1 Introduction

This guidance document explains the decision logic used throughout a munitions response (MR) project and assists in developing the Quality Assurance and Quality Control (QA/QC) activities that ensure quality data and confidence in decisions. This document provides an overview of the MR process and identifies specific quality considerations at critical decision points for MR projects. Planning for each decision point requires specific quality metrics be assigned and ongoing monitoring confirms project objectives are met.

Using this information, regulators and stakeholders can quickly review MR project work plans and evaluate the quality of MR work as it is performed. This document guides regulators through the project planning process by identifying appropriate quality goals, steps, and metrics, which minimizes rework, speeds completion, and reduces cost. This document is specifically targeted towards:

- federal, state, and local environmental regulators
- MR managers, technical staff, and contractors such as scientists, engineers, and geophysicists
- federal land management agencies
- tribal, environmental, community, and other stakeholders with an interest in MR

This document describes recent advances in MR technology, including advanced geophysical classification (AGC), and corresponding developments in QA/QC procedures, as well as requirements for qualifications and training. When used in conjunction with systematic planning that fully engages regulators and other stakeholders, acquired data can provide greater confidence in decision logic and faster timelines to gain consensus.

1.1 About this Guidance

ITRC completed the guidance document *Geophysical Classification for Munitions Response Sites* (GCMR-2) (ITRC 2015), which introduced new QA/QC procedures developed for geophysical classification surveys using advanced geophysical sensors. As a result of these advances in QA/QC procedures, many of the QA/QC activities presented in previous ITRC documents, specifically *Geophysical Prove-outs for Munitions Response Projects* (UXO-3) (ITRC 2004) and *Quality Considerations for Munitions Response Projects* (UXO-5) (ITRC 2008) are obsolete and should no longer be used. This current guidance supersedes the UXO-3 and UXO-5 documents. Additional, related ITRC resources that are still current include:

- *Frequently Asked Questions About Wide-Area Assessment for Munitions Response Projects* (UXO-6) (ITRC 2010)
- *Survey of Munitions Response Technologies* (UXO-4) (ITRC 2006)
- *Technical/Regulatory Guideline for Munitions Response Historical Records Review* (UXO-2) (ITRC 2003)
- *Breaking Barriers to the Use of Innovative Technologies: State Regulatory Role in Unexploded Ordnance Detection and Characterization Technology Selection* (UXO-1) (ITRC 2000)

1.2 Resources and Planned Updates

High-quality products and performance standards are required for all geophysical surveys, including analog detection methods, digital geophysical mapping (DGM), and AGC. Detailed and documented QC/QA procedures are required for each of these geophysical technologies and should be expected in all MR projects, regardless of the selected technology. This document includes information on related guidance and programs recently implemented, including:

- Overall Munitions Response Quality Assurance Project Plan (MR-QAPP) toolkit developed by the Intergovernmental Data Quality Task Force (IDQTF)
- Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan (AGC-QAPP) template
- DOD Advanced Geophysical Classification Accreditation Program (DAGCAP)

Specific MR-QAPP and AGC-QAPP template worksheets are referenced within sections of this document that correspond to the worksheet content. These worksheets are designed to facilitate the preparation of QAPPs. By walking the project team

and other stakeholders through a systematic planning process, the worksheets help focus data collection on the specific decisions to be made so that the type, quality, and quantity of data to be collected would be suitable for their intended uses and agreed upon before data collection began.

This document presents key elements of evidence-based decision making, which makes use of relevant information to provide a clear and defensible basis for project decisions. Two primary elements that are the basis for evidence-based decisions include:

- Conceptual Site Model (CSM) that evolves throughout an MR project life cycle: A CSM is a representation of relevant site characteristics, conditions and features developed from lines of evidence collected or acquired throughout the project life cycle. A CSM can be presented in multiple ways including text description, tables, figures, flow diagrams, maps, and pictures. Attributes of a high-quality MR CSM are type of munitions and extent (horizontal and vertical distribution) of UXO, discarded military munitions (DMM), munitions debris (MD), as well as current and anticipated future land use exposure pathways and receptors. Depending on the phase of the MR, the CSM may be based on historical information or on investigation derived data. The CSM should be updated throughout the process of MR as additional information becomes available and initial assumptions are confirmed or refuted.
- Well-defined data quality objectives (DQOs): DQOs stipulate project-specific objectives (decisions), decision confidence and the type, quality, and quantity of data to make the decision. To effectively implement DQOs during a project's life cycle, qualitative and quantitative requirements and acceptance thresholds and limits for these requirements should be defined and documented. These elements are defined during the systematic planning process and documented in the UFP-QAPP as part of that process. This document presents an overview of the elements that comprise DQOs and presents the progression of their development.

This document only addresses land-based MR and not the underwater environment. This document also does not address munitions constituents (MC) or explosives safety as related to MR. MCs are generally addressed during MRs, when encountered, but the focus of this document is on managing risks posed by unexploded ordnance (UXO) and discarded military munitions (DMM). The DOD Manual 4715.20, Defense Environmental Restoration Program (DERP) Management, (DOD 2012) considers potential risks posed by MC at MR sites where an MR is required.

1.3 About Munitions Response Projects

There are a total of 5,400 former ranges and munitions operating facilities throughout the United States. As of fiscal year 2016, the U.S. Department of Defense (DoD) completed cleanup at 61% of the munitions response sites (MRS) in its inventory, leaving 39% that still require a munitions response (MR). The total cost-to-complete estimate for the Military Munitions Response Program (MMRP) is $11.2 billion, which includes the cost to complete cleanup for the subset of sites MRS that may contain unexploded ordnance (UXO) and discarded military munitions (DMM) and still require a munitions response, and the cost for monitoring activities once cleanup is complete. The scope of the MMRP, including the costs, is available in the DOD Environmental Restoration Program Annual Reports to Congress.

To support the MR process, the project delivery team (PDT) relies on a quality system and evidence-based decision making, which integrates the best information with the expertise of the investigators, and values of the stakeholders. Ideally, the investigation will require multiple lines of evidence including qualitative and quantitative data. The PDT determines the type, quality, and quantity of data needed to support decision confidence. As all the necessary data quality needs and allowable uncertainties have been predefined by the PDT during project planning, the decision-making process is streamlined, as long as the established measurement performance criteria (MPC) have been met and the CSM does not change during the investigation.

At any phase in the MR project, relevant information and data must be acquired to support a specific point of decision. The confidence in the decision is only as good as the quality of the relevant evidence used to make the decision.

Quality management considerations discussed in this document are presented to assist PDTs in defining data quality needs during project planning to optimize strategies to most effectively investigate and mitigate explosive hazards resulting from munitions.

Back to Top ■ Next Section