Restoration Program (IRP) sites at active DoD facilities, HTRW actions associated with Civil Works projects, and any other mission or non-mission work performed for others at HTRW sites. For the purposes of MEC support, HTRW actions during the investigative/design phase of a HTRW project on a site with known UXO or unknown fillers requires anomaly avoidance procedures. HTRW activities during the remedial action phase (construction) of a HTRW project on a site with known or UXO with unknown fillers may require either standby support or subsurface removal.

Material Potentially Presenting an Explosives Hazard (MPPEH): Material potentially containing explosives or munitions; for example, munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or final disposition; and range-related debris). Also includes material potentially containing a high enough concentration of explosives that the material presents and explosive hazard.
Military Munitions: All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed (10 U.S.C. 2710(e)(3)(A)).

Munitions and Explosives of Concern (MEC): This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (1) UXO, as defined in 10 U.S.C. 101(e)(5)(A) through (C); (2) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (3) Munitions constituents (such as, TNT or RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

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

Munitions Debris: Remnants of munitions remaining after munitions use, demilitarization, or final disposition. Examples of munitions remnants include fragments, penetrators, projectiles, shell casings, links, and fins. Also includes inert munitions-related material recovered during an MEC removal.

Recovered Chemical Warfare Materiel (RCWM): Non-stockpile CWM that was previously discarded, buried, or fired and discovered either unexpectedly or during planned environmental restoration operations.

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

UXO-Qualified Personnel: Personnel who meet the training requirements for UXO Technician and Personnel and have performed successfully in military EOD positions or are qualified to perform in the following service contract act contractor positions: UXO Technician II, UXO Technician
III, and UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), and SUXOS. Refer to DDESB TP 18 for detailed information for approved contract titles and qualifications.

4.2 ABBREVIATIONS

EPA U.S. Environmental Protection Agency
DDESB Department of Defense Explosive Safety Board
DoD U.S. Department of Defense
DPT direct push technology
FSP Field Sampling Plan
FUDS Formerly Used Defense Site
GPS global positioning system
HTRW hazardous, toxic and radiological waste
IDW investigated derived waste
IRP Installation Restoration Program
MC munitions constituents
MEC Munitions and Explosives of Concern
PPE personal protective equipment
SSHP Site Safety and Health Plan
SOP standard operating procedure
SSO site safety officer
SUXSO Senior UnExploded Ordnance Supervisor
USACE U.S. Army Corps of Engineers
UXO Unexploded Ordnance
UXOQCS Unexploded Ordnance Quality Control Specialist
UXOSO Unexploded Ordnance Safety Officer
WP work plan

5.0 PROCEDURES

5.1 UXO TEAM

The senior UXO-qualified person will serve as the UXO Team Leader and has ultimate responsibility for ensuring all MEC anomaly avoidance support activities are performed in accordance with this SOP, the WP and/or the SSHP. The UXO Team Leader will direct all MEC anomaly avoidance support during field operations.
STEP ONE—The UXO Team will:

A. Review any archival information available on the area where MEC anomaly avoidance is required in an effort to determine the probable of types of MEC that may be encountered and identify specific hazards and precautions.

B. Provide MEC recognition, location, and safety function for the prime contractor during construction support and HTRW activities.

C. Conduct MEC safety briefing for all site personnel and visitors.

D. Conduct a surface access survey to locate all surface and near-surface anomalies.

E. The UXO Technician on the point position will conduct the initial surface sweep.

F. Establish and delineate surface MEC or subsurface anomaly-free ingress/egress lanes and work areas.

G. Reporting of all MEC encountered to the appropriate authority, and coordinate final disposition as directed by the Project Manager.

H. Work closely with the USACE personnel on all MEC-related matters.

I. Document all MEC discoveries following these procedures.

J. Coordinating and reporting MEC discoveries to the appropriate authority.

STEP TWO—Non UXO-qualified personnel responsibilities include:

A. Be trained to recognize the potential hazards imposed by MEC, which are fire, fragmentation, and blast overpressure.

B. Remain with the UXO Technician all times unless otherwise cleared to proceed on your own.

C. Follow the instructions given by the UXO Technician in the event of an accident.

D. Notify the UXO Technician immediately if witnessing something suspicious.

E. Exercise caution when walking on site and following UXO Technician directions.

F. Use the buddy-system at all times on the work site.

5.2 ANOMALY AVOIDANCE

A. Anomaly avoidance procedures will be used during HTRW-related field investigation activities whenever there is a potential for encountering MEC. These activities include, but are not limited to:

1. Ensuring site access and conducting MEC clearance survey;
2. Performing clearing and grubbing;
3. Completing land surveying and mapping;
4. Conducting PA/SI on Formerly Used Defense (FUDS) and Base Realignment and Closure (BRAC) Sites;
5. Performing geophysical surveying; and
6. Conducting environmental and natural resource assessments:
   (a) surface soil sampling,
   (b) subsurface soil sampling,
   (c) boring and drilling,
   (d) ground water monitoring, and
   (e) test pits and trenches excavations.

B. The purpose of MEC anomaly avoidance is to keep away from any potential surface and subsurface MEC hazards during these activities. For anomaly avoidance on an HTRW site with potential MEC, HGL will provide an UXO Team consisting of a minimum of two personnel, one of whom must be a UXO Technician II or above.

5.2.1 Site Access and MEC Clearance Surveying

In HTRW areas with known or suspected MEC the UXO Team will:

STEP ONE:

A. Use geophysical instrumentation capable of detecting the smallest known or anticipated MEC to locate anomalies just below the surface that may be encountered through erosion from rain or continual foot or vehicular traffic.
B. Conduct a geophysical instrument-assisted surface clearance access survey and/or a subsurface survey for anomalies before any activities, such as site visits, field investigations or PA/SI, commence, including footpath and/or vehicular traffic routes.
C. Ensure the access route both approaching and leaving is at least twice as wide as the widest vehicle that will use the route. The route shall be clearly marked with flagging or stakes for future entry control.
D. Make certain non-UXO qualified HTRW field personnel are escorted by UXO-qualified personnel at all times in areas where there is any potential for encountering MEC hazards until the UXO Team has completed the access surveys and the cleared areas are visibly marked.
E. Ensure non-UXO-qualified personnel follow behind the UXO Technician.
F. Take appropriate steps if MEC hazards are detected; specifically, the UXO Technician will halt the escorted personnel in place, select a course around the hazard, and instruct escorted personnel to follow behind.
G. Make certain no personnel are allowed outside the surveyed and cleared areas.
STEP TWO:

A. Complete an access survey of an area around the proposed investigation site that is large enough to support all planned operations.

B. Determine that the size of the surveyed area is appropriate for the project and takes into account factors such as, maneuverability of required equipment (drill rigs, excavation equipment, and similar items), parking of support vehicles, and establishment of decontamination stations.

C. Ensure that the surveyed area, at a minimum, has a dimension in all directions equal to twice the length of the longest vehicle or piece of equipment to be brought on site and is clearly delineated with flagging or stakes.

STEP THREE:

A. Mark any anomalies or surface MEC hazards encountered with flagging and relocate the investigation area to avoid contact with the hazards.

B. Clearly mark the boundaries of the surveyed area using survey flagging or pin flags.

C. Establish a system of flagging colors that will distinguish anomalies, surface MEC, and route boundaries from each other as well as from any utility markings used at the site.

D. Attempt to identify the hazard and will inform the appropriate project management personnel. Under no circumstances will the team disturb the hazard in anyway.

E. Coordinate with the proper authorities for the final disposition of all MEC hazards. Coordination will include the HGL PM and stakeholders addressed the project WP.

5.2.2 Clearing and Grubbing

Initial clearing and grubbing operations may be required for specific projects before HTRW field activities. The objective of clearing and grubbing is to allow for unhindered access by the HTRW field teams. In areas with potential MEC hazards, the UXO Team must:

STEP ONE:

A. Conduct an access survey of the routes to and from the proposed clearing and grubbing area. The UXO Team will conduct a geophysical instrument-assisted clearance survey for the entire area to be grubbed. When this step has been accomplished, the clearing and grubbing operation may commence.

B. Ensure Qualified UXO Technicians accompany grubbing teams at all times.

C. Exercise caution when using mechanical grubbing equipment. Specifically, the lowest part of the cutting deck of the grubbing equipment must remain at least 6 inches above
ground level to ensure that any possible surface MEC hazard that may have been missed during the surface sweep is not contacted by the cutting blades of the equipment.

STEP TWO:

A. Stop all clearing and grubbing operations if a potential MEC hazard is encountered. The clearing and grubbing team will immediately notify the accompanying UXO Technician. No further action shall be taken until the UXO Technician has made all notifications and the appropriate safety concerns are addressed, in accordance with the SSHP.

B. Avoid disturbing identified MEC hazards. The UXO Team Leader is responsible as directed by the Project Manager for all coordination with the proper authorities for the final disposition of all MEC hazards. After final disposition of the MEC hazard has been coordinated, clearing and grubbing operations may continue.

5.2.3 Land Surveying and Mapping

During land surveying activities in areas with potential MEC, the survey team will have a minimum of one UXO Technician II or above assigned to perform MEC anomaly avoidance. The UXO Technician will:

A. Conduct an access clearance survey of the routes to and from the proposed survey site as well as an area around the site, as described in Section 5.2.1.

B. Visually survey the surface of each proposed survey point for any indication of MEC or MEC-related contamination.

C. Use a Schonstedt GA-52Cx magnetometer (or equivalent) to assess the presence or absence of buried metallic anomalies at the locations where survey points/stakes will be installed. If magnetometer responses indicate a buried metallic anomaly, no survey point/stake will be installed at that specific location. An alternate location will be selected.

D. Use GPS for location surveying in areas with suspected non-conventional MEC may exist, for example, micro-gravel mines. Additionally, no intrusive survey markers will be used, only traffic cones and paint will be used to mark locations.

5.2.4 Geophysical Surveying

Geophysical survey methods will consist of several progressive procedures to ensure the safe collection of reliable quality data that can be used to relocate and investigate any anomalies detected. When an area has been identified and selected for geophysical surveying, UXO sweep personnel will:
STEP ONE:

A. Conduct a geophysical instrument-assisted surface clearance of the area to aid in locating surface metal that may be obscured by vegetation.

B. Manage the surface clearance using a search system based on transects. To accomplish this surface clearance, UXO sweep personnel will line up side by side, forming a sweep line, and walk each geophysical survey area in an orderly manner.

C. When appropriate, divide the geophysical survey area into grids. An automated line-marking system or physical lines will be used to ensure complete coverage within each geophysical survey area or grid.

D. Use the geophysical instrument-aided surface clearance to determine the presence or absence of surface MEC and provide increased safety to site personnel.

E. Remove surface debris during the surface clearance process support subsequent geophysical mapping. Non-MEC metallic debris, which may interfere with the subsurface geophysical survey, will be removed from the surface of the work area, to the maximum extent possible, and consolidated for later disposition.

STEP TWO:

A. Stop all geophysical survey operations if the geophysical mapping team a potential MEC item is encountered by the geophysical mapping team, all geophysical survey operations will cease.

B. Immediately notify the UXO Team Leader when MEC items are encountered.

C. Do not disturb potential MEC items.

D. Cease activities until the UXO Team Leader has made all notifications and the appropriate safety concerns are addressed, in accordance with the SSHP. The UXO Team Leader is responsible as directed by the Project Manager for all coordination with the proper authorities for the final disposition of all MEC hazards.

5.2.5 Sampling and Drilling

5.2.5.1 Surface Soil Sampling

The following paragraphs describe anomaly avoidance procedures for surface soil sampling (between 0 and 12 inches below ground surface [bgs]) in areas with potential MEC. Soil sampling at depths greater than 12 inches bgs will follow the procedures in Section 5.2.5.4 of this plan. The UXO Team will:
STEP ONE:

A. Conduct a surface clearance and access survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in Section 5.2.1.
B. Visually survey the surface of each proposed surface soil sampling site for any indication of MEC or MEC-related contamination.
C. Conduct a survey of the proposed sample locations using hand-held geophysical instruments.

STEP TWO:

A. Select an alternate location to collect surface soil samples if anomalies are detected at a proposed sampling location or too many anomalies are detected in a general area of interest.
B. Prominently mark any anomalies detected with survey flagging or non-metallic pin flags for avoidance during HTRW sampling activities.

