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Guidance on Practice for UXO Risk Mitigation Strategy for Projects - Implementation

GP 04-81

BP GROUP
ENGINEERING TECHNICAL PRACTICES

Foreword

This document is the second of two Group Engineering Technical Practices, ETP GP 04-80 and GP 04-81, on the development and implementation of an UXO RMS for projects.

The aim of these Guidelines is to ensure that BP's people, projects and reputations are protected from the affects of encountering UXO contamination as part of the HSSE plan.

The guidelines are in two parts:

- GP 04-80 provides guidance on the development of a UXO RMS.
- GP 04-81 provides guidance on how a project team should implement the selected UXO RMS and should only be read once the reader is familiar with GP 04-80.

These guidelines show how UXO RMS is aligned to the Capital Value Practice.

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1. Scope

This GP covers the implementation of a UXO RMS formulated under the guidance given in GP 04-80.

2. Normative references

The following normative documents contain requirements that, through reference in this text, constitute requirements of this technical practice. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this technical practice are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

International Mine Action Standards (IMAS)

IMAS 01.10	Guide for the application of International Mine Action Standards.
IMAS 04.10	Glossary of Terms and Definitions.

International Organization for Standardization (ISO)

ISO 9000	Quality management systems – Fundamentals and vocabulary.
ISO Guide 51	Safety aspects -- Guidelines for their inclusion in standards.
ISO Guide 2859	Sampling procedures for inspection by attributes.

BP

E&P risk management guidelines for major projects.

3. Terms and definitions

For the purposes of this GP, the following terms and definitions apply:

AAP6

AAP 6 is the document that defines NATO terms.

Alert (<http://projects.bpweb.bp.com/alert/>)

ALERT is a structured and facilitated session to discuss the risk and uncertainties of a project. It is usually conducted in the Appraise stage of project development to enable early management intervention and to promote development of effective risk management and opportunity capture plans.

Accreditation

The procedure by which an organisation is formally recognised as being competent and able to plan and manage UXO risk mitigation activities safely, effectively and efficiently.

Bomblet

(see submunition)

Clearance (explosive ordnance clearance)

Tasks or actions to reduce or eliminate the explosive ordnance (EO hazard) from a specified area in order to provide land fit for use. [NATO study 2187]. This can also be referred to as Explosive Ordnance Disposal (EOD) operations.



Cleared Area

An area that has been physically and systematically processed by a demining organisation to ensure the removal and /or destruction of all mine and UXO hazards to a specified depth. [IMAS]

Destroy (destruction) in situ [“blow in situ”]

the destruction of any item of ordnance by explosives without moving the item from where it was found, normally by placing an explosive charge alongside.

Disarm

The act of making a mine (munition) safe by removing the fuse or igniter. The procedure normally removes one or more links from the firing train.

Disposal

The final acts that removes the hazards presented by a UXO. The final disposal of explosive ordnance which may include demolition or burning in place, removal to a disposal area or other appropriate means. [AAP-6]

Note: In a number of countries, the final “Disposal” of UXO remains the responsibility of the national authority.

Early Assessment (EA)

The first part of a GA the aim of which is to determine whether there is evidence of potential UXO contamination within a broad project footprint and local environs.

Environmental Impact Assessment (EIA)/ Environmental and Social Impact Assessment (ESIA)

A process to assess the potential impact and environmental (/social) improvement opportunities of all stages of the future development on the surrounding environment (and social conditions).

Explosive Ordnance

All munitions containing explosives, nuclear fission or fusion material, and biological and chemical agents. This includes bombs and warheads, guided and ballistic missiles; artillery, mortar, rocket and small arms ammunition; all mines, torpedoes and depth charges; pyrotechnics; clusters and dispensers; cartridge and propellant devices; electro-explosive devices; clandestine and improvised explosive devices; and all similar or related items or components explosive in nature [AAP-6].

Explosive Ordnance Disposal (EOD)

The deliberate searching for (detection), identification, evaluation, render safe, recovery/removal and destruction/final disposal of unexploded ordnance.

Note: For the purpose of GP 04-80 & GP 04-81, the term EOD should be considered to cover all the services provided by an EOD authorities, agencies and contractors in support of a project's UXO Risk Mitigation Strategy including the delivery of Mine Risk.

Explosive Ordnance Disposal (EOD) Consultant

EOD Consultants provide advice on managing EOD programmes. This may include putting in place management systems, the conduct of UXO Risk assessments, the production of UXO RMS and the audit of working systems.

