FACT SHEET
Unexploded Ordnance (UXO) Response Process

Department of the Navy RAB/TRC Training Workshop

The Department of the Navy defines military munitions/explosive ordnance as any munition, weapon delivery system, or ordnance item that contains explosives, propellants, or chemical agents. UXO is military munitions/explosive ordnance that has been primed, fused, armed, or otherwise prepared for action, and that has been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material, and remains unexploded either by malfunction, design, or for any other cause.

UXO vs HTRW

With respect to its threat to human health and the environment, UXO differs from other hazards in several ways that can be inferred from the quick comparison chart below. Hazardous, toxic, and radiological wastes (HTRW) generally present a threat to human health and the environment through repeated and accumulated exposures to certain contaminants above acceptable exposure limits. UXO presents an immediate risk of acute physical injury from fire or explosion resulting from accidental or unintentional detonation.

General Characteristics

UXO	HTRW
Not very mobile	Very mobile
Not chemical specific	Chemical specific
Not concentration dependent	Concentration dependent
Single exposure	Multiple exposure
Narrow target population	Broad target population
Immediate acute physical injury	Long-term health effects

UXO SAFETY AND REPORTING

It is important to understand how to react responsibly in the presence of UXO

WHAT SHOULD YOU DO IF YOU SEE UXO?

1. **Do not continue to move toward a suspected UXO.** Some UXO are sensitive to motion and could explode if you come too near.
2. **Do not move or disturb UXO.** It could explode, resulting in injury or death.
3. **Do not move any object on or near UXO.** UXO can become unstable over time and detonate with any motion.
4. **Note the location.** Note the direction, any landmarks, or other features that would aid in locating the UXO.
5. **Leave the UXO hazard area.** If you see UXO leave the area immediately, other UXO may be present.
6. **Report the UXO to the site manager.** If the site manager is not available, report the UXO to the local law enforcement agency.
7. **Stay away from areas of known or suspected UXO.** Do not enter fenced areas or areas with posted UXO warnings. This is the best way to prevent injury.

UXO Risk Assessments

Risk models use site-specific data on the distribution and density of UXO to estimate the threat to human health and the environment according to current and reasonably anticipated future land use. The models are used to determine risk on the basis of

the characteristics of the UXO present (amount, depth, size, and type), the characteristics of the site (topography, vegetation, soil type, and climate), and the range of potential exposure (current and future land use, and population size and proximity to site).

UXO Response Process

The Department of the Navy conducts UXO response actions to address explosives safety hazards posed to public health, welfare, or the environment. Depending on the amount of time available for responding to the threat, response actions may take place within a few hours or may last several years. Where UXO presents an imminent, immediate threat to human health or the environment, the Navy may initiate an Emergency Response, normally conducted by uniformed military explosives ordnance disposal (EOD) teams, to address the immediate risk of physical injury, death, or destruction of property. Under circumstances that only allow a response within a few months, the Navy may initiate a *Time-Critical Removal Action (TCRA)*, which may involve surface clearance of UXO, fencing or other measures to

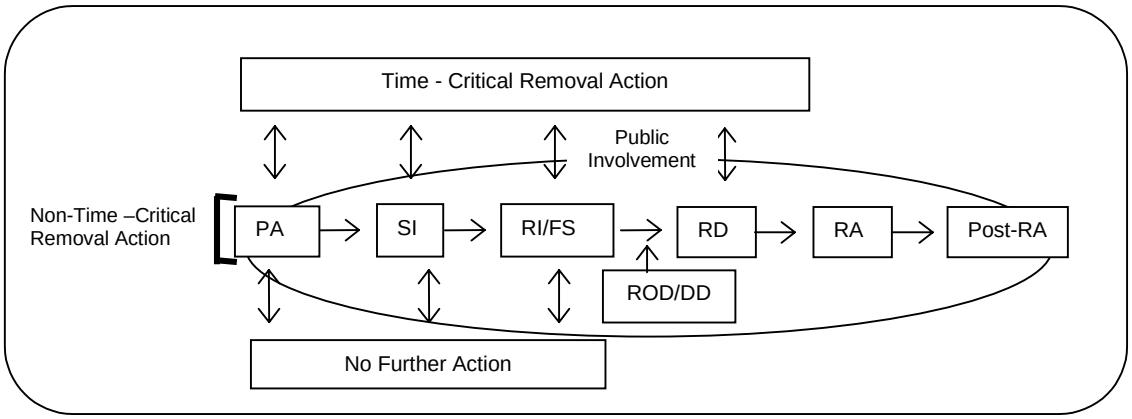


Figure 1. UXO Assessment and Removal Process

restrict access, posting of signs to warn of UXO hazards, or a combination of the foregoing. Whenever possible, Navy will conduct UXO response activities as a Non-Time Critical Removal Actions (NTCRA) under the CERCLA process, depicted in Figure 1. Even during the NTCRA process, circumstances may give rise to the need to conduct a more expedited response, such as an Emergency Response or a TCRA. The standard phases of the NTCRA are explained below:

Preliminary Assessment (PA) This phase involves recognizing the existence of the site in question, determining whether a UXO hazard is present, and identifying whether further action is needed.

Site Investigation (SI) During this phase, an Archives Search Report (ASR) is conducted. Information from the ASR is combined with results from a preliminary risk assessment to verify the extent of the suspected UXO hazard. Components of the ASR include a historical record search, interviews with knowledgeable personnel, and interpretation of aerial photos and old maps to gain a better understanding of the types and amounts of UXO hazards potentially present.

