

LAO PDR NATIONAL UXO/MINE ACTION STANDARDS (NS)



Chapter Eight Explosive Ordnance Disposal (EOD)

National Regulatory Authority for
the UXO/Mine Action Sector in Lao PDR

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Explosive Ordnance Disposal (EOD)

1. Introduction

The safe and efficient disposal of UXO and mines is an integral part of UXO/mine action in Lao PDR. The Lao PDR National Regulatory Authority (NRA), as the authority for the control and regulation of UXO/mine action within the country, has the responsibility for the development of procedural, management and safety requirements for all Explosive Ordnance Disposal (EOD) tasks conducted as part of UXO/mine action within Lao PDR.

2. Scope

This chapter describes the procedures that are to be followed for all EOD operations within Lao PDR.

The requirements included in this chapter of NS apply specifically to UXO clearance operations although some mines may be dealt with during these operations.

When UXO are referred to in this chapter, this is to be taken as including mines able to be dealt with in accordance with these NS.

3. Scope of EOD Operations in Lao PDR

For the purposes of this chapter of NS, EOD is the disposal of UXO including:

- a. The insitu disposal on clearance sites of UXO located during UXO area clearance operations.
- b. The insitu disposal of UXO located during EOD roving tasks.

Note: Insitu disposal includes those items that are safe to move by hand for short distances for disposal.

- c. The multiple item disposal of safe to move UXO on disposal sites. Disposal sites may be permanent or temporary.
- d. The rendering safe of UXO to enable its safe removal for disposal.

Demolition is the destruction of UXO by the use of explosive techniques. Demolition is a common component of all the UXO disposal operations indicated above.

4. Authority for EOD

4.1. Levels of EOD Qualification

There are four levels of EOD qualification within UXO/mine action in Lao PDR. These are:

- a. Level 1. A level 1 EOD qualification enables a clearance technician to conduct UXO area clearance operations, assist with EOD roving operations and assist with the disposal of UXO. This level of EOD qualification applies to national clearance technicians at the lowest grade.

Note: This level would typically apply to a deminer or demining technician.

- b. Level 2.A level 2 EOD qualification enables a clearance technician to supervise a UXO clearance task and carry out the in-situ disposal of UXO up to 89mm, including White Phosphorus (WP). This level of EOD qualification applies to national clearance technicians at the lowest UXO clearance task supervisor level.

Note: This level would typically apply to a section commander.

- c. Level 3.A level 3 EOD qualification enables a clearance technician to supervise multiple UXO clearance tasks, dispose of UXO up to 240 mm, dispose of single aircraft bombs up to 500 lb (excluding 100 lb WP bombs) and conduct multiple item UXO disposal up to a limit of 250 kg Net Explosive Quantity (NEQ). This level of EOD qualification applies to national clearance technicians at the highest UXO clearance task supervisor level.

Note: This level would typically apply to a team leader.

- d. Level 4.A level 4 EOD qualification enables a clearance technician to plan and manage multiple UXO/mine clearance tasks, render safe UXO, dispose of all aircraft bombs (including 100 lb WP bombs and the use of low-order techniques). A level 4 clearance technician may also deal with UXO containing liquid propellant, Fuel Air Explosive (FAE) and lethal and damaging chemical agents provided they have specialist qualifications, recognised by the NRA, to deal with these items. This level of EOD qualification applies to national clearance technicians at the UXO clearance management level.

Note: This level would typically apply to a senior EOD technician.

EOD is only to be undertaken by personnel who are qualified in accordance with **Chapter 3 of NS, Training and Qualifications** and the NS Support Document **NRA Training Standards for Lao PDR**.

Qualifications are to have been gained through successfully completing appropriate and authorised training conducted by either the central training facility or an accredited clearance organisation operating in Lao PDR. Qualifications gained elsewhere may be recognised by the NRA in accordance with the requirements of **Chapter 3 of NS, Training and Qualifications**.

Clearance organisations are to grade their clearance technicians in accordance with these 4 levels, and in accordance with the qualifications held. This is irrespective of the title of the position held. For example, a team leader in one organisation may be graded as level 2, while a team leader in another organisation may be graded level 4. However, the qualifications held by the individual must match the qualification requirements for the level given to the appointment.

