



Designation: D 5792 – 95

## Standard Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives<sup>1</sup>

This standard is issued under the fixed designation D 5792; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

### 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 and (2) data quality assessment. This guide should be used in concert with Practice D 5283, which outlines the quality assurance (QA) processes specified during planning and used during implementation.

1.3 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, or waste samples, or any combinations thereof.

1.4 The DQO process should be developed and initiated prior to the application of planning, implementation, and assessment of sampling and analysis activities.

1.5 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 requirements will be met remains a matter of technical judgement.

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

1.7 *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 appro-*

*priate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

C 970 Guide for Sampling Special Nuclear Materials in Multi-Container Lots<sup>2</sup>

C 1215 Guide for Preparing and Interpreting Precision and Bias Statements in Test Method Standards Used in the Nuclear Industry<sup>2</sup>

D 5283 Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation<sup>3</sup>

### 3. Terminology

3.1 *Definitions*—Where applicable, the originating reference is associated with the definition and follows the definition in boldface type.

3.1.1 *accuracy (see bias)*—(1) bias; (2) the closeness of a measured value to the true value; (3) the closeness of a measured value to an accepted reference or standard value.

3.1.1.1 *Discussion*—For many investigators, *accuracy* is attained only if a procedure is both precise and unbiased (see *bias*). Because this blending of *precision* and *accuracy* can lead to confusion, ASTM requires a statement on *bias* instead of *accuracy*.

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3.1.2 *action level*—the numerical value that causes the decision maker to choose one of the alternative actions (for example, compliance or noncompliance). It may be a regulatory threshold standard, such as maximum contaminant level for drinking water, a risk-based concentration level, a technological limitation, or reference-based standard.

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3.1.3 *bias (see accuracy)*—the difference between the population mean of the test results and an accepted reference value.

3.1.3.1 *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

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.01 on Planning for Sampling.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 12.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 11.04.

<sup>4</sup> The boldface numbers in parentheses refer to the list of references at the end of this practice.