JULY 2023

THE RADON REPORTER™

Practical Information for Your Success

GOOD NEWS

International Intercomparison of Radon Calibration Facilities

TABLE of CONTENTS

AD INDEX

Please submit content, comments, or questions to editor@aarst.org.

AARST™ is a nonprofit, professional organization of members who are dedicated to the highest standard of excellence and ethical performance of hazard identification and abatement of radon, chemical vapor intrusion, and other contaminants of concern in the built environment. The organization primarily strives to advance the interests of its members through developing industry standards, certifying technical proficiency, enabling advancement of public policy, and communicating health risks to the public.

2023 AARST Board Election

As a leading voice for industry progress, AARST is led by a standout group of industry leaders. The AARST election process begins with the Nominating Committee's call this month for nominations to be submitted in June. The election will be conducted during October with results announced at the Annual Meeting October 31 in Nashville. Positions open for election are Nationally Elected Directors (five), President-Elect, Vice-President (1), Secretary and Treasurer.

Path to Becoming a Nationally Elected AARST Board Member

Those eligible to run for the Nationally Elected Board need to be members in good standing of the Association. Officers and Nationally Elected Directors shall be elected by the membership of the Association by a secure, independent internet balloting service. For each Officer position, the winner shall be the candidate for that office receiving the largest number of votes. For the positions of Nationally Elected Directors, winners shall be those having the largest number of votes among the candidates, as shall be enough to fill the number of open seats for said Directors. A recent bylaw change limits the composition of the Board to no more than two Directors and no more than one Officer from a single company or organization of common ownership or other closely related companies.

The results of the election shall be tabulated 24 hours prior to the Annual Meeting and announced at the Annual Meeting of the Association. In the event of a tie, the sitting Board will cast a tie breaking vote consisting of a quorum of the Board.

Board Terms

As per the bylaws 4.03 regarding Terms of Directors, Nationally Elected Directors shall hold office for a term of two years. A Nationally Elected Director may serve a maximum of three consecutive terms plus the unexpired term of a previous Director.

As per the bylaws 5.06 regarding Terms of Officers, Officers serve for a term of two years or until their successors are elected. A President-elect shall be elected every other year for a one-year term and afterward shall serve as President for two years. The outgoing President shall become the Immediate Past President, and shall serve as an Officer, for a term of one year. Except for the President, President-elect and Immediate Past President, an Officer may serve a maximum of three consecutive terms plus the unexpired term of a previous Officer.

How to Apply?

Those interested please contact nominations@aarst.org or complete the AARST Board Member Nominating Profile submission **form**. Please submit the completed form no later than July 15. For more information please see the **AARST SOP Nominations and Elections.**

Certification Council

The Certification Council establishes credentialing criteria and complaint evaluation, decertification, and reciprocity policies for the National Radon Proficiency Program (NRPP). It consists of stakeholders representing a cross-section of industry segments.

The Council ensures NRPP credentialing policies maintain impartiality and are free from conflicts of interest. The Certification Council meets monthly.

NRPP Needs A Few Good Volunteers for the Certification Council

There are upcoming vacancies on the 15-member Certification Council. A Certification Council member must be NRPP-certified in the field or industry segment in which they provide radon related services to the public. Please volunteer to serve on this important credentialing governance body and help shape our ANAB-Accredited proficiency program as it grows and diversifies with several new credentials, improvements to the exam process, and more.

The following Certification Council seats will be vacant November 1, 2023:

Radon Mitigation – Residential; Radon Chambers; Consumer Interests; Radon Measurement – Residential; and Non-licensing/certifying States.

The seats for ***Home Inspector*** *and* ***Radon Educator*** *are also vacant.*

The deadline for applications is August 31.

Interested applicants are encouraged to review the **qualifications**. Applications should be submitted using **this form.**

NRPP Certification Council

Name	Seat
Ashley Falco	Certification Council Chair
Jill Newton	AARST Technical & Science Committee
Bruce Snead*	Radon Chambers
Bill Brodhead*	Radon Mitigation – Residential
Dawn Goard	Radon Mitigation – Large Buildings
Angela Tin*	Consumer Interests
VACANT	Home Inspectors
Mark Ungerer	Certified States

Name	Seat
VACANT	Radon Educator
Matt Hendrick	Radon Device Manufacturers
David Metzger*	Radon Measurement – Residential
Eric Gabrielson	Radon Measurement – Large Buildings
Justin Otto*	Non-certified States
Owen Reese	Radon Laboratories
Chris Lutes	Chemical Vapor Intrusion
Diane Swecker	AARST Executive Director (Non-voting)

NRPP Management Committee

The NRPP Management Committee manages and oversees the policy and compliance practices of the program and recommends policy to the Certification Council. The Management Committee consists of the Certification Council Chair, the AARST Executive Director, another Certification Council member who serves a term of 1 year, and two NRPP staff (non-voting).

Name	Position
Ashley Falco	Certification Council Chair
Diane Swecker	AARST Executive Director
Mark Ungerer	Designated Certification Council Member
Amy Roedl	Director of Proficiency (non-voting)
Christina Johnson	NRPP Credentialing Manager (non-voting)
Diane Swecker	AARST Executive Director

2023 ANSI/AARST Standards Released

With thanks to the leadership of the AARST Consortium on National Standards, **American Association of Radon Scientists and Technologists (AARST)** has released the 2023 versions of eight ANSI/AARST Standards. These standards have been revised by their respective all-volunteer committees to, for example, include changes recommended by subject matter experts, make edits necessary to increase clarity, and achieve harmonization across standards. Although the 2023 standards have an effective date of December 1, 2023, they are available on the **Consortium website** and recommended for immediate use.

Consolidations. Two pairs of previously existing standards were consolidated from four to two standards. The standards for measurement of radon in multifamily buildings and in schools and other large buildings, MAMF and MALB, have been merged into the standard titled MA-MFLB 2023 Protocol for Conducting Measurements in Multifamily, School, Commercial, and Mixed-Use Buildings. The standards for mitigation in multifamily buildings and in schools and other large buildings, RMS-MF and RMS-LB, were combined into SGM-MFLB 2023 Soil Gas Mitigation Standards for existing Multifamily, School, Commercial, and Mixed-Use Buildings.

New versions of six other standards are also now available:

- MAH 2023 *Protocol for Conducting Measurements in Homes*
- MS-QA 2023 *Quality Assurance for Radon Measurement Systems*
- SGM-SF 2023 *Soil Gas Mitigation for Existing Homes*
- CCAH 2020 Rev.5/23 *New Construction of One- & Two-Family Dwellings*
- RRNC 2020 Rev.10/22 *Rough-In of Radon Control Components in New Construction*
- CC-1000 2018 Rev.5/23 *Soil Gas Control Systems in New Construction Multifamily, School, Commercial, and Mixed-Use Buildings*

Soil gas mitigation/control. Consistent with the prior change to the single-family mitigation standard from RMS-SF to SGM-SF, the large building standards for mitigation and new construction were retitled "Soil Gas" to reflect the reality that numerous activities that apply to controlling radon apply to the intrusion of chemical vapor contaminants. As in SGM-SF, a radon mitigation project is not mandated to achieve mitigation of other soil gas unless the scope of work specified the other soil gases, although this result may be a corollary benefit of the mitigation.

continued on page 6

NEW AARST MEMBER BENEFIT!

With the release of the 2023 standards, AARST is now providing association members with free access to current and previous standards in both licensed PDF format and searchable flipbook format. AARST members will be **able to access** these versions whenever they are logged in to the MY ACCOUNT section of the website at the **Standards Library**.

Members of the public will continue to have free access to non-searchable flipbooks as well as to purchase PDF versions at standards.aarst.org

Earlier versions: Because some states have adopted a previous version of standards, these are also still available in flipbook and for **purchase**.

BACKGROUND – ANSI/AARST STANDARDS

ANSI-Accredited. AARST is accredited by the **American National Standards Institute** to administer the AARST Consortium on National Standards. ANSI is the organization in the United States that oversees and accredits the development of many industry consensus standards. Accreditation is an ongoing process of oversight that involves ongoing audits by ANSI to ensure that the consensus process is adhered to and continuously improved. It is arduous work to obtain and maintain ANSI accreditation, and a major achievement to be accredited as a standards Development organization. Not all radon standards have been developed or maintained following this rigorous and transparent process.

About the Consortium. The mission of the Association's standards consortium, the AARST Consortium on National Standards is to establish and maintain a continuous consensus process for writing and amending voluntary standards to ensure that all resulting standards are technically proficient and functionally viable in a manner to achieve universal acceptance and utilization in the United States. Incumbent upon this mission is a duty to seek a consensus process that is balanced, open, and capable of addressing standards in a timely manner. The goal and process in writing standards conforms with applicable US law and Congress' intent that federal agencies recognize industry standards when they are created using a consensus process. Extensive deliberations by volunteers in consortium committees (buoyed by constructive comments during public review periods) have built ten ANSI-AARST Standards developed and maintained by the AARST Consortium on National Standards. The standards process has been and remains independent of the AARST Board.

History. Twenty-two years ago, AARST took the initial steps to begin writing radon standards using the consensus process involving and recognizing the contributions made by various types of key stakeholders, including consumer groups, other affected professions, and industries as well as state and federal agencies. Until 2001, the fledgling radon profession in the United States relied on initial measurement protocols and a radon mitigation standard developed by the US Environmental Protection Agency (EPA) to initiate the foundation and development of radon standards. EPA standards were poised to anchor EPA's Congressionally mandated credentialing of radon professionals to address the newly recognized environmental threat of low-level ionizing radiation in homes and other buildings. That infrastructure began to change when EPA's federal radon proficiency program was discontinued, and the private sector and many states took a front seat in professional radon credentialing.