Annex A to this chapter shows the authority levels for EOD in tabular form.

4.2. Authority for EOD of Specialised Items

Clearance organisations are to obtain the express agreement of the NRA to undertake EOD operations involving items known or suspected to contain:

- a. Liquid propellant.
- b. Fuel Air Explosive (FAE).
- c. Lethal and damaging chemical agents.

When such EOD operations are agreed to by the NRA, the operations are only to be conducted by level 4 clearance technicians with the appropriate specialist training.

Organisations conducting EOD operations involving liquid propellant or FAE are to read and familiarise themselves with the latest versions of the Technical Note for Mine Action (TNMA) covering these operations.

5. Responsibilities of Disposal Task Supervisors

Disposal task supervisors are responsible for the safe and efficient disposal of the UXO. Supervisors are to ensure:

- a. The task is adequately planned.
- b. Where safe-to-move UXO are to be disposed of, an appropriate disposal site at the clearance worksite or elsewhere is selected. See section 6 below for details on the selection of disposal sites.
- c. The disposal site is laid out in accordance with the requirements of section 7 below.
- d. Medical support is available and accident response plans are in place in accordance with the requirements of **Chapter 16 of NS, Medical Support to UXO Clearance Operations**.
- e. Communications are established and functioning in accordance with **Chapter 17 of NS, Communications**.
- f. Explosives for the EOD task, and any safe-to-move UXO to be disposed of are transported, stored and handled in accordance with **Chapter 22 of NS, Storage, Transportation and Handling of Explosives**. This includes provision for the security of explosives and UXO.
- g. Fire fighting equipment, appropriate to the assessed fire risk, is available on site.
- h. Liaison is undertaken with local communities and authorities. This should occur at least 24 hrs before EOD operations are to take place.
- i. Protective works are used where necessary.
- j. All personnel involved in the EOD task are qualified for the work they are to do.
- k. EOD records are maintained. This includes:
 - (1) Proper accounting for UXO to ensure that all items are disposed of and none are lost (see section 15.2 below).
 - (2) Accounting for explosives used. See **Chapter 22 of NS, Storage, Transportation and Handling of Explosives**
 - (3) Internal reporting of UXO disposed of.
- l. The disposal site and immediate environs are inspected after the EOD task, declared safe from UXO and refurbished appropriately.

5.1. Quality Checking of Explosives

Explosives and explosive accessories are to be checked by the disposal task supervisor, on receipt from the explosive store, each day prior to use. The check is to ensure:

- a. That the explosives and explosive accessories issued are from the organisations stocks.
- b. That the explosives and explosive accessories are serviceable, i.e. no water damage, no broken blocks of TNT etc.
- c. That the quantities are correct.

These checks are in addition to the quality checks on explosives carried out by the clearance organisation when it receipts explosives into stock. See **Chapter 22 of NS, Storage, Transportation and Handling of Explosives.**

6. Selection of Disposal Sites

When selecting a disposal site, including those cases in which in-situ disposal is conducted, the disposal site is to be selected to ensure that the planned disposal operations can be carried out safely and will not cause undue damage to property, infrastructure or areas of cultural or historical significance. Consideration is also to be given to the effects of ground shock and noise and the impact this will have on local communities.

Communities which own, control or live in the vicinity of land on which EOD operations are to be carried out are to be briefed on the operations in accordance with the requirements of **Chapter 5 of NS, Worksite Preparation.** Where damage to property or infrastructure is possible, the property owners or local authorities are to be consulted about the operations. If necessary, advice to minimise damage is to be given to property owners close to disposal sites.

6.1. Safety Distances and Danger Areas

The danger area for a disposal task is to be determined from the safety distance requirement for the items to be destroyed. The safety distance is dependant on the range that fragmentation will travel during the detonation. **AnnexB** to this chapter details the minimum safety distances to be applied for the disposal of single mines and common UXO. The minimum distances provided in Annex B may be increased if conditions warrant.