5.2.5.2 Subsurface Soil Sampling and Monitoring Well Installation

The following paragraphs describe anomaly avoidance procedures for subsurface soil sampling and monitoring well installations in an area with potential MEC. Subsurface soil sampling is defined as the collection of samples below a nominal depth of approximately 12 inches with a split-spoon, Shelby tube, direct push sampler, or bucket auger (that is, hand auger) soil sampler using drilling techniques. Drilling techniques also will be used to drill larger diameter soil borings (for example, 4- to 8-inch outer diameter) and install groundwater monitoring wells for HTRW investigations. The UXO Team will:

STEP ONE:

A. Conduct a surface clearance and access survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in Section 5.2.1.
B. Complete a hand-held, geophysical instrument-assisted, subsurface survey of the proposed drill-hole location(s).

STEP TWO:

A. Select a new borehole location if an anomaly is detected.
B. Prominently mark any anomalies detected with survey flagging or non-metallic pin flags for avoidance.
C. Incrementally complete the downhole geophysical survey to undisturbed soil depth. If the subsurface sampling depth is greater than the geophysical instrumentation (for example, handheld geophysical instrument) detection capabilities. This process is outlined below.

5.2.5.3 Underground Utilities

Utility clearance and/or excavation permits, if required, must be obtained before beginning any incremental subsurface geophysical survey activities by the UXO Team. The UXO Team Leader is responsible for:

**STEP ONE:**

A. Verifying that all necessary excavation permits are on-site prior to commencing operations.

B. Ensuring that the appropriate agencies or companies have marked the location of all subsurface utilities in the investigation areas prior to commencing intrusive work.

C. Using high-visibility paint, pin flags, or other appropriate means to visually delineate their approximate subsurface routing. The color shall not conflict with the colors used in MEC avoidance activities.

**STEP TWO:**

A. Attempting to verify the location of subsurface utilities if their presence is suspected in an excavation area.

B. Understanding that not all utility lines will be detectable with geophysical instrument equipment. Not all utility lines are constructed of ferrous material.

C. Recognizing that utility clearance procedures and contact numbers are listed in the Field Sampling Plan (FSP).

5.2.5.4 Pilot Hole and Incremental Geophysical Survey for Conventional MEC Clearance

For intrusive sampling (that is, subsurface sampling and well drilling) in areas with incremental suspected conventional (metallic) MEC, pilot holes and geophysical surveying will be completed. When an access survey has been completed, the team will install a pilot hole to undisturbed soil depth at each proposed drill-hole location. During pilot hole installation, the team will:

**STEP ONE:**

A. Have non-essential personnel withdraw from the immediate area while the UXO team is completing their geophysical survey.

B. Use manual or mechanical means to install the pilot hole.
C. Employ a geophysical instrument configured for down-hole utilization during installation of the pilot hole to inspect for anomalies every 2 feet or unless otherwise specified by the WP or SSHP.

STEP TWO:

A. Backfill the pilot hole if an anomaly is detected. Backfilling will be conducted in accordance with project-specific procedures, and HTRW sampling personnel will select a new drill-hole location.

B. Prominently mark any anomalies detected on the surface with survey flagging or pin flags for avoidance.

STEP THREE:

A. Advance the pilot hole when no anomalies are detected. Advance to the maximum reach of the auger or to the maximum depth of the proposed drill hole, whichever is less.

B. Inspect the pilot hole upon reaching the final depth. Provide a total clearance depth equal to the pilot hole depth plus 2 feet.

C. Bring the drill rig on site if no anomalies are detected. Operate the rig to the total depth of the proposed drill hole.

STEP FOUR:

A. Advance in 2-foot increments beyond the clearance depth of the pilot hole with the drill rig when the pilot hole does not reach the proposed boring depth; for example, the proposed depth of the drill hole is more than the maximum depth of the auger or the team cannot penetrate the soils using the auger.

B. Have UXO personnel screen for anomalies at the end of each 2-foot increment. As necessary with loose soils, a polyvinyl chloride (PVC) pipe (minimum 3 inches inner diameter) may be inserted to keep the hole open and to allow for incremental geophysical instrument screening.

C. Cease incremental screening once the drilling has extended to depths greater than the maximum estimated depth of MEC presence (as described in the WP), based on the maximum depth of fill materials and maximum depth of MEC penetration.

D. Backfill holes in accordance with project-specific procedures.

5.2.5.5 Test Pits for Non-Conventional MEC Clearance

For intrusive sampling (subsurface and well drilling) in areas with suspected non-conventional MEC (for example, non-metallic micro-gravel mines), MEC avoidance and location clearance activities will also include test pits. The test pits will:
STEP ONE:

Be dug by armored or remote-controlled equipment for each intrusive sampling location.

STEP TWO:

The procedure for test pit non-conventional MEC clearance will be as follows:

1. Conduct a geophysical instrument-assisted subsurface survey of the proposed boring location to identify metallic anomalies. If an anomaly is detected, a new location will be selected.
2. Withdraw all non-essential personnel to a distance not less than the MGFD established for the site.
3. Use an armored or remote-controlled excavator to excavate a small area around the proposed soil boring down to 2 feet. UXO Technicians will inspect the excavation and excavated soil for non-conventional MEC. This process will continue at 2-foot intervals until undisturbed soil is reached or until depths determined in the project WP.
4. Mobilize HTRW sampling personnel and equipment to the site after excavation operations have ceased and begin intrusive soil sampling.

5.2.5.6 Soil Sampling with Direct Push Technology

The following paragraphs describe anomaly avoidance procedures for soil sampling and use of direct push technology (DPT) in areas with potential MEC. Soil sampling with DPT typically involves manual or mechanical penetration at the desired location, followed by withdrawal and collection of a soil sample. The UXO Team will:

1. Conduct a surface clearance and access clearance survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in Section 5.2.1.
2. Ensure soil sampling and DPT installations follow the same anomaly-avoidance procedures as described previously for subsurface soil sampling and monitoring well installations; specifically, incremental down-hole geophysical survey for metallic anomalies and remote-dig test pits for non-conventional MEC. However, the actual sampling and geophysical instrument screening will occur through the DPT borehole. Following collection of the soil samples, the sampling location will be backfilled in accordance with project-specific procedures.
5.2.6 Test Pit and Trench Excavating

Test pits and trench excavations may be used to identify and characterize large subsurface HTRW areas of concern. The following paragraphs describe MEC anomaly avoidance procedures for test pit and trench excavations on a HTRW site with potential MEC. The UXO Team will:

STEP ONE:

A. Conduct a surface clearance and access survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in Section 5.2.1.

B. Complete a subsurface geophysical survey of the proposed excavation locations.

STEP TWO:

A. Coordinate with HTRW sampling personnel to select a new excavation location if an anomaly is detected

B. Prominently mark anomalies with survey flagging or pin flags for avoidance.

C. Perform an incremental geophysical survey as outlined by STEPS THREE, FOUR and FIVE below if proposed excavation depths are greater than the geophysical instrumentation detection capabilities.

5.2.6.1 Test Pits and Trenches MEC Avoidance

STEP THREE:

A. Begin excavation in 2-foot increments after an access survey has been completed. During excavation, personnel not directly involved in the excavation activities should withdraw to a distance of not less than the fragmentation distance of the MGFD established for the site.

B. Screen for anomalies at the end of each 2-foot increment. If an anomaly is detected, HTRW sampling personnel will modify the excavation locations to avoid the anomaly.

C. Prominently mark detected anomalies with survey flagging or pin flags for avoidance.

STEP FOUR:

A. Cease operations if a potential MEC hazard is uncovered in an excavation. The UXO Team will attempt to identify the hazard.

B. Address appropriate safety concerns in accordance the SSHP and WP.

C. Resume excavations after final disposition of the MEC hazard has been completed.
STEP FIVE:

A. Use an armored or remote-controlled excavator for test pits and trenches in areas with suspected non-conventional MEC, for example, non-metallic micro-gravel mines.

B. Visually inspect 100 percent of the material excavated, as well as the excavation, for non-conventional MEC.

5.2.6.2 Waste and/or Other Materials Encountered

In the event potentially hazardous waste, debris, or drums are encountered during test pit or trenching operations, excavation activities will cease. The HTRW SSO will:

A. Assess the situation and may direct a change to the personal protective equipment (PPE) for site workers.

B. Notify the appropriate personnel in accordance with the WP or SSHP.

C. Handle wastes in accordance with the Investigation-Derived Waste (IDW) Management, Transportation, and Disposal Plan (IDW Plan).

5.2.7 Groundwater Monitoring

Groundwater monitoring activities include measuring groundwater elevations, measuring free product thickness, and collecting analytical samples. Unless a path is clearly marked, HTRW sampling personnel must be escorted by UXO-qualified personnel when conducting groundwater monitoring/aquifer characterization activities in areas with potential MEC.

5.2.8 Preliminary Assessment and Site Inspection

Whenever HGL employees conduct PA/SI work on in areas where MEC may be encountered UXO-qualified personnel will provide anomaly avoidance measures to prevent non-UXO-qualified personnel from coming into contact with an MEC hazard.

5.3 MUNITIONS AND EXPLOSIVES OF CONCERN

5.3.1 MEC ENCOUNTERED

If MEC/UXO is encountered, the UXO Technician on point will direct the team to stop, point out the hazard and mark the hazard with a high-visibility pin flag, paint, or surveyors tape. The UXO Technician discovering the MEC hazard will inform the UXO Team Leader who then will notify the Site Supervisor of the hazard and its location. The UXO Team Leader shall:

A. Attempt to identify the MEC hazard via markings and other external features such as shape, size, and external fittings.

B. Record the MEC hazard item(s) location, record GPS coordinates if possible.
C. Take a digital photograph of the hazard.
D. Notify the Site Supervisor and all other authorities of the MEC hazard(s) and collect the necessary data. After these steps are taken, the team may proceed with their activities.

5.3.2 DISPOSITION

The disposition of MEC hazards will be implemented as specified by the applicable site WP, SSHP or when applicable the Memorandum of Agreement (MOA). The senior UXO-qualified person has the responsibility for coordinating with the proper authorities for the final disposition of all MEC hazard(s) discoveries. Specific procedures for reporting MEC discoveries during a PA/SI are covered by USACE Military Munitions Center of Expertise (MM CX) Interim Guidance Document 06-05.

6.0 QUALITY CONTROL

The HGL Senior UXO Operation Manager is responsible for ensuring this SOP is reviewed annually for completeness, accuracy, and safety. The HGL UXO Safety Manager is responsible for the maintenance, management, and annual review of this SOP for procedural, quality control and safety issues. All questions, comments or recommendations regarding this SOP should be directed to HGL’s UXO Safety Manager.

Project Managers and supervisors are responsible for ensuring all site personnel read, understand, and follow this SOP. If any discrepancies are found with procedural steps or safety issues pertaining to this SOP, they will be brought to the attention of the responsible supervisor for corrective action. Anytime there is a potential for encountering MEC during HTRW-related activities, a UXO Team will be assigned to provide anomaly avoidance support.

6.1 AUTHORITY

The senior UXO-qualified person on site has final on-site authority on all munitions and MEC procedures and safety issues. This individual will have direct reporting and communications responsibility with and as directed by the HGL Project Manager with all responsible authorities.

6.2 CERTIFICATIONS

HGL will provide UXO-qualified personnel who meet the certification levels specified by DDESB Technical Paper 18 and USACE EP 75-1-2. The UXO Team will:

A. Consist of a minimum of two personnel for anomaly avoidance, one of whom must be a UXO Technician II or above.
B. Be on-call during all investigative/design HTRW activities where there is a potential for encountering MEC.
C. Conduct access clearance surveying activities:
1. The second person can be a designated UXO Sweep Person (DDES B TP 18).

2. UXO Sweep Personnel are required to have undergone site specific training on the potential hazards present.

D. Assess the need for additional UXO-qualified personnel. Staffing is dependent on project-specific and task-specific conditions and requirements, certificates of training and medical monitoring guidelines, and as specified in the Site Safety and Health Plan (SSHP).

