



Asking Good Questions: The DQO Process and Beyond

Presented by:

Jason Speicher (US Navy, NAVFAC)

Steve Garbaciak (BBL, Inc.)

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004



Presentation Overview

- Part I (Jason Speicher)
 - What is the Data Quality Objectives Process?
 - Why is it use important with sediment sites?
 - Where can it be used in the CERCLA Process?
 - Tools/methods/information to assist in implementing the DQO Process
 - Lessons Learned from implementing the DQO process
 - Beyond the DQO Process
- Part II (Steve Garbaciak)
 - DQO Case Study –Hudson River remediation project
 - How the DQO Process assisted in planning for data collection to support design of dredging, resuspension control and sediment dewatering

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

What is the DQO Process?



- Many variations of definitions and interpretation exist.
- The USEPA describes the DQO Process as a strategic planning approach based on the Scientific Method that is used to prepare for data collection (EPA, 1994)
 - Assists in defining the criteria that a data collection design should satisfy, including when to collect samples, where to collect samples, what are the tolerable level of decision error for the study, what decisions will be made with the data, and how many samples to collect.

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

The 7 Steps of the DQO Process



- Step 1 – State the Problem
- Step 2 – Identify the Decision(s)
- Step 3 – Identify the Inputs to the Decision
- Step 4 – Define the Study Boundaries of the Study
- Step 5 – Develop a Decision Rule(s)
- Step 6 – Specify Tolerable Limits on Decision Error
- Step 7 – Optimize the Design for Obtaining Data

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

Useful DQO Process Resources



- USEPA
 - <http://www.epa.gov/quality/>
 - http://www.epa.gov/quality/qa_docs.html
- USDOE
 - <http://www.hanford.gov/dqo/>

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

Why the DQO Process For Sediment Sites?



Sediment Sites can often be complex in nature and therefore have intensive data needs



USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

Importance of the DQO Process



- An excellent project planning tool
 - Provides a framework to properly define the criteria that data collection design for a study should satisfy
 - Assists in assuring that the type, quantity, and quality of environmental data used in decision making will be appropriate for the intended application
 - Helps project managers guard against committing resources to data collection efforts that will not ultimately lead to a defensible decision
 - Provides clarity to all stakeholders regarding what information will be collected as part of a study and how that data will be used in making decisions.

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

Timing the use of the DQO Process



- Where can the DQO Process be implemented within the CERCLA Process?
 - Especially useful in planning investigations and other data collection studies
 - Site Investigation
 - Remedial Investigation
 - Feasibility Study
 - Remedial Design
 - Long-term monitoring

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

Inputs and Tools to Assist the DQO Process



- Inputs that can assist in implementing the DQO Process at a sediment site
 - Gathering historical data and other relevant site information
 - Developing a good conceptual site model based on available information
- Tools that can complement the DQO process
 - Rapid Sediment Characterization
 - Gathers information (e.g., sediment chemistry) quickly to feed into planning of more expansive and expensive studies
 - <http://web.ead.anl.gov/ecorisk/issue/pdf/rsc.pdf>
 - Visual Software
 - Utilizing visual software (e.g., GIS) can assist in identifying where data gaps and areas of most uncertainty exist

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

DQO Process Advice and Lessons Learned



- Spending the extra time and funding to complete the DQO Process can provide many project management benefits
 - However, scale the DQO process to the complexity of your site and planned study
 - For complex sites, consider the use of a trained DQO facilitator
- Involve your stakeholders in the development of the DQOs for an investigation
- It is important to have a decision making team that is open to and understands the DQO process
 - Some people don't like explaining the rationale behind why data should be collected and how it will be used
- Having a turnover in team members could result in a reluctance to accept DQOs and adhere to defined decision rules

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

Beyond the DQO Process



- Triad Approach for Sediment Sites
 - Technically defensible methodology for managing decision uncertainty that leverages both innovative characterization tools and strategies
 - Includes three primary components
 - Systematic planning
 - Dynamic work strategies
 - Real-time measurement systems (e.g., rapid sediment characterization tools)
 - Goal is to manage decision uncertainty more effectively by increasing confidence that project decisions are made correctly and cost effectively

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004



What is the Triad Approach to Site Cleanup?



A framework for organizing cleanup project activities to achieve transparent, scientifically defensible, cost-effective project outcomes.

This framework integrates 25+ years of practitioner experience about how to incorporate advancing science & technology into project planning & implementation to achieve efficient, successful projects.

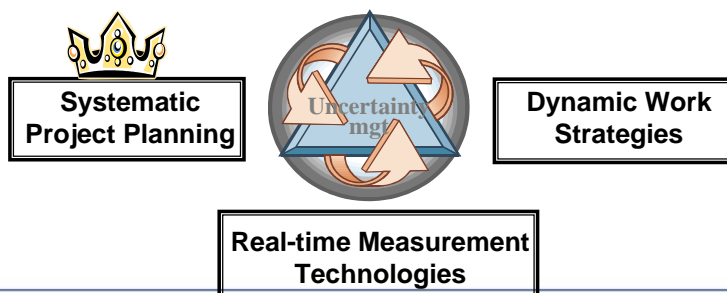
This “Triad” is completely different from the “sediment triad” described by Chapman.

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

The Triad approach expects contaminated matrices to be heterogeneous: it copes by using...



- 1) "Mgt of decision uncertainty" as the keystone concept
- 2) Conceptual site models that accurately portray the spatial & physical nature of site contamination
- 3) A 2nd-generation data quality model that incl. sampling variables & controls for sample representativeness
- 4) Modern tools & work strategies that rapidly develop the CSM & use it to guide efficient designs for remediation and site reuse



USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004

Assorted Papers/Articles Describing the Triad Approach



See the Technical Components & References sections in the Triad Resource Center: <http://www.triadcentral.org/ref/index.cfm>

- Interstate Technology & Regulatory Council TechReg Guideline for Triad: <http://www.triadcentral.org/ref/ref/documents/SCM-1.pdf>
- *ES&T* "Managing Uncertainty in Environmental Decisions" article: <http://www.triadcentral.org/tech/documents/oct01est.pdf>
- *Quality Assurance* journal "Representativeness" article: <http://www.triadcentral.org/tech/documents/dcrumbling.pdf>
- *Remediation* journal "Next Generation Practices" article: <http://www.triadcentral.org/tech/documents/spring2003v13n2p91.pdf>
- *Remediation* journal "Triad Myths" article: <http://www.triadcentral.org/ref/doc/Fall2004RemediationArticlePreprint.pdf>
- More *Remediation* journal articles coming Winter 2004

USACE/USEPA/SMWG Joint Sediment Conference, October 26-28, 2004