For multi-item disposal tasks, or for the disposal of items not included in Annex B, the appropriate safety distance is to be determined by the disposal task supervisor. Among the tools to assist in determining the appropriate safety distance are the **IMAS Danger Area Support Tool** and **TNMA10.20/01 Estimation of Explosion Danger Areas.**

It is possible to reduce the necessary safety distance if personnel are sheltered in Splinter-Proof Shelters (SPS). A SPS provides total protection to the occupants from the blast and fragmentation hazard produced by the disposal. Total protection includes protection from falling fragmentation or debris.

6.2. Contamination of Uncleared Areas

Disposal sites established close to clearance sites should be sited so that fragments from UXO being destroyed do not contaminate any areas to be cleared.

6.3. Risk of Fire

Selection of disposal sites is to take into account any risk of fire from the disposal operations to be carried out. Disposal sites should not contain any secondary fire hazards.

7. Layout of Disposal Sites

Each disposal site, including worksites in which in-situ UXO disposal is to be conducted, should have control and administration areas established as necessary, in accordance with the requirements of **Chapter 5 of NS, Worksite Preparation**.

In addition to the control points listed in **Chapter 5 of NS, Worksite Preparation**, disposal site control points must include:

- a. Safety Area. An area, outside of the assessed danger area, where personnel, vehicles and equipment not involved in the disposal operation are to be located.
- b. Firing Point. Firing points must be outside of the assessed danger area unless a SPS is to be used.
- c. Sentry points. See section 8 below.

8. Restriction of Access to Disposal Site

It is essential to ensure that people can not inadvertently enter disposal sites or unknowingly remain on disposal sites. To ensure this, suitably briefed sentries are to be positioned on all likely access routes to the disposal site prior to the placement of demolition charges. The placement of sentries is to conform to the following requirements:

- a. Sentries are to be placed to control all likely access routes to the disposal site.
- b. Sentries are to be placed outside the danger area. Where sentries cannot be placed outside of the danger area, they must be provided with suitable protection from the danger of fragmentation and blast. This protection is not to affect the sentry's ability to effectively fulfil their duties.
- c. Sentries are to be allocated individual areas of responsibility and these areas are to overlap to ensure complete coverage.
- d. Sentries are to have communications with the disposal task supervisor throughout the duration of the task. Ideally, this should be radio communications, however other methods of communications may be used provided the requirement for communications between the supervisor and sentries is able to be complied with.

Ideally, sentries should be able to observe the whole danger area including gullies and dead ground, however if this is not possible:

- a. The danger area is to be cleared before the placement of demolition charges.
- b. Sentries are to be equipped with megaphones.

The disposal task supervisor is to regularly test communications with the sentries. If communications is lost, preparation for the demolition is to be suspended until communications are re-established.

8.1. Briefing of Sentries

Prior to placing sentries, the disposal task supervisor is to thoroughly brief the sentries on their responsibilities and duties. As a minimum, the issues to be covered during the briefing are:

- a. The precise location of their sentry post and their individual area of responsibility.
- b. The location of other sentries.
- c. The requirement to remain alert at all times.
- d. The procedure for communications checks and the call-signs and signals to be used.
- e. The alternate means of communications to be used if radio communications fail.
- f. The action the sentry is to take in the event of:
 - (1) Misfires.
 - (2) Accidents.
 - (3) Loss of communications.
 - (4) Unauthorised entry into the disposal area.
- g. Any requirement to clear the danger area.

Note: When UXO disposal is to take place in areas where there is air traffic, sentries are to be briefed on the action to be taken if they see or hear an aircraft approaching.

9. Permanent Disposal Sites

Where permanent disposal sites are to be established the organisation requiring the disposal site is to notify the NRA and provide the relevant details. The NRA will then assist the organisation to obtain the relevant approvals from Provincial/District authorities and local communities as necessary.

9.1. Technical Approval

Prior to being put into service, permanent disposal sites are to be inspected and technically approved by a level 4 clearance technician. The level 4 technician is to:

- a. Determine the limit on the All Up Weight (AUW) or NEQ of items that can be destroyed in a single action.
- b. Site the firing point(s) and sentry points.

Note: More than one firing point may be necessary for different types of disposal tasks.

9.2. Closure of Permanent Disposal Sites

Prior to any permanent disposal site being closed, the clearance organisation responsible for the site is to:

- a. Conduct a thorough check of the entire disposal area to ensure that no UXO or hazardous components remain in the area.

