DERP Forum

Strengthening Relationships with our Regulatory Partners

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DERP Forum

Data Quality Objectives (DQOs) and MR Quality Assurance Project Plan (QAPP)

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DoD Environmental Data Quality Workgroup

- Develop and recommend policy related to sampling, testing, and quality assurance for environmental programs to eliminate redundancy, streamline programs, improve data quality, and promote data integrity.
- Coordinate the exchange of information among DoD components.
- Develop DoD issuances to implement environmental quality systems and promote cost effective government oversight.
- Implement and provide oversight of the DoD ELAP.

Intergovernmental Data Quality Task Force

- IDQTF Executive Committee
  - EPA
    - OEI/Quality Staff Director
    - Lead Region QAM for OEI
    - Lead Region QAM for OSWER
  - DoD
    - EDQW Principals
- Work collaboratively to :
  - Address environmental issues of emerging concern at federal facilities
  - Promote implementation of consistent and transparent intergovernmental quality systems
  - Ensure a scientific basis for environmental decision-making.

IDQTF and EDQW Efforts for Munition Response

Develop and implement a quality system based on national and international standards for the performance remediation at DoD Munitions Response Sites

- Develop a Quality Assurance Project Plan template using the ***Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP)***
  - ✓ Implements ANSI/ASQ E4 (IDQTF)
- Develop quality systems documentation for the 3rd-party accreditation of organizations performing advanced classification
  - ✓ Implements ISO/IEC 17025 (EDQW)

UFP-QAPP

- Integrates technical and quality control aspects of a project including planning, implementation, assessment, and corrective actions.
- A document
  - presents the steps to ensure environmental data collection are of the correct type and quality required for a specific decision or use
- An organized and systematic description of
  - quality assurance (QA) and
  - quality control (QC)
  - application to the collection and use of environmental data

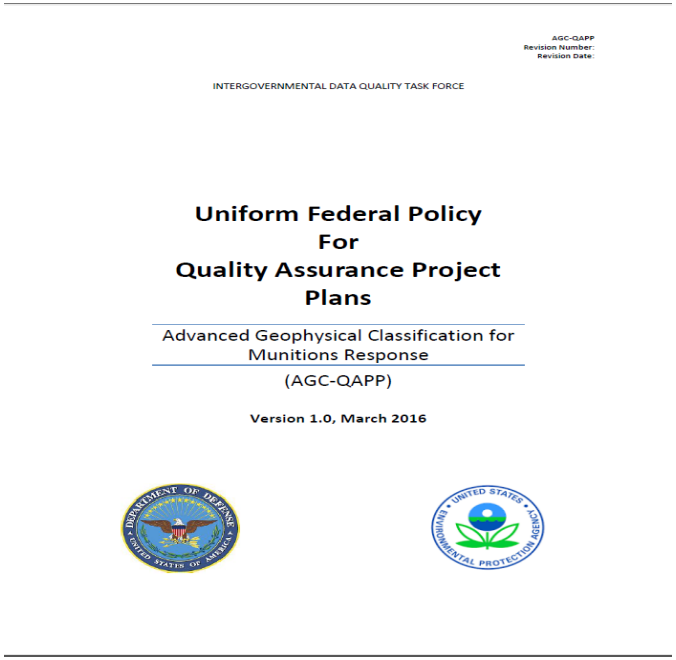
EPA DQO Process

- State the problem
- Identify the decision
- Identify the inputs to the decision
- Define the boundaries of the study
- Develop a decision rule
- Specify tolerable limits on decision errors
- Optimize the design

AGCMR-QAPP

AGCMR-QAPP Template

- Requirements based on extensive research and development conducted under the ESTCP
- Consists of “optimized” UFP-QAPP worksheets that document the output of a systematic planning process
- Considers site-specific conditions, future land use and end-uses of data



AGC-QAPP
Revision Number:
Revision Date:

INTERGOVERNMENTAL DATA QUALITY TASK FORCE

Uniform Federal Policy
For
Quality Assurance Project Plans

Advanced Geophysical Classification for Munitions Response

(AGC-QAPP)

Version 1.0, March 2016

AGCMR-QAPP Template

- **Green text** provides instructions and guidance for completing each worksheet
- **Blue text** provides examples of the type of information needed
- **Black text** identifies minimum recommended requirements (where applicable)

Template is based on the RA phase of investigation
Project teams should modify as needed for other phases

DoD Advanced Geophysical Classification Accreditation Program

DAGCAP Overview

Why Use Accreditation?

- *Qualifications, training and experience of staff*
- Demonstrations of capability
- Proper equipment maintenance
- Documented organizational quality systems
- Management accountability
- Measurement traceability
- Recordkeeping and reporting
- External assessments

DAGCAP Overview

Why Use Accreditation?