Explosive Ordnance Disposal (EOD) Contractors

This covers contractors employed to deliver Mine Risk Education, Technical Investigation (TI), Clearance, Disposal and QA/QC.



Note: In a number of countries the final “Disposal” of UXO remains the responsibility of the national authorities.

Explosive Ordnance Safety and Awareness Briefing (or Training)

(see Mine Risk Education).

General Assessment (GA)

The continuous process by which a comprehensive inventory can be obtained, and developed, of all reported and/or suspected locations of UXO contamination, the quantities and types of explosive hazards, and information on local land and sea conditions. This includes but is not limited to: soil characteristics, vegetation, geology, hydrography and climate; and assessment of the scale and impact of the UXO problem on the project or activity.

Note: For the purpose of GP 04-80 & GP 04-81, the term GA covers the rolling assessment of the UXO risk to a project or activity. The GA encompasses the Early Assessment, the Initial Assessment, the Risk Estimation, the Risk Workshops and Technical Investigations.

Hazard

Potential source of harm from items of UXO or component parts.

[based on ISO Guide 51:1999(E)]

Initial Assessment (IA)

A stage in the General Assessment the aim of which is to quantify, by type, the potential UXO contamination within a project footprint. The IA examines:

- The probability of the risk event occurring.
- The potential impact of the risk if it occurs.
- The ranges of uncertainty in impact and probability.
- The risk rating (a function of probability and impact).
- And advice on how easily the risk can be managed.

International Mine Action Standards (IMAS)

IMAS provides a framework of international standards and guidelines, sponsored by the United Nations, for Mine action. The aim is to improve safety and efficiency in mine action by promoting the preferred procedures and practices at both headquarters and field level.

Note: IMAS provides the only internationally agreed standards that cover EOD operations.

Note: IMAS allows for National and other Military standards to be at variance the central standard.

Mine Risk Education

A process that promotes the adoption of safer behaviours by at-risk groups, and that provides the links between affected communities, other mine action components, and other sectors. [IMAS 04.10].

Note: For the purpose of GP 04-80 & GP 04-81 the term MRE cover the training and education of Company and contractor staff in the risks associated with operating in a UXO



contaminated area and the measures that they need to take in order to mitigate the risk they face.

Munitions

(Also “Ammunition”) - A complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions [AAP-6].

Neutralise

The act of replacing safety devices such as pins or rods into an explosive item to prevent the fuse or igniter from functioning.

Note: It does not make an item completely safe as removal of the safety devices will immediately make the item active again.

Note: A mine is said to be neutralised when it has been rendered, by external means, incapable of firing on passage of a target, although it may remain dangerous to handle. [AAP-6]

Probability Impact Grid

A diagram depicting the importance of a risk and which plots probability on the x-axis and impact on the y-axis.

Quality Assurance (QA)

Part of quality management focused on providing confidence that quality requirements will be met ISO 9000.

Note: The purpose of QA is to confirm that management practices and operational procedures for EOD are appropriate and will achieve the stated requirement in a safe, effective and efficient manner. Internal QA will be conducted by EOD organizations themselves; but, external inspections by an external monitoring body should also be conducted.

Quality Control (QC)

Part of quality management focused on fulfilling quality requirements [ISO 9000].

Note: QC relates to the inspection of a finished product. The 'product' is safe cleared land.

Random Sampling

The selection of samples by a process involving equal chances of selection of each item. Used as an objective or impartial means of selecting areas for test purposes.

Render Safe Procedure (RSP)

The application of special EOD methods and tools to provide for the interruption of functions or separation of essential components to prevent an unacceptable detonation.

Remedial EOD Work

EOD work completed by Project coordinated EOD resources when an item of UXO is discovered on the Project construction footprint after it has been released for construction.



Residual UXO Risk

The risk from UXO that remains at a location when a Project releases an area to a contractor for construction or other activities.

Risk Estimate

An appraisal of the UXO risk to a project or associated activity that identifies the hazards, assesses their impact, and proposes response options.

Sampling

A defined procedure whereby part or parts of an area of cleared land are taken, for testing, as a representation of the whole area.

Small Arms Ammunition (SAA)

Ammunition with a calibre of less than 12,5 mm.

Note: Although potentially dangerous the risk posed is less than that posed by UXO.

Submunition

Any munition that, to perform its task, separates from a parent munition. [AAP-6]

Technical Survey (TS)/ Investigation (TI)

The detailed investigation of known or suspected UXO contaminated area identified during the planning phase employing visual techniques and equipment in order to gain a more detailed understanding of the type, level and extent of the UXO contamination within a specified area to a specified depth. Such areas may have been identified during the general mine action assessment or have been otherwise reported.

