



Standard Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives¹

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1. Scope

1.1 This practice covers the process of development of data quality objectives (DQOs) for the acquisition of environmental data. Optimization of sampling and analysis design is a part of the DQO process. This practice describes the DQO process in detail. The various strategies for design optimization are too numerous to include in this practice. Many other documents outline alternatives for optimizing sampling and analysis design. Therefore, only an overview of design optimization is included. Some design aspects are included in the practice's examples for illustration purposes.

1.2 DQO development is the first of three parts of data generation activities. The other two aspects are (1) implementation of the sampling and analysis strategies, see Guide D 6311 and (2) data quality assessment, see Guide D 6233.

1.3 This guide should be used in concert with Practices D 5283, D 6250, and Guide D 6044. Practice D 5283 outlines the quality assurance (QA) processes specified during planning and used during implementation. Guide D 6044 outlines a process by which a representative sample may be obtained from a population, identifies sources that can affect representativeness and describes the attributes of a representative sample. Practice D 6250 describes how a decision point can be calculated.

1.4 Environmental data related to waste management activities include, but are not limited to, the results from the sampling and analyses of air, soil, water, biota, process or general waste samples, or any combinations thereof.

1.5 The DQO process is a planning process and should be completed prior to sampling and analysis activities.

1.6 This practice presents extensive requirements of management, designed to ensure high-quality environmental data. The words "must" and "shall" (requirements), "should" (recommendation), and "may" (optional), have been selected carefully to reflect the importance placed on many of the statements in this practice. The extent to which all require-

ments will be met remains a matter of technical judgment.

1.7 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.8 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

C 1215 Guide for Preparing and Interpreting Precision and Bias Statements in Test Method Standards Used in the Nuclear Industry²

D 5283 Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation³

D 6044 Guide for Representative Sampling for Management of Waste and Contaminated Media³

D 6233 Guide for Data Assessment for Environmental Waste Management Activities³

D 6250 Practice for Derivation of Decision Point and Confidence Limit for Statistical Testing of Mean Concentration in Waste Management Decisions³

D 6311 Guide for Generation of Environmental Data Related to Waste Management Activities: Selection of Optimization of Sampling Design³

3. Terminology

3.1 Definitions:

3.1.1 *bias, n*—the difference between the sample value of the test results and an accepted reference value.

3.1.1.1 *Discussion*—*Bias* represents a constant error as opposed to a *random error*. A method *bias* can be estimated by the difference (or relative difference) between a measured average and an accepted standard or reference value. The data from which the estimate is obtained should be statistically analyzed to establish *bias* in the presence of *random error*. A

¹ This practice is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01 on Physical and Chemical Characterization.

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² *Annual Book of ASTM Standards*, Vol 12.01.

³ *Annual Book of ASTM Standards*, Vol 11.04.