- b. Refurbish the site in accordance with the requirements of the land owner/controlling authority.

If necessary, the land may have to be formally handed over.

10. Render-Safe and Low Order Techniques

Render-safe and low order techniques are only to be carried out in accordance with the authority levels for EOD included at **Annex A** to this chapter of NS.

Before any render-safe activities are carried out, the UXO, fuze, and its state of safety or arming, must be positively identified.

Only the render-safe and low-order techniques included in the **NRA Training Standards for Lao PDR** are to be used in Lao PDR unless specific NRA approval has been obtained for an alternative render-safe or low-order technique to be used.

When render-safe and low-order techniques are used, the safety distance requirements are the same as those as if the item was being disposed of using conventional demolition (high order) techniques.

11. Movement of UXO

Unless factors such as proximity to communities, buildings or important facilities, or the inability to achieve required safety distances preclude it, in-situ disposal, in which UXO are destroyed where they are found, is to be the option used for the disposal of UXO. In-situ disposal negates the inherent risk to personnel in the moving of UXO.

Where UXO have to be moved, they are only to be moved from their original location if assessed and identified as safe-to-move by a person qualified and authorised to do so in accordance with the authority levels included at **Annex A** to this chapter of NS. This may or may not involve the rendering safe of UXO.

When UXO must be destroyed in-situ and there is a risk to property, then protective works must be used.

12. Means of Initiation

Unless there is an electrical or Radio Frequency (RF) hazard in the disposal area, or other conditions preclude it, electrical initiation should be used to initiate all demolition charges due to the greater degree of control it provides.

13. General Safety Requirements

The following general safety requirements are applicable to all disposal operations:

- a. No disposal tasks are to be undertaken if there are electrical storms in the immediate area.
- b. The disposal task supervisor is to ensure that required safety distances can be achieved for the particular disposal task.
- c. There is to be no smoking or naked flames within 30 m of explosives or UXO.

13.1. Mandatory Wait Times

The following minimum mandatory wait times are to be applied for EOD tasks carried out in Lao PDR:

- a. Low-order case entry technique used, i.e. shaped charge, 30 minutes after firing and then, if evidence of burning is present, 60 minutes after the last sign of smoke or flame is observed.

Note: The 30 minute mandatory wait time after firing does not apply when a time delay fuze (M123, Mk346 or similar) is involved. In this situation, provided burning has not started, the wait time after firing may be reduced by the demolition supervisor to permit follow-up action to be carried out quickly due to the risk of the fuze functioning.

- b. Bomb fuze removal involving an explosive RSP, 10 minutes after firing.
- c. Disposal of WP, 30 minutes after the last sign of smoke or flame is observed.
- d. Deliberate burning of explosives when a booster is present; a minimum of 60 minutes after the last sign of smoke or flame is observed.

13.1.1. Burning Aircraft Bombs

In cases where the demolition supervisor can observe the bomb (either directly, or indirectly via sentries), the 60 minutes commences from the time when smoke or flame is last observed.

In cases where the demolition supervisor cannot observe the bomb, it will be necessary for the demolition supervisor to move closer to the bomb to determine whether it is burning or not. This is to be done only after any wait time after firing has elapsed (10 minutes for RSP and 30 minutes for case entry), solely by the demolition supervisor, using whatever natural protection is available and only to the minimum distance required to confirm whether burning is occurring or not.

If burning has occurred as a result of a case entry technique the demolition supervisor is to return to the firing point and wait for at least 60 minutes before confirming burning again.

If the case entry has not resulted in burning and deliberate burning is started the demolition supervisor is to return to the firing point and wait for at least 60 minutes before confirming burning again.

If the further confirmation check reveals the bomb is still burning, further checks may be made at a minimum of 20 minute intervals, solely by the demolition supervisor, using whatever natural protection is available and only to the minimum distance required to confirm whether burning is occurring or not.

Once a check reveals the bomb has ceased burning the 60 minutes wait time is to be applied before the bomb is deemed safe to approach.

14. Demolition Procedures

14.1. Preparation of Charges

The following procedures relate to the preparation of charges:

- a. Only qualified personnel are allowed to handle explosives.

