Data Quality Objectives for Munitions Response Remedial Investigations

Presented to:

Military Munitions Support Services –

DQOs and RAOs Webinar

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Presentation Agenda

- What are DQOs?
- The DQO Process
- What Happened?
- Good and Bad MR RI DQOs.
- Why are DQOs Important?

So What Are DQOs?

- A process?
- A statement?
- Designed to confuse and confound?
- Redundant bureaucratic fill-in-the-blank paperwork with no real value?

All of the above?

What are DQOs (continued)?

- The DQO is a seven step **systematic planning process** that produces **qualitative and quantitative statements** (the DQO) that define the **type, quantity and quality of data** required to **make a decision**.

EPA QA/G4 “sort of”

DQO Process

EPA DQO Process

Step 1 State Problem

Step 2 Identify The Decision

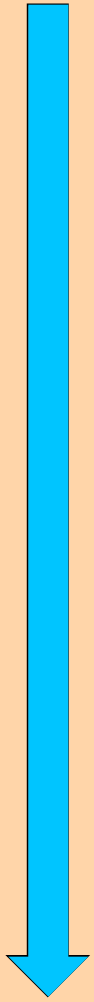
Step 3 Identify Decision Inputs

Step 4 Define Study Boundaries

Step 5 Develop Decision Rules

Step 6 Specify Performance Criteria

Step 7 Optimize Design



Why

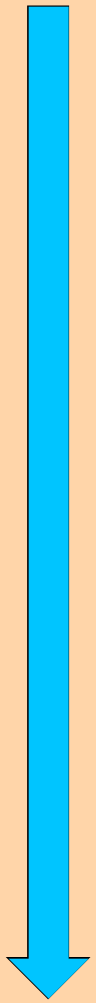
What

Where

When

DQO Process (continued)

EPA DQO Process



Step 1 State Problem	Why
Step 2 Identify Decision	What
Step 3 Identify Decision Inputs	Where
Step 4 Define Study Boundaries	When
Step 5 Develop Decision Rules	
Step 6 Specify Performance Criteria	**Quantity and Quality**
Step 7 Optimize Design	

DQO Process (continued)

Quantity = Representativeness

How many samples or measurements do you need.

- The more the better

Sampling uncertainty is decreased when sampling density is increased.

- But you also have to know when to stop

DQO Process (continued)

Quality = Reproducibility

"Same Begets Same"

- Performance Requirements
- QA/QC
- Conformance to Requirements

DQO Process (continued)

Data

Representative - quantity

Reproducibility - quality

Proper DQOs

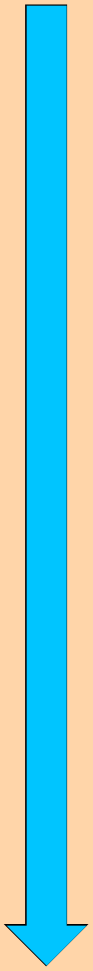
Quantity

Quality

DQO Process (continued)

