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ANSI/HPS N13.56-2012 (R2019)

Sampling and Monitoring Releases of Airborne Radioactivity in the Workplace

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*The N13 Administrative Committee recognizes the contributions of Rob Forrest, who passed away before this standard was completed.

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Foreword (This foreword is not part of American National Standard N13.56-2012)

Sampling and monitoring of airborne radionuclides in workplaces are critically important for maintaining worker safety at facilities where dispersible radioactive materials are used. Specifically, air sampling and monitoring for radionuclides are critical for evaluation of containment integrity, evaluation of effectiveness of contamination control programs and work practices, providing measurements for qualitative dose assessment, providing a general assessment of the level of the airborne hazard in a room, and for providing workers an immediate warning when air concentrations exceed safe levels.

There were several motivations to develop the ANSI/HPS N13.56 standard for workplace air sampling. First, ANSI N13.1-1969, "Guide for Sampling Airborne Radioactive Material in Nuclear Facilities," was published in 1969 and had been the only ANSI standard that specifically addressed air sampling for radionuclides in the workplace. Although the overall scope of the 1969 version of the ANSI/HPS N13.1 standard included the topic of workplace sampling, the main focus of the standard was on extractive sampling from exhaust ducts, and ANSI/HPS N13.1-1969 did not address problems of workplace sampling in sufficient detail. Second, when the ANSI/HPS N13.1 standard was revised in 1999, the scope of the standard was narrowed and now excludes workplace air monitoring. Third, as evidenced by the numerous guidance documents produced by various regulatory agencies, the lack of a high-level standard on room air sampling has led to inconsistencies in air sampling practices. Finally, the body of scientific information generated since the publication of the 1969 version of ANSI/HPS 13.1 standard has led to technologies that substantially improved the sensitivity and rapidness of detection of accidentally released radioactive materials in workplaces.

Suggestions for improvement of this standard are welcome. Suggestions should be sent to the Health Physics Society, 1313 Dolley Madison Boulevard, Suite 402, McLean, VA 22102.

Key words: aerosols, air monitoring, air sampling, occupational exposure, radioactivity, radiation protection, statistics, ventilation

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Contents

1.0 Purpose and Scope 1
1.1 Purpose 1
1.2 Scope 1

2.0 Normative References 1

3.0 Definitions and Nomenclature 2
3.1 Definitions 2
3.2 Nomenclature 4

4.0 Evaluating the Need for an Air Sampling Program 5

5.0 Collection of Air Samples 6
5.1 Aerosol Sampling 6
5.2 Gas Sampling 7
5.3 Sampling Considerations Based on Purpose of Air Sample 7
5.3.1 Air Sampling When Respiratory Protective Equipment Is Used 8
5.3.2 Air Sampling to Establish Containment and Posting of Airborne Radioactivity Areas 8
5.3.3 Air Sampling As a Basis for Determining Worker Intakes 8
5.3.4 Air Monitoring for Early Warning of Elevated Air Concentrations 8
5.4 Frequency of Sampling 8
5.4.1 Grab Versus Continuous Air Sampling 8
5.4.2 Continuous Air Monitoring 8
5.4.3 Prompt Analysis of Certain Samples 9
5.5 Substitutes for Air Sampling 9

6.0 Evaluation of Air Sampling Results 9
6.1 Determining the Activity Concentration and Concentration-Hour 9
6.2 Minimum Detection Capability for an Air sampling Program 10
6.3 Uncertainty of Measurements 10
6.4 Techniques for Correcting for Radon Progeny Interference 12
6.5 Evaluating Changes in Air Concentration over Time 13
6.5.1 Evaluating Air Concentrations for Accumulation Sampling During Continuous Air Monitoring 13
6.6 Review of Air Sampling Results 13

7.0 Location of Air Samplers 14
7.1 Types of Airflow Studies 14
7.1.1 Qualitative Airflow Studies 14
7.1.2 Quantitative Airflow Studies 15
7.2 Locating Samplers for Estimating Committed Effective Dose 15
7.3 Locating Samplers for Evaluating Effectiveness of Containment 16
7.4 Locating Samplers for Posting of Airborne Radioactivity Areas 16
7.5 Locating Portable Air Samplers 16
7.6 Locating Continuous Air Monitors 17