- Effectiveness of internal quality assurance, quality control,
  - Corrective action
  - Prevent reoccurrence
  - Continual improvement (Management Review)

DAGCAP Overview

Why Use Accreditation?

- ✓Provides formal recognition to competent testing organizations
- ✓Provides a means to identify and select testing organizations that meet minimum program requirements
- ✓Provides for ongoing demonstrations of capability and periodic re-evaluation for continued compliance

Enhances confidence in results by clients, regulators and the public

DAGCAP
Quality Systems Requirements (QSR) Document

- Designed to be used in conjunction with ISO/IEC 17025
- Users must obtain a licensed copy of 17025:2017
- Presented in “checklist” format using 17025 outline
- Supplemental DoD text is provided in relevant sections of the 17025 outline
  - Clarification: Explains 17025 requirements in the context of advanced classification
  - Requirement: Supplements 17025 requirements with DoD-specific requirements for advanced classification
  - Guidance: Provides information to assist with implementation

DAGCAP Accreditation of GCOs

- Single field of accreditation – Advanced Classification Accreditation
- Attests to the capability of GCO in meeting minimum requirements expressed in QSR – AC data is accurate, traceable, and reproducible
- DOD component contracts require DAGCAP
- Renewal every two years

Munitions Response QAPP Toolkit

MR-QAPP Toolkit

- MR-QAPP Toolkit contains multiple modules and fact sheets that help project teams plan data collection efforts and generate QAPPs for all phases of MRS investigations
- Module 1 - Remedial Investigation (RI)/Feasibility Study (FS)
- Module 2 - Remedial Action (RA)

MR-QAPP Toolkit

Module 1: Example Site

- Blue text in Module 1 is based on a fictional site, "Camp Example"
- Example designed to illustrate an RI/FS at a complex munitions response site
  - Several different types of target areas, maneuver areas, and other areas of concern.
- SPP and data collection activities are conducted in phases, requiring planning steps and QAPP revisions between phases.
- While a phased investigation is well-suited to a complex MRS, the process of QAPP development is scalable, however, and may be simplified for smaller, less complex projects.

MR-QAPP Toolkit

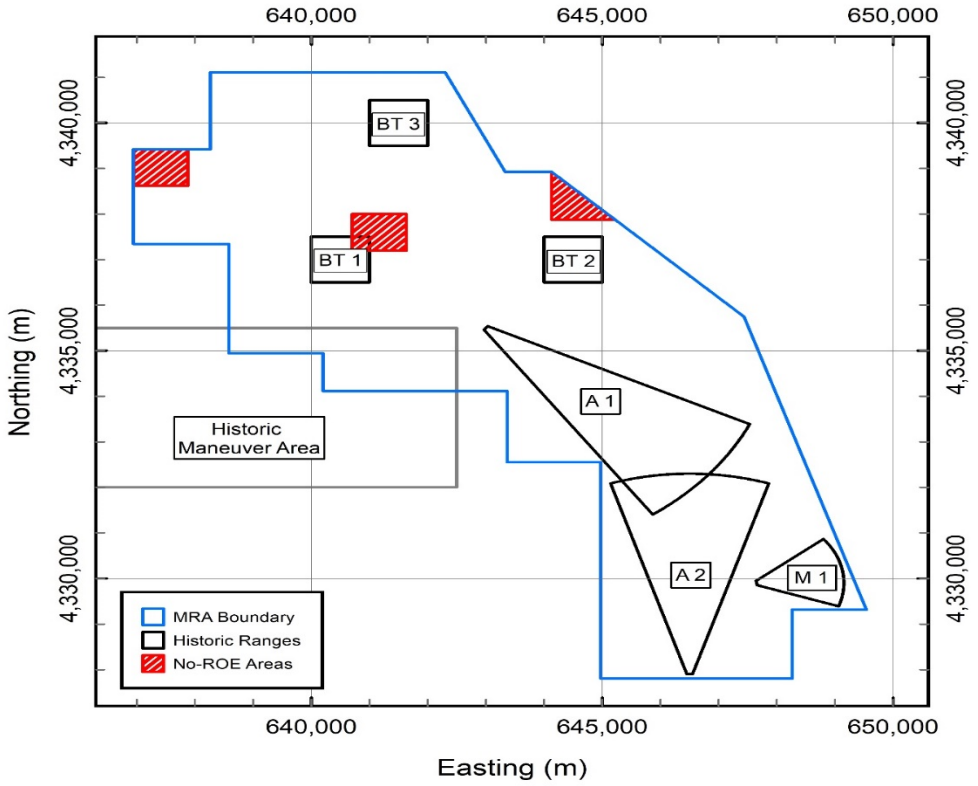
Module 1: Weight of Evidence Decision Making