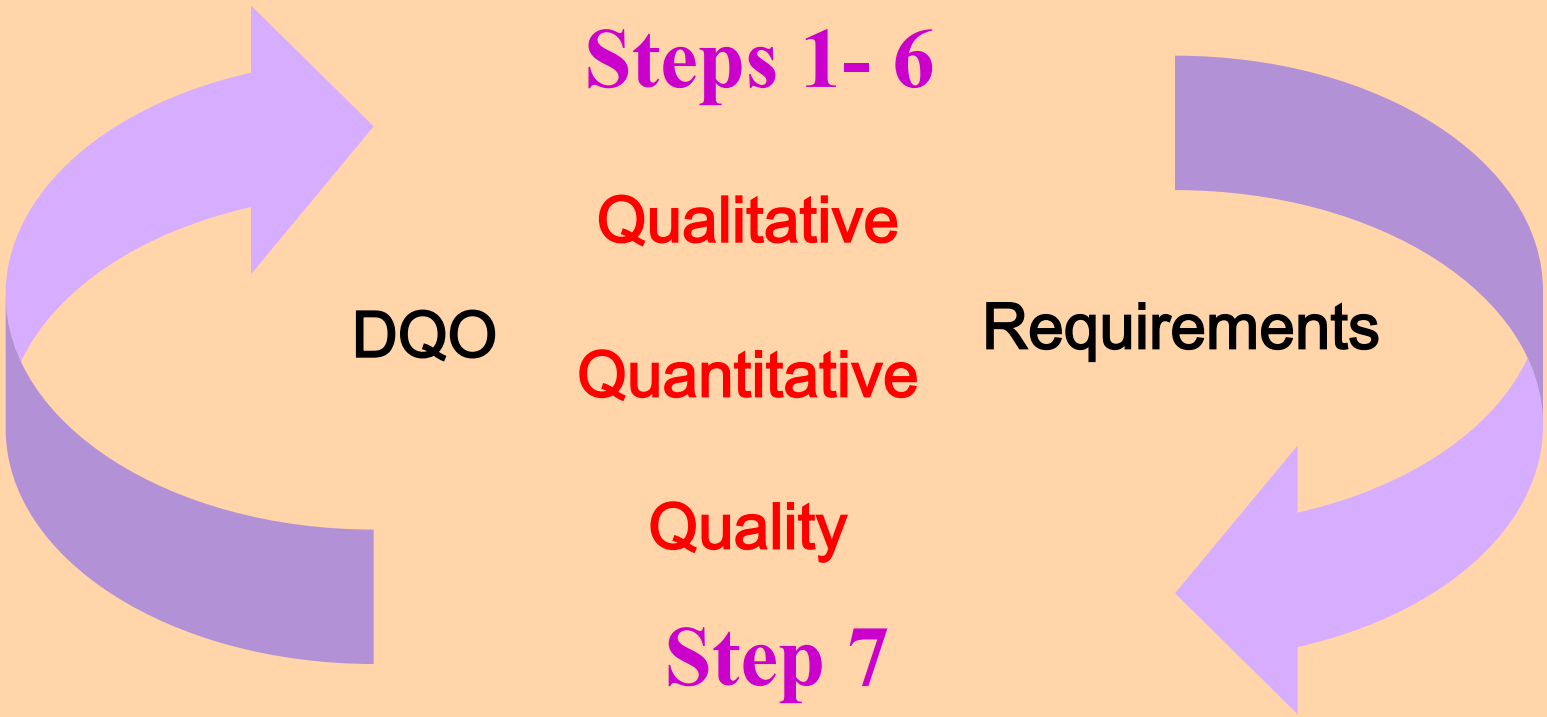
EPA DQO Process

Step 1 State Problem	Why
Step 2 Identify Decision	What
Step 3 Identify Decision Inputs	Where
Step 4 Define Study Boundaries	When
Step 5 Develop Decision Rules	
Step 6 Specify Performance Criteria	Quantity Quality
Step 7 Optimize Design	**How**



What are DQOs

Summary



So What Happened?

EPA developed the DQO process @ 1987. EPA's current iteration of the "7 Step Process" has been around since 1994

- *1987 DQOs defined as:*
  "…qualitative and quantitative statements which specify the quality of the data required to support the Agency decisions during remedial response activities

- 1994 DQOs defined as:
  "…a systematic planning tool based on the Scientific Method for establishing criteria for data quality and for developing data collection designs"

Ever since it's inception the DQO has been abused, misunderstood, misapplied or ignored. ..

So What Happened?
Bad DQOs

- “The DGM program will develop data that is adequate to characterize the nature and extent of MEC contamination at the site.”
- “3.5-miles of linear DGM transects will be spaced evenly across the MRS.”
- “Additional grid-based DGM sampling will be performed centered on MEC found on the transects.”

Disclaimer

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Thank you.

So What Happened?

- Senior management does not take DQOs seriously.

- Senior management does not understand DQOs and therefore does not take DQOs seriously.

So What Happened?

- Contractors, DoD staff and **regulators** are not trained in DQOs.
- Contractors presumptive data collection plans.
- Guidance Envy

So What Happened?

