

# Radiological Air Monitoring

June 14-18, 2021 ♦ "Live" Online Instruction

## SCOPE

This 3-day course will provide cover the fundamentals and applications of radiological air monitoring. The course will begin by reviewing radiation measurement fundamentals, aerosol physics with a survey of these using radon and its progeny to describe the complexity of the subject. The course will also cover the basics and applications of air sampling as this applies to regulatory compliance for off-site and onsite applications to include emergency response. The course will also cover relevant federal regulations along with DOE standards and orders as they apply to air monitoring. Substantial attention will be given to the consensus based standards including ANSI N42.17B, ANSI N42.18, ANSI N42.30 and ANSI N323C but more specifically on ANSI 42.54 which will replace all of these with a single comprehensive standard.

## Fundamentals and Systems

1. Basic principles for measuring air emissions
  - a. Aerosol physics
  - b. Radiation detection
  - c. Radon progeny
  - d. Air Sampling Methods
    - i. Field
    - ii. Laboratory
    - iii. Combined
  - e. Aerosol tests (what they mean and associated issues)
  - f. Principles of isokinetic sampling
  - g. Effect of fluctuations of stack flow on measurement devices
  - h. Deposition in sampling systems and ventilation equipment (variation due to particle size)
  - i. Emergency Response
    - i. WIPP event
2. Standards applicable to radiological (rad) monitoring systems
  - a. 10 CFR 835 (operational health physics)
    - i. DOE G 441.1-1C
  - b. DOE O 151.1C (emergency response)
    - i. DOE G 151.1-1A
  - c. NESHAPS (40 CFR 61H)
  - d. DOE O 458.1 (environmental radiation protection)
  - e. National Industry standards and consensus standards (e.g. ANSI 13.1, ANSI N42.54 is designed to replace ANSI N42.17B, ANSI N42.18 (airborne only), ANSI N323C and ANSI N42.30)
3. Implementing an emission point monitoring program
  - a. Types of sample collection devices
  - b. Sample location
    - i. Basic design
    - ii. Placement requirements
    - iii. What can invalidate a sample result
    - iv. What modifications are allowed and disallowed with out further evaluation
  - c. Items to look for in evaluating a sample system
4. Source Term
  - a. Determination
  - b. Pitfalls of determinations

## QA/QC and Sampling and Data Evaluation

5. Ensuring a representative sample was received
6. Data validation and interpretation
  - a. Sources of error
    - i. Sampling error
    - ii. Analytical error
  - b. Interpreting results
  - c. Decay rates
  - d. Pitfalls (e.g. flow measurement inaccuracies, location affects, too large or too small of a sample)

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THE AMERICAN ACADEMY OF HEALTH PHYSICS (AAHP) HAS AWARDED THIS COURSE 24 CONTINUING EDUCATION CREDITS.

**FOR FURTHER INFORMATION OR ASSISTANCE, PLEASE CONTACT:**

Technical Management Services  
 Phone: 1-860-738-2440  
 Fax: 1-860-738-9322  
 info@tmscourses.com  
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June 14-18, 2021 ♦ "Live" Online Instruction ♦ Course fee: \$1195

## Course Instructor



**Dr. Robert Hayes** is an Associate Professor of Nuclear Engineering at North Carolina State University's Nuclear Engineering Department (also the world's first nuclear engineering program). His research includes using off-site air sampling to reconstruct radiological releases from nuclear facilities and the consequence assessment for the WIPP event in 2014. He has a PhD in Nuclear Engineering, is Certified by the American Board of Health Physics and is a Licensed Professional Engineer. He is a Fellow of the American Physical Society and is a research affiliate in the MIT physics department's laboratory for nuclear science. He has many scientific peer reviewed journal articles published in the area of radiological air monitoring and chaired the upcoming ANSI standard on instrumentation systems for monitoring airborne radioactivity (ANSI N42.54).

### HOW TO REGISTER ...

**COURSE FEE: \$1195**

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"This was one of the best courses I have ever taken. The instructor was clear and precise. Case studies and job experiences shared with the class were excellent learning tools."

"I consider myself lucky to have been able to take this course."

"I was very much impressed with the knowledge and quality of the instructor."

"The interaction between the course participants was a great advantage."

"This course introduced me to some regulations that I wasn't aware existed."

"This has been the best course I have ever had the pleasure of taken."

**CANCELLATION POLICY:**

Cancellations are accepted up to three weeks prior to the start of the course. After this time a \$100 cancellation fee will be charged. Registrants who cancel within 1 week of the course will be liable for the full course fee. Occasionally, enrollment for a course is low and it becomes necessary for us to cancel the course. We apologize for any inconvenience a cancellation may cause and will make every effort to reschedule the course or make other arrangements for you.

In the event TMS may cancel a course due to low enrollment, notice will be given 2 weeks prior to the class.