8.0 Quality Assurance and Quality Control 17
8.1 Sample Identification, Handling, and Storage 17
8.2 Air Sampling and Counting Equipment 17
8.2.1 Performance of the Counting System 17
8.2.1.1 Calibration of Counting System 17
8.2.1.2 Operability Checks 17
8.2.2 Performance of Sampling Rate Measurements 17

Documents
Document Sharing Hub

Full document details: HPS N13.56 2019

8.2.2.1 Calibration of Flow-Rate Instruments 17
8.2.2.2 Operability 18
8.2.2.3 Air Inleakage Testing 18
8.3 Documentation and Record Keeping 18

9.0 Evaluating the Effectiveness of the Air Sampling Program 19
9.1 Dose-based Assessment of the Adequacy of the Air Sampling Program 19

10.0 Informative References 21

Tables

Table 1. Air sampling recommendations based on ALI and airborne concentrations expressed as a fraction of a derived air concentration (DAC) 6

Table 2. Typical minimum detection capability for various purposes of air sampling 20

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Document Sharing Hub

Full document details: HPS N13.56 2019

Sampling and Monitoring Releases of Airborne Radioactivity in the Workplace

1.0 Purpose and Scope

1.1 Purpose

This standard sets forth guidelines and performance criteria for sampling airborne radioactive substances in the workplace. Emphasis is on health protection for workers in the indoor environment. This standard provides best practices and performance-based criteria for the use of air sampling devices and systems, including retrospective samplers, continuous air monitors, and personal air samplers. Specifically, this standard covers air sampling program objectives, design of air sampling and monitoring programs to meet program objectives, methods for air sampling and monitoring in the workplace, and quality assurance critera to ensure system performance toward protecting workers against unnecessary inhalation exposures.

The primary purpose of workplace air monitoring is to measure airborne radioactive material for evaluation and mitigation of inhalation hazards by workers in facilities where radioactive material may become airborne. A comprehensive air sampling program can be used to determine whether administrative and engineering controls for confinement of radioactive material are effective, to measure airborne radioactive material and alert workers to high air concentrations, to estimate worker intakes, to determine posting requirements, and to determine what protective equipment and measures (e.g., limiting stay times, engineering controls such as containments and/or ventilation, and respiratory protection) are appropriate. Results often provide the basis for development and evaluation of control procedures and may indicate whether engineering controls or operational changes are necessary.

Air sampling techniques consist of two general approaches. The first approach is retrospective sampling, in which the air is sampled, the collection medium is removed and taken to a radiation detector system and analyzed for radioactive material, and the concentration results are made available at a later time. In this context, the measured air concentrations are evaluated retrospectively. The second approach is real-time air monitoring, where air concentrations are continuously monitored so that workers can be warned that a significant release of airborne radioactive material may have just occurred. In implementing an effective air sampling program, it is important to achieve a proper balance between the two general approaches. The specific balance will depend on hazard level of the work and the characteristics of each facility.

When designing an air sampling strategy, the As Low As Reasonably Achievable (ALARA) principle shall be considered, which requires internal and external exposures be kept as low as can reasonably be achieved and balanced with social, technical, economic, practical, and public policy considerations that are associated with the use of the radioactive material.

A comprehensive air sampling strategy should also consider that the air sampling program is only one element of a broader radiation protection program. Therefore, individuals involved with the air sampling program should interact with personnel working in other elements of the radiation protection program such as contamination control and internal dosimetry.

1.2 Scope

This document addresses the technical issues involved in sampling and monitoring air for radioactive materials in the workplace. Specifically, this document addresses the techniques, appropriateness, quality, and accuracy of air sampling/monitoring methods and techniques for such a program. This standard does not address environmental air sampling, effluent monitoring, or radon measurements.

2.0 Normative References

There are no normative references for implementation of this standard.

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