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Standard Guide for Air Monitoring at Waste Management Facilities for Worker Protection[1]

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1. Scope

1.1 This guide is intended to provide a standardized approach for establishing and carrying out an air monitoring program to protect workers at waste management facilities. This guide may apply to routine operations at an active treatment, storage, or disposal site or the extraordinary conditions that can be encountered in opening and cleaning up a remedial action site.

1.2 The user shall understand that it is impossible to predict all the issues that could arise at a waste management facility due to hazardous airborne emissions. Although air contaminant measurements obtained in accordance with this guide may indicate acceptable or tolerable levels of toxic agents are present, care and judgment must still be exercised before concluding that all atmospheric contaminants at the site are under control and that a reasonable safe work environment exists.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D1605 Practices for Sampling Atmospheres for Analysis of Gases and Vapors (Withdrawn 1992)[3]

D2820 Test Method for C Through C Hydrocarbons in the Atmosphere by Gas Chromatography (Withdrawn 1993)[3]

D2913 Test Method for Mercaptan Content of the Atmosphere

D3162 Test Method for Carbon Monoxide in the Atmosphere (Continuous Measurement by Nondispersive Infrared Spectrometry)

D3249 Practice for General Ambient Air Analyzer Procedures

D3269 Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Manual Procedures) (Withdrawn 2010)[3]

D3413 Test Method for Lead (Inorganic) in Workplace Atmospheres by Atomic Absorption Spectrometry (Withdrawn 1989)[3]

D3449 Test Method for Sulfur Dioxide in Workplace Atmospheres (Barium Perchlorate Method) (Withdrawn 1989)[3]

D3476 Test Method for bis (Chloromethyl) Ether (bis CME) in Workplace Atmospheres (Gas Chromatography-Mass Spectrometry (Withdrawn 1989)[3]

D3614 Guide for Laboratories Engaged in Sampling and Analysis of Atmospheres and Emissions

D3686 Practice for Sampling Atmospheres to Collect Organic Compound Vapors (Activated Charcoal Tube Adsorption Method)

D3687 Practice for Analysis of Organic Compound Vapors Collected by the Activated Charcoal Tube Adsorption Method

D3824 Test Methods for Continuous Measurement of Oxides of Nitrogen in the Ambient or Workplace Atmosphere by the Chemiluminescent Method

D4185 Practice for Measurement of Metals in Workplace Atmospheres by Flame Atomic Absorption Spectrophotometry

D4240 Test Method for Airborne Asbestos Concentration in Workplace Atmosphere (Withdrawn 1995)[3]

D4323 Test Method for Hydrogen Sulfide in the Atmosphere by Rate of Change of Reflectance

D4490 Practice for Measuring the Concentration of Toxic Gases or Vapors Using Detector Tubes

D4532 Test Method for Respirable Dust in Workplace Atmospheres Using Cyclone Samplers

D4599 Practice for Measuring the Concentration of Toxic Gases or Vapors Using Length-of-Stain Dosimeters

D4600 Test Method for Determination of Benzene-Soluble Particulate Matter in Workplace Atmospheres

D4687 Guide for General Planning of Waste Sampling

D5681 Terminology for Waste and Waste Management

[1] This guide is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.04 on Workplace Air Quality.

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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] The last approved version of this historical standard is referenced on www.astm.org.