Unexploded Ordnance (UXO)

Explosive ordnance that has been primed, fused, armed, or otherwise prepared for use or used. It may have been fired, dropped, placed, launched, or projected yet remains unexploded either through malfunction or design, or for any other reason.

Note: For the purpose of GP 04-80 & GP 04-81 the term includes all explosive ordnance, munitions or parts thereof that might be encountered, irrespective of whether it has been prepared for use or not.

UXO Risk Mitigation Strategy

A systematic process for identifying and assessing the risk posed by UXO to personnel and projects in order to determine and implement the most appropriate and proportionate means of mitigation. It provides quantifiable assurance that land and seabed is fit for purpose.

War Grave

Ship or aircraft containing human remains or individual bodies that are casualties of war.

4. Symbols and abbreviations

For the purpose of this GP, the following symbols and abbreviations apply:

ALARP As Low as Reasonably Practicable

EOD Explosive Ordnance Disposal



EODCC	EOD Coordination Centre
FEL	Front End Loading
FFE	Free From Explosives
GIS	Geographical Information System
HSSE	Health, Safety, Security and Environmental
IMAS	International Mine Action Standards
MERP	Medical Emergency Reaction Plan
MRE	Mine Risk Education
PM	Project Manager
ROV	Remotely Operated Vehicles
QA/QC	Quality Assurance/Quality Control
SOPs	Standing Operational Procedures
SPA	Single Point of Accountability
SQL	Specified Quality Level
UXO	Unexploded Ordnance
RMS	Risk Mitigation Strategy

5. Context

5.1. General

- a. Managing an EOD programme within the context of an Oil and Gas Project should be seen as the implementation of the Project's UXO RMS. The development of a Project UXO RMS is covered in GP 04-80. For the purpose of this GP, an EOD programme is considered to be any activity that requires the contracting of UXO EOD Services for any of the following activities, or a combination thereof:
 1. Mine Risk Education (MRE). The role of the MRE contractor is the promotion of awareness of the UXO risk that leads to the adoption of safer behaviours by at-risk groups. This might include the reporting of indications that UXO contamination might be present or the correct action to be taken should an item of UXO be discovered. A general safety poster can be found on the UXO RMS Website.
 2. Technical Investigation (TI). The role of the TI contractor is to develop the ongoing General Assessment (overall UXO risk assessment) by conducting detailed on-site investigation (visual search, magnetic instrument search, side scan sonar, and magnetometer offshore) in order to inform the decision-making processes for alternatives and clearance options. This might include the location and identification of individual items of concern.
 3. UXO Clearance Operations. The role of the Clearance contractor is to eliminate all UXO hazards from a site in order to produce cleared land or sea bed (i.e., a specified



area that has been physically and systematically processed by an EOD organisation to ensure the removal and/or destruction of all UXO hazards to a specified depth).

4. **Quality Assurance (QA).** The purpose of QA is to confirm that management practices and operational procedures of MRE and EOD contractors are appropriate and will achieve the stated requirement in a safe, effective and efficient manner. The MRE and EOD contractors will conduct internal QA; this should be assessed by an independent external QA monitoring body in accordance with IMAS.
 5. **Quality Control (QC).** The purpose of QC is the independent inspection of the finished product; (i.e. confirm whether the land or seabed is fit for purpose, following clearance).
- b. The aim of this GP is to provide practical guidance to Project staff on the implementation of the Project UXO RMS.

5.2. International Mine Action Standards (IMAS)

5.2.1. Generals

- a. International Standards for UXO operations were developed by the United Nation as the IMAS. Since the introduction of IMAS in 2001, many EOD organisations claim to understand and comply with the Standard. However, there is evidence that this may not be the case. Project teams should be aware of this and put mechanisms in place to ensure that they receive the quality of service that is required. The basis of this GP is the IMAS standard - this provides a minimum standard to which any EOD contractor should conform.

Note As a parallel, in 2005 the EOD industry should be considered to be as mature as the commercial diving industry was 15 years ago.

- b. The EOD Quality processes should ensure the safety of all stakeholders and provide an acceptable and verifiable level of confidence that the land or sea bed in question is fit for purpose (i.e., clear of UXO contamination).