Volunteers Needed for Standards Committees

The AARST Consortium needs volunteers for the next round of standard development. Plans for 2024 include two new publications and completion of additional revisions of the current ten standards to be published in 2025. All such work is subject to public review. There are openings on the committees developing new standards for Mitigation of Radon in Water and (SG-OM&M) Long-Term Stewardship of Radon and Soil Gas Hazards. The Consortium will soon begin the process of repopulating all "standing" committees with a combination of new and existing participants for work that will commence in 2023. These include the Radon Measurement, Soil Gas Mitigation, Radon Measurement QA, and Radon Measurement/Mitigation for Water. Descriptions of these committees and participation can be found here. To submit your name or others in nomination for committees, click here.

KEYNOTE SPEAKER

Steve Diggs (CSP) is the founder of six businesses; he led his own advertising agency and broadcast production firm for 25 years. Early in his business career, over two decades ago, at age 27, Steve was diagnosed with significant heart disease and later underwent 5 heart bypasses (and at one time was given only one to two years to live). In 2000, he sold his businesses with a mission to go from personal success to significance in other people's lives. Since then, he has become an internationally recognized author and speaker. His Fast-Forward Leadership Programs™ keep Steve's clients on the cutting edge of industry best practices. Nashville-based, he travels the world as a sought-after keynote and breakout speaker and corporate leadership trainer. Steve possesses the National Speakers Association's Certified Speaking Professional (CSP) designation, which is considered the highest earned credential in the speaking industry. He has been a trainer in the US Army's Master Resiliency Program and is an inductee to the Motivational Speakers Hall of Fame.

Steve is a bestselling author of eleven books and 100's of published articles who inspires his audiences with wit, storytelling, and an encyclopedic knowledge of leadership strategies, branding and communication skills... and lots of laughs. He will be the keynote speaker on October 30 at Indoor Environments 2023, the Radon and Vapor Intrusion **Symposium** in Nashville.

INDOOR Environments 2023

Radon and Vapor Intrusion Symposium

Nashville

Indoor Environments 2023 will take place October 29 - November 1 at the Renaissance Nashville Hotel located at 611 Commerce St, Nashville, TN 37203. The hotel is situated in the heart of downtown Nashville, near the historic Ryman Auditorium, and one block from Broadway. "Honky Tonk Highway" is the famous stretch of Broadway known for music. We are told, "Be certain that anyone playing in any of the bars (honky-tonks) is good enough to be on the big stage at the Bridgestone Center!" The Broadway vibe is exciting, fun, happy, and musically loud. Special gems can be found off each side street, from the Johnny Cash Museum to the Country Music Hall of Fame, and more. Eateries, BBQs, and classic southern vittles are tucked in everywhere. The end of Broadway meets up with 1st Avenue and the Cumberland River.

AARST's Indoor Environments 2023 – The Radon and Vapor Intrusion Symposium is the largest gathering of practitioners, training providers, researchers, regulators, technicians, and manufacturers in radon and vapor intrusion in the US. AARST is convening its 37th annual gathering for hundreds of attendees seeking to learn, share, and network.

Indoor Environments 2023™ will offer concurrent technical tracks focusing on Practice and Policy, Vapor Intrusion, Science and Research, and training for State Radon Programs. The agenda, speakers, and topics are determined at the culmination of a public "call for presentations" with thoughtful input from the Symposium Committee and AARST leadership regarding additional important topics. Peer-reviewed and invited presentations will deliver the latest testing and mitigation techniques, scientific findings, recently revised standards, emerging public policies, and current approaches to community outreach and education programs.

Additional valuable content will be the subject of continuing education courses run by third-party training providers, including focus on vapor intrusion and the 2023 editions of the ANSI/AARST standards. AARST's annual meeting, awards announcements, and, inevitably, numerous side meetings will round out the agenda in Nashville this year.

Indoor Environments 2023™ – The Radon and Vapor Intrusion Symposium boasts the largest soil gas exhibition hall featuring vendors from around the globe displaying latest products and newest technology for soil gas testing and remediation as well as timely and relevant resources to elevate business performance. The 2 ½ day show will allow attendees to visit with suppliers and check out new products while providing the hub for impromptu meetings and socializing during a Sunday evening reception and breaks.

AARST leads in communication and support to the industry. As such, Indoor Environments 2023™ is the definitive source for government agencies, advocates, educators, scientists, and companies sourcing field-application-based needs that are seeking the leading indoor environments gathering annually.

#RockingOutRadon

Youth Factor

Indoor Environments 2023 is the place where young professionals explore the radon and soil gas industries. With panel conversations and meet ups, look forward to Monday to MASH UP younger pros and industry leaders for a unique networking opportunity.

Selfie Stage

Have fun on the Selfie Stage in the exhibit hall! Decorated with fun Nashville musical props and real guitars, it will be THE place to take pics of yourself and your friends and post them to your socials. **#RockingOutRadon**

Line Dancing

Learn to line dance on Monday during the social hour. Taught by professional dancers, you can learn a few dance steps to get you ready for going out on the town. You and your friends can show off your new skills and brag about it the next morning!

Day Out Tour

Bring your family along! For this fun event, we get back on the bus offering a full day of sightseeing with photo ops and more! Enjoy the famous and infamous sights of Nashville with new friends.

Each year the committee has fun setting the scene of our host city. This year can't be more fun than Nashville!

The AARST Symposium comes together with help from hard-working volunteers giving many hours to make each year a success. The Planning Committee is led by Co-Chairs: Dawn Oggier and Duane West. Additionally, other volunteers involved in the planning are: Technical Program Advisor and States Track Advisor Josh Kerber; Marketing and Vendor Coordinator Ksenia Kolyeva; Local Coordinator and Tennessee Chapter Will Carmichael; AV Coordinator Shannon Cory; Volunteer Coordinator Jennifer Long; Science & Research Coordinator and Proceedings Editor Mike Kitto; Reviewers Jill Newton, Phil Jenkins, and Uttam Saha; Vapor Intrusion Coordinators Henry Schuver, Lila Beckley, and Aaron Friedrich.

Welcome New Members!

January

Daniel Thomas (ID), Jay D Anderson (IN), Jennifer L Thorne (MT), Kathy Cook (IL), Keith L Valenti (IL), Kimberley A. Waldron (CO), Kimberly Steves (KS), Kyle Quinn (TN), Robert Donaldson (FL), Robert Vitek (IL), Robin Lawson (IL), Ronald VeVerka (PA), Sara Hamidovic (IN), William Carmichael (TN)

February

Adam J Fitzgerald (IL), Andrey Barshay (IL), Angela Trebicka (MA), Brian Krantz (IL), Brian Meyer (MN), Carol Howat (IL), Chad Dunham (IL), Chris Williams (CO), Christopher Bice (IL), Christopher L Hayes (CT), Christos Kontomichalos (IL), Daniel Cox (IL), David Dinsick (IL), David H Wright (CO), DAVID WARD (IL), Deborah Woodbury (IL), Denice McCalip (IL), Donald M Neag (IL), Donald O Payne Jr. (IL), Donna Griffin (IL), Eric Bastian (IL), Filamor Rivera (IL), Gene Johnston (IL), Heather E Hatherly (MA), John Albright (IL), JOHN DAWSON (IL), John DeChristopher (MA), JOHN WEGNER (IL), KEITH CLOUGH (IL), Mark Douma (IL), MATTHEW WARD (IL), Michael Borkstrom (IN), Mike Albright (IL), Mike Dilger (IL), Nathaniel Real (OH), Patrick Howard (IL), Phil Gould (IL), Ralph Quin (SC), Ramesh Nair (IL), Rich Mennecke (IL), Richard VanOteghem (IL), Robert Bruce (IL), Ryan Goeglein (CO), Scott Haycraft (IA), Steve Kostro (IL), Stuart E. Zwang (IL), Todd Santanello (IL), Tom Thomas (IL), Tony Rossignuolo (IL), Tracy Heard (IL), Trevor Karns (IL), William Frost (MO), William Harris (IL), William Nicholson (IL)

March

Aaron Simonye (CO), Brian O'Connor (IL), Crystal N Kunz (MI), Daniel C Buske (IL), Daniel Hunsaker (IL), David Scharer (IA), Edward Benoit (VT), Frank Vizza (IL), Iann Eliason (IL), James Marody (CO), Jared McAfee (UT), John Vruno (MN), Jon McCreath (NE), Joseph DiCianni (IL), Kelly Mccusker (IL), Laura M Ferlita (IL), Lora Gilbert (IL), Maria Peterson (IL), Marleigh M Mitchum (FL), Matthew G Emanuels (IL), Michael Christerson (IL), Mike Solomon (MN), Nicholas C. Nicholas (IL), Paige Livingston (CO), Robert Burke (IL), Scott Spaulding (OR), Steven Henningsen (IL), Terry Ross (FL), Tim Taylor (IL), Wanderson Silva (WV)

April

Aaron Alumbaugh (IL), Ashwin Ashok (GA), Chance Emanuels (IL), Craig Burden (ID), derek Dobyns (IL), Douglass Held (IL), Dr Meera Neb (TX), Dyllan Rose (OH), Jason L Sylvester (WV), Jeff O'Shea (IL), Josh Badman (IL), Julie Niehaus (IL), Kris Stahl (MN), Laura Weigle (IL), Ruth D Alfasso (MA), Westin Brawley (CO)