- **EPA QA/G4 - The seven-step process**
- **Army and ACE Technical Project Planning (TPP) Process – 4 step process**
- ***The Army MMRP RI/FS Guidance***
- ***UFP QAPP – The EPA seven step process.***

So What Happened?

USACE TPP

UFP
QAPP

Army
MMRP RI/
FS

EPA QA/
G4

So What Happened?

"see EPA guidance QA/G4 for further instruction."

So What Happened?

Compatibility of USACE TPP Process with the UFP-QAPP and the EPA 7-Step DQOs.

Technical Project Planning (TPP) Process	UFP QAPP Systematic Planning Process	EPA DQO 7-Step Systematic Planning Process
PHASE I: Identifying the Current Project	Identifying and involving the PM, PDT and Stakeholders	Step 1: Define the Problem
		Part A of the QA Project Plan
	Identifying the project schedule,resources, milestones, and requirements	Step 1: Define the Problem
	Describing the Project Goal and Objectives	Step 2: Identify the Goals of the Study
PHASE II: Determine the Data Needs	Identifying the Type of Date Needed	Step 3: Identify Information Needed or the Study
	Identifying the Constraints to Data Collection	Step 4: Define the Boundaries of the Study
PHASE III: Develop Data Collection Options	Determining the Quality of Data Needed	Step 5: Develop Analytic Approach
		Step 6: Specify Performance or Acceptance Criteria
		Step 7: Develop the Plan for Obtaining Data
	Determining the Quantity of Data Needed	
	Describing How, When and Where the Data will be Obtained	
Phase IV: Finalize Data Collection Program	Specifying Quality Assurance and Quality Control Activities to Assess the Quality Performance Criteria	Part B of the QA Project Plan
		Part C of the QA Project Plan
	Describing Methods for Data Analysis Evaluation and Assessment Against the Intended Use of the Data and Quality Performance Criteria	Part D of the QA Project Plan
		Data Quality Assessment Process

MR RI DQOs
Step 2 The Decision Statement?

MR RI DQOs
Step 2 The Decision Statement

- Have all MRSs within the MRA been identified?
- Has the extent of MEC within the MRS been defined?
- Does the concentration of anomalies within the MRS indicate target areas?
- Are surface soils within the MRS contaminated with MC?
- Are munitions-like anomalies within the MRS hazardous?
- Are the munitions identified in the MRS the same as the munitions expected?
- Is there MEC on the surface within the MRS?

MR RI DQOs
Inputs & Quantity and Quality

Step 3 DQO Inputs

1. Density of anomalies.
2. Concentration of MC in the surface or subsurface soils.
3. Concentration of MC in the groundwater
4. Geophysical maps
5. Exposure pathways
6. Background chemical concentrations/geophysical
7. Appropriate measurement instruments/methods exist
8. Type of munitions
9. Number of munitions
10. Depth of munitions

Step 6 DQO Quantity & Quality

1. *X* % survey coverage
2. *X* feet detection depth
3. *X* number of soil samples
4. *X*% RSD
5. *X* % of false negatives
6. *X* % confidence level for traversing and detecting target area with a radius of *Y* feet
7. *X* % confidence level for less than # TOI per acre within the buffer area