6.3 EQUIPMENT

Project equipment for MEC anomaly avoidance and construction support will come from HGL sources, subcontractors, and local vendors offering equipment for lease or purchase. All equipment, regardless of source, will be inspected and function checked to ensure completeness and operational readiness. Any equipment found damaged or defective will be repaired or returned for replacement. All instruments and equipment that require routine maintenance and/or calibration will be inspected initially upon arrival and then periodically as required in the manufacturer’s equipment manual. Equipment required for daily usage shall be calibrated twice daily (start and finish). This system of checks ensures that the equipment on site is functioning properly. If an equipment function check indicates that any piece of equipment is not operating correctly and field repair cannot immediately be accomplished, the equipment will be removed from service until it can be repaired. Alternately, the equipment may be replaced with a like model or an approved substitute. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

6.3.1 Geophysical Equipment

A. The use of geophysical sweep equipment (magnetometers) will depend on site conditions and the intended work to be conducted in that area. If the area is to be investigated only on foot, it may suffice to conduct only a detector-aided visual search of the area. If vehicular traffic is expected, the site will require a geophysical sweep for shallow subsurface anomalies. For the purpose of anomaly avoidance, the following geophysical equipment will be used:

1. For a geophysical sweep of an area, either the Schonstedt GA-52Cx or GA-72Cd or the Subsurface ML-1 or ML-1M will be utilized. These units can be expected to detect subsurface ferrous anomalies to a depth of 4 feet.

2. Additionally, the White’s Spectrum XLT all-metals detector may be used. This unit can be expected to detect subsurface ferrous and non-ferrous anomalies to a depth of 18 to 24 inches.

3. For down-hole surveillance, the Subsurface BHG-1, Schonstedt MG 220/230, MAGEX 120 LW or the MK26 Forrester will be used. The down-hole geophysical instrument used will depend on the diameter of the borehole. If direct push technology (DPT) is used, then the MAGEX 120 LW, Subsurface BHG-1 or
Schonstedt MG 220/230 will be used. The MK 26 will not fit inside the typical direct push borehole (for example, 1 to 1.5 inches outer diameter).

B. Additional equipment items that may be required for marking hazards are as follows:

1. Pin flags (as required)
2. Brightly colored surveyors tape (as required)
3. High visibility, biodegradable spray paint (as required)

6.3.2 Equipment Function Checks

A daily equipment function check will be performed on all geophysical instruments and global positioning systems (GPS). The check will consist of using the geophysical instrument in the demarcated function check area and verifying its response on a known designated target anomaly. A record of the geophysical equipment/serial number function check will be noted in the logbook or logged using an instrument maintenance and calibration log following each functionality test describing the performance results.

6.4 TRAINING

As part of the anomaly avoidance support process, the senior UXO-qualified person or UXOSO, as assigned, will perform project-specific training for all on-site personnel assigned to these activities. The purpose of this training is to ensure that all on-site personnel fully understand the operational procedures and methods to be used, including individual duties and responsibilities and all safety and environmental concerns during investigation and excavation activities. Any personnel arriving at the site after this initial training session will have to complete the training before being allowed to work. On-site training will include the following topics:

A. Field equipment operation, including safety precautions and safety equipment, field inspection of equipment, and maintenance procedures that will be used.
B. Procedures, guidelines, and requirements in relevant sections of the WP and the SSHP, as they relate to the task being performed.
C. Site- and task-specific hazards, including physical, biological and chemical hazards.
D. Specific ordnance materials (for example, MEC, MC, explosive soil) potentially found on-site and hazards awareness.
E. Public relations, including interactions with press and public.
F. Environmental concerns and sensitivities, including endangered/threatened species and historical, archaeological, and cultural resources on site.
G. Emergency procedures and contact information.
7.1 SAFETY

If MEC is encountered during any phase of work the HGL Project Manager, and when assigned the Site Safety Officer or UXOSO will be immediately notified. In general, the following MEC safety precautions and protocols will be followed:

- Always remain alert at all times for MEC, UXO and related scrap or MPPEH hazards.
- Observe this cardinal principle when work may involve ordnance, explosives, ammunition, severe fire hazards, or toxic materials: limit the exposure to a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material consistent with a safe and efficient operation.
- Always assume MEC hazards contain a live charge until determined otherwise.
- Recognize that death or injury can occur from MEC/UXO and explosive related accidents.
- Understand that the age or condition of a MEC hazard does not decrease the effectiveness. MEC that has been exposed to the elements for an extended period of time becomes more sensitive to shock, movement, and friction because the stabilizing agent in the explosives may be degraded.
- Consider MEC that has been exposed to fire as extremely hazardous. Chemical and physical changes to the contents may have occurred that render it more sensitive than it was in its original state.
- **DO NOT** touch, move or jar any ordnance items regardless of the markings or apparent condition. Under no circumstances will any MEC be handled during avoidance activities or moved in an attempt to make a positive identification.
- **DO NOT** touch, pick up, kick, or move anything that is unfamiliar or unknown.
- **DO NOT** roll the item over or scrape the item to identify markings.
- **DO NOT** approach or enter a munitions site if an electrical storm is occurring or approaching. If a storm approaches during site operations, leave the site immediately and seek shelter.
- **DO NOT** transmit radios or cellular phones in the vicinity of suspect MEC hazards.
- **DO NOT** walk across an area that the ground surface cannot be seen that has not been cleared of MEC hazards by the UXO Technician.
- **DO NOT** rely on color codes for positive identification of ordnance items nor their contents.
- **DO NOT** drive vehicles into a suspected MEC area until anomaly avoidance techniques have been implemented.
- DO NOT carry matches, cigarettes, lighters or other flame-producing devices into a MEC site.

- DO Not be misled by markings on the MEC item stating “practice bomb,” “dummy,” or “inert.” Practice ordnance can have explosive charges that are used to mark and/or spot the point of impact; or the item could be marked incorrectly.

- The location of any ordnance item found anomaly avoidance activities will be clearly marked so it can be easily located and avoided.

- Follow the procedures of the WP and SSHP; and upon locating any MEC hazards immediately notify the UXO Technician so appropriate measures can be taken.

--- WARNING ---

REMOVING OR TAKING ANY MUNITIONS, EXPLOSIVE OR UNEXPLODED ORNANCE OR MUNITIONS-RELATED DEBRIS FROM THE SITE BY ANY EMPLOYEE IS STRICTLY PROHIBITED,

7.1 DAILY TAILGATE SAFETY MEETING

Before entering an area requiring MEC anomaly avoidance, the UXO Team Leader must conduct a safety brief covering emergency procedures, operations, MEC hazards, and anomaly avoidance procedures.

8.1 RECORDS

Documentation generated as a result of this procedure is collected and maintained using the following forms:

- SOP Acknowledgment (Attachment 1)
- HGL MEC Form 15.01 MEC Investigation Field Log (Attachment 2)
- HGL MEC Form 15.16 Instrument Maintenance and Calibration Log (Attachment 3)
- HGL MEC Form 15.19 Daily Tailgate Meeting Log (Attachment 4)

All forms also are available on the HGL SharePoint Website.

9.0 REFERENCES

U.S. Army Corps of Engineers (USACE), 2004. Engineer Pamphlet 75-1-2 Munitions and Explosives of Concern Support during Hazardous, Toxic and Radioactive Waste (HTRW) and Construction Activities, August.


USACE, 2007b. Engineer Regulation 385-1-95 Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations, March.


ATTACHMENT 1

STANDARD OPERATING PROCEDURE ACKNOWLEDGMENT

I have read, understand and agree to abide by the provisions as detailed in this standard operating procedure (SOP) prepared by HGL. By signing below, I certify that I have had the opportunity to read and ask questions about this SOP, and that I understand the procedures, equipment, and restrictions and agree to abide by them. Failure to comply with this SOP may lead to disciplinary action and/or my dismissal from the work site and termination of employment.

Before beginning any work task associated with these SOPs, the Senior Unexploded Ordnance Supervisor (SUXOS) or Senior Unexploded Ordnance Technician assigned to the project will discuss additional procedures to be implemented, or any other site-specific conditions that may arise.

<table>
<thead>
<tr>
<th>Print Name</th>
<th>Signature</th>
<th>Date</th>
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</tbody>
</table>
### ATTACHMENT 2

**Munitions and Explosives of Concern Investigation Field Log**

**UOX Technician:***

<table>
<thead>
<tr>
<th>Anomaly ID No.</th>
<th>Team:</th>
<th>Date:</th>
</tr>
</thead>
</table>

**Actual Anomaly Coordinates (Latitude: **Longitud:*Y)**

<table>
<thead>
<tr>
<th>X:</th>
<th>Y:</th>
</tr>
</thead>
</table>

**Object Depth (from center of mass):**

<table>
<thead>
<tr>
<th>Inches</th>
</tr>
</thead>
</table>

**Object length:**

<table>
<thead>
<tr>
<th>Inches</th>
</tr>
</thead>
</table>

**Object Diameter/Thickness:**

<table>
<thead>
<tr>
<th>Inches</th>
</tr>
</thead>
</table>

**Object Weight (Estimated):**

<table>
<thead>
<tr>
<th>Lbs.</th>
</tr>
</thead>
</table>

**Slope of terrain (Check one box):**

<table>
<thead>
<tr>
<th>□ &lt;10°</th>
<th>□ 10° to 30°</th>
<th>□ &gt;30</th>
</tr>
</thead>
</table>

**Vegetation cover (Check one box):**

<table>
<thead>
<tr>
<th>□ Clear</th>
<th>□ Tundra</th>
<th>□ Swamp</th>
</tr>
</thead>
</table>

**Soil type (Check one box):**

<table>
<thead>
<tr>
<th>□ Sand</th>
<th>□ Clay</th>
<th>□ Rock</th>
</tr>
</thead>
</table>

**Inclination:**

<table>
<thead>
<tr>
<th>□ 0°</th>
<th>□ 45°</th>
<th>□ 90°</th>
<th>□ 135°</th>
<th>□ 180°</th>
</tr>
</thead>
</table>

**Orientation:**

<table>
<thead>
<tr>
<th>N-S</th>
<th>NW-SE</th>
<th>E-W</th>
<th>SW-NE</th>
</tr>
</thead>
</table>

**Item Description/Justification/Comments:**

---

**Anomaly type categories (Check Appropriate Box):**

<table>
<thead>
<tr>
<th>□ MEC</th>
<th>□ Abandoned</th>
<th>□ Scrap</th>
<th>□ Practice Ordnance</th>
<th>□ Inert Ordnance</th>
<th>□ Metal Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Other</td>
<td>□ No Find</td>
<td>□ No Dig</td>
<td>□ Rust Layer</td>
<td>□ Dig Abandoned</td>
<td>□ Target &gt;4 ft</td>
</tr>
</tbody>
</table>

**Was photo taken?**

<table>
<thead>
<tr>
<th>□ Yes</th>
<th>□ No</th>
</tr>
</thead>
</table>

**File Name:**

---

**Ordnance Positive Identification (If Known, Record Below and record fuze condition and disposition):**

**Quantity:**

<table>
<thead>
<tr>
<th>Ordnance Mark/Mod:</th>
<th>Nose Fuze Mark/Mod:</th>
<th>Tail Fuze Mark/Mod:</th>
</tr>
</thead>
</table>

**Ordnance Filler:**

<table>
<thead>
<tr>
<th>□ Explosive</th>
<th>□ Propellant</th>
<th>□ Pyrotechnic</th>
<th>□ Other</th>
<th>N.E.W.</th>
</tr>
</thead>
</table>

**Ordnance Category:**

<table>
<thead>
<tr>
<th>□ Bomb</th>
<th>□ Guided Missile</th>
<th>□ Mortars</th>
<th>□ Pyrotechnics and Flares</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Cluster/Dispenser</td>
<td>□ Land Mine</td>
<td>□ Projectiles</td>
<td>□ Small Arms</td>
</tr>
<tr>
<td>□ Grenade</td>
<td>□ Misc. Explosive Device</td>
<td>□ Rockets</td>
<td>□ Underwater Ordnance</td>
</tr>
</tbody>
</table>

**Fuzing Types:**

<table>
<thead>
<tr>
<th>□ All-ways Acting</th>
<th>□ Base Detonating</th>
<th>□ Influence</th>
<th>□ Electric</th>
<th>□ Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Mechanical Time</td>
<td>□ Mechanical long delay</td>
<td>□ MT Super-quick</td>
<td>□ Piezoelectric</td>
<td>□ Point Detonating (PD)</td>
</tr>
<tr>
<td>□ Point-initiating, Base-detonating</td>
<td>□ Powder Train Time Fuze (PTTF)</td>
<td>□ Pressure</td>
<td>□ Proximity (VT)</td>
<td></td>
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HGL ME Form 15.01 (April 2007)

| 1 of 2 |
# Munitions and Explosives of Concern
## Anomaly Avoidance Support

### Munitions and Explosives of Concern Investigation Field Log

<table>
<thead>
<tr>
<th>Status of MEC:</th>
<th>□ Armed</th>
<th>□ Unarmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Condition of MEC:</td>
<td>□ Broken Open</td>
<td>□ Soil Staining</td>
</tr>
<tr>
<td>MEC/MPPHEH Disposition:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disposition: (Clarify Under Remarks)</td>
<td>□ Transport</td>
<td>□ Leave In Place</td>
</tr>
<tr>
<td>Notifications To EOD By:</td>
<td>Signature:</td>
<td>Date:</td>
</tr>
<tr>
<td>Transported By:</td>
<td>Signature:</td>
<td>Date:</td>
</tr>
<tr>
<td>Transferred To:</td>
<td>Signature:</td>
<td>Date:</td>
</tr>
<tr>
<td>Storage Location:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Destroyed By:</td>
<td>Signature</td>
<td>Date:</td>
</tr>
<tr>
<td>Remarks:</td>
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---

**SUXOSUXO Team Leader Signature:**

---

**EOD Personnel Signature (when applicable):**

---

**Abandoned**—MEC that was disposed of by abandonment; may have been fused or armed, but was not employed.

**Inert**—Same physical features as an ordnance item but does not and never did contain energetic material.

**MEC**—Military munitions that may pose unique explosives safety risks. Unexploded ordnance (UXO). Discarded military munitions (DMM), Munitions constituents (e.g., TNT, RDX), present in high enough concentrations to pose an explosive hazard.