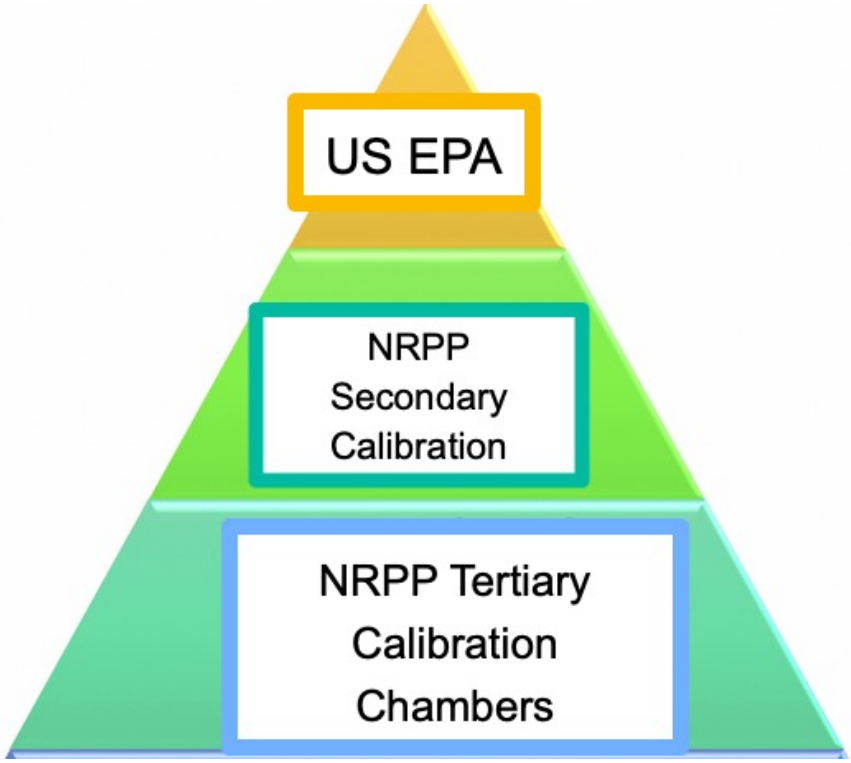
May

Amy Roedl (NC), Benjamin Hammond (TN), Chadwick Rice (GA), Chris Catton (NE), Devin McDowell (AR), Dylan Morgan (VA), Eric Anthony Altobellis (KY), Holly Tabano (NC), Joseph Rossi (IL), Joshua Ross (AK), Luke D Loomis (FL), Robert Victor Matibag (CO), Susan Lancaster (NJ)

Good News: Results are In from the International Intercomparison of Radon Calibration Facilities

All radon measurements are based on the calibration of their system in a calibration chamber. But, how do calibration chamber operators know exactly what their radon concentrations are, and how sure are they?

Obviously, if one calibration chamber is "off" on its concentration compared with another calibration chamber, there could be huge repercussions. The overall system for standardizing measurements in the world relies on a chain of traceability from some national authority who sets the standard, and then every calibrating facility compares with this standard, down through a series of secondary and tertiary calibration facilities.



This system is pretty easy for gases that do not change over time, like carbon monoxide, which can be purchased in cylinders of certified concentrations. However, such simple acquisition is not possible for radon gas, so each chamber must generate its own radon gas by using a radium source, calculating the number of radon atoms emitted from their radium source, then calculating the concentration based on dilution in their volume of air. This sounds tricky enough, but different chambers use different types of radium sources–some pump air through a solid pumice stone type material infused with radium, others pump air through a radium-infused powder, and others use special flow-through solid radium sources. How can chambers be sure of the accuracy of the concentrations that they use to calibrate thousands of instruments? Intercomparisons between chambers provide such assurance and are vital to ensuring confidence in the accuracy of measurements and the millions of dollars spent in response to measurement results.

continued on page 12

The Consortium of International Radon Associations, (COIRA) organized an intercomparison of calibration facilities in 2019, which included 18 chambers from 6 countries and three continents. Three NRPP-classified secondary chambers in the US and three calibration chambers in Canada participated. The intercomparison used a trio of AlphaGUARD instruments (AlphaGUARDs) loaned for the project by the manufacturer, Bertin Technologies, as the tool to compare radon concentrations reported by each participating chamber. The three instruments were shipped together in a case, including background alpha track detectors (to monitor for the extremely unlikely but possible exposure during shipment), from chamber to chamber.

Each chamber followed the same specific procedures and exposed the three instruments together in its chamber for at least three days. The chamber then emailed COIRA the results of its measurements during this exposure. The AlphaGUARD instruments' measurement logs remained securely stored in the instruments' buffers as they continued from chamber to chamber and airport to airport.

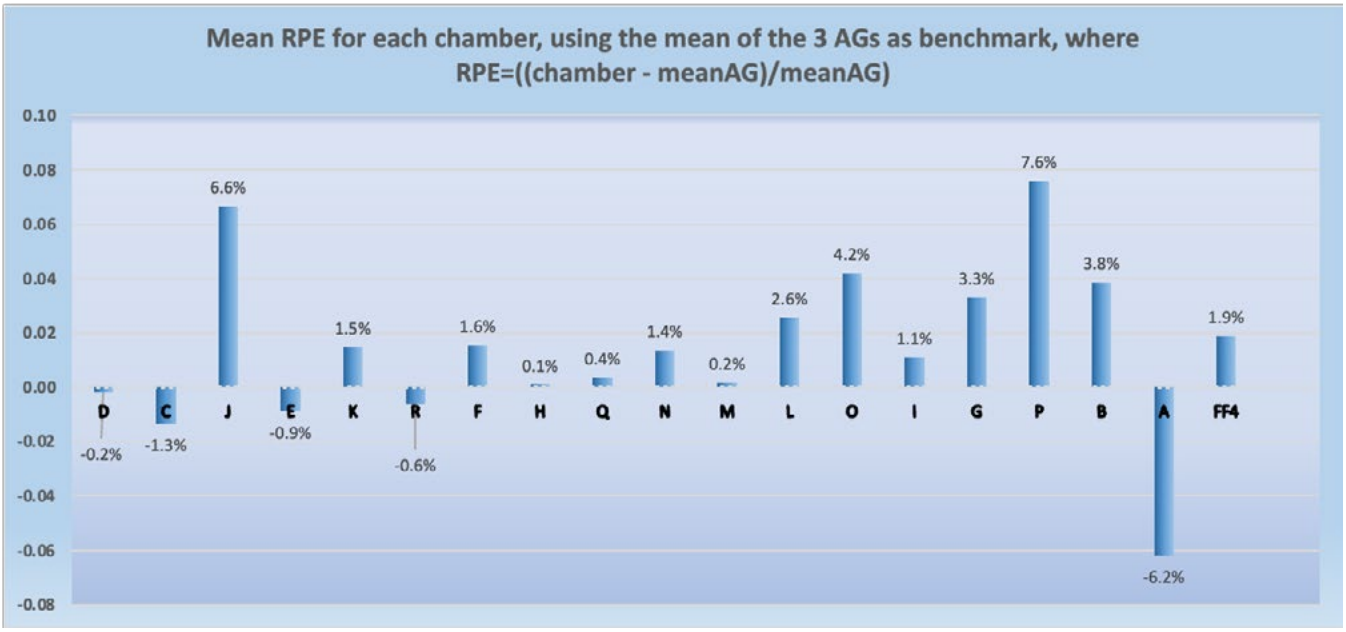
Principal Investigators: Melinda Ronca-Battista, AARST,
Jose Luis Gutierrez Villanueva, ERA, and
Project Administrator: Pam Warkentin, CARST

After the final chamber exposure, the traveling AlphaGUARDs were shipped to Flagstaff, Arizona, where they were extensively tested in background concentrations (outdoors, encased in three layers of plastic, protected from rain in a tent) to verify correct response to near-zero concentrations and confirm that there had been no build-up of background radon during all their exposures. In addition, a final intercomparison was conducted in a high concentration enclosed indoor

environment. For these final exposures, a fourth AlphaGUARD loaned by the US EPA Las Vegas laboratory joined the lineup. The four instruments were exposed to outdoor concentrations as low as a tenth of a pCi/L and indoor concentrations as high as 150 pCi/L as part of their final assessment.

The results are impressive and reassuring to all who use radon measurements to make decisions. Imagine if calibration chambers differed greatly–not only would it require immediate corrective action, but thousands of measurement results, with no fault of the field technicians, would be called into question.

FIGURE 1. MEAN RELATIVE PERCENT ERROR FOR EACH CALIBRATION CHAMBER



The benchmark was the average of the three traveling AlphaGUARDs–in other words, each chamber's response was compared to the average of the three traveling instruments. As shown in the Figure 1, no chamber differed by more than 8% from the average of the three AlphaGUARDs, and 11 were within 2%. Considering that each chamber calculates and measures its own concentrations, this is very impressive.

This finding is very important as it dovetails with the requirements in ANSI/AARST MS-QA Standard (https://aarst.org/product/ms-qa-2019/) that calibration facilities stated one-sigma uncertainty (see MS-QA for explanation and your calibration certificates) for a 48+ hour measurement must be 8% or less. This is the starting uncertainty, upon which every step of the measurement process adds some uncertainty, with the goal that the overall error of field measurements is less than 25%.