5.2.2. Fundamentals and assumptions

The following fundamentals and assumptions informed the development of IMAS:

- a. The goal of every EOD clearance operation should be the removal of all UXO identified as a potential hazard from a defined area. This shall be assumed to be BP's default setting unless the project team can demonstrate that an alternative option reduces the risk to a statistically acceptable level.
- b. The specified clearance standard should take account of the intended use of the contaminated land. This determines the effort and, therefore, the resources required to verify the overall quality of clearance achieved. The more sensitive the intended use of the land, the more resources that could be expected to be committed to verify the quality of the cleared land. This is known as a 'suitable for use' approach. This should have been defined in the Project's UXO RMS.
- c. IMAS recognises that no human process is ever entirely error-free. Therefore, some residual risk may remain following a clearance operation even after all remedial action that results from a Quality Assurance process has been completed. Also, natural and man-made circumstances may move UXO into previously cleared areas - particularly offshore. This residual risk needs to be managed.
- d. The residual risk should be verifiable (quantifiable) through the final independent Quality Control process and deemed tolerable (acceptable) to the client.



5.2.3. IMAS based process

The IMAS based process includes the following:

- a. Production of comprehensive EOD policies/procedures.
- b. A formal Organisational Accreditation (AO) process for all EOD organisations.

Note It should be noted that “organisational accreditation” is the term IMAS uses for what is referred to within BP as contractor “pre-qualification”.

- c. A formal Inspection of EOD Contractor’s teams on mobilisation (Operational Accreditation).
- d. Internal & External Quality Assurance monitoring of EOD Contractor’s activities.
- e. External Quality Control Inspection of EOD Contractor’s field activities.

5.3. Unplanned discovery of UXO

- a. The premise behind this GP is that a UXO risk, like many other risks, can be mitigated with proper planning. In order to produce the most cost effective solution, this planning should be done in line with the concept FEL well in advance of any required action.
- b. If, however, UXO is found on the site of a project that has chosen a Do Nothing strategy, the Project should refer to the guide for the management action required that can be found at Annex A.
- c. Projects also, however, need to consider how they might expect their staff to react to such a hazard if the workforce has not received any training in this subject. The Project should consider the potential delays that may be caused if no provision has been made to provide EOD clearance support to the project site.

6. Implementing the project UXO RMS**6.1. Scope**

The implementation of a successful Project UXO RMS, should include the following:

- a. Contracting the right support from EOD Contractors at the right time and place and in the most cost effective manner.
- b. Ensuring that EOD contractors deliver their services to the prescribed standards.
- c. Ensuring that the Project Team remains aware and up-to-date with the potential risk from UXO even after a site has been cleared to the specified standard. This is referred to as ‘Managing the Residual Risk’.
- d. Ensuring that non-EOD contractors, who may be undertaking work on land that has been released as being fit for purpose following implementation of the project UXO RMS, are made aware of the risk that UXO may still pose to them and understand the risk mitigation options open to them.

6.2. Purpose

- a. The purpose of any EOD programme is to ensure that the land or seabed in question is fit for purpose.
 - 1. An Initial Assessment may have alerted the project team to a potential UXO hazard on, or in the vicinity of, the project site.



2. If detailed records and information are available of the precise location of activity that could have led to the existence of potential UXO contamination, this assessment may have enabled the project team to eliminate some areas of the project site from being considered as being at risk and pin-pointed others as being of concern.
- b. If records and information are incomplete, the Project should consider using TI to improve the accuracy and completeness of the data available to make the informed decision as to whether a
 1. Clearance operation would be required or whether some other option might be available.
 2. TI may range from 100% visual/side scan sonar cover plus random instrument samples (4, 8, or 12%) up to a 100% instrument investigation of a specific part of the site.
 3. The aim would be to achieve a clear understanding of the UXO contamination on the site to enable the Project team to make informed decisions on the requirements for Clearance operations.
 4. The project team is likely to want only to conduct EOD Clearance operations in as limited an area as possible where no practical alternative to Clearance can be found.
- c. Once the requirement for a Clearance operation has been established in a specific area, the EOD programme manager shall ensure that the work is completed to the required standard. The EOD programme manager should ensure that any UXO cleared from the site does not present any hazard in the future.
- d. The EOD programme manager may also be required to deal with the sensitive issue of war dead should any remains be discovered during UXO EOD work.