- b. A person qualified to handle explosives is to be appointed by the disposal task supervisor to be in charge of explosives and accessories at the site and to keep a record of explosive issued and explosive returned.
- c. The minimum number of personnel is to be employed in the preparation and placement of charges.
- d. All personnel not required for the disposal task are to remain in the designated safety area.
- e. The disposal task supervisor is to retain control of the exploder key or other means of initiation from the time of commencing the preparation of charges until after the disposal site has been declared clear of hazards.
- f. Detonators used for the initiation of charges are never to be buried.
- g. If electrical firing systems are used, precautions are to be taken against Radio Frequency (RF) hazards. Specifically:
 - (1) Personnel must ground themselves before handling electric detonators.
 - (2) Hand held radios and telephones are not to be operated within 15 m of an electric detonator (outside the metal container) or a completed firing circuit, except at the firing point prior to firing.
 - (3) Electrical firing circuits are not to be sited closer than 50 m from high tension overhead cables.
 - (4) Electrical firing cable must not be laid across other strands of cable.
 - (5) Electrical firing cable should, where practicable, be laid along the ground, not suspended over roads or gullies.
- h. All components of an electrical firing system (cable and electric detonators) are to be tested separately to ensure that they have continuity. For cables, tests are to be made of both continuity and discontinuity to ensure the cable is not short-circuited. During testing:
 - (1) Detonators are to be under a filled sandbag or behind a suitable natural barrier.
 - (2) Only safety ohmmeters or the testing component incorporated in an exploder are to be used for testing.
- i. If non-electric firing systems are used the following procedures apply:
 - (1) The length of safety fuze to be used is to be sufficient to allow personnel lighting the fuze sufficient time to move at a walking pace to either the firing point or outside of the danger area after lighting the fuze.
 - (2) Every coil or remnant of a coil of safety fuze to be used is to be inspected, and tested for serviceability and burning speed prior to use.
 - (3) The minimum length of safety fuze to be used is 1 m.

14.2. Placement of Charges

The following procedures relate to the placement of charges:

- a. All explosive charges used for the high order destruction of UXO are to be of sufficient quantity to ensure complete destruction of the UXO.
- b. Charges for the disposal of UXO are to be placed to ensure that the maximum destructive effect of the explosive is achieved.
- c. Electric detonators are to be connected to the firing cable before being connected to any detonating cord or a main charge.
- d. Sentries are to be notified immediately prior to the insertion of detonator(s) into the charge(s) and the danger area confirmed as clear.

14.3. Pre-Firing Procedures

Pre-firing procedures are:

- a. The danger area is to be cleared of all non-essential personnel, vehicles, equipment and livestock.

Note: Clearance of the danger area would have occurred during the preparation of the charges and this would be the final clearance of personnel who may have assisted with the task.

- b. If electrical initiation systems are used, the complete firing circuit is to be tested for continuity.
- c. Immediately before firing occurs the disposal task supervisor is to radio the sentries to confirm the danger area is still clear and to warn them the firing of the charges is about to occur.

14.4. Misfire Procedures

In the event of a misfire, the disposal task supervisor is to observe the following minimum wait time before moving from the firing point and approaching the demolition charge:

- a. Electrical initiation: 10 minutes.
- b. Non-electrical initiation: 30 minutes.

During the wait time, no person is to leave the safety area nor is any unauthorised person to be allowed access into the danger area.

14.5. Post-Firing Procedures

Post-firing procedures are:

- a. Any mandatory wait time for the type of disposal operation being conducted is to elapse before any movement into the danger area is to occur (see section 13.1 above).
- b. The disposal task supervisor is to personally check that all charges have fired as intended and there is no residual hazard in the area.

- c. Any necessary post-demolition activities for the type of mine or UXO being disposed of, for example raking of the ground to expose residual WP, is to occur.
- d. Once the disposal task supervisor has determined that the area does not pose a hazard, the all clear is announced. No person is to leave the safety area or be allowed access to the disposal area until the supervisor has given this all clear.

15. Multiple Item UXO Disposal Operations

The procedures in the following sections apply to all multiple item UXO disposal operations.

15.1. Destruction Limits

Individual disposal serials are not to exceed the AUW or NEQ limits approved for the particular disposal site.

