STATE OF CONNECTICUT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION

IMPORTANCE OF COMMUNICATION BETWEEN THE ENVIRONMENTAL PROFESSIONAL AND THE LABORATORY DURING THE DQA/DUE PROCESS

GUIDANCE DOCUMENT

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Robert Klee, Commissioner

79 Elm Street, Hartford, CT 06106-5127
www.ct.gov/deep/remediation
860-424-3705

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INTRODUCTION

It is incumbent on environmental professionals and others performing sampling and analysis of environmental media (referred to collectively herein as "environmental professionals") to evaluate whether analytical data are of sufficient quality to be usable for the intended purpose. This evaluation is a two-step process, the initial step being a Data Quality Assessment (DQA) to identify any quality control problems or issues that occurred during laboratory analysis (Quality Control non-conformances). The results of the DQA are then used to perform the second step of the process, the data usability evaluation (DUE), to determine whether the quality of the analytical data is suitable for the intended purpose.

In 2007, the Connecticut Department of Energy and Environmental Protection (CT DEEP) created the Reasonable Confidence Protocols (RCPs) in coordination with the Connecticut Department of Public Health to facilitate the generation of laboratory data of known quality. The RCP process is described in the DEEP RCP Guidance Document, effective November 2007, revised December 2010. The procedures for assessing the quality of analytical data and evaluating the data in a project-specific context are presented in the Data Quality Assessment and Data Usability Evaluation Guidance Document, effective May 2008, revised December 2010. This guidance document was written based on the two guidance documents mentioned above. This guidance document focuses on the DQA/DUE of analytical data generated using RCP analytical methods and the importance of clear communication between the environmental professional and the laboratory throughout a project. The DQA/DUE process for other analytical methods is described in Section 4.5 of the Data Quality Assessment and Data Usability Evaluation Guidance Document.

CONCEPTUAL SITE MODELING AND DATA QUALITY OBJECTIVES

Evaluating and ensuring that the quality of data meets project-specific Data Quality Objectives (DQOs) and the requirements of the Conceptual Site Model (CSM) occurs throughout the course of a project. The analytical results must be representative of the environmental conditions and meet the DQOs. The data should also be incorporated into the CSM and justify conclusions about environmental conditions and risk to human health and the environment.

The CSM is a tool for understanding and explaining the basis and rationale for site investigations and the conclusions drawn regarding the environmental conditions, environmental risk, and the need for and extent of remediation. The CSM incorporates information about the fate and transport of chemicals released to the environment and potential receptors that could be at risk as a result. Consideration of the CSM is an important part of the DQA/DUE process to ensure that the data are of sufficient quality for decision-making purposes about site characterization, mitigation, or remediation required in each situation. Effective communication of the CSM through proper documentation is an important component of site characterization.

DQOs are developed by the environmental professional to ensure that representative analytical data are obtained that are of sufficient quantity and quality to meet the goals of the project and support defensible conclusions that protect human health and the environment. DQOs are based on the intended use of the analytical data. They are used to determine how accurate and reliable the analytical data must be to make

sound, rational decisions regarding data usability. DQOs are established based on the requirements of the project or situation. Development of the DQOs by the environmental professional should take into account the location, sampling interval, types of analyses, environmental risks and receptors, and other factors based on the data needs for the data and the project.

During the process of characterizing and remediating a site or a release, the environmental professional determines the type and quantity of data necessary to meet a variety of objectives. These include evaluation of environmental conditions, confirmation of the effectiveness of remediation or mitigation measures, or evaluation of areas of environmental concern, as described in the CT DEEP Site Characterization Guidance Document (SCGD).

DATA QUALITY ASSESSMENT AND DATA USABILITY EVALUATION

DATA QUALITY ASSESSMENT

Data Quality Assessment (DQA) is the first step in the evaluation of environmental data performed by the environmental professional. Evaluation of the DQA is achieved by assessing the quality of the analytical data with respect to the requirements for the RCPs used. Information reviewed during the DQA includes results of specific Quality Assurance/Quality Control (QA/QC) procedures, such as percent recovery of surrogates or other substances injected into samples. The DQA also includes a review by the environmental professional of the written case narrative provided by the laboratory as part of the RCPs that reports specific information on QA/QC issues and non-conformances, as well as other data or information included in the laboratory report package associated with the sample results.

DATA USABILITY EVALUATION

The results of the DQA are used to perform the second step in the data evaluation process, which is the Data Usability Evaluation (DUE). The purpose of the DUE is to determine whether the analytical data are usable for the intended purpose. The DQA focuses on the quality of analytical data, whereas the DUE focuses on the usability of that data for its intended purpose. The DUE involves evaluation of DQA information in the context of the site-specific CSM and DQOs, and includes review of additional information beyond that reviewed during the DQA. The DUE includes review of general quality control information, such as:

- Chains of custody,
- Sample preservation and holding times,
- Equipment,
- Trip and field blanks and duplicates, and
- Laboratory control procedures as described in the RCPs and the methods associated with those protocols.