Remedial Investigation/Feasibility Study (RI/FS) A geophysical survey is performed in suspected UXO areas. A geostatistically based sampling program can be used to develop a sampling strategy to characterize areas suspected of containing UXO.

In this phase, a range of site-specific response actions, consistent with future land use, are evaluated according to criteria in the National Contingency Plan. This evaluation compares and contrasts the alternatives with respect to their overall protectiveness, implementability, and cost. The evaluation results provide the basis for selection of the action to be taken. The RI/FS is made available for public comment to solicit input on the potential response and reasonably anticipated future land uses. After the installation has responded to the public comments, the response action is finalized in a Record of Decision (ROD) or Decision Document (DD).

Remedial Design (RD) During the design phase, an RD plan is prepared that will achieve the UXO response objectives outlined in the ROD or DD. The plan defines the contract specifications, response plans, safety and personnel qualifications, and anticipated depth of clearance. During this phase, an explosives safety submission (ESS) must be prepared for approval by the Navy Ordnance Safety and Security Activity (NOSSA). When UXO responses are being conducted on property leaving DoD control, the DoD Explosives Safety Board (DDESB) must concur with the ESS.

Removal Action (RA) During this phase, the selected solution is implemented according to the specifications defined in the RD plan. The response action may consist of removal of UXO for detonation at an off-site demolition area or, when Navy explosives safety experts determine it is unsafe to move the UXO, detonation is conducted in place.

Post-Removal Action (Post-RA) This phase may be required to ensure the long-term safety at the site and may include public education, periodic UXO sweeps, long-term management such as use restrictions, and additional UXO response actions if land use changes.

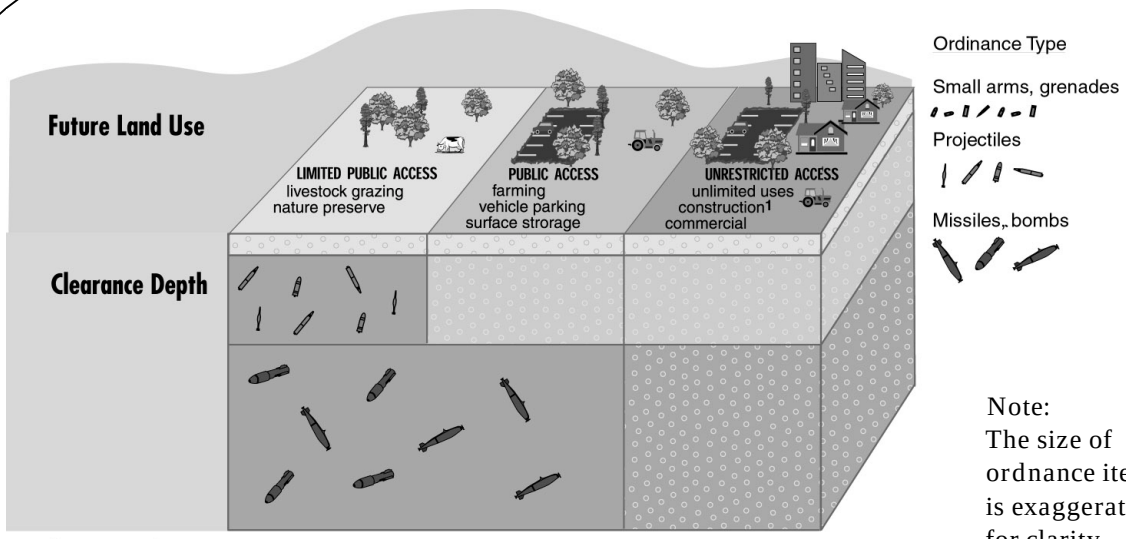
Public Involvement

Public involvement is a key component in the entire removal process. Each UXO project phase has a specific requirement to keep the public informed and to seek public support. Communication with the public and regulators is critical to successful and timely project completion. This can be accomplished through the use of Restoration Advisory Boards, which consist of volunteer public and government stakeholders for a specific site.

UXO Clearance Standards

Figure 2 shows a hypothetical area with UXO. If a response involves clearance, the depth of clearance is determined using site-specific information, including site conditions and reasonably anticipated future land use. For planning purposes, and in the absence of site-specific information, DDESB has developed generic clearance depths of 1 foot, 4 feet, or 10 feet, depending on anticipated reuse. **Actual clearance**

depths for a specific site may vary from DDESB planning criteria. This figure illustrates the generic clearance depths recommended by DDESB, when site-specific planning is not possible, to support different future land uses. The figure also shows the current assessment technologies available for identifying and characterizing the presence of UXO at the stated depths.



Note:
The size of ordnance items is exaggerated for clarity

Assessment Technology 2

Less than 1 foot
- Gradiometers
- Magnetometers
- Electromagnetic induction
- Ground-penetrating radar
- Multiple sensors
- Infrared sensors
- Synthetic aperture radar
- Sampling

Up to 4 feet
- Gradiometers
- Magnetometers
- Ground-penetrating radar
- Multiple sensors
- Sampling

Up to 10 Feet
- Gradiometers
- Magnetometers
- Ground-penetrating radar
- Multiple sensors
- Sampling

[1] If construction will occur, clearance to 4 feet below planned excavation is recommended
[2] Does not include emerging, active, or passive assessment technologies

Where to Learn More

Federal Regulations and Guidance

- Defense Environmental Network Information Exchange – DENIX
  http://www.denix.mil
  (Must be viewed with Internet Explorer version 5.0 or higher (IE5)

Points of Contact

- Office of the Chief of Naval Operations (N45): (703) 602-5330
- Navy Ordnance Environmental Support Office: (301) 744-4450/4534