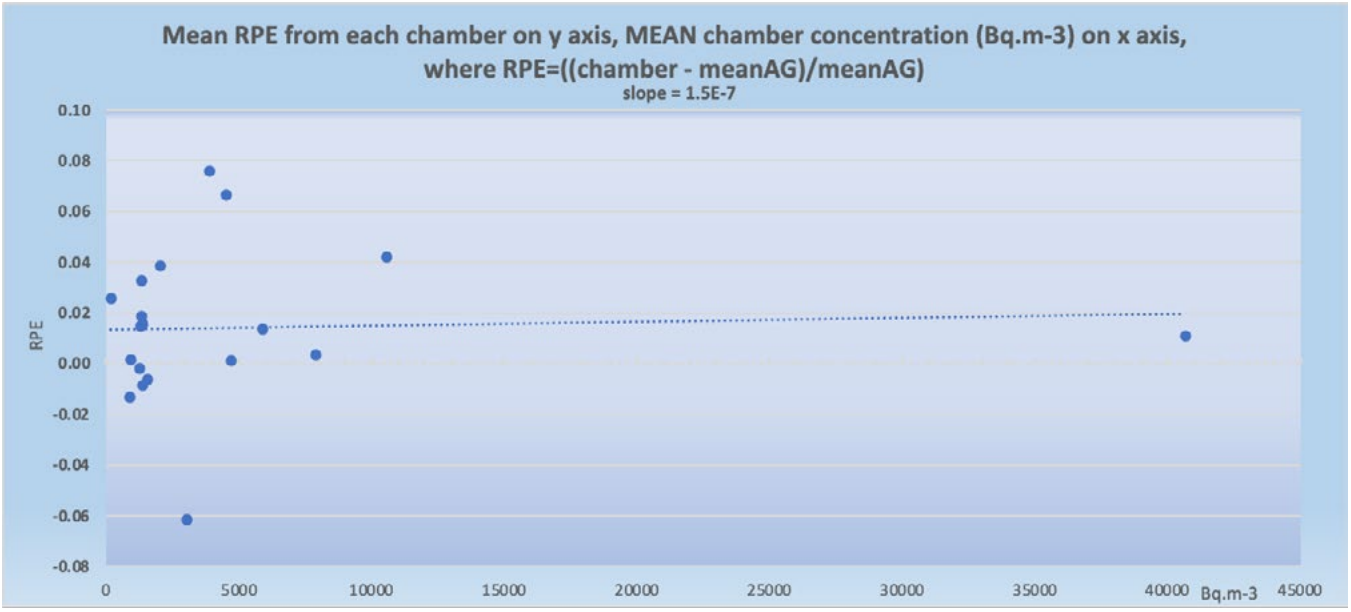
The final exposure in Flagstaff is shown as FF4 in the charts, where the fourth AlphaGUARD from the US EPA Las Vegas was used as the "chamber" reported concentration. This final Flagstaff comparison showed a Relative Percent Error (RPE) of 1.9% between the average of the three traveling AlphaGUARDs and the fourth instrument. Again, this is impressive, considering the thousands of miles traveled by the instruments, the range of conditions and concentrations in the chambers, and the final environment at 7500-foot elevation and 50-degree F range of temperature.

continued on page 14

Before being sure of our conclusions, we needed to also rule out several possible confounding factors, including (1) a nonlinear response to concentration, which could be revealed by a different response to very high, or very low, concentrations, especially since there were some extremely high concentrations used in some chambers, (2) any change in the AlphaGUARDs response relative to one another during the intercomparison, and (3) a change in the AlphaGUARDs relative response when compared to the chamber concentration. (In other words, if one instrument started out at always running about 5% higher than the second instrument, but then gradually trended over time to the end of the study when it was running 20% higher than the second instrument, that would call into question the data from both instruments, without being sure which one, or if either, was correct.)

First, did the AlphaGUARDs respond any differently at higher, or any differently at lower concentrations? To assess this, we plotted and calculated the slope of a possible linear relationship between the concentration and the RPE (% off of the benchmark) of each concentration. As is shown in Figure 2, there was no relationship at all, with a very flat slope close to zero. In other words, the AlphaGUARDs responses (counts registered in the instrument per disintegration in the chamber) were the same no matter if the concentration was close to zero, or over 40,000 Bq/m3 (over 1000 pCi/L).

FIGURE 2. MEAN RPE FROM EACH CALIBRATION CHAMBER AND CHAMBER CONCENTRATION



continued on page 16

Did You Know? AARST is rebranding to Indoor Environments Association™

- AARST's Board of Directors decided to rebrand to formally adopt work already started on chemical vapor intrusion and pursue efforts focused on other contaminants of concern in the built environment while maintaining significant attention to radon, the second leading cause of lung cancer.
- Over the next year, the association's website, logo, and public identity will change to align with the organization's recently revised mission statement.
- Revised Mission Statement: AARST is a nonprofit, professional organization of members who are dedicated to the highest standard of excellence and ethical performance of hazard identification and abatement of radon, chemical vapor intrusion, and other contaminants of concern in the built environment. The organization primarily strives to advance the interests of its members through developing industry standards, certifying technical proficiency, enabling advancement of public policy, and communicating health risks to the public.

PROVEN

RADON TESTING AND MITIGATION

PRODUCTS

INNOVATIVE

VAPOR INTRUSION

SOLUTIONS

RadonAway

800-767-3703 | radonaway.com

RADONAWAY MOBILE APP AVAILABLE ON:

Download on the App Store

GET IT ON Google Play

Second, were there any changes in the relative responses between the instruments, over time especially as the study went on so long (due to delays caused by the pandemic)? To assess this, we calculated the ratio of each AlphaGUARD relative to the average of the other two, over time, as shown in Figure 3. This analysis shows that the slope of the response of each instrument relative to the average of the other two is also close to a flat zero, indicating that each instrument had a consistent response throughout the entire study (at least relative to the other two). Note that chamber F's individual instrument results are significantly different, but on average chamber F performed as well as others, and chamber F's data do not affect the trend line. To illustrate this, Figure 4 plots the same data without chamber F.

FIGURE 3. RATIO OF EACH ALPHAGUARD TO THE MEAN OF THE OTHER TWO

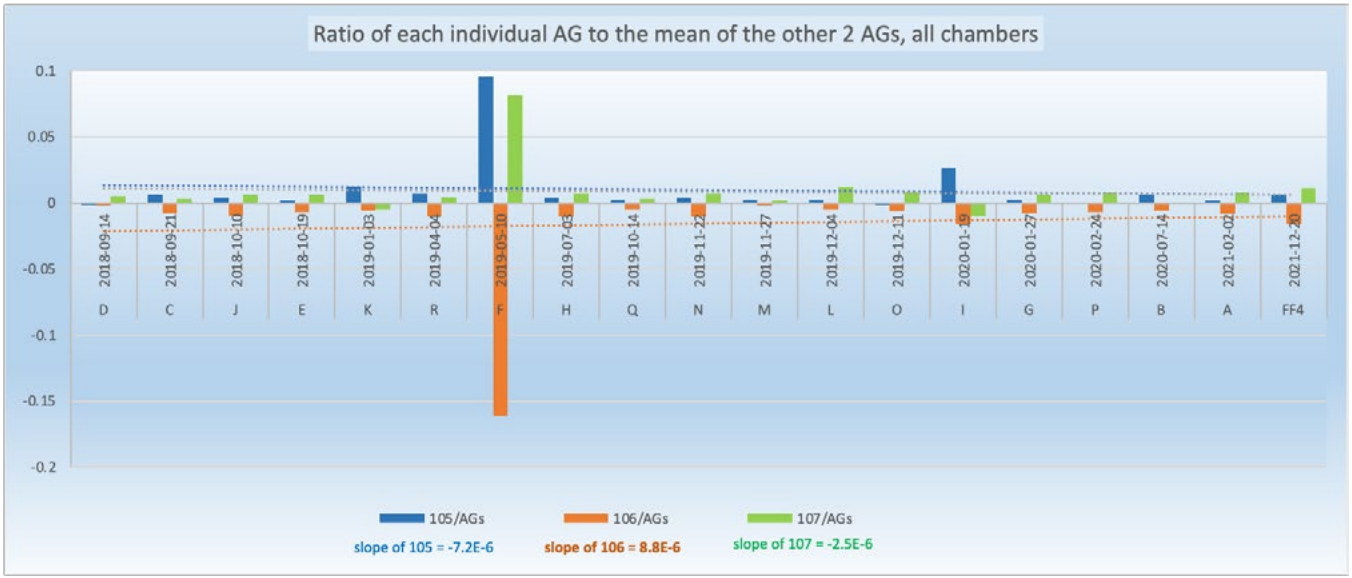
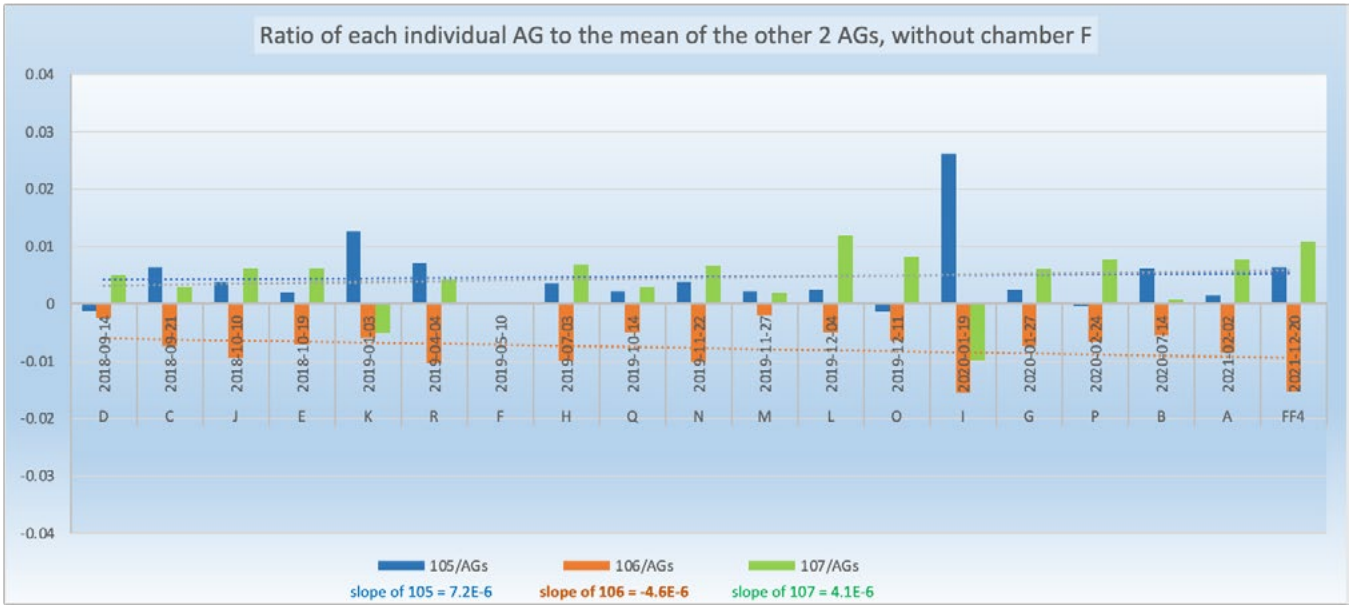