- Unlike traditional chemical cleanups, MRS do not have a clearly defined endpoint based on acceptable risk
- A weight of evidence approach is a familiar concept found in scientific and regulatory literature.
- Method for decision-making that involves consideration of multiple sources of information and lines of evidence.
  - CSM
- Avoids relying solely on any one piece of information.
- Allows us to make informed defensible decisions on MRS

WS #10 – Conceptual Site Model

- A working, iterative model depicting current understanding of sources, pathways, and receptors
  - Facility profile (site location/size, facility uses, previous investigation findings)
  - Physical profile (topography, geology, climate, sensitive habitats, access restrictions)
  - Release profile (MEC use/storage/disposal, expected distribution of MEC)
  - Land use and exposure profile (Current/future uses, accessibility, receptors)
- Preliminary CSM depicted in QAPP usually is CSM generated at the end of the SI
- Working version of the CSM should be updated throughout project

Example Figure 10-1. Camp Example



Example Table 10-1. CSM Overview

Table 10-1. Overview of Preliminary Conceptual Site Model, Camp Example – MRS A

Site Details	Potential/Suspected Location and Distribution of MEC	Known/ Suspected Munitions	Exposure Medium	Current and Future Receptors	Exposure Pathways
Camp Example, MRS A **Boundaries and acreage: See Figure 10-2** **Background anomaly density (estimated): 75/acre** **Known/suspected past DoD activities (release mechanisms):** **Bombing Target #1: Proposed, but no evidence of use** **Bombing Target #2: 100-lb practice bombs** **Bombing Target #3: Proposed but no evidence of use** **Current land use: Low-density residential, agricultural, and wildlife preserve** **Future land use: Future increased residential density expected in northwest area of MRS**	HUAs: -Evidence of munitions handling or use (e.g., target areas) -High likelihood of finding residual MEC, MD, or range-related debris (RRD) -Anomaly density ≥ critical density	-Bomb, HE, M30A1 -Bomb, practice, 100-lb, M38A2 -nose fuze, AN-M103 Series -tail fuze, AN-M100 Series M1A1 spotting charges for 100-lb practice bombs	Surface soil and subsurface soil	Ranchers Farmers Hunters Hikers Campers Residents U.S. Forestry Service	HUAs: Potentially complete exposure to surface and/or subsurface MEC
	Low use areas (LUAs): -Low likelihood of finding residual MEC, MD, or RRD -Anomaly density < critical density				LUAs: Potentially complete exposure to surface and/or subsurface MEC
	Non-impacted Areas (NIAs): -No evidence of munition use				NIAs: Incomplete

DQO Step 1: State the problem

Define the problem in terms specific to the MRS, considering information in the preliminary CSM.

[Example] Evidence from previous investigations indicates that MEC in the form of Unexploded ordnance (UXO) and discarded military munitions (DMM) may be present at MRS A and MRS B resulting from their use between 19XX and 19XX as bombing targets, artillery ranges, and mortar ranges involving the use of both practice munitions and high explosives (HE). Further investigation is needed to:

- Confirm the locations of targets,
- Establish boundaries for high-use areas (HUA) and low-use areas (LUA),
- Characterize the type, nature and distribution of munitions within each HUA and LUA,
- Evaluate risk,
- Support determinations of non-impacted areas (NIA), and
- Collect data to support a feasibility study (FS) if necessary.

DQO Step 2: Identify the goals of data collection

Identify principal study questions. State how data will be used. Define alternative outcomes.

Principal study questions: [Example]

- What are the nature and extent (i.e. horizontal and vertical distribution) of explosive hazards at MRS A and MRS B?
- What current and potential future threats may be posed to human health and the environment by MEC remaining at the site?
- What are alternative actions for mitigating current and potential threats (if identified) posed by MEC remaining at the site?

DQO Step 3: Identify information inputs

Identify information needed to fill data gaps in CSM and answer study questions.

Information needed to establish presence/absence of MEC and characterize potential hazard

e.g., Background density, target area density, type/distribution of MEC

Information needed to establish exposure potential

e.g., current/future land use, receptors, and exposure scenarios

Information needed to support the FS, if necessary

e.g., cost effectiveness & practicality of alternatives

DQO Step 4: Define the boundaries of the project

Specify the target population and characteristics of interest. Define spatial and temporal boundaries.

Target population: [Example] The target population includes any ordnance used, stored, or discarded at Camp Example, including UXO and DMM. The target population also includes MD, which serves as an indicator of potential MEC hazards and potential munitions constituent (MC) contamination. Table 11-1 lists munitions that are known or suspected to be present at Camp Example.