15.2. Security and Accounting for UXO

The organisation carrying out the multiple item UXO disposal operation is to ensure that adequate measures are taken to ensure the security of UXO to be disposed of and that the items are correctly accounted for.

15.3. Contamination of Surrounding Areas

When carrying out disposal operations involving potentially toxic or hazardous components, consideration is to be given to the contamination of the surrounding area by toxic or hazardous substances such as WP.

15.4. Use of Pits

If pits are to be used for the disposal:

- a. The location of the pit is to be checked with metal detection equipment to ensure it is free from explosive hazards before any digging commences.
- b. Measures are to be taken to ensure that personnel do not walk or stand over undercuts into the sides of pits.
- c. The pits are to be checked to ensure that no hazardous items are present both before disposal operations commence and after each serial.
- d. Separate pits are to be used for the disposal of WP and High Explosive (HE) items.
- e. A minimum 24 hour wait time should be applied between WP disposal serials carried out in the same location/pit.

15.5. Use of Stacks

Where stacks are used for multiple item UXO disposal operations:

- a. Stacks and their explosive chains are to be stable enough and sufficiently shielded so as not to be affected by detonations in other pits/areas.
- b. The best use of the explosive fillings of the items to be destroyed is to be made to effect their destruction.

- c. The correct mixture of high-capacity and low-capacity items in mixed stacks is to be applied.
- d. There are to be no air gaps between separate items and there is to be the minimum possible amount of metal/material between explosive fillings.
- e. Whenever possible, stacks are to be tamped with earth-filled sandbags rather than loose earth.

15.6. Preparation

Safe areas away from the disposal point(s) are to be selected for the unloading of UXO and the preparation of explosives. Separate areas should be established for the storage of WP UXO.

During unloading of UXO and preparation for multiple item UXO disposal operations, sensitive UXO components are to be protected from accidental bumping or jarring.

15.7. Placement of Charges

Where disposal operations involve munitions that contain rocket motors or shaped charges, explosive charges are to be placed to ensure that:

- a. Rocket motor initiation does not occur.
- b. Shaped charge jets and/or slugs are not formed.

15.8. Record Keeping

Organisations carrying out multiple item UXO disposal operations are to maintain records of each task, or in the case of more than one serial being carried out during a task, each serial. Details are to include:

- a. GPS location of the task (not required for each serial).
- b. Items disposed of. Separate lists are to be kept for each serial.
- c. AUW or NEQ of the task or each serial.
- d. Time of task or each serial.
- e. Minimum safety distance applied.
- f. Summary of the results of the task or each serial to cover the results of the task and any problems or difficulties encountered for example:
 - (1) Secure cordon being breached.
 - (2) UXO throw outs.
 - (3) Safety distances found to be inadequate.
 - (4) UXO burning being initiated (unless deliberate burning was carried out).
 - (5) Communication difficulties.

- g. Action taken at the end of the task to ensure that no UXOs, or hazardous or toxic components of UXO remained on the disposal site.

16. Protective Works

Where protective works must be used to ensure the protection of property or infrastructure, or to prevent the contamination of work areas, the type of protective works used are to be appropriate for the hazards of the task. They are to be properly designed, constructed and positioned so as to achieve the protection required.

17. Personal Protective Equipment

Where applicable, PPE in accordance with the requirements of **Chapter 18 of NS, Personal Protective Equipment** is to be used for EOD tasks.

18. Standard Operating Procedures (SOPs)

All organisations involved in EOD operations are to develop and promulgate appropriate Standard Operating Procedures (SOPs) specific to EOD operations.

19. Reporting of UXO

When UXO/mine action organisations have UXO reported to them, or they find these items as part of their normal operations, and they are not dealt with, the details are to be reported to NRA provincial offices.

When reporting UXOs details that should be included are:

- a. Location of the item(s) by map reference or GPS reading. A sketch of the location should also be provided.
- b. Type and quantity of item(s). If known, the common name should be provided, if not a detailed description should be provided. If possible, photographs should also be provided.
- c. Details of the effect that the UXO is having i.e. restricting land use or posing a risk to communities.
- d. Any marking systems used and if known, who emplaced the marking systems.
- e. Contact details of local personnel who may assist in locating the item(s).