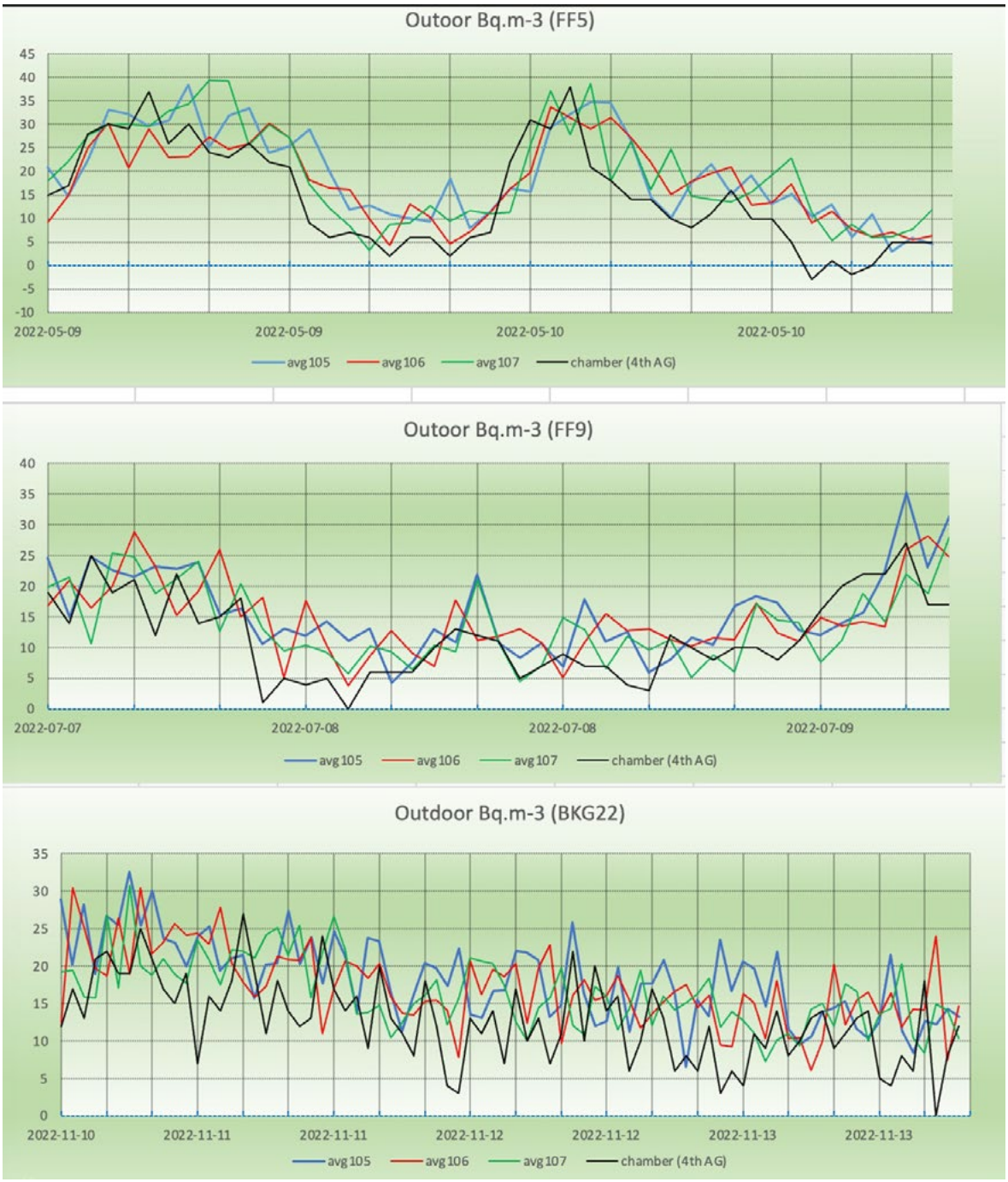
FIGURE 4. RATIO OF EACH ALPHAGUARD TO THE MEAN OF THE OTHER TWO, WITHOUT CHAMBER F



As shown in Figure 4, the slope of the linear relationship between the ratio of each instrument relative to the mean of the other two is essentially zero, indicating that over time there was no drift in relative response between the three AlphaGUARDs.

Finally, the three traveling AGs were exposed in an outdoor environment (tent), within which they were encased in three layers of 0.1 mm plastic. Three sets of such exposures were conducted, and their results are shown in Figure 5.

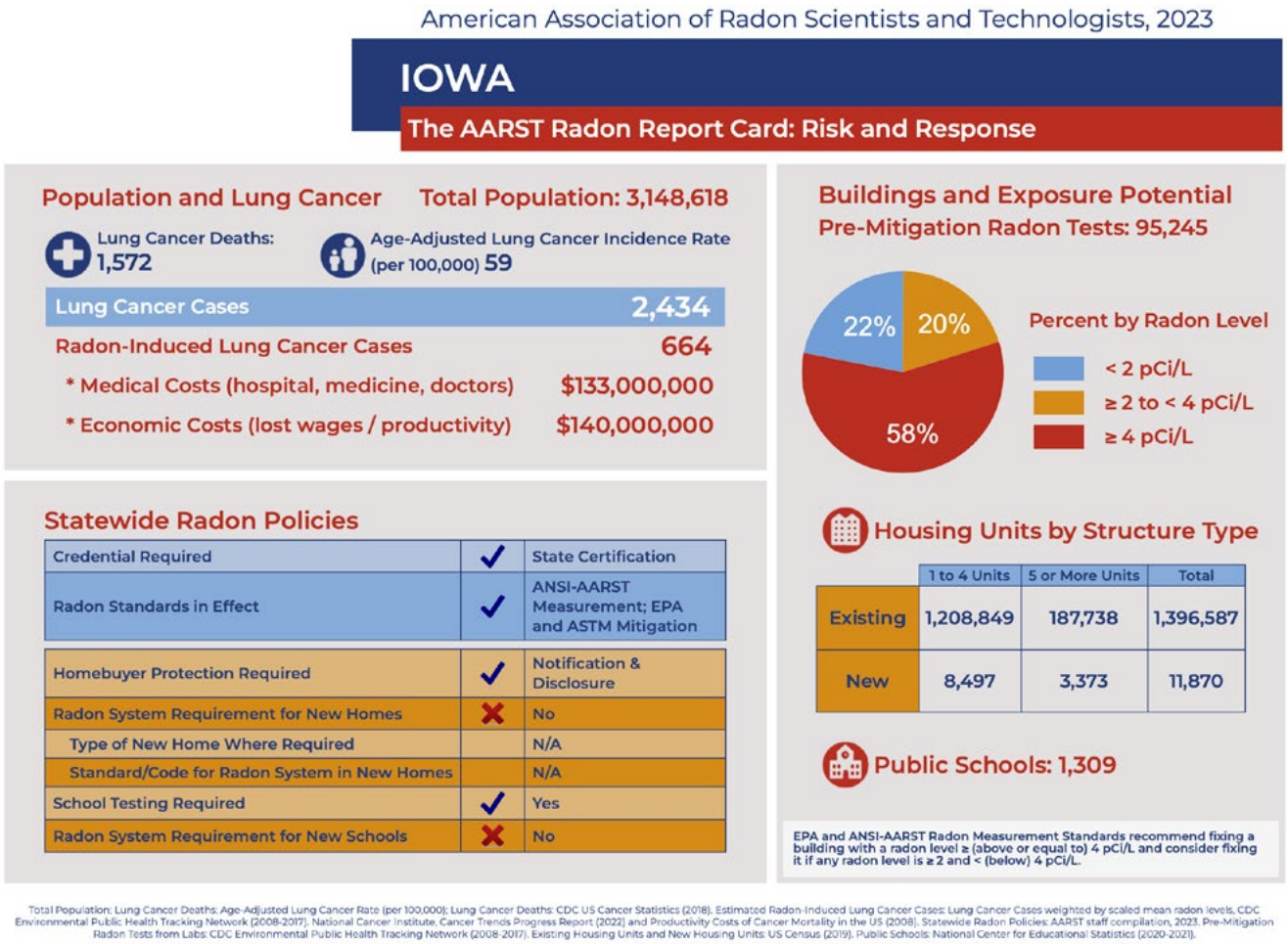
FIGURE 5. INDIVIDUAL CONCENTRATION MEASUREMENTS BY EACH OF THE THREE TRAVELING AGS WITH THE 4TH (LOANED FROM THE US EPA LAS VEGAS) AG IN A VERY LOW CONCENTRATION ENVIRONMENT (DATE AXES OF DIFFERENT SCALES).