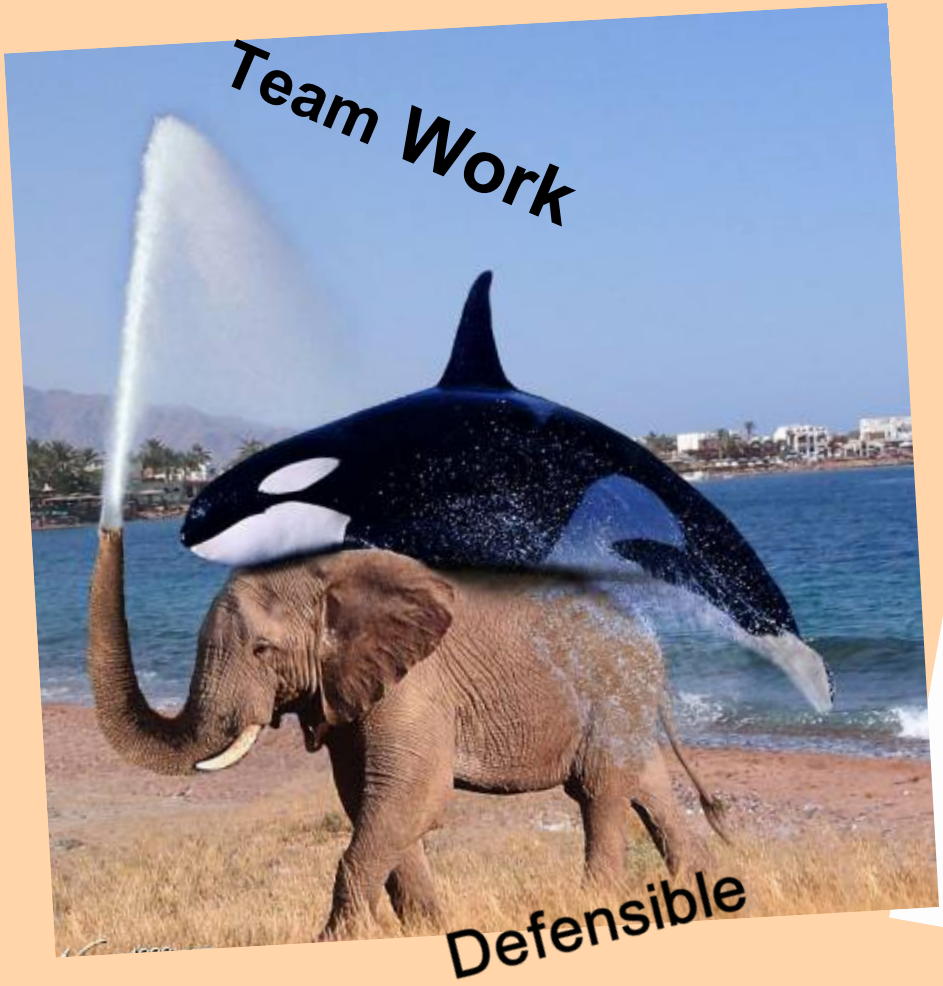
MR RI DQOs
Proper DQOs

- “To ensure intersection of targets with a fragmentation diameter of 280-ft., DGM transects will be spaced 100-ft. apart.”
- “10% deviation from the ideal transect spacing is allowable. Further deviation will require additional data collection in the data gap.”
- “Anomalies will be selected for excavation randomly based on the overall number as determined by UXO Estimator to achieve 95% confidence there are no more than 1 TOI/acre.”
- "Blind seeding will be used to indicate that 100% "mag and dig" search lane coverage is being achieved. Blind seeds will be emplaced as follows: 1) near the surface, 2) at the edges of the search lane, 3) at a frequency so that each magnetometer operator encounters at least one blind seed every day. Failure to detect a blind seed will indicate failure to achieve 100% coverage of the search lane."

Why Are DQOs Important?

Back to the Future

Why Are DQOs Important (cont.)?



Summary

Keys to Developing DQOs:

- Implement TPP and Army MR RI/FS using EPA DQO 7 Step Process.
- Begins with scoping (CSM) - a key element.
- Early input from regulatory agencies and key decision makers.
- Statistical Support
- Technical Support
- Use a facilitator to coordinate everything

Summary

3 Rs of Good Data

1. **R**ight Type
2. **R**ight Quantity
3. **R**ight Quality

Thank You

UXOPro

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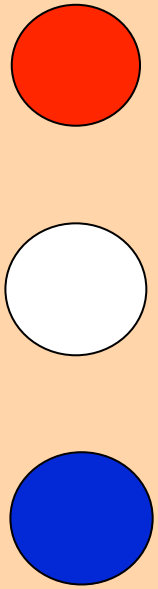
Recognize
Retreat
Report



Regulators

Reasonable

Right