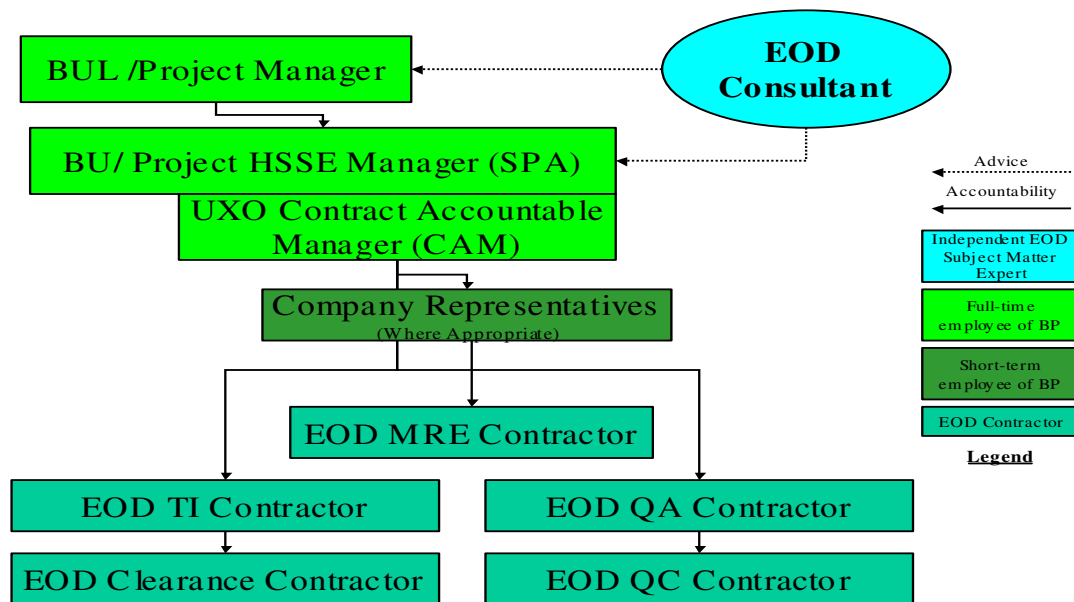
6.3. Programme management responsibilities

- a. The Business Unit or Project Team shall determine and agree early with the Host Nation Authorities where responsibilities and authority for EOD operations lie.
 1. The National Authority, as a requirement of IMAS, should be responsible for ensuring that EOD contractors working in-country are fit for role through some form of a National accreditation scheme.
 2. However, this is not always the case. The question of accreditation should be clarified in the Host Nation Agreement.
 3. If there is no National Authority responsible for EOD work within National boundaries or it does not meet BP's needs, BP shall assume this responsibility.
- b. The overall SPA for UXO matters is covered in Part One. As part of any contracting strategy, the BU/Project SPA may nominate a Contract Accountable Manager (CAM) to run the EOD programme and all its associated contracts. For small EOD operations, the SPA may elect to perform this function themselves. The CAM requires the following competencies:
 1. Lead.
 2. Let and manage contracts.
 3. Conversant with the practices outlined in this GP and aware of IMAS and its provisions.
 4. Sufficiently aware of UXO issues to be able to evaluate the changing impact that identified UXO risk may have on the project especially as construction approaches.
 5. Sufficient personal credibility for their advice to senior members of the project team to be taken seriously.



6. Understand the requirements of and implementation of a Quality Management Framework.
7. Know BP's UXO network and where to obtain UXO SME advice both at the strategic and the operational level.
- c. Clear responsibilities should be established for parties involved in the programme. Wherever EOD services are conducted, IMAS requires that the EOD contractor's work be monitored and inspected by an independent third party (a QA/QC contractor). The CAM shall decide how this work is managed.
- d. If required, the CAM should look initially to the Project HSSE Manager for advice. The Project HSSE Manager may refer the CAM to BP UXO SPA who in turn may point the CAM towards a UXO Subject Matter Expert.
- e. A typical division of responsibility for Project EOD for the management of EOD operation within a project is at Figure 1. The QA and QC role could be performed by the same contractor. MRE, TI, and Clearance could be performed by a single contractor independent of the QA/QC contractor.

Figure 1 – Responsibilities



- f. If appropriate, the CAM may use a BP Representative as an intermediary between themselves and the EOD Contractor. The BP Representative would be a short-term hire by BP to represent their interests during a specific phase of an EOD programme. The CAM may consider using their UXO consultant to help find and select any BP Representatives required. To fulfil their role, BP Representatives need to have the following competencies:
 1. Be an SME in the operational EOD disciplines that they are monitoring.
 2. Understand the provisions of IMAS and have experience of its implementation.
 3. Be experienced in contract management and the implementation of a Quality Management Framework.
- g. Once it has been determined that EOD contractor support is required, the CAM should establish a focal point for all UXO RMS coordination across the entire Project. For smaller packages of work, this role may remain as part of the function of the Contract Accountable