As shown in Figure 5, the background measurements showed consistency and exhibited no evidence of background buildup in the three AlphaGUARDs relative to the fourth, in the final very low concentration outdoor environment.

The overall conclusions are clear: radon calibration chamber engineers and operators successfully manage radon emanation rates, air flow and leakage, as well as their own measurement systems, and report calibration concentrations with an impressive degree of accuracy. The participating NRPP secondary calibration facilities in the US can be confident that their systems accurately correspond with those in Canada, Sweden, the United Kingdom, Australia, Spain, and the Czech Republic. These intercomparisons need to be repeated periodically, but for now, American radon measurement providers can be assured that if they use an NRPP listed calibration facility, their results can be used with confidence.

Radon Report Card: Spotlight on the Cost of Cancer and Radon-Induced Lung Cancer



AARST has updated the **Radon Report Card** to include the cost of radon-induced lung cancer (see Iowa's report card above; see all states' repot cards at **https://aarst.org/report-card**). Each state's report card now presents, along with the estimated number of radon-induced lung cancer cases, the total cost for such incidence in the state, based on US National Cancer Institute research, for:

- Medical and prescription drug costs for each radon-induced lung cancer patient - $201,000
- Lost earnings / productivity and cost to society / families for each case - $210,000

The cost of radon-induced lung cancer in all 50 states is $5.9 billion for patient care (medical and prescription drugs) and $6.2 billion in economic costs (lost earnings/productivity and societal/family).

The remainder of this article breaks down the source material behind each figure.

Medical and Prescription Costs – All Cancers

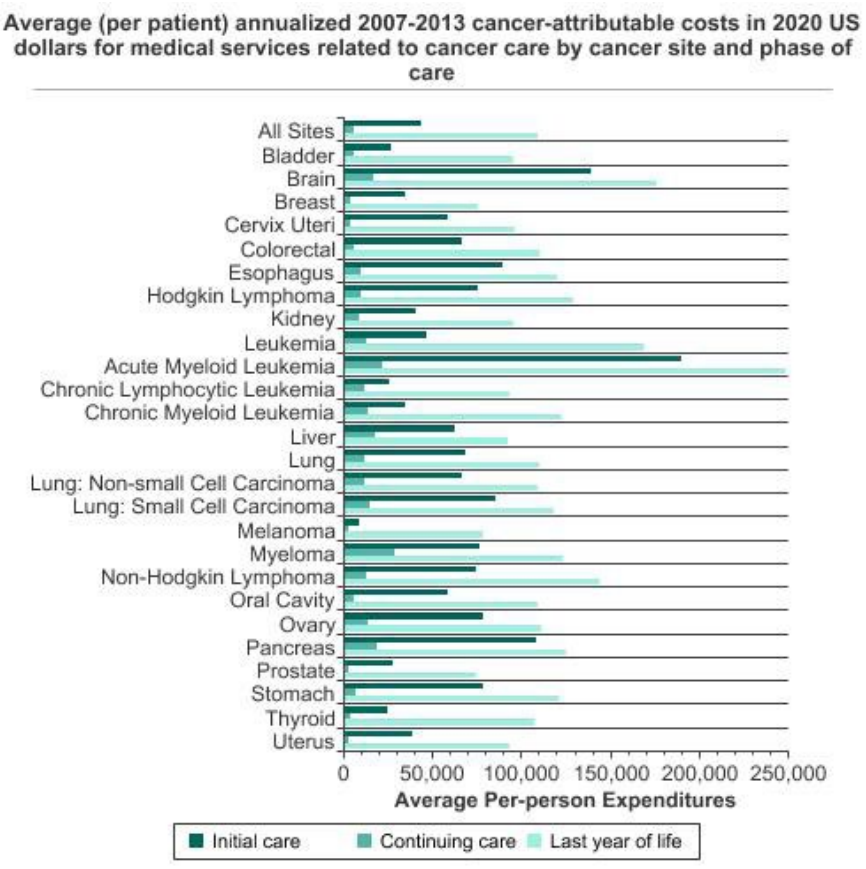
The Cancer Trends Progress Report from the National Cancer Institute is the source of information for medical and prescription costs. The following is excepted from the 2022 report:

The national cancer-attributed medical care costs in the United States are substantial and projected to increase due to population changes alone, according to the Medical Care Costs Associated with Cancer Survivorship in the United States(link is external) article, published in the journal *Cancer Epidemiology, Biomarkers & Prevention* (1)[1]. National costs for cancer care were estimated to be $190.2 billion in 2015. Assuming constant future costs, we project costs to be $208.9 billion in 2020 (2020 U.S. dollars), an increase of 10 percent that is only due to the aging and growth of the U.S. population.[2] These cost estimates include cancer-attributable costs for medical services and oral prescription drugs. National medical services costs were largest for those diagnosed with female breast, colorectal, lung, and prostate cancers and non-Hodgkin lymphomas. National oral prescription drug costs were highest for those diagnosed with female breast, leukemia, lung, and prostate cancers. The differences in national costs reflect prevalence of the disease, treatment patterns, and costs for different types of care for the different cancer sites.

If cancer diagnosis and treatment is divided into phases of care: initial (first year after diagnosis), end-of-life (year before cancer death) and continuing (the time in between), per-patient annualized average costs were highest in the last year of life, followed by the initial and continuing phases. [Figure 1]

Per-patient annualized average cancer-attributable costs were estimated, respectively, from 2007-2013 Medicare claims by subtracting costs between patients with cancer and their matched controls without cancer. Annualized average medical costs were estimated by phases of care: initial (first year after diagnosis), end-of-life (year before cancer death) and continuing (the time in between). Medical services care costs were estimated from Medicare Parts A and B claims and include both Medicare payments and patient responsibilities for all billed medical services, including hospitalizations, outpatient hospital services, physician/supplier services, infusion or injectable drugs, durable medical equipment, hospice care, and home health care. Oral prescription drug costs were estimated from Medicare Part D claims.[3]

FIGURE 1. ATTRIBUTABLE COST OF CANCERS



Source: Medicare Parts A & B claims, 2007-2013
Cost estimates expressed in 2020 dollars using the medical care series of the Consumer Price Index for All Urban Consumers (CPI-U).

1 Mariotto AB, Enewold L, Zhao JX, Zeruto CA, Yabroff KR. Medical Care Costs Associated with Cancer Survivorship in the United States. Cancer Epidemiol Biomarkers Prev. 2020;29(7):1304-12.

2 The estimates in this report come from Mariotto, et al. and are an extension and update of previous estimates. All cost estimates have been adjusted and are reported in 2020 U.S. dollars.

3 https://progressreport.cancer.gov/after/economic_burden

continued on page 20

Medical and Prescription Costs – Lung Cancer

For lung cancer alone, the Cancer Trends Progress Report indicates:

- Nationally, the total cost of medical care for lung cancer in the US in 2020 was $24 billion.[4]
- The per-patient cost to diagnose and treat lung cancer in 2000 was $201,000.[5]

FIGURE 2. COST TO DIAGNOSE AND TREAT LUNG CANCER

	Phases of Care			
	Initial Care	**Continuing Care**	**Last year of Life**	**Total**
Medical Care	$68,293	$12,389	$110,248	$190,930
Prescriptions	$3,644	$2,707	$4,581	$10,931
Total	$71,937	$15,095	$114,829	$201,861

Lost Earnings Due to Cancer Mortality – All Cancers

An often-cited peer-reviewed article on the economic benefit of reducing cancer mortality, "Productivity Costs of Cancer Mortality in the United States: 2000–2020," projected that the national annual productivity cost of cancer mortality in 2020 would be $147.6 billion. This estimate used the "human capital" method to estimate the present value of lost earnings from paid employment by the individual with the cancer diagnosis based on years of life lost. This total does not include lost earnings for caregivers who forgo paid employment to attend to the needs of the cancer patient for housekeeping, meal preparation, transportation, complex medical tasks, medication administration, and assistance with activities of daily living. This study did not measure the value of a life or the probability of living an additional year given survivorship to a particular age. [6]

FIGURE 3. LOST EARNINGS FROM ALL CANCERS BY CANCER SITE

Table 2

Site-specific present value of lifetime earnings (PVLE) among adults 20 and older in 2010

Cancer site	PVLE, $US	Percentage of total cost	Deaths	PVLE/death, $US
Total (all cancers)	142 373 887 175	100.00	657 005	216 701
Lung and bronchus	38 953 476 028	27.36	185 202	210 330
Colon and rectum	12 802 283 437	8.99	67 928	188 468
Female breast	10 878 840 020	7.64	48 776	223 037
Pancreas	7 058 015 604	4.96	35 474	198 963
Leukemia	5 879 620 378	4.13	24 459	240 387
Brain and other nervous system	5 851 151 373	4.11	14 894	392 853
Non-Hodgkin lymphoma	5 755 042 326	4.04	26 230	219 407
Liver and intrahepatic bile duct	4 638 204 280	3.26	16 041	289 147
Ovary	2 944 996 275	2.07	16 700	176 347
Kidney and renal pelvis	3 632 633 377	2.55	14 246	254 993
Head and neck	3 630 391 776	2.55	12 109	299 809
Prostate	3 537 601 571	2.48	37 819	93 540
Stomach	3 453 510 837	2.43	14 774	233 756
Melanoma of the skin	3 298 014 331	2.32	8871	371 775
Urinary bladder	1 976 965 144	1.39	14 794	133 633
Cervix uteri	1 807 797 110	1.27	4666	387 440
Corpus and uterus	1 101 322 676	0.77	7896	139 479
Hodgkin lymphoma	828 691 758	0.58	1523	544 118
Testis	471 622 615	0.33	372	1 267 803
All other sites	23 873 706 259	16.77	104 231	229 046

Lost Earnings Due to Cancer Mortality – Lung Cancer

As can be seen in Figure 3, earnings lost from paid employment by the individual with the cancer diagnosis due to lung and bronchus cancer was $210,330 in 2010 for each individual case. In aggregate, lung and bronchus cancer cost $39 billion in lost wages for all incidences; this constitutes 27% of all wages lost due to cancer mortality.[7]

4 Ibid
5 Ibid
6 Bradley CJ et al 2008.
7 Ibid

Commercial Building Radon Professionals – Tell us about your job!