**MPPHEH**—Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions documented as an explosive hazard (MDEH) or material document as safe (MDAS) remaining after munitions use, demilitarization, or disposal; and range-related debris) or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard.

**MDEH**—Material documented as an explosive hazard that contains an energetic material.

**MDAS**—Material documented as safe that does not contain an energetic material.

---

HGL MR Form 15.01 (Jul 2007)

2 of 2
<table>
<thead>
<tr>
<th>Date</th>
<th>Calibration Standard (example, Test Kit)</th>
<th>Test results (check box)</th>
<th>Name of Individual</th>
<th>Comments or Observations</th>
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## Tailgate Safety Meeting Log

**Date:**

**Time:**

**Team No:**

**Grid No:**

<table>
<thead>
<tr>
<th>Site Name/Location:</th>
<th>Team No:</th>
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<tr>
<td>Grid No:</td>
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### 1. SAFETY TOPICS DISCUSSED:

- [ ] Site Description
- [ ] Site Controls
- [ ] Personal Protective Equipment
- [ ] Emergency Procedures / Equipment
- [ ] Site Evacuation
- [ ] Physical/Biological Hazards
- [ ] Heat or Cold Stress
- [ ] Communication/Radio Procedure
- [ ] Environmental Concerns/Hazards
- [ ] Emergency Procedures/Route
- [ ] First Aid Procedures
- [ ] Injury Reporting
- [ ] Safe Work Practices
- [ ] Other:
- [ ] Other:
- [ ] Other:

### 2. TASK OPERATION AND REMARKS:

**Meeting Conducted by:**

**Signature:**

---

HGL MR Form 15.19 (Nov 2007)
1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide HGL employees with the basic guidance and procedures for performing munitions and explosives of concern (MEC) support construction and environmental projects where there is a potential for encountering MEC.

2.0 SCOPE AND APPLICATIONS

These procedures apply all HGL and subcontractor personnel during MEC construction support activities involving subsurface removal (on-site support) intrusive activities for building construction, laying utilities, road improvement and the removal or remediation of debris or media in areas where there is a probability of encountering MEC. HGL and its subcontractors will work closely to ensure a safe working environment and ensure the equipment, supplies, and other resources needed to provide MEC construction support are present on-site. These procedures were developed using the Department of Defense (DoD) Manual 6055.09-M DoD Ammunition and Explosive Safety Standard, DoD Explosive Safety Board (DDES) Technical Paper 18 Minimum Qualifications for UXO Technicians and Personnel, United States Army Corps of Engineers (USACE) EM 385-1-97 Explosives Safety and Health Manual, USACE EP 75-1-2 Munitions and Explosives of Concern (MEC) Support During HTRW and Construction Activities and USACE ER 385-1-95 Safety and Health Requirements for MEC Operations.

3.0 GENERAL REQUIREMENTS

All work will be performed in a manner that is consistent with Occupational Safety and Health Administration established standards and requirements. Refer to the site- or project-specific health and safety plan for relevant health and safety requirements. All activities will be conducted in conformance with the Site Health and Safety Plan.

Personnel who use this procedure must provide documented evidence to the Senior Unexploded Ordnance Supervisor (SUXOS) and Unexploded Ordnance Quality Control Specialist (UXOQCS) that they have read and understand this procedure by completing the SOP acknowledgement form (Attachment 1). This documentation will be retained in the project file.

Any deviations from specified requirements will be justified to and authorized by the project manager and/or the relevant program manager and discussed in the approved project plans. Deviations from requirements will be sufficiently documented to re-create the modified process.
4.0 DEFINITIONS AND ABBREVIATIONS

4.1 DEFINITIONS

Chemical Warfare Materiel (CWM): An item configured as a military munition containing a chemical substance that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. Also includes V- and G- series nerve agent, H- series blister agent, and lewisite in other- than-munition configurations. Due to their hazards, prevalence, and military-unique application, chemical agent identification sets are also considered CWM. CWM does not include: riot control agents, chemical herbicides; smoke and flame producing items; or soil, water, debris, or other media contaminated with chemical agent (CEMP-CE Interim Guidance - Notification Procedures for Discovery of Recovered Chemical Warfare Materiel (RCWM) During USACE Projects).

Construction Support. Support provided by UXO-qualified personnel during construction activities at potential MEC sites to ensure the safety of construction personnel from the harmful effects of MEC. When it is determined that the probability of encountering MEC is low (e.g., current or previous land use leads to a determination that MEC may be present), a minimum of a two-person UXO team will stand by in case the construction contractor encounters a suspected MEC item with unknown fillers. When a determination is made that the probability of encountering MEC is moderate to high (current or previous land use leads to a determination that MEC was employed or disposed of in the parcel of concern, e.g., open burn and open detonation areas), UXO teams are required to conduct subsurface UXO removal for the known construction footprint, either in conjunction with the construction contractor or prior to construction. The level of effort will be determined and a case-by-case basis in accordance with USACE ER 1110-1-8153 Military Munitions Support Services.

On-site Construction Support. Dedicated support provided by UXO-qualified personnel and/or by personnel trained and qualified for operations involving intrusive construction activities on property known or suspected to contain MEC, or CWM, where the probability of encountering such has been determined to be moderate to high and MEC surface removal is required.

Discarded Military Munitions (DMM): Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. [10 U.S.C. 2710(e)(2)].

Exclusion Zone (EZ): A safety zone established around a MEC work area. Only project personnel and authorized, escorted visitors are allowed within the EZ. Examples of EZs are safety zones around MEC intrusive activities and safety zones where MEC is intentionally detonated. For RCWM project sites, it is the area within the No Significant Effects (NOSE) zone.
Material Potentially Presenting an Explosives Hazard (MPPEH): Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or final disposition; and range-related debris); or material potentially containing a high enough concentration of explosives that the material presents and explosive hazard.

Military Munitions: All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smoke, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed [10 U.S.C. 2710(e)(2)].

Munitions and Explosives of Concern (MEC): This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) UXO, as defined in 10 U.S.C. 101(e)(5)(A) through (C); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

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

Munitions Debris: Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or final disposition. Inert munitions-related material recovered during an MEC removal.

On-call Construction Support. Support provided, on an as needed basis (“On-call”), by UXO-qualified personnel and/or by personnel trained and qualified for operations involving intrusive construction activities on property known or suspected to contain MEC, UXO, CWM, or other munitions that have experienced abnormal environments where the probability of encountering such has been determined to be low. This support can respond from off-site when called, or be on-site and available to provide required construction support.
Recovered Chemical Warfare Materiel (RCWM): Non-stockpile CWM that was previously discarded, buried, or fired and discovered either unexpectedly or during planned environmental restoration operations.

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

UXO-Qualified Personnel: Personnel who meet the training requirements for UXO Technician and Personnel and have performed successfully in military EOD positions or are qualified to perform in the following service contract act contractor positions: UXO Technician II, UXO Technician III, and UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), and Senior UXO Supervisor (SUXOS). Refer to DDESB TP 18 for detailed information for approved contract titles and qualifications.

4.2 ABBREVIATIONS

- CWM: chemical warfare material
- EOD: Explosive Ordnance Disposal
- DDES: Department of Defense Explosive Safety Board
- DoD: Department of Defense
- EZ: exclusion zone
- HTRW: hazardous, toxic and radiological waste
- MC: munitions constituents
- MEC: Munitions and Explosives of Concern
- MPM: most probable munition
- OESS: Ordnance and Explosives Safety Specialist
- PPE: personal protective equipment
- PM: Project Manager
- RCWM: recovered chemical warfare material
- SSHP: Site Safety and Health Plan
- SOP: standard operating procedure
- SUXSO: Senior Unexploded Ordnance Supervisor
- USACE: United State Army Corps of Engineers
- UXO: Unexploded Ordnance
- UXOQCS: Unexploded Ordnance Quality Control Specialist
- UXOSO: Unexploded Ordnance Safety Officer
- UXO TL: Unexploded Ordnance Team Leader
5.0 PROCEDURES

5.1 UXO TEAM

The senior UXO-qualified person will serve as the UXO Team Leader (TL) and has ultimate responsibility for ensuring all MEC construction support activities are performed in accordance with this SOP, the WP and/or the SSHP. The UXO TL will direct all construction support during field operations where MEC may be encountered.

The UXO team responsibilities include:

- Review any archival information available on the area of the proposed construction footprint in an effort to determine the probable types of MEC that may be encountered and identify specific hazards and safety precautions.
- Provide MEC recognition, location, and safety function for the prime contractor during construction support and HTRW remedial activities.
- Conduct MEC safety briefing for all site personnel and visitors
- Reporting of all MEC encountered to the appropriate authority, and coordinate final disposition as directed by the Project Manager.
- Work closely with the USACE personnel on all MEC-related matters.
- Document all MEC discoveries following these procedures.

Non UXO-qualified personnel responsibilities include:

- Being trained to recognizing the potential hazards impose by MEC, which are fire, fragmentation and blast overpressure as stated in Sections 4.0 and 5.0 of this SOP.
- Remain with the UXO Technician all times unless otherwise cleared to proceed on your own.
- In the event of an accident, follow the instructions given by the UXO Technician.
- If you see something suspicious please notify the UXO Technician immediately.

5.2 MEC CONSTRUCTION SUPPORT PROCEDURES

The purpose of this section is to give MEC construction support guidance for the excavation and disposal of contaminated soils and other waste materials. For MEC support during construction activities, HGL will provide the appropriate personnel based on the project-specific conditions.

Support during construction activities may require only MEC “On-call” (standby) or “On-site (direct) support during intrusive activities depending on the probability of encountering MEC and the level of confidence associated with the determination. The level of effort for
construction support is site/task-specific and will be determined on a case-by-case basis by the project development team in coordination with the appropriate DoD agency or service component.

5.2.1 On-Call Construction Support

When the probability of encountering MEC is low, only “On-call” construction support will be required in case the construction contractor encounters a suspected MEC hazard. The UXO team composition for on-call support will consist of a UXO Technician III and UXO Technician II.

In the event MEC is discovered during “On-call” construction support the following actions will be taken by the construction/work crew:

- Immediately cease all construction and equipment operations within the pre-established exclusion zone (EZ) based the either most probable munitions (MPM) other predetermined hazards.
- Immediately notify the UXO point of contact and follow all instruction provide by the UXO team.
- DO NOT allow anyone to enter the EZ until cleared by the UXO team.
- The UXO team will record all MEC discoveries per section 3.3.3.