There is no designated format for the reporting of UXOs. This information is to be passed to the NRA provincial office by whatever means is available.

Clearance organisations should mark UXOs that they are not required, or unable to deal with, however this is dependant on the particular situation. In some cases marking may advertise the presence of UXO. Non clearance organisations should not mark UXOs. Details of the requirements for marking UXOs are included in **Chapter 4 of NS, Marking Systems**.

**Annex A
Authority Levels for EOD**

	Category of EOD task	Clearance Technician Level 1	Clearance Technician Level 2	Clearance Technician Level 3	Clearance Technician Level 4
1.	Assist with EOD.	Y	Y	Y	Y
2.	Insitu disposal of UXO up to 89 mm calibre.	N	Y	Y	Y
3.	Disposal of UXO up to 240 mm calibre.	N	N	Y	Y
4.	Disposal of single aircraft bombs up to 500 lb. ^{Note 1.}	N	N	Y	Y
5.	Multiple item UXO disposal up to a NEQ of 250 kg.	N	N	Y	Y
6.	Rendering safe UXO.	N	N	N	Y
7.	Disposal of all aircraft bombs including 100 lb WP.	N	N	N	Y
8.	Use low order techniques.	N	N	N	Y
9.	Disposal of items containing liquid propellant. ^{Note 2}	N	N	N	Y ^{Note 2}
10.	Disposal of items containing Fuel Air Explosives (FAE). ^{Note 2}	N	N	N	Y ^{Note 2}
11.	Disposal of items containing lethal and damaging chemical agent. ^{Note 2}	N	N	N	Y ^{Note 2}

Notes:

1. The authority levels for clearance technicians in this table only apply to personnel who have the relevant EOD qualifications in accordance with **Chapter 3 of NS, Training and Qualifications** and the **NS Support Document NRA Training Standards for Lao PDR**.
2. UXO technical surveyors qualified in accordance with the Training Standards are required to be EOD level 1 qualified and have six months working experience before attending technical survey training. During the technical survey training they then cover the same UXO recognition competency as an EOD level 2 clearance technician. Based on this, a qualified technical surveyor has the qualifications to assess UXOs up to 89mm calibre as safe to move.
3. The authority levels in rows 2, 3 and 5 include WP.
4. Clearance organisations may impose greater restrictions on the authority levels of their staff.

Notes in the table:

Note 1. Excludes 100lb WP bombs.

Note 2. Disposal of these items is only to be undertaken with agreement of the NRA and clearance technicians carrying out these tasks must have qualifications and experience recognised by the NRA to deal with the items.

Annex B
Minimum Safety Distances for Disposal of UXO – Single Items

High Explosive (HE), Smoke (Smk), Incendiary and Illumination (Illum) (Excluding White Phosphorus (WP))	Danger Area – Radius in Metres			Soil or Sand Bag Cover ^{Note 5}
	Item on Surface	Item on Surface Tamped ^{Note 3}	Item in Undercut Tamped ^{Note 4}	
Fuzes (all), Pyrotechnic UXOs, Grenade HE Offensive, Mine Apers Blast, Hand Grenade Smk, 4 lb Incendiary M50, Mortar Illum and Smk up to 60 mm.	200	100	100	0.40 m
BLU 3, 24, 26, 42, 61, 63, Mk118, Grenade HE Defensive, HE Rifle Grenades, HE Infantry Rocket up to 66mm, HE Projectiles and Mortars up to 60 mm.	300	150	100	0.50 m
Projectiles, Mortars and Rockets Illum or Smk over 60 mm up to 122 mm, including Mortars 4.2 inch Illum and Smk.	350	200	150	0.60 m
Projectiles, Mortars and Rockets Illum or Smk over 122 mm up to 175 mm.	400	250	150	0.70 m
Projectiles, Mortars and Rockets HE over 60 mm up to 85 mm, including 2.75" and 3.5" and BLU 45, 49, M83 and Mines Apers Fragmentation and Mines AT blast.	500	300	200	0.70 m
Projectiles, Mortars and Rockets HE over 85 mm up to 122 mm, including Mortars 4.2" and Fragmentation Bombs 23 lb and 20lb.	800	350	250	0.90 m
Projectiles, Mortars and Rockets HE over 122 mm up to 175 mm, including Rockets 5".	1000	400	300	1.00 m
White Phosphorus UXO				
Hand and Rifle Grenades WP and BLU17.	200	NA	NA	NA
Projectiles, Mortars and Rockets WP up to 60 mm & Bomb Incendiary 10 lbs.	200	NA	NA	NA
Projectiles, Mortars and Rockets WP over 60 mm up to 85 mm, including 2.75" and 3.5" Rockets and Igniter M23.	300	NA	NA	NA
Projectiles, Mortars and Rockets WP over 85 mm up to 122 mm, including Mortars 4.2".	400	NA	NA	NA
Projectiles, Mortars and Rockets WP over 122 mm up to 175 mm, including Rockets 5" and bombs 100 lb.	500	NA	NA	NA