NRPP is seeking input from radon measurement and mitigation service providers whose work includes, or has included, Multifamily, School, Commercial, and Mixed-Use Buildings.

If you perform this type of work, have performed it in the past, or supervise others performing this work, NRPP would like to hear from you! Please complete our survey to help us identify the essential tasks required to perform commercial mitigation and measurement to reduce radon and protect the health and wellness of the public.

To access the survey, click on the link below that best represents your role. The survey takes under 20 minutes to complete. Your responses will be kept confidential. Survey results will be aggregated and used to create the new Commercial Mitigator and Commercial Measurement certifications' exams designed to assess competent mitigation and measurement practice.

Commercial Measurement Survey

Commercial Mitigation Survey

We thank you in advance for supporting the radon profession.

AARST's New Director of Proficiency

Amy Roedl joined AARST on April 26 as the Director of Proficiency. She has been a part of the credentialing industry for over 20 years and has helped professional credentialing organizations create, maintain, or improve their programs and prepare for and gain accreditation. She has served as a psychometric assessor for the ANSI National Accreditation Board (ANAB), assessing certifying bodies' compliance to ANSI/ISO/IEC 17024, ***General requirements for bodies offering certification of persons*** for accreditation of personnel certification programs. Amy is excited to join AARST and is looking forward to supporting NRPP's current certification programs and developing new credentials for radon and vapor intrusion professionals and others. She said, "As an accredited certification body, NRPP is aligned with standards and best practices in credentialing and embraces fair and impartial practices. It's an honor to be a part of such a program." [Her surname is pronounced RAY-duhl]

AIRTHINGS

Corentium **Pro**

CONTINUOUS RADON MONITOR

The Airthings Corentium Pro is the ultimate radon testing solution for professionals. It's perfect for any job, lightweight, comes with customizable ready-made report templates, and it's IOS & Android compatible.

Don't wait any longer and upgrade to the Corentium Pro today and take your radon testing to the next level!

- ***Bluetooth connectivity***
- ***Rental options available***

PHONE: **1.833.776.2767**

Choosing the "Right" Vapor Barrier

By Dawn Oggier

In the realm of radon and other soil gases, vapor barriers (soil gas retarder membranes) play a vital role in protecting occupants and buildings by impeding movement of moisture vapor. Vapor barriers help maintain the desired indoor environmental conditions such as humidity and improve energy efficiency. Vapor barriers are typically made of plastic films such as polyethylene. There are many on the market to choose from and in this article we are going to wade through what you need to know to choose the "right" vapor barrier: terms such as mil, puncture resistance, tensile strength and permeance and ASTM E1745 Standard(s) to identify the puncture resistance, tensile strength and permeance ratings required to satisfy the ANSI/AARST Standard(s).

First up is "mil." There is a common belief that the thicker the mil, the more robust the barrier. The term "mil" is a unit of measurement equal to "one-thousandth of an inch or .001 inches." When you see a vapor barrier described as, for example, "6 mil," it means the thickness of the plastic film is 0.006 inches. This is the most common allowable thickness in building codes and other standards. Using mil as the only criterion for strength may be short-sighted because it doesn't take into consideration the wide array of 6-mil barriers on the market with varying puncture, tensile and permeance ratings, all of which matter when talking about protecting occupants from radon.

The ASTM E1745 standard has criteria for puncture resistance. Puncture resistance refers to the ability of a material to withstand the penetration of sharp objects or forces without tearing or puncturing. Puncture resistance is typically calculated in grams according to the ASTM D1709 Standard Test Method for Impact Resistance of Plastic Film by the Free-Falling Dart Method. In this test, a dart of a specified weight and shape is dropped from a certain height onto a sample of the vapor barrier. When the dart penetrates the film, the energy required to puncture the barrier is measured. The higher the energy (gram weight) required for puncture, the greater the puncture resistance of the vapor barrier.

ASTM E1745 also specifies requirements for tensile strength, elongation, and tear resistance. These properties determine the material's ability to resist stretching, tearing, or breaking when subjected to mechanical stresses. Tensile strength is typically measured using standardized tests, such as ASTM D882. During the test, a sample of the vapor barrier material is subjected to controlled tension until it reaches its breaking point. The maximum force or stress the material can withstand before breaking is recorded as tensile strength.

ASTM E1745 permeance rating refers to the measure of a material's ability to allow the passage of water vapor or moisture. Permeance is typically expressed in units of perms (permeability). A perm represents the amount of water vapor that can pass through a square foot of material in one hour with a specific vapor pressure difference. In the context of vapor barriers, permeance is an important characteristic as it indicates how resistant the barrier is to the movement of moisture vapor.

The American Society of Testing and Materials developed ASTM E1745 to provide guidelines for selection, installation requirements for continuity, guidelines for sealing joints, overlaps, penetrations, and inspection of vapor barriers. ASTM E1745 specifies performance criteria for plastic water vapor retarders used in contact with soil or granular fill under concrete slabs. The standard outlines the physical properties that vapor barriers must possess, such as strength, flexibility, and resistance to moisture penetration.

After measurement, the vapor barrier is given one of three classifications:
Class A - Maximum of 0.1 perms, minimum 45 lb./in tensile strength, minimum 2200 grams puncture resistance.
Class B - Maximum of 0.1 perms, minimum 30 lb./in tensile strength, minimum 1700 grams puncture resistance.
Class C - Maximum of 0.1 perms, minimum 13.6 lb./in tensile strength, minimum 475 grams puncture resistance.

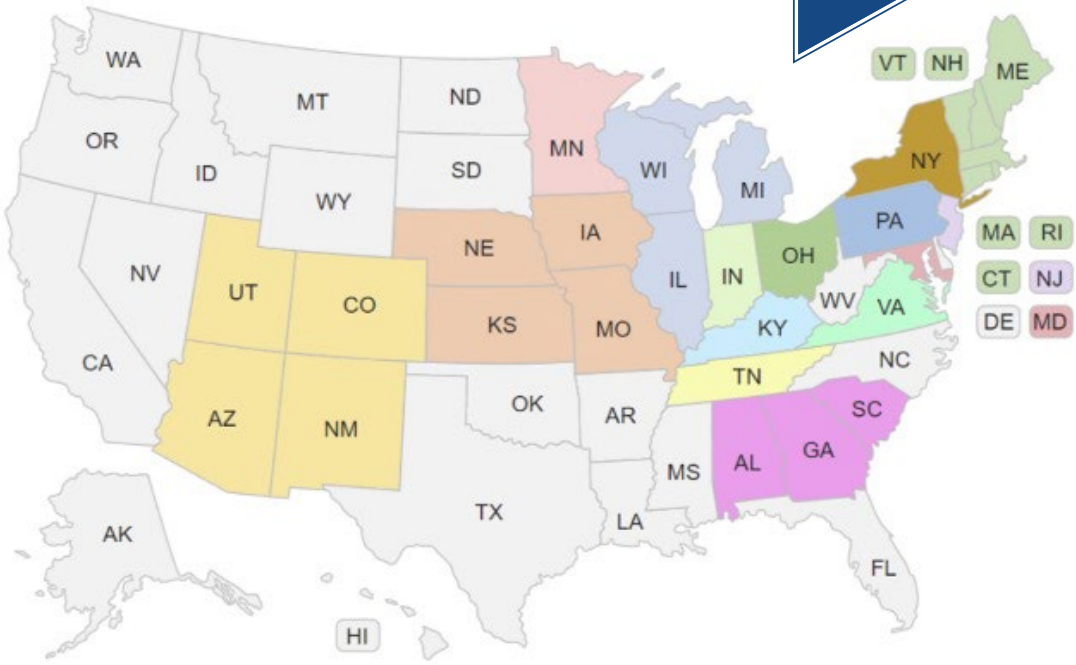
The ASTM E1745 Standard has been incorporated into the ANSI/AARST all Radon / Soil Gas Mitigation Standards.

Radon Professionals understand that choosing the "right" vapor barrier not only complies with the ANSI/AARST Standards but more importantly protects occupants against the dangers of radon gas, saving lives.

Chapter Corner

AARST National Benefit:
Membership in AARST National automatically assigns you to your Chapter for free! (If you are in a state which has a chapter.)

AARST Chapters are growing! A warm welcome to the Indiana, Virginia, and Tennessee Chapters. Visit the Chapter section of the website to find your local Chapter and how to start a chapter in your own state.



Regions (EPA Regions) and Chapters have been busy offering a variety of meetings, educational events, and stakeholder gatherings. AARST features a **Google Radon Events Calendar** that lists current meetings throughout the year. In addition to offering their members educational opportunities, Chapters also produce events to raise funds and awareness. Upcoming are golf events for both OARP and Rocky Mountain Chapters. Most Chapters have their own websites, with their events calendars posted as well as a listing of their members and officers. Many chapters have social media platforms, where connecting and engaging can grow their members' professional profile.

AARST Executive Director Diane Swecker presented in-person at Region 7 in Iowa March 7th and Midwest AARST in Illinois March 10th.

Rocky Mountain Chapter at the EPA Region 8 Meeting in Westminster CO April 21. L to R: Zan Jones, Rachel Peterson, Terry Kerwin, Jill Newton, Bryan Coy.