5.2.2 On-site Construction Support

For direct construction support when the determination is made that the probability of encountering MEC is moderate to high, the UXO team will conduct a subsurface removal of the known construction footprint and remove all discovered MEC. The UXO team must be on-site for all construction activities. The UXO team composition for on-site support will at minimum, consist of a UXO Technician III and UXO Technician II. The actual number of construction support personnel required shall be determined from onsite requirements, e.g., construction schedule, construction scope, and consistent with the requirements of DoDM 6055.09-M-V7 and EM 385-1-97, including Change 1 and errata.

In the event MEC is discovered during On-site construction support, the UXO Technician will:

- Stop all construction and equipment operations within the pre-established exclusion zone (EZ) based the either most probable munitions (MPM) other predetermined hazards.
- Notify the authorities of the MEC hazard and its location.
- Record all MEC discoveries per section 3.3.3.

5.2.3 Underground Utilities

Utility clearance and/or excavation permits, if required, must be obtained prior to the commencement of any incremental subsurface geophysical survey activities by the UXO team. The UXO team is responsible for verifying that all necessary excavation permits are on-site prior to commencing operations. The UXO TL is responsible for ensuring that the appropriate
agencies or companies have marked the location of all subsurface utilities in the investigation areas prior to commencing intrusive work. Paint, nonmetallic pin flags, or other appropriate means will be used to visually delineate their approximate subsurface routing. The color shall not conflict with the colors used in MEC avoidance activities. In the event subsurface utilities are suspected in an excavation area, the field sampling team must attempt to verify their location. The team should be aware that not all utility lines will be detectable with geophysical instrument equipment; not all utility lines are constructed of ferrous material. Utility clearance procedures and contact numbers should be listed in the WP.

5.2.4 Excavation and Trenching Procedures

The UXO team will conduct a MEC reconnaissance and anomaly avoidance to provide clear access routes to each work site prior to excavating/trenching crews entering the planned construction footprint or work area, and:

- Ensure all utilities and dig permits have been obtained in accordance with the work plan.
- UXO Technicians will identify, and clearly mark the boundaries of a cleared approach path for the excavating/trenching crews, vehicles, and equipment to enter the planned work area. This path will be, at a minimum, twice the width of the widest vehicle. No personnel will be allowed outside any marked boundary area.
- If MEC is encountered on the ground surface, the UXO Technician will clearly mark the area where the item is found and divert the approach path around the MEC item(s). Any anomalies detected will be prominently marked with surveyors tape or pin flags for avoidance.
- The UXO Technician will conduct an access survey using the appropriate geophysical instrument over the approach path for avoidance of MEC that may be subsurface. If a magnetic anomaly is encountered, it will be assumed to be MEC and the approach path will be diverted around the anomaly. UXO personnel only will operate the appropriate geophysical instrument and identify MEC.
- Once the access survey is completed, the UXO Technician will perform geophysical anomaly avoidance during excavating/trenching operations at pre-establish incremental monitoring depth(s).
- Backhoe or earthmoving machinery can proceed with excavation/trenching operations as long as the UXO Technician can maintain continuous visual observation of the operation from a safe position, upwind and out of the reach of the equipment.
- Monitor all excavations and trenching activities for surface and below ground surface MEC hazards.
- If an MEC hazards is encountered or unearthed the UXO Technician will stop the equipment operator, ground the bucket/blade, and investigate the anomaly. If an anomaly is determined to be an MEC hazard, operations will cease and the excavating/trenching crew personnel will evacuate to a safe distance outside of the EZ until the hazard is removed.
5.2.5 Screening Excavated Soils and Spoils Stockpiles for Potentially Hazardous Items

It is paramount that all excavated soils and spoils stockpiles undergo a thorough screening for any potentially hazardous materials, MEC or munitions debris that may be located at the project work site(s) and to ensure any discovery of these items are processed and disposed in accordance with DoD regulations, WP and this SOP.

The following steps are required for UXO Technicians to conduct a proper and thorough inspection and screening during excavation, trenching, spoils removal/loading/dumping and pre-stockpile screening for potentially hazardous materials:

5.2.5.1 Visual inspection and geophysical instrument check during soil excavation activities:

- The UXO team will:
  - Conduct a visual inspection and a handheld geophysical instrument check of the surface soil prior to excavation.
  - Conduct a visual inspection and handheld geophysical instrument during the first one-foot lift increment.
  - Continue visual monitoring for potential MEC of all excavation depth beyond the first one-foot lift increment
  - Immediately stop the activity when any potentially hazardous item is discovered.
  - Once an item is determined to be hazardous, direct all equipment operators to secure their equipment and direct all non UXO-qualified personnel to evacuate to a safe area.

- During excavation activities, the UXO Technician will conduct a hand held geophysical instrument check of the first one-foot lifts within the excavation limits. After the first one-foot lift increment and no hazardous items are discovered, excavation lifts can continue unrestricted. However, if during a lift a MEC or hazardous item is discovered, the lift increment will be reduced back to one-foot until it is determined safe by the UXO Technician to return to unrestricted lifts. The safe MEC screening excavation depth determination will be based on both actual site conditions and available previous site MEC historical information.

- Once an item is confirmed as hazardous non-UXO personnel will not be allowed back into work area until the UXO TL declares the area is safe to resume the work activity.

5.2.6 Visual inspection and geophysical instrument check at the spoils stockpile screening area:

- The UXO team will:
  - Have the dump truck driver spread the spoils load of the first one-foot depth excavated layer over the stockpile screening area.
5.3 MUNITIONS AND EXPLOSIVES OF CONCERN

5.4 ENCOUNTER

If MEC/UXO is encountered, the UXO Technician on point will direct the team to stop, point out the hazard and mark the hazard with a high-visibility pin flag, paint, or surveyor's tape. The UXO Technician discovering the MEC hazard will inform the UXO TL who then will notify the Site Supervisor of the hazard and its location. The UXO TL shall:

- Visually examined the MEC hazard for markings and other external features such as shape, size and external fittings.
- Record the MEC hazard item(s) GPS coordinates in the UXO team logbook.
- Record the MEC hazard as outlined by Section 7.0.
- Take a digital photograph of the hazard and record the photo number using the MEC Investigation Field Log Form (HGL MEC Form 15.01) and UXO TL logbook.
- After notifying the Site Supervisor and all other authorities of the MEC hazard(s), and collecting the necessary data, the team may proceed with their activities.

5.5 DISPOSITION

The disposition of MEC hazards will be implemented as specified by the applicable site WP, SSHP or when applicable the Memorandum of Agreement (MOA). The senior UXO-qualified person has the responsibility for coordinating with the proper authorities for the final disposition of all MEC hazard(s) discoveries. Specific procedures for reporting MEC discoveries during a
PA/SI are covered by USACE Military Munitions Center of Expertise (MM CX) Interim Guidance Document 06-05.

5.6 MATERIAL POTENTIAL PRESENTING AN EXPLOSIVE HAZARD (MPPEH) DISPOSITION

All MPPEH will undergo a thorough inspection, sorting and certification process by the UXO team in accordance with HGL SOP 15.03, as well as any other applicable laws, regulations and restrictions. The UXO TL will make the final determination whether the condition of MPPEH is either material documented as an explosive hazard (MDEH) or material documented as safe (MDAS). All MDEH/MDAS disposition actions will be performed in accordance with the approved WP, SSHP, or explosive safety submission/plan.

5.7 RECOVERED CHEMICAL WARFARE MATERIAL (RWCM)

This SOP DOES NOT discuss procedures for discovery of chemical warfare material (CWM) or recovered chemical warfare material (RCWM). The procedures for CWM discovered items are contained in HGL SOP 15.09.

6.0 QUALITY CONTROL

The HGL Senior UXO Operation Manager is responsible for ensuring this SOP is reviewed annually for completeness, accuracy and safety. The HGL UXO Safety manager is responsible for the maintenance, management and annual review of this SOP for procedural, quality control and safety issues. All questions, comments or recommendations regarding this SOP should be directed to the UXO Safety Manager.

Project Manager and Supervisors are responsible for ensuring all site personnel read, understand, and follow this SOP. If any discrepancies are found with procedural steps or safety issues pertaining to this SOP, it will immediately be brought to the attention of the responsible supervisor for corrective action.

6.1 AUTHORITY

The senior UXO-qualified person on site has final on-site authority on all munitions and MEC procedures and safety issues. This individual will have direct reporting and communications responsibility with and as direct by the HGL Project Manager with all responsible authorities.

6.2 CERTIFICATIONS

HGL will provide UXO-qualified personnel that meet the certification levels specified by DDESB Technical Paper 18 and USACE EP 75-1-2. For all UXO construction support, “On-call and “On-site”, the UXO team will be comprised of a minimum of two UXO-qualified personnel,
one UXO Technician III and one UXO Technician II. The UXO team may include additional UXO-qualified personnel depending on-site/task-specific conditions and requirements. Additional personnel requirements, including certificates of training and medical monitoring guidelines will be described in the project site safety and health plan (SSHP).

6.3 EQUIPMENT

Project equipment for MEC anomaly avoidance and construction support will come from HGL sources, subcontractors, and local vendors offering equipment for lease or purchase. All equipment, regardless of source, will be inspected and function checked to ensure completeness and operational readiness. Any equipment found damaged or defective will be repaired or returned for replacement. All instruments and equipment that require routine maintenance and/or calibration will be inspected initially upon arrival and then periodically as required in the manufacturer’s equipment manual. Equipment required for daily usage shall be calibrated twice daily (start and finish). This system of checks ensures that the equipment on-site is functioning properly. If an equipment function check indicates that any piece of equipment is not operating correctly and field repair cannot immediately be accomplished, the equipment will be removed model or an approved substitute. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

6.3.1 Geophysical Equipment

The use of geophysical sweep equipment (magnetometers) will depend on the local area of the sweep and the intended work to be conducted in that area. If the area is to be investigated only on foot, it may suffice to conduct only a detector-aided visual search of the area. If vehicular traffic is expected, the site will require a geophysical sweep for shallow subsurface anomalies (to a depth of 4 feet). For the purpose of MEC and anomaly avoidance, the following geophysical equipment will be utilized:

- Schonstedt GA-52Cx or GA-72Cd or the Subsurface ML-1 or ML-1M will be utilized. These units can be expected to detect subsurface ferrous anomalies to a depth of 4 feet.
- White’s Spectrum XLT all-metals detector may be utilized. This unit can be expected to detect subsurface ferrous and non-ferrous anomalies to a depth of 18 to 24 inches.
- For down-hole surveillance, the Subsurface BHG-1, Schonstedt MG 220/230 or the MAGEX 120 LW will be utilized. The down-hole geophysical instrument used will be determined by the diameter of the borehole.

Additional equipment items that may be required for marking hazards are:

- Non-metallic shaft pin flags (as required)
- Brightly colored surveyors tape (as required)
- High visibility, biodegradable spray paint (as required)
6.3.2 Equipment Function Checks

A daily equipment function check will be performed on all geophysical instruments and global position systems (GPS). The check will consist of using the geophysical instrument in the demarcated function check area and verifying its response on a known designated target anomaly. Log entry using the Instrument Maintenance and Calibration Log (HGL MEC Form 15.16) will be made after each functionality test describing locator performance and serial number. A record of geophysical equipment function checks will from service until it can be repaired. Alternately, the equipment may be replaced with a like Training

As part of the MEC construction support process, the senior UXO-qualified person will perform project-specific training for all on-site personnel assigned to construction support activities. The purpose of this training is to ensure that all on-site personnel fully understand the operational procedures and methods to be used, including individual duties and responsibilities and all safety and environmental concerns related to MEC hazards and safety. Any personnel arriving at the site after this initial training session will have to complete this training prior to starting work. On-site training will include the following topics:

- Field equipment operation, including safety precautions and safety equipment, field inspection of equipment, and maintenance procedures that will be used.
- Procedures, guidelines, and requirements in relevant sections of the WP and SSHP, as they relate to the task being performed.
- Public relations, including encounters with press and public related to MEC discoveries.
- Specific ordnance materials (e.g., MEC, munitions constituents [MC], explosive soil) potentially found on-site.
- Emergency procedures and contact information.

7.1 SAFETY

If MEC is encountered during any phase of work the HGL Project Manager, and when assigned the Site Safety Officer or UXOSO will be immediately notified. In general, the following MEC safety precautions and protocols will be followed:

- Always remain alert at all times for MEC, UXO and related scrap or MPPEH hazards.
- The cardinal principle to be observed involving ordnance, explosives, ammunition, severe fire hazards, or toxic materials is to limit the exposure to a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material consistent with a safe and efficient operation.
- Always assume MEC hazards contain a live charge until determined otherwise.
- Death or injury can occur from MEC/UXO and explosive related accidents.
The age or condition of a MEC hazard does not decrease the effectiveness. MEC that has been exposed to the elements for an extended period of time becomes more sensitive to shock, movement, and friction because the stabilizing agent in the explosives may be degraded.