D6561 Test Method for Determination of Aerosol Monomeric and Oligomeric Hexamethylene Diisocyanate (HDI) in Air with (Methoxy-2–phenyl-1) Piperazine (MOPIP) in the Workplace
D6562 Test Method for Determination of Gaseous Hexamethylene Diisocyanate (HDI) in Air with 9-(N-methylaminomethyl) Anthracene Method (MAMA) in the Workplace
D6785 Test Method for Determination of Lead in Workplace Air Using Flame or Graphite Furnace Atomic Absorption Spectrometry
D6832 Test Method for the Determination of Hexavalent Chromium in Workplace Air by Ion Chromatography and Spectrophotometric Measurement Using 1,5-diphenylcarbazide
D7035 Test Method for Determination of Metals and Metalloids in Airborne Particulate Matter by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)
D7036 Practice for Competence of Air Emission Testing Bodies
D7539 Practice for Using a Test Chamber for Humidity Conditioning of Test Panels of Pavement Marking Paints
D7773 Test Method for Determination of Volatile Inorganic Acids (HCl, HBr, and HNO_3) Using Filter Sampling and Suppressed Ion Chromatography
D7948 Test Method for Measurement of Respirable Crystalline Silica in Workplace Air by Infrared Spectrometry
E1370 Guide for Air Sampling Strategies for Worker and Workplace Protection

2.2 *ISO Standard:*
ISO 17025 General Requirements for the Competence of Testing and Calibration Laboratories[4]

2.3 *Federal Standards:*
OSHA Analytical Methods Manual[5]
NIOSH Manual for Analytical Methods[6]
OSHA, 29 CFR Part 1910 Hazardous Waste Operations and Emergency Response; Interim Final Rule, December 1986[7]

3. Terminology

3.1 *Definitions:*

3.1.1 *General*—Terminology commonly used in air monitoring can be found in Terminology D1356. Terminology commonly used in waste and waste management can be found in Terminology D5681.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *operating site*—an operating site is a location or facility where waste is treated, stored, or disposed as part of an on-going operation.

3.2.2 *remedial action site*—a remedial action site is a location or facility that may pose a threat to human health and the environment.

4. Summary of Guide

4.1 The procedures described in this guide address safety considerations, acute health hazards, and chronic health hazards due to airborne hazardous materials.

4.2 Monitoring concepts are described for cleanup operations at remedial action sites as well as routine activities at operational waste management sites.

5. Significance and Use

5.1 The techniques of air monitoring are many and varied. This guide is intended to describe standard approaches that are used in designing an air monitoring program to protect waste management site workers.

5.2 When entering a remedial action site to initiate an investigation or a cleanup operation, operating personnel may be faced with fire, explosion, and acute or chronic health hazards. A robust safety and health program, including site-specific injury and illness prevention program (IIPP) and a safety and health plan, must be in place to direct worker activity. Details for such plans can be found in the OSHA Interim Final Rule for Hazardous Waste Operations and Emergency Response and Refs (**1, 2**).[8] Air monitoring is an integral part of such a program. This guide describes equipment and sampling procedures which can be used to evaluate the airborne hazard potential so as to gain and maintain a safe work environment at the site.

5.3 Upon obtaining air quality measurements at the site, a decision must be made as to whether conditions are under control and safe or not. That decision will depend on the nature and concentrations of the contaminants (toxicity, reactivity, volatility, etc.), the spatial extent (area affected, number of workers, etc.) of the contaminants, and the level of worker protection available and needed. Since all such parameters are typically site specific, this guide does not include air quality measurement based guidance on decision making.

5.4 This guide does not include monitoring sites containing radioactive materials, nor does it cover general safety aspects, such as access to emergency equipment or medical support for emergency needs. These items should be covered in a work place safety and health plan.

5.5 Ideally, this guide is used in combination with Guide D4687.

6. General Considerations

6.1 The scientific field addressing the assessment of airborne hazards to workers is industrial hygiene. Professional industrial hygienists, besides performing such tasks as measuring the concentration of contaminants in air, recommend the means for controlling such airborne hazards, protecting

[4] Adopted by ASTM as an American National Standard.
[5] 1985 manual available from Occupational Safety and Health Administration, OSHA Analytical Laboratory, Salt Lake City, UT.
[6] Fifth edition manual, January 2015, available from the National Institute of Occupational Safety and Health, (NIOSH), Cincinnati, OH.
[7] Available from the Superintendent of Documents, Government Printing Office, Washington, DC, 20401.
[8] The boldface numbers in parentheses refer to the list of references at the end of this guide.