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Standard Guide for Generation of Environmental Data Related to Waste Management Activities: Selection and Optimization of Sampling Design[1]

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1. Scope

1.1 This document provides practical guidance on the selection and optimization of sample designs in waste management sampling activities, within the context of the requirements established by the data quality objectives or other planning process.

1.2 This document (*1*) provides guidance for selection of sampling designs; (*2*) outlines techniques to optimize candidate designs; and (*3*) describes the variables that need to be balanced in choosing the final optimized design.

1.3 The contents of this guide are arranged by section as follows:

1. Scope
2. Referenced Documents
3. Terminology
4. Significance and Use
5. Summary of Guide
6. Factors Affecting Sampling Design Selection
   6.1 Sampling Design Performance Characteristics
   6.2 Regulatory Considerations
   6.3 Project Objectives
   6.4 Knowledge of the Site
   6.5 Physical Sample Issues
   6.6 Communication with the Laboratory
   6.7 Analytical Turn Around Time
   6.8 Analytical Method Constraints
   6.9 Health and Safety
   6.10 Budget/Cost Considerations
   6.11 Representativeness
7. Initial Design Selection
8. Optimization Criteria
9. Optimization Process
   9.2 Practical Evaluation of Design Alternatives
   9.3 Statistical and Cost Evaluation
10. Final Selection

Annex A1 Types of Sampling Designs
   A1.1 Commonly Used Sampling Designs
   A1.2 Sampling Design Tools
   A1.3 Combination Sample Designs

Appendix X1. Additional References

Appendix X2. Choosing Analytical Method Based on Variance and Cost

Appendix X3. Calculating the Number of Samples: A Statistical Treatment

1.4 *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:*[2]

D5956 Guide for Sampling Strategies for Heterogeneous Wastes

D6044 Guide for Representative Sampling for Management of Waste and Contaminated Media

D6051 Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities

D6232 Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities

E135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials

E943 Terminology Relating to Biological Effects and Environmental Fate

2.2 *USEPA Documents:*

USEPA, Guidance for the Data Quality Objectives Process, EPA QA/G-4, Quality Assurance Management Staff, Washington, DC, March 1995[3]

[1] This guide 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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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

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