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

**DO NOT** touch, move or jar any ordnance items regardless of the markings or apparent condition. Under no circumstances will any MEC be handled during avoidance activities or moved in an attempt to make a positive identification.

**DO NOT** touch, pickup up, kick or move anything that is unfamiliar or unknown.

**DO NOT** roll the item over or scrap the item to identify markings.

**DO NOT** approach or enter a munitions site if an electrical storm is occurring or approaching. If a storm approaches during site operations, leave the site immediately and seek shelter.

**DO NOT** transmit radios or cellular phones in the vicinity of suspect MEC hazards.

**DO NOT** walk across an area that the ground surface cannot be seen that has not been cleared of MEC hazards by the UXO Technician.

**DO NOT** rely on color codes for positive identification of ordnance items nor their contents.

**DO NOT** drive vehicles into a suspected MEC area; use clearly marked lanes.

**DO NOT** carry matches, cigarettes, lighters or other flame-producing devices into a MEC site.

**DO NOT** be misled by markings on the MEC item stating “practice bomb,” “dummy,” or “inert.” Practice ordnance can have explosive charges that are used to mark and/or spot the point of impact; or the item could be marked incorrectly.

The location of any ordnance item found anomaly avoidance activities will be clearly marked so it can be easily located and avoided.

Follow the procedures of the WP and SSHP; and upon locating any MEC hazards immediately notify the UXO Technician so appropriate measures can be taken.

--- WARNING ---

REMOVING OR TAKING ANY MUNITIONS, EXPLOSIVE OR UNEXPLODED ORNANCE OR MUNITIONS RELATED DEBRIS FROM THE SITE BY ANY EMPLOYEE IS STRICTLY PROHIBITED,
STANDARD OPERATION PROCEDURE

Munitions and Explosives of Concern
Construction Support

SOP No.: 15.13
SOP Category: MMRP
Revision No.: 01
Date: March 2011

7.1 DAILY TAILGATE SAFETY MEETING

Prior to entering an area requiring MEC anomaly avoidance, the UXO TL must conduct a safety brief covering emergency procedures, operations, MEC hazards and anomaly avoidance procedures.

8.1 RECORDS

Documentation generated as a result of this procedure is collected and maintained utilizing the following forms:

- SOP Acknowledgement (Attachment 1)
- HGL MEC Form 15.01 MEC Investigation Field Log (Attachment 2)
- HGL MEC Form 15.16 Instrument Maintenance and Calibration Log (Attachment 3)
- HGL MEC Form 15.19 Daily Tailgate Meeting Log (Attachment 4)

All forms are available on the HGL SharePoint Website, Munitions Response Folder:

https://sharepoint.hgl.com/docs/Munitions%20Response/Forms/AllItems.aspx?RootFolder=%2fdocs%2fMunitions%20Response%2fUXO%20Personnel&FolderCTID=&View=%7b82CD0347%2dEF52%2d433E%2d9E9C%2d99870ACC8736%7d

8.0 REFERENCES


US Army Corps of Engineers, 2004 Engineer Pamphlet 75-1-2 Munitions and Explosives of Concern Support during Hazardous, Toxic and Radio Active Waste (HTRW) and Construction Activities, August.


**ATTACHMENT 1**

**STANDARD OPERATING PROCEDURE ACKNOWLEDGEMENT**

I have read, understand and agree to abide by the provisions as detailed in this standard operating procedure (SOP) prepared by HGL. By signing below, I certify that I have had the opportunity to read and ask questions about this SOP, and that I understand the procedures, equipment and restrictions, and agree to abide by them. Failure to comply with this SOP may lead to disciplinary action and/or my dismissal from the work site and termination of employment.

Prior to the commencement of any work task associated with these SOPs, the Senior Unexploded Ordnance Supervisor (SUXOS) or Senior Unexploded Ordnance Technician assigned to the project will discuss additional procedures to be implemented, or any other site-specific conditions that may arise.

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<th>Print Name</th>
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</table>
ATTACHMENT 2

Munitions and Explosives of Concern Investigation Field Log

<table>
<thead>
<tr>
<th>UXO Technician:</th>
<th>Team:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anomaly ID No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual Anomaly Coordinates (Latitude = Longitude=Y)</td>
<td>X:</td>
<td>Y:</td>
</tr>
<tr>
<td>Object Depth (from center of mass):</td>
<td>Inches</td>
<td></td>
</tr>
<tr>
<td>Object Length:</td>
<td>Inches</td>
<td></td>
</tr>
<tr>
<td>Object Diameter/Thickness:</td>
<td>Inches</td>
<td></td>
</tr>
<tr>
<td>Object Weight (Estimated):</td>
<td>Lbs.</td>
<td></td>
</tr>
<tr>
<td>Slope of terrain (Check one box):</td>
<td>□ &lt;10°</td>
<td>□ 10° to 30°</td>
</tr>
<tr>
<td>Vegetation cover (Check one box):</td>
<td>□ Clear</td>
<td>□ Tundra</td>
</tr>
<tr>
<td>Soil type (Check one box):</td>
<td>□ Sand</td>
<td>□ Clay</td>
</tr>
<tr>
<td>Inclination:</td>
<td>□ 0°</td>
<td>□ 45°</td>
</tr>
<tr>
<td>Orientation:</td>
<td>N-S</td>
<td>NW-SE</td>
</tr>
<tr>
<td>Item Description/Justification/Comments:</td>
<td></td>
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</tbody>
</table>

Anomaly type categories (Check Appropriate Box):

- □ MEC
- □ Abandoned
- □ Scrap
- □ Practice Ordnance
- □ Inert Ordnance
- □ Metal Waste
- □ Other
- □ No Find
- □ No Dig
- □ Rust Layer
- □ Dig Abandoned
- □ Target >4 ft

Was photo taken? □ Yes □ No

Ordnance Positive identification (if Known, Record Below and record fuze condition and disposition):

<table>
<thead>
<tr>
<th>Quantity:</th>
<th>Ordnance Mark/Mod:</th>
<th>Nose Fuze Mark/Mod:</th>
<th>Tail Fuze Mark/Mod:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordnance Filler:</td>
<td>□ Explosive</td>
<td>□ Propellant</td>
<td>□ Pyrotechnic</td>
</tr>
</tbody>
</table>

Ordnance Category:

- □ Bomb
- □ Guided Missile
- □ Mortars
- □ Pyrotechnics and Flares
- □ Cluster/Dispenser
- □ Land Mine
- □ Projectiles
- □ Small Arms
- □ Grenade
- □ Misc. Explosive Device
- □ Rockets
- □ Underwater Ordnance

Fuzing Types:

- □ Always Acting
- □ Base Detonating
- □ Electric
- □ Impact
- □ Mechanical Time
- □ Mechanical long delay
- □ MT Super-quick
- □ Piezoelectric
- □ Point Detonating (PD)
- □ Point-initiating, Base-detonating
- □ Powder Train Time Fuze (PTTF)
- □ Pressure
- □ Proximity (VT)

HGL MIR Form 15.01 (Jul 2007)
## STANDARD OPERATION PROCEDURE

### Munitions and Explosives of Concern
**Construction Support**

<table>
<thead>
<tr>
<th>Status of MEC:</th>
<th>□ Armed</th>
<th>□ Unarmed</th>
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<table>
<thead>
<tr>
<th>Physical Condition of MEC:</th>
<th>□ Broken Open</th>
<th>□ Soil Staining</th>
<th>□ Filler Visible</th>
<th>□ Soil Sample Taken</th>
</tr>
</thead>
</table>

### MEC/MPPEH Disposition:

- **Disposition:** (Clarify Under Remarks)
- **Transport:** □
- **Leave In Place:** □
- **Other:** □
- **Date:**

<table>
<thead>
<tr>
<th>Notifications To EOD By:</th>
<th>Signature</th>
<th>Date</th>
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<tr>
<th>Transferred By:</th>
<th>Signature</th>
<th>Date</th>
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<th>Transferred To:</th>
<th>Signature</th>
<th>Date</th>
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### Storage Location:

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<tr>
<th>Destroyed By:</th>
<th>Signature</th>
<th>Date</th>
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### Remarks:

### Abandoned—MEC that was disposed of by abandonment; may have been fused or armed, but was not employed.

### Inert—Same physical features as an ordnance item but does not and never did contain energetic material.

### MEC—Military munitions that may pose unique explosives safety risks; Unexploded ordnance (UXO), Discarded military munitions (DMM), Munitions constituents (e.g., TNT, RDX); present in high enough concentrations to pose an explosive hazard.

### MPPEH—Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions documented as an explosive hazard (MDEH) or material document as safe (MDAS) remaining after munitions use; demilitarization, or disposal; and range-related debris) or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard.

### MDEH—Material documented as an explosive hazard that contains an energetic material.

### MDAS—Material documented as safe that does not contain an energetic material.
## ATTACHMENT 3

### Equipment/Instrument Calibration/Maintenance Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Calibration Standard (example, Test Kit)</th>
<th>Test results (check box)</th>
<th>Name of Individual</th>
<th>Comments or Observations</th>
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<tbody>
<tr>
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HGL MR Form 15.16 (Oct 2007)
ATTACHMENT 4

Tailgate Safety Meeting Log

<table>
<thead>
<tr>
<th>Date:</th>
<th>Time:</th>
<th>Team No:</th>
<th>Grid No:</th>
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<tbody>
<tr>
<td>Site Name/Location:</td>
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1. SAFETY TOPICS DISCUSSED:
   - [ ] Site Description
   - [ ] Site Controls
   - [ ] Personal Protective Equipment
   - [ ] Emergency Procedures / Equipment
   - [ ] Site Evacuation
   - [ ] Physical/Biological Hazards
   - [ ] Heat or Cold Stress
   - [ ] Communication/Radio Procedure
   - [ ] Environmental Concerns/Hazards
   - [ ] Emergency Procedures/Route
   - [ ] First Aid Procedures
   - [ ] Injury Reporting
   - [ ] Safe Work Practices
   - [ ] Other: ___
   - [ ] Other: ___

2. TASK OPERATION AND REMARKS:
   ______________________________
   ______________________________

3. ATTENDEES:

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<tr>
<th>Print Name</th>
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<th>Company</th>
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Meeting Conducted by: ______________________________  Signature: ______________________________

HGL MR Form 15.19 (Nov 2007)
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1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide HGL employees the basic guidance and procedures for the safe operation of off-highway vehicles (OHV) used to transport project personnel and recovered munitions in conjunction with military munitions response program (MMRP) operations.

2.0 SCOPE AND APPLICATIONS

This SOP applies to all OHV operations conducted in support of HGL MMRP activities. These procedures were developed following the guidelines established by United States Army Corps of Engineers (USACE) Engineering Manual (EM) 385-1-1.

3.0 GENERAL REQUIREMENTS

All work will be performed in a manner that is consistent with Occupational Safety and Health Administration established standards and requirements. Refer to the site- or project-specific health and safety plan for project related health and safety requirements. All field activities will be conducted in conformance with the Site Health and Safety Plan.

Personnel who use this procedure must document evidence to the site manager/Senior Unexploded Ordnance Supervisor and the Unexploded Ordnance Quality Control Specialist (UXOQCS) that they have read and understand this procedure by completing the SOP Acknowledgement, Attachment 1. This documentation will be retained in the project file.

Significant deviations from the requirements of this SOP will be authorized by the project manager and/or the relevant program manager. Changes by the responsible party to approved project plans will be sufficiently documented to re-create the modified process.

4.0 DEFINITIONS AND ABBREVIATIONS

4.1 DEFINITIONS

Competent OHV Trainer: An individual designated by HGL MRT Safety Manager to have shown an adequate level of knowledge and proficiency in the operation of a particular OHV. This person will have satisfied all the requirements stipulated in this SOP.

OHV: The term off-highway vehicle (OHV) is used to describe all-terrain vehicles (ATV) and off-road vehicles (ORV).