The DUE should take into consideration the extent to which any non-conformances in the quality of the analytical data affect how the data can be used in the decision-making process, including any analytical bias in the data. The DUE should be performed using a conservative approach that is fully protective to minimize the potential for underestimating risk to human health and the environment.

In addition to the quality of the data for the specific area or release, the DUE should include a critical evaluation of the reliability of the analytical data that is used for decision-making purposes, including such factors as:

- The source of the sample,
- The environmental professional's level of involvement with the project,
- The methods used to collect the samples,
- Choice of analytical methods, and
- Time-frames during which samples were collected and analyzed.

It is important to note that bias introduced through the collection of non-representative samples or an inadequate number of samples will, in many cases, exceed the bias caused by laboratory analysis of the samples. The environmental professional should determine that the number and location of samples collected and analyzed are sufficient to provide adequate and representative characterization of site conditions. A comprehensive discussion of site characterization sampling is provided in the SCGD.

Concluding whether data can be used for decision-making purposes during a DUE is not limited to the assessment of analytical data quality alone. Multiple lines of evidence developed using the CSM and DQO processes can often be used to evaluate whether the quality of the analytical data is adequate for the intended purpose. Analytical data generated for the project are evaluated in the context of the CSM to determine whether the data are adequate to support conclusions. This evaluation should also identify any significant data gaps or issues related to the number of samples collected and analyzed; locations, depths, and types of samples; specific analyses performed; and any other information related to the sample collection and handling and results. The evaluation should also critically examine all relevant information for a site, including patterns and trends in analytical results, sampling locations and depths as they relate to these patterns, and the nature of the release and its environmental fate and transport as described in the CSM, to determine whether the samples are representative of the release and therefore a basis for environmental decision-making under the RSRs.

APPLICABILITY OF THE DQA/DUE PROCESS

Data quality assessment and data usability evaluations are commonly performed for:

- Sites undergoing investigation and remediation for which compliance with the Remediation Standard Regulations (RSRs) is required or desirable,
- Underground Storage Tanks (USTs) regulated under Sections 22a-449(d)-1 and 22a-449(d) 101-113 of the RCSA,
- Soil and groundwater investigations and/or remediation at sites receiving State or Federal funding (e.g., Brownfields grants, Department of Economic and Community Development), and
- RCRA Closure and RCRA Corrective Action sites.

COMMUNICATION WITH THE LABORATORY

Communication between environmental professionals and laboratory personnel should be a two-way street so that data quality objectives for the project are achieved. Effective communication is accomplished through many means during the course of a project, such as:

- Properly completing chains of custody;
- Submitting laboratory communication forms (Appendix A of the "Laboratory Quality Assurance and Quality Control Guidance Reasonable Confidence Protocols Guidance Document"); and
- Directly communicating with laboratory personnel and couriers.

It is important to communicate with the laboratory during initial project preparations so that the appropriate sample containers and preservatives are provided, preservation techniques are understood, appropriate analysis will be performed, the desired reporting limits are identified, and the required holding times are met. It may also be necessary to communicate with the laboratory during the DQA process to better understand the QA/QC information provided by the laboratory. Evaluating the usability of the data requires a thorough understanding of the quality of the analytical data.

The environmental professional should work with the laboratory to receive the analytical data in a convenient format, particularly if the laboratory report is provided electronically. The use of electronic deliverables from the laboratory can make the transfer of data into computer spreadsheets and databases more accurate and efficient, which in turn will improve efficiency when performing the DQA and DUE.

DOCUMENTATION

Documentation of the thought processes used, as well as the outcomes of the DQA and DUE, is an essential task that is necessary to support the environmental professional's decisions regarding the usability of the analytical data for the intended purpose. Documentation is an essential part of the DQA/DUE process because it demonstrates an understanding of the quality of the data, the project objectives, the CSM, and how the data is usable for decision-making purposes. DEEP expects this information to be presented in the report where the analytical data are used to support the environmental professional's opinion that the quality of analytical data is appropriate for the intended purpose.

Typical documentation of a DQA/DUE includes a written summary regarding data usability and DQA and DUE worksheets. The report that presents the analytical data must also include:

- The laboratory reports, laboratory narratives, RCP Analysis, QA/QC certification form, and chain of custody form,
- RCP project communication forms (if used),
- RCP equivalency determination form (if needed), and
- Any other pertinent information.

Please Note: This document excludes radiological issues including, but not limited to, those described in Title 22a Chapters 446 and 446A that are overseen by the DEEP Monitoring and Radiation Division of the

Bureau of Air Management. This document does not apply to Polychlorinated Biphenyls pursuant to Title 40 Code of Federal Regulations (CFR) Part 761.

QUESTIONS OR COMMENTS?

Questions or comments regarding quality assurance and quality control may be directed to Peter Hill or by calling (860) 424-3705.