DQO Step 5: Develop Data Collection/Analysis Approach

Define parameters of interest, specify inference and develop decision rules

Example approach involves three phases:

- Preliminary MRS Characterization: delineate high density (HD) and low density (LD) areas)
- HD Area Characterization: determine whether HD area is munitions-related, and if so, characterize anomalies and establish high-use-area (HUA) boundaries
- LD Area Characterization: differentiate low-use areas (LUA) from non-impacted areas (NIA)

DQO Step 5: Develop Data Collection/Analysis Approach

Caveats:

- Preliminary characterization phase may not be necessary if target locations are well-documented in CSM
- HD/LD Area characterizations may not require separate mobilizations.
- For smaller sites, it may be impractical/unnecessary to distinguish between LUA and NIA.

DQO Step 5: Develop Data Collection/Analysis Approach

[Example] HD Area Characterization

Parameters of interest: The sources of anomalies and horizontal/vertical distribution of munitions-related anomalies

Type of inference: Within an HD area, the presence of MEC, or MD associated with munitions that have functioned, will indicate an HUA.

Decision rules (partial list):

1) IF MEC/MD are identified, and CSM indicated munitions were used, HD area will be confirmed as HUA and team will establish boundary and buffer zone.
2) If no MEC, MD or RRD are found, the team will revisit the CSM to confirm use of the are and investigate area as presumed LUA or NIA, based on evidence.

DQO Step 6: Develop project-specific MPCs

Considering previous steps, derive project-specific MPCs to minimize possibility of making erroneous decisions

MPCs are documented on Worksheet #12

- Document requirements (accuracy, sensitivity, representativeness, completeness, comparability) necessary to meet DQOs
- Guide development of sample design
- Provide criteria for data usability assessment at the end of the study
- Project-specific QAPP must justify any changes to specifications presented in black text

Table 12-1: Measurement Performance Criteria

Measurement	Data Quality Indicator	Specification	Activity Used to Assess Performance
Site Preparation			
1. Accessibility	Completeness	All areas inaccessible to investigation or inaccessible to use of proposed geophysical systems are identified and mapped in a geographic information system (GIS).	Lead organization will visually inspect the site and/or review the GIS
Sampling Design			
2. Planned survey coverage (Preliminary MRS Characterization)	Representativeness/ Completeness	Planned, initial transect spacing will be sufficient to detect HUA with a radius of X at a confidence level of 100%. Infill transects will be designed to achieve the MPC for anomaly density estimates (see MPC 13).	QC geophysicist reviews Visual Sample Plan (VSP) output. [VSP *Post-Survey-Probability-Of-Traversal* tool.]
3. Detection threshold (transects & grids)	Sensitivity	5 x RMS noise [Note: This is expected to be sufficient to permit detection of both munitions and munitions debris.]	1) Review of sampling design 2) Initial verification at instrument verification strip (IVS) 3) Background analysis prior to VSP analysis

DQO Step 7: Sampling Design and Project Work Flow

Develop a resource-effective sample design for collecting data that will meet project-specific DQOs (WS #11) and MPCs (WS #12)

- For simpler projects conducted in one mobilization, this is typically the last planning session
- VSP inputs and outputs needed to develop the sample design can be documented on Worksheet #11, Tables 11-2 and 11-3
- Step 7 usually refers to WS #17, which documents the sampling design and project work flow in detail

Worksheet #37: Data Usability Assessment

- Performed by key members of project team
- Regulators have opportunity to review and comment
- Integrated into decision-making
- Conducted at end of each phase (if applicable)
- Evaluates whether data support MPCs and DQOs, i.e.

Are underlying assumptions supported?

Have sources of uncertainty been managed appropriately?

Do data represent the population of interest?

Can the results be used as intended with an acceptable level of confidence?

Worksheet #37: Data Usability Assessment

Identify personnel responsible for participating in the DUA, e.g.,

- DoD RPM
- Project Manager
- Project QA Manager
- Project Geophysicist
- QC Geophysicist
- Field Geophysicist (lead)

Identify documents and records required as DUA inputs

Describe how the DUA will be documented

Worksheet 37: DUA (cont'd.)

The DUA Process

Step 1: Review objectives and sampling design

- Review DQOs – are underlying assumptions valid?
- Review sampling design as implemented – Were VSP inputs representative?
- Summarize deviations and describe their impacts on DQOs

Step 2: Review data verification/validation outputs and evaluate conformance to MPCs

- Was RCA/CA effective?
- Do data gaps remain?

Worksheet 37: DUA (cont'd.)

The DUA Process

Step 3: Document data usability, update the CSM and draw conclusions

- Can the data be used as intended?
- Are data sufficient to answer the study questions?

Step 4: Document lessons learned and make recommendations

- Summarize lessons learned
- Make recommendations for future investigations
- Prepare the data usability summary report

Summary

- Quality Control/Quality Assurance are critical to successful implementation of cleanup at an MRS
- Project-planning process is flexible and should be adapted to specific site under investigation
- A working version of the CSM is a valuable tool for decision-making, and should be updated throughout the project, as agreed during planning
- The DUA is key to determining whether DQOs were achieved, i.e., the data can be used as intended, with an acceptable level of confidence