ATV: Class 1 ATVs are motorized flotation-tired vehicles with at least three but no more than six low pressure tires that have an engine displacement of less than 960 cubic centimeters and total dry weight of less than 1000 pounds. Class 2 ATVs are motorized flotation-tired vehicles
with at least three, but no more than six, low pressure tires that have an engine displacement of less than 960 cubic centimeters and total dry weight of 1,000 to 1,800 pounds. Dry weight is normally the weight of the vehicle without fluids.

*ORV*: ORVs are motorized recreational vehicles capable of cross-country travel on natural terrain.

### 4.2 ABBREVIATIONS

- **ATV**: all-terrain vehicle
- **EM**: Engineering Manual
- **MEC**: munitions and explosives of concern
- **MRT**: Munitions Response Team
- **OHV**: off-highway vehicle
- **ORV**: off-road vehicle
- **PM**: project manager
- **PPE**: personal protective equipment
- **QC**: quality control
- **SOP**: standard operating procedure
- **USACE**: United States Army Corps of Engineers
- **UXOQCS**: Unexploded Ordnance Quality Control Specialist

### 5.0 PROCEDURES

#### 5.1 MANAGERS AND SUPERVISORS

The project manager (PM) will provide the necessary management support and allocate sufficient project resources to permit project personnel to operate OHVs in a safe manner. The project Site Supervisor is responsible for implementation of the OHV safety, training, and operations procedures in the field.

#### 5.2 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer will ensure that the requirements of these procedures are implemented in the field.

#### 5.3 OFF-HIGHWAY VEHICLE OPERATOR

The OHV operator is responsible for the safe operation of the vehicle as well as the safety of any passengers. All OHVs utilized by HGL will comply with the requirements outlined in USACE EM 185-1-1, and all applicable state laws and regulations.
5.4 PRE-OPERATIONAL CHECKS

1. Before operating the OHV, the vehicle will be thoroughly inspected using Attachment 3, Vehicle Inspection Checklist, HGL Form 15.23.
2. All discrepancies will be annotated on the checklist and corrected prior to vehicle operation.
3. If discrepancies are found the inspector will inform the supervisor so discrepancies can be remedied promptly.
4. If the vehicle is inoperable or could be damaged, the inspector will secure the vehicle in a fashion as to prevent its operation. The checklist annotating the problem will be left secured in the vehicle.

5.5 OPERATIONAL CHECKS

1. Don appropriate PPE as required.
2. Mount OHV and fasten the seatbelt.
3. Ensure parking brake is engaged.
4. Start engine (a cold engine may require the use of choke for starting) and listen for unusual sounds.
5. Verify engine is making adequate oil pressure.

CAUTION – To prevent engine damage, NEVER use starting fluid to start the engine unless specifically called for in vehicle owner’s manual

6. Allow engine to completely warm up before getting underway.
7. As you begin to move out, listen for any unusual noise coming from drive train.
8. Test brakes and steering for proper operation.

5.6 CARE AND MAINTENANCE

1. Check fluids daily or before each use. If any fluids are low or contaminated, replace only with fluids recommended by owners operating manual.
2. Ensure vehicles are fueled at the end of each day’s operations.
3. Note vehicle operation discrepancies and report them to a supervisor.

6.0 TRAINING/CERTIFICATION REQUIREMENTS

All OHV operators and passengers will be trained on the requirements of this SOP. Each OHV operator will be thoroughly familiar with all aspects of and will be trained in the practical use of the vehicle. HGL personnel who operate OHVs shall first demonstrate to the Competent OHV Trainer their competence during the training course.
Attachment 2, OHV Training Course Lesson Guide and Attachment 3, OHV Qualification will be used for classroom and practical training and evaluation. Training will at a minimum, consist of negotiating steep terrain, safe backing, turning, braking, proper loading and load securing, basic troubleshooting, performing pre- and post- operation inspections, and use of required personal protective equipment.

7.0 SAFETY

7.1 SAFE DRIVING

- Accelerate slowly to prevent loss of traction. Terrain should dictate speed but the operator should never exceed manufacture’s recommendations.
- If the brakes are used to control forward speed, apply them gently to prevent sliding.

WARNING – Never accelerate or brake suddenly while driving. This could cause the vehicle to roll over causing serious injury or death.

- Do not operate the vehicle on a slope greater than 30 degrees or the maximum recommended by the manufacturer. Terrain conditions may lessen this value.
- When driving uphill or downhill, try to pick a path that will keep the vehicle perpendicular to the slope and minimize the possibility of sliding sideways or rolling over.
- When negotiating slopes, keep the vehicle in the lowest gear to maximize power and prevent the brakes from overheating. If at all possible, do not operate vehicle on a side slope or when the orientation of the vehicle could become parallel to the slope of the terrain. In the event that side slopes cannot be avoided, limit slope to 20 degrees.
- Passengers will only ride in designated seating with seatbelts fastened. All occupants will ride with arms and legs inside the vehicle at all times.
- It may be prudent for passengers to dismount when negotiating rough or steep terrain.

WARNING – Never overload an OHV. Loads will change the vehicle’s center of gravity and could adversely affect the vehicle’s handling and performance. All equipment and loads shall be secured to prevent damaged to vehicle or injury to occupants.

7.2 SAFETY EQUIPMENT

All OHVs will undergo a proper safety inspection by the operator prior to operation using Attachment 4 and be properly equipped with the following safety equipment:

- **Hearing Protection.** When operating OHVs for extended periods of time it is recommended that hearing protection be worn.
STANDARD OPERATING PROCEDURE

Off-Highway Vehicle Operation

- **Fire Extinguishers.** Each OHV will carry at least one Type B-I or B-II fire extinguisher approved by Underwriters Laboratories (UL). Each fire extinguisher shall be inspected at least once weekly to ensure that it is sufficiently charged and that the nozzle is free and clear. Discharged or defective fire extinguishers shall be recharged or replaced immediately.

- **Inclinometers.** Each ATV/Utility Vehicle shall be equipped with an inclinometer to enable the operator to accurately access the slope of terrain in degrees. The ATV/Utility Vehicle will not be operated on side slopes greater than 20 degrees or inclines/declines greater than 30 degrees.

- **Load Capacity.** The maximum load of the OHV will not exceed manufacturer’s recommendations, for example the ARGO is 1,150 lbs and the Polaris is 1,500 lbs. When loading OHVs, the heavy items will be placed low in the vehicle so that the stability of the vehicle will remain within safe operating limits. All light equipment will be secured within the racks provided on the vehicles front, rear, or top as applicable. It is always advisable to keep the center of gravity as low as possible when operating in mountainous terrain.

- **Tool Kit.** OHVs will be equipped with basic tools for emergency repairs. The tool kit shall consist of but not be limited to the following: Allen wrench set, flat screwdriver, hammer, pliers, and pin for removing track pin, lug wrench, portable air compressor, and low pressure air gage.

8.0 QUALITY CONTROL

The HGL Senior UXO Operations Manager is responsible for ensuring this SOP is reviewed annually for completeness, accuracy and safety. The HGL UXO Safety manager is responsible for the maintenance, management, and annual review of this SOP for procedural, quality control, and safety issues. All questions, comments or recommendations regarding this SOP should be directed to the UXO Safety Manager.

Project manager and supervisors are responsible for ensuring all site personnel read, understand, and follow this SOP. If any discrepancies are found with procedural steps or safety issues pertaining to this SOP, it will be brought to the attention of the responsible supervisor immediately for corrective action.

8.1 THREE PHASE INSPECTION CHECKLIST

The Unexploded Ordnance Quality Control Specialist (UXOQCS) is responsible for ensuring that the quality control (QC) and safety measures instituted by this SOP are met during the initial, preparatory and final phases OHV training and operations. The UXOQCS will use the
Three Phase Inspection Checklist, Attachment 5 to evaluate OHV operations performance and safety.

9.1 RECORDS

All personnel operating OHVs are responsible for documenting records and inspections associated with this SOP. Training records will be maintained along with all other training documentation conducted on-site. The following forms will be utilized for documenting training, operations and QC on HGL projects requiring the use OHVs.

- Standard Operating Procedure Acknowledgement Form, Attachment 1
- OHV Training Course Guide, Attachment 2
- OHV Qualification Card, Attachment 3
- Vehicle Checklist, Attachment 4

8.0 REFERENCES

US Army Corps of Engineers, 2008 Engineer Manual 385-1-1 Safety and Health Requirements Manual; September

10.0 ATTACHMENTS

| Attachment 1 | Standard Operating Procedure Acknowledgement Form |
| Attachment 2 | OHV Training Course Guide |
| Attachment 3 | OHV Qualification Card |
| Attachment 4 | Vehicle Safety Inspection Checklist, HGL MR Form 15.23 |
| Attachment 5 | Three Phase Inspection Checklist |
Attachment 1

STANDARD OPERATING PROCEDURE ACKNOWLEDGEMENT

I have read, understand and agree to abide by the provisions as detailed in this standard operating procedure (SOP) prepared by HGL. By signing below, I certify that I have had the opportunity to read and ask questions about this SOP, and that I understand the procedures, equipment and restrictions, and agree to abide by them. Failure to comply with this SOP may lead to disciplinary action and/or my dismissal from the work site and termination of employment.

Prior to the commencement of any work task associated with these SOPs, the Senior Unexploded Ordnance Supervisor (SUXOS) or Senior Unexploded Ordnance Technician assigned to the project will discuss additional procedures to be implemented, or any other site-specific conditions that may arise. All on-site personnel of HydroGeoLogic, Inc. must sign this Acknowledgment Form before performing the task covered by these SOPs.

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Attachment 2

OHV TRAINING COURSE LESSON GUIDE

A. OHV

1. The OHV can be configured several different ways:
   a. With tracks
   b. With tires
   c. A combination of the two

2. Configuration is determined by a careful recon of the area of operation prior to starting work.
   a. Though the ARGO OHV is an amphibious vehicle, we do not operate them as such.
   b. The top of the vehicle provides a large sail area for the wind and makes the vehicle top heavy as well.
   c. When crossing through water make sure the wheels of the vehicle maintain contact with the ground.

3. Though the OHV is capable of operating in various off-road terrain conditions, it has its limitations, which will be discussed in detail later on.

CAUTION – If the vehicle floats, it will go wherever the wind takes it! AVOID AND STAY OUT OF PONDS AND LAKES!

4. As you gain experience operating the OHV you will find it will take you most anywhere you need to go, for example:
   a. The ARGO Avenger is equipped with a liquid-cooled, 674cc, 25-horsepower, V-twin engine. The Polaris is equipped with a 700cc liquid-cooled 40 hp engine.
   b. The ARGO and Polaris gearbox has two forward speeds, reverse, and neutral.
   c. The gear should be selected that best suits the terrain and load to be carried.
   d. If the vehicle is equipped with tracks, low gear is normally the best choice.

5. To steer the ARGO, the brake is applied to the wheels on the side you want to steer toward, hence the name “skid-steer.” The Polaris steering box operates the same as a car. The ARGO brakes are dual piston calipers over 9-inch rotors. The Polaris has 4 wheel hydraulic disc brakes. The following operating procedures apply to the ARGO ONLY:
   a. The skid-steer brake mechanism is the weak-link in the system and must be kept lubricated and adjusted properly.
   b. If the idler chain brakes, the effected side will lose steering and braking power.
a. Tension on the drive chains is kept constant by chain tensioners that help to prevent sprocket damage.
b. Tensioners should be replaced when they can no longer take up the slack in the chain.

6. OHVs equipped with enclosed cab.
   a. If the vehicle is equipped with an enclosed cab of any sort, make sure there is plenty of ventilation to avoid exposure to exhaust gases and particulates.
      1) Gasoline engine exhaust contains high levels of carbon monoxide, an odorless, colorless, toxic gas that will cause injury or death.
      2) Inspect the engine exhaust for damage and disrepair.
      3) Listen for a change in exhaust or engine noise that may indicate a leak in the exhaust system.

   **CAUTION** -- If an exhaust leak is suspected, place the vehicle out of service and report it to the craft supervisor.

**B. DRIVING THE OHV**

1. **PRE-OPERATIONAL CHECKS:**
   a. Before operating the OHV it should be thoroughly checked out as to its condition and an inspection sheet filled out.
      1) See Attachment 4, Vehicle Safety Inspection Checklist of this SOP.
      2) All discrepancies should be noted on the Vehicle Safety Inspection Checklist and corrected prior to operating the vehicle.
      3) Inform the craft supervisor of any problems with the vehicle so that repairs can be made promptly.
      4) If the craft supervisor is not available leave the check sheet on the seat with a description of the problem written in the comments or on the back and they will get to it as soon as possible.