Maryland Chapter convened its inaugural annual meeting and C.E. event in March 10, with 51 attendees.

Excerpts: AARST's Comments to HUD

Regarding HUD Notice CPD-21-136

"Departmental Policy for Addressing Radon in the Environmental Review Process" submitted electronically 4-14-23 at www.regulations.gov Docket No. FR-6358-N-01

AARST commends HUD for its decision to formally recognize the need for a department-wide radon policy and acknowledge that properties used in HUD programs must be evaluated for radon to ensure that occupant health and safety are not adversely affected. The decision is consistent with the conclusion of the Inspector General Report of April 8, 2021, OIG 2020-OE-0003, HUD Program Offices' Policies and Approaches for Radon (OIG report) that HUD policy must "ensure that residents in HUD-assisted housing receive consistent and sufficient protection from the hazardous health effects of radon exposure."

The notice specifically invites responses to two questions:

What specific guidance would a HUD grantee or interested member of the public need to successfully identify and mitigate radon?

HUD grantees should ensure the use of "current techniques by qualified professionals" as required by 24 CFR 58.5(i)(2)(iv). Contracting with one of the thousands of professionals already credentialed by an EPA-recognized proficiency program such as NRPP or state agency, all of which require adherence to legitimate consensus standards, is one option. Another option is to build in-house capacity by getting staff properly trained and credentialed by an EPA-recognized proficiency program or state agency. HUD grantees should not take the public health risk and incur the potential legal liability of having unqualified persons using substandard methods to identify or mitigate radon.

Interested members of the public - everyone who owns or rents their own home – should be encouraged to get that home tested for radon. Testing is the only way to know if the radon level is above or below the EPA action level of four picocuries per liter of air (4 pCi/l). Radon professionals are available to provide measurement and if needed mitigation. A low- cost do-it-yourself test kit can be used to screen a home, but it is important to have a qualified radon professional perform another test to confirm the result.

What concerns do you have about implementation of the proposed radon policy?

Notice Incomplete. The notice should clarify in the opening paragraphs that existing HUD program policies that support testing and mitigations are not pre-empted by the policy.

Ambiguous Language Regarding Testing. It is suggested in the draft that "As radon is a radioactive substance, HUD or the responsible entity (RE) must "consider it" as part of the site contamination analysis." "Consider," which is used elsewhere in the draft, falls far short of the requirement in the regulation at 24 CFR 58.5(i)(2)(i) and (ii)[4]

> [i]t is HUD's policy that all properties that are being proposed for use in HUD programs **be free of hazardous materials, contamination, toxic chemicals and gases, and radioactive substances,** where a hazard could affect the health and safety of occupants or conflict with the intended utilization of the property.
>
> The environmental review of multifamily housing... **must include the evaluation of** ...other evidence of contamination on or near the site, to ensure that occupants of proposed sites are not adversely affected by any of the hazards listed in paragraph (i)(2)(i) of this section.

Current Methods and Qualified Professionals Are Required by HUD Regulation. HUD programs are subject to the provisions of 24 CFR 50 or 24 CFR Part 58 regulations which are not ambiguous about requiring action. Indeed, the HUD environmental standards at 24 CFR 58.5(i)(2)(iv) require the use of both current techniques and qualified professionals for testing:

"(iv) The responsible entity shall use current techniques by qualified professionals to undertake investigations determined necessary."

Adherence to Standards Should Be Required, Not Just A Best Practice. It is acknowledged that the policy recommends the American National Standards Institute/American Association of Radon Scientists and Technologists (ANSI/AARST) radon testing standards for single- and multi- family buildings, schools, and large buildings. This section of the policy neglects to make clear that the laws and or regulations in 20 states, covering 48% of the US population, require that radon work be performed in compliance with established standards.

continued on page 26

HUD's department wide policy should be consistent with HUD's multifamily lending programs and require the ANSI/AARST standards exclusively. They are the only US radon standards that are subject to active continuous maintenance and accountable for compliance with ANSI procedures for openness, lack of dominance, balance, coordination and harmonization, notification of standards development, consideration of views and objections, consensus votes and appeals. Most regulatory states, both EPA-recognized national proficiency programs, the International Code Council's green building code, and other bodies require adherence to the EPA-recommended voluntary consensus standards.

The National Technology and Transfer of Information Act (NTTIA) at 15 USC 272 requires that federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies. HUD has the capacity and duty to comply with this federal policy on consensus standards. HUD has not sought or obtained a waiver from the Office of Management and Budget that would permit HUD to develop or adopt substandard techniques or methods of measuring (or mitigating radon). OMB would be unlikely to grant that waiver given the existence of standards that meet the NTTIA and are recommended by the leading federal agency tasked with oversight of radon and related technology.

Qualified Professionals. The Indoor Radon Abatement Act (IRAA), which is a significant federal statute relevant to radon, directed EPA at 15 USC 2665(a)(2) to operate a voluntary proficiency program:

"A voluntary proficiency program for rating the effectiveness of radon measurement devices and methods, the effectiveness of radon mitigation devices and methods, and the effectiveness of private firms and individuals offering radon-related architecture, design, engineering, measurement, and mitigation services"

After implementing the program, EPA ceased operating it, and in 2001 recognized two private radon certification programs, the National Radon Proficiency Program (NRPP) and the National Radon Safety Board (NRSB) to carry out nationwide proficiency functions. EPA also recognizes state credentialing programs. Combined, these programs implement Congressional intent regarding indoor radon and deliver the only nationwide framework for qualifications to perform radon services. EPA has recently issued a notice at 88 FR 17215 to describe its intended criteria to recognize private and state radon proficiency programs in the future.

HUD policy should not sidestep this infrastructure, but instead should unequivocally and consistently require use of "qualified professionals" i.e., persons with state radon licenses or certification and persons certified by the NRPP and/or NRSB. Low-income families should not be subjected to incompetent work, like testing for radon improperly and missing high radon levels or digging around in a basement to release high levels of radon into a home. HUD should insist that programs deploy or use personnel who have the relevant education, training, and experience to conduct radon measurement or mitigation. AARST and others would be pleased to assist HUD in providing housing authorities, local governments, and other responsible parties with technical assistance regarding how to create and maintain in-house capacity for qualified professionals.

Alternative Testing Strategies. It is unclear what would be the meaning of "Where radon testing is not feasible." These strategies are not protective of public health and fail to meet the requirement of 24 CFR 58.5(i)(2)(iv) to use current techniques by qualified professionals to undertake investigations.

This section of the policy neglects to make clear that the laws and or regulations in 20 states, covering 48% of the US population, require that radon work be performed in compliance with established standards. In those jurisdictions, what HUD allows as alternative strategies will conflict with applicable law.

Do-it-yourself Radon Test Kits. This strategy is not protective of public health and fails to meet the

requirement of 24 CFR 58.5(i)(2)(iv) to use current techniques by qualified professionals to undertake investigations.

A few of the more obvious cautionary notes are:

- Subsidizing do-it-yourself testing limited to tenants and owner-occupants is a good first step for their own benefit. It should not be tied to refinancing, real estate transactions, or federal program determination of need for mitigation.
- If allowed in multifamily properties, the use of test kits by owners must test 100% of the ground contact units
- Suggesting that state- and SIRG-funded test kits be used to test residence is not viable: kits are for occupants' self-protective action.
- An occupant self-test cannot be used to exempt the unit from program action
- Recommending kit purchase sources is inappropriate for a policy
- Citizen's guide contains insufficient guidance for third party testing – delete
- Legitimate third-party test devices are approved by proficiency program

Testing in Remote Areas. The need for greater capacity that exists in few areas of the country will be met as demand grows. It is important that HUD support programs and agencies in such areas with relevant, timely, and health-protective guidance consistent with the mandate to use current techniques and qualified professionals. Local government staff, and others involved in HUD programs, can fulfill capacity gaps in measurement (and mitigation) by getting staff trained and credentialed through a private proficiency program and, as applicable, state credentialing program. They can also use the state, NRPP and NRSB listings to identify qualified providers. There are radon professionals who will drive more than an hour to meet a need.

For HUD programs testing properties to determine the need for mitigation, consumer monitoring devices are not a substitute for devices that have been approved by the EPA-recognized certification programs.

The applicable regulation at 24 CFR 58.1(d) allows the Assistant Secretary for Community Planning and Development to, for good cause and with appropriate conditions, approve waivers and exceptions. Responsible parties and programs that can document inability to comply should be able to submit a request for a waiver or exception. HUD should establish criteria for granting a variance so that the building does get tested and public health is not compromised. Such exceptions should be rooted in specific types of circumstances proposed by the requestor, such as testing will be done using a specific equipment/person to do the work.

Scientific Data Review. Testing is the only way to determine if a building has a high radon level: scientific data cannot be used to determine "whether the project site is located in an area identified as having a high potential for high radon levels." This criterion is flawed, since any risk potential is the only legitimate threshold to define whether an area is impacted by high radon levels.

The mischaracterization of radon-induced lung cancer risk is a longstanding health equity problem. The historic EPA radon zone maps classified 3,000 plus counties as having high, medium, or low risk, based on 5,694 radon tests and some geologic and ambient air data. For thirty years, the resultant EPA maps have effectively steered consumer testing decisions and public resources toward the many places labeled high risk and away from Texas, California, and numerous southern states deemed low risk. The EPA Map's mean radon levels mask measurements above the action level. Millions of additional measurements have occurred since this point-in-time study.

Geological studies should not be used to define whether an area is impacted by high radon levels. While certain geologic formations increase the potential for greater levels of uranium, radon has been found in buildings in many areas that lack these formations.

The