Aircraft Bombs and Dispensers				
Bomb HE over 23lbs up to 120 lbs.	800	NA ^{Note 6}	400 ^{Note 7}	1.00 m
Bomb HE over 120lbs up to 250 lbs.	1000	NA ^{Note 6}	500 ^{Note 7}	1.50 m
Bomb HE over 250 lbs and up to 1000 lbs	1500	NA ^{Note 6}	800 ^{Note 7}	2.00 m
Bomb HE over 1000 lbs and up to 2000 lbs.	2000	NA ^{Note 6}	1200 ^{Note 7}	2.50 m
Dispenser fully loaded.	1500	NA ^{Note 6}	800 ^{Note 8}	1.50 m

Notes:

1. The danger areas given in the table are those from which all personnel, animals and easily damaged movable objects should be removed or placed under suitable cover.
2. The details given in the table do not provide for every situation. The disposal task supervisor must fully assess each disposal task situation separately taking into account his/her own technical knowledge and experience.
3. Tamped means covered with filled sand bags.
4. An undercut is a horizontal cut made into the side of a vertical (or near vertical) earth face. The earth above an undercut is undisturbed.
5. This column shows the required depth of the sand bag tamping over tamped items, or undisturbed earth above an undercut.
6. The tamping of large air delivered bombs on the surface is considered impracticable.
7. The disposal of aircraft bomb in an undercut with tamping increases the ground shock. Where necessary, protective works should be used to protect property.
8. A fully loaded dispenser can only be disposed of in an undercut with tamping when the contents are not WP.

Annex C Minimum Safety Distances for Disposal of UXO – Multiple Items

Note: The danger area radii in the table below are based on calculations of the fragmentation danger areas for common UXO found in Lao PDR.

All Up Weight (AUW) ^{Note 3}	Danger Area – Radius in Metres (Items on Surface)
Up to 0.5 kg	200
0.51 kg to 1.5 kg	300
1.51 kg to 2.5 kg	400
2.51 kg to 5.0 kg	500

Note: The danger area radii in the table below are taken from TNMA 10.20/01.

All Up Weight (AUW) ^{Note 3}	Danger Area – Radius in Metres (Items on Surface)
5.1 kg to 10 kg	581
10.1 kg to 20 kg	652
20.1 kg to 30 kg	732
30.1 kg to 40 kg	783
40.1 kg to 50 kg	821
50.1 kg to 60 kg	852
60.1 kg to 70 kg	878
70.1 kg to 80 kg	901
80.1 kg to 90 kg	922
90.1 kg to 100 kg	940
100 kg to 150 kg	957
150 kg to 200 kg	1,023
200 kg to 250 kg	1,074
250 kg to 300 kg	1,114
300 kg to 350 kg	1,149
350 kg to 400 kg	1,179
400 kg to 450 kg	1,205
450 kg to 500 kg	1,229
500 kg to 1,000 kg	1,251
1,000 kg to 2,000 kg	1,404

Notes:

1. The danger areas given in the table are those from which all personnel, animals and easily damaged movable objects should be removed or placed under suitable cover.
2. The details given in the table do not provide for every situation. The disposal task supervisor must fully assess each disposal task situation separately taking into account his/her own technical knowledge and experience.
3. All Up Weight (AUW) includes the explosive content of the munitions, the weight of their casings and fuzing systems and the weight of the donor explosive charges.