2. **OPERATIONAL CHECKS:**
   a. Get in the vehicle and have everyone buckle up.
   b. Start the engine and listen for any unusual sounds.
   c. A cold engine may require the use of the choke for starting.
   d. Allow the engine to warm up before getting underway.
   e. As you begin to move out, listen again for any unusual noise coming from the gearbox or drive train.
   f. Check your gages and inclinometer for proper operation.
   g. Test the brakes and steering for proper operation.

3. **OPERATING THE OHV IN REMOTE AREAS:**
   a. When traveling in remote areas ensure you have the required safety equipment with you in the OHV.
b. Follow safe driving techniques when traveling in remote areas.

c. When driving up hills, always attempt to approach the hill head on to minimize the possibility of sliding sideways or rolling over.

1) Accelerate slowly to prevent loss of traction.

CAUTION – Never accelerate or brake suddenly while driving up or down a hill. Sudden acceleration or braking can cause the vehicle to roll over, causing serious injury or death.

2) When traction is lost, the vehicle may slide sideways or backwards.

3) Apply the brakes gently and evenly to stop the slide.

4) Attempt to avoid steep hills and inclines.

5) When a steep hill or inclines can’t be avoided, be prepared to shift occupant weight forward, or have occupant get out of the vehicle to decrease the possibility of rolling over.

6) Do not operate the OHV on side slopes greater than 20 degrees or inclines/declines greater than 30 degrees.

7) Due to terrain conditions you may wish to lower the limit to a lesser value.

CAUTION – When driving downhill attempt to approach the hill head on to minimize the possibility of sliding sideways or rolling over.

8) Shift the gearbox into low and keep the speed of the engine up just enough to keep the clutch engaged. This allows the engine to brake the vehicle and keeps the brakes from overheating.

9) If the brakes need to be used to control forward speed, apply them gently so as not to break traction.

4. OPERATING ON A SIDE SLOPE:

   a. If at all possible, DO NOT drive the OHV on a side slope.

   b. In the event a side slope cannot be avoided, choose a path that limits operation to 20 degrees or less. Side slope operation greatly increases the risk of rolling the vehicle.

   c. Operation of vehicles on a side slope requires constant use of the brakes for steering correction as the vehicle tends to head downhill.

   d. This may cause brake overheating or fade.

C. CARE AND MAINTENANCE OF THE ATV/OHV

1. ENGINE OIL INFORMATION:

   a. Check the engine oil each day before operating the engine.

   b. To check the oil during an operating period, shut the engine off and allow the oil time to drain into the sump.

   c. Do not overfill the sump.

2. GEARBOX OIL INFORMATION:

   a. Check the gearbox oil each day before operating the vehicle.

   b. Clean the area around the dipstick before removing.

   c. Do not overfill the gearbox.
Off-Highway Vehicle Operation

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Revision No.:
Date: June 2011

3. BRAKE FLUID LEVEL:
   a. Check the brake fluid level each day before operating the vehicle. The fluid level must be above the top of the sight glass mounted in the side of the master cylinder reservoir.
   b. If the brake fluid is below this level, thoroughly clean the master cylinder cover and surrounding area.
   c. Remove the two screws; lift off the cover and the gasket.
   d. Add only fresh clean DOT 5 fluid.
   e. Replace the cover on each master cylinder, making sure the rubber gaskets are properly seated before tightening the cover screws.

CAUTION – Do not mix DOT 3 and DOT 5 fluid. They are not compatible. DOT 5 is recommended by the manufacturer for both OHVs.

4. BRAKE COOLING SYSTEM:
   a. Eight-wheel ARGO vehicles with hydraulic brakes have a 12-volt fan forcing cool air from outside the engine compartment onto the brake components to protect the system from overheating.
   b. Overheating can damage the brake components and gearbox seals.
   c. Make sure the brake cooling fan is operating when the vehicle is being driven.
   d. The fan can be heard as soon as the ignition key is turned to the “on” position.

D. CARRYING PASSENGERS AND ATV/OHV

1. Keep OHV as low as possible and evenly distributed.

2. Use extreme caution when negotiating inclines with a load in the vehicle.
   a. Heavy loads and high loads decrease the stability of the vehicle and may cause it to roll.
   b. Keep the weight of the load near the floor of the vehicle. This will lower the center of gravity and help keep the vehicle stable.
   c. The maximum load is 1,150 pounds for the ARGO Avenger and 1,500 pounds for the Polaris.
   d. Secure the load to prevent shifting of the weight while driving.

3. When carrying passengers, ensure they wear their seatbelts and keep their arms and legs in the OHV.
   a. It may be advisable to have passengers get out of the vehicle when rough or steep terrain is encountered.
   b. These vehicles are not known for their comfort in rough terrain.
   c. Limit the number of personnel in the OHV to the driver and three passengers. No passengers are allowed on a Class I ATV.
E. POST OPERATION CHECKS

1. When securing the OHV check the following:
   a. Check the fuel level.
   b. If the fuel level is low, report condition to the site supervisor for refueling as directed.
   c. Remove tools and personal gear.
   d. Close the doors and fasten the snaps.
   e. Always chock the wheels, even if parked on level ground.

2. Plan for the next day’s operation. Follow the 6-Ps, *Proper Prior Planning Prevents Poor Performance*:
   a. Inform the site supervisor when OHV requires relocation to the next work site/area.
   b. Vehicles equipped with tracks will not be driven on public roads.
   c. If you have any problems, let the site supervisor know so correct actions can be taken as necessary or have another OHV delivered to the work area.
Attachment 3

OHV QUALIFICATION CARD

Name: ________________________________

Instructor: ___________________________ Date: _______________

QUALIFICATION

1. Classroom instruction completed. __________

2. Pre-operation checks. __________

3. Test drive. __________

4. Driving on a 30-degree incline. __________

5. Driving on a 30-degree decline. __________

6. Driving on a 20-degree right side slope. __________

7. Driving on a 20-degree left side slope. __________

8. Driving and parking on uneven terrain. __________

9. Backing and ground guide procedures __________

10. Securing the loading and weight distribution. __________

11. Post-operations OHV inspections. __________

12. On the job training. __________

I certify that the individual named above has met the training requirements specified by this SOP of the safe operation of the OHVs required for use on this project:

SSHO: ________________________________ Date: _______________

Signature

SUXOS: ________________________________ Date: _______________

Signature

HGL—Standard Operating Procedure

13
### Vehicle Safety Inspection Checklist

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<thead>
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<th>Inspection date:</th>
<th>Site name/location:</th>
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<tr>
<td>Mileage:</td>
<td>Owner (contractor/HGL/rental):</td>
</tr>
</tbody>
</table>

#### 1. DOCUMENTATION:
- Registration and License Plate
- Insurance
- Emergency Route Map & Phone #

#### 2. TIRES:
- Pressure
- Condition

#### 3. EQUIPMENT:
- Fire extinguishers
- First Aid/CPR/Burn Kits
- Emergency Route Directions/Map
- Vehicle Registration/Rental Contract
- HGL Insurance Coverage Card
- Eyewash Kits
- Spare Tire
- Tire Changing Equipment
- Tie downs (if applicable)
- Chocks (if applicable)
- Placards (if applicable)

#### 4. FLUID LEVELS:
- Oil
- Coolant
- Brake
- Steering
- Transmission
- Windshield Wiper
- Fluid Leaks
- Last Oil Change (mileage):

#### 5. BRAKES:
- Hand/Emergency Service

#### 6. BELTS:
- Proper tension
- Condition

#### 7. GENERAL:
- Windshield Wipers
- Steering
- Horn
- Gas Cap
- Mirrors
- Door Window Handles/Latches
- Cleanliness
- Exhaust System

#### 8. LIGHTS:
- Headlights (high & low)
- Brake Lights
- Parking
- Back-up
- Turn Signals
- Emergency Flashers
- Interior Lights

---

**Notes:**
1. To be used weekly for all vehicles except explosive carriers that must be inspected prior to each explosives transport.
2. Items marked with an * are required for explosive carriers and must be inspected prior to each use per HGL MRT SOP 15-0.
3. All forms with deficiencies noted must be returned to the Safety Officer within two working days.

---

**Description of deficiencies:**

**Corrective Actions to be taken:**

**Inspection conducted by:**

**(Printed name/signature)**

**Deficiencies corrected by:**

**(Printed name/signature)**

*HGL MR Form 15-13 (Sep 2005)*
## THREE PHASE INSPECTION CHECKLIST
### OFF-HIGHWAY VEHICLE OPERATION

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<th>Inspection Phase Requirement</th>
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<td>1.</td>
<td>Work plan</td>
<td>Is a current copy of SOP 15.14 available for Supervisor/Operator review before OHV operations?</td>
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<td>2.</td>
<td>SOP 15.14, Sections 3.0, 5.0, 6.0, 7.0 and Attachment 1</td>
<td>Has the Project Manager, Site Supervisor, Site Safety and Health Officer, OHV operators/passengers reviewed and understand their individual responsibilities by completing the SOP acknowledgment?</td>
<td>P/I/F</td>
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<td>3.</td>
<td>SOP 15.14, Section 6.0 and Attachment 2 &amp; 3</td>
<td>Have all OHV operators/passengers received the appropriate classroom and practical training?</td>
<td>P/I/F</td>
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<td>4.</td>
<td>SOP 15.14, Section 5.2 &amp; 7.0</td>
<td>Are SSHO personnel available to perform operational and safety oversight of OHV operations?</td>
<td>P/I/F</td>
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<td>5.</td>
<td>SOP 15.14, Section 5.1 &amp; 6.0</td>
<td>Does the Site Supervisor have a current training record on file for all OHV operators/passengers?</td>
<td>P/I/F</td>
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<td>6.</td>
<td>SOP 15.14 Section 5.0, 7.2 &amp; Attachment 4</td>
<td>Are safety devices and equipment required for OHV operation available and utilized?</td>
<td>P/I/F</td>
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<td>7.</td>
<td>SOP 15.14 Section 4.4.1</td>
<td>Do OHV operators/passengers wear hearing protection for periods of prolonged vehicle operation?</td>
<td>P/I/F</td>
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<td>8.</td>
<td>SOP 15.14 Section 7.2 and Attachment 4</td>
<td>Are OHVs equipped with an approved and properly mounted fire extinguisher?</td>
<td>P/I/F</td>
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### Off-Highway Vehicle Operation

**SOP No.:** 15.14  
**SOP Category:** MMRP  
**Revision No.:**  
**Date:** June 2011

<table>
<thead>
<tr>
<th></th>
<th>SOP No.</th>
<th>Section/Attachment</th>
<th>Question</th>
<th>I/F</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>SOP 15.14 Section 4.4.2</td>
<td>Are OHV fire extinguishers inspected at least once each week to ensure that they are sufficiently charged and that the nozzle is free and clear?</td>
<td>I/F</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>SOP 15.14 Attachment 2</td>
<td>Is each OHV equipped with an inclinometer and proper working order?</td>
<td>I/F</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>SOP 15.14 Section 7.1 and Attachment 2</td>
<td>Is each OHV operated on side slopes less than 20 degrees or inclines/declines less than 30 degrees?</td>
<td>I/F</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>SOP 15.14 Section 7.1 and Attachment 2</td>
<td>Are OHV loads limited restricted to the safe working loads established by the OHV manufacturer and are loads properly placed low and securely in the vehicle so that the stability of the vehicle will remain within safe operating limits?</td>
<td>I/F</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>SOP 15.14 Section 4.6</td>
<td>Are all OHVs equipped with basic tools for emergency repairs to include a hex wrench set, flat screwdriver, hammer, pliers, and a pin for removing the track pin, lug wrench, portable air compressor, and low pressure air gauge?</td>
<td>P/1/F</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>SOP 15.14 Section 4.7</td>
<td>Does the OHV operator utilize Attachment 3, Vehicle Checklist to conduct pre and post inspections for operational serviceability?</td>
<td>I/F</td>
<td></td>
</tr>
</tbody>
</table>

#### Punch list Items (assigned by number):

1.  
2.  
3.  
4.  
5.  
6.  
7.  

**Inspection by (print name):**  

**Acknowledged by (print name):**  

**Inspection by (print name):**  

**Acknowledged by (print name):**