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Standard Guide for General Planning of Waste Sampling[1]

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INTRODUCTION

The analysis and testing of solid waste requires collection of adequately sized, representative samples. Wastes are found in various locations and physical states. Therefore, each sampling routine shall be tailored to fit the waste and situation. Wastes often occur as nonhomogeneous mixtures in stratified layers or as poorly mixed conglomerations. For example, wastes are commonly stored or disposed of in surface impoundments with stratified or layered sludges covered by ponded wastewater. In these situations, the collector may be faced with sampling the wastewater, the sludge, and some depth of soil beneath the sludges. Collecting representative samples in these situations requires a carefully assessed, well-planned, and well-executed sampling routine.

1. Scope

1.1 This guide provides information for formulating and planning the many aspects of waste sampling (see 1.2) that are common to most waste sampling situations.

1.2 The aspects of sampling that this guide addresses are as follows:

	Section
Safety plans	4
Sampling plans	5
Quality assurance considerations	6
General sampling considerations	7
Preservation and containerization	8
Cleaning equipment	9
Packaging, labeling, and shipping procedures	10
Chain-of-custody procedure	11

1.3 This guide does not provide comprehensive sampling procedures for these aspects, nor does it serve as a guide to any specific application. It is the responsibility of the user to ensure that the procedures used are proper and adequate.

1.4 *Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For more specific precautionary statements see 3.2, 3.3, and Section 4.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

2.2 *Other Document:*

EPA-SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods[3]

3. Significance and Use

3.1 The procedures covered in this guide are general and provide the user with information helpful for writing sampling plans, safety plans, labeling and shipping procedures, chain-of-custody procedures, general sampling procedures, general cleaning procedures, and general preservation procedures.

[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 Superintendent of Documents, U.S. Printing Office, Washington, DC 20402.

3.2 For purposes of this guide, it is assumed that the user has knowledge of the waste being sampled and the possible safety hazards.

3.3 This guide is not to be used when sampling sites or wastes when safety hazards are unknown. In such cases, the user shall use other more appropriate procedures.

4. Safety Plans

4.1 Proper safety precautions shall always be observed when sampling wastes. Persons collecting samples shall be aware that the waste can be a strong sensitizer and corrosive, flammable, explosive, toxic, and capable of releasing extremely poisonous gases. The background information obtained about the waste should be helpful in deciding the extent of safety precautions to be observed and in choosing protective equipment to be used. The information obtained should be checked for hazardous properties against such references as "Sax's Dangerous Properties of Industrial Materials,"[4] the "Hawley's Condensed Chemical Dictionary,"[5] and the "Toxic and Hazardous Industrial Chemicals Safety Manual for Handling and Disposal with Toxicity and Hazard Data."[6]

NOTE 1—The following safety precautions are not comprehensive. Rather, they provide additional guidance on health and safety to complement professional judgment and experience.

4.2 Personnel should wear protective equipment when response activities involve known or suspected atmospheric contamination, vapors, gases, or airborne particulates may be generated, or direct contact with skin-affecting substances may occur. Respirators can protect lungs, gastrointestinal tract, and eyes against air toxicants. Chemical-resistant clothing can protect the skin from contact with skin-destructive and absorbable chemicals. Good personal hygiene limits or prevents ingestion of material.

4.2.1 Equipment to protect the body against contact with known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded:

4.2.1.1 *Level A*—Should be worn when the highest level of respiratory, skin, and eye protection is needed.

4.2.1.2 *Level B*—Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies and appropriate personnel protection utilized.

4.2.1.3 *Level C*—Should be selected when the type(s) of airborne substance(s) is (are) known, the concentrations(s) is measured, and the criteria for using air-purifying respirators are met.

4.2.1.4 *Level D*—Should not be worn on any site with respiratory or skin hazards. It is primarily a work uniform providing minimal protection.

4.2.2 The level of protection selected should be based primarily on the following:

4.2.2.1 Type(s) and measured concentration(s) of the chemical substance(s) in the ambient atmosphere and its toxicity, and

4.2.2.2 Potential or measured exposure to substances in air, splashes of liquids, or other direct contact with material as a result of work being performed.

4.2.2.3 In situations where the type(s) of chemical(s), concentration(s), and possibilities of contact are not known, the appropriate level of protection shall be selected based on professional experience and judgment until the hazards can be better characterized.

4.2.3 *Level A Protection—Personal Protective Equipment:*

(a) Pressure-demand, self-contained breathing apparatus, approved by the Mine Safety and Health Administration (MSHA) and National Institute of Occupational Safety and Health (NIOSH),

(b) Fully encapsulating chemical-resistant suit,

(c) Coveralls,[7]

(d) Long cotton underwear,[7]

(e) Gloves (outer), chemical-resistant,

(f) Gloves (inner), chemical-resistant,

(g) Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot),

(h) Hard hat[7] (under suit),

(i) Disposable protective suit, gloves, and boots[7] (worn over fully encapsulating suit), and

(j) Two-way radio communications (intrinsically safe).

4.2.3.1 The fully encapsulating suit provides the highest degree of protection to skin, eyes, and respiratory system if the suit material is resistant to the chemical(s) of concern during the time the suit is worn or at the measured or anticipated concentrations, or both. While Level A provides maximum protection, the suit material may be rapidly permeated and penetrated by certain chemicals from extremely high air concentrations, splashes, or immersion of boots or gloves in concentrated liquids or sludges. These limitations should be recognized when specifying the type of chemical-resistant garment. Whenever possible, the suit material should be matched with the substance it is used to protect against.

4.2.3.2 Many toxic substances are difficult to detect or measure in the field. When such substances (especially those readily absorbed by or destructive to the skin) are known or suspected to be present and personnel contact is unavoidable, Level A protection should be worn until more accurate information can be obtained.

4.2.4 *Level B Protection—Personal Protective Equipment:*

4.2.4.1 Pressure-demand, self-contained breathing apparatus (MSHA/NIOSH approved),

4.2.4.2 Chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; hooded, one- or two-piece chemical-splash suit; disposable chemical-resistant coveralls),

4.2.4.3 Coveralls,[7]

4.2.4.4 Gloves (outer), chemical-resistant,

4.2.4.5 Gloves (inner), chemical-resistant,

4.2.4.6 Boots, chemical-resistant, steel toe and shank,

[4] Lewis, R. J. Sr., *Sax's Dangerous Properties of Industrial Materials*, 5 Volume Set, 12th ed., John Wiley and Sons, 2012.

[5] Lewis, R. J. Sr., *Hawley's Condensed Chemical Dictionary*, 15th ed., John Wiley and Sons, 2007.

[6] Gijutsu, Kagai and Kenkyujo, Shiryo (Tokyo, Japan), *Toxic and Hazardous Industrial Chemicals Safety Manual for Handling and Disposal with Toxicity and Hazard Data*, Tokyo International Technical Information Institute, 1975.

[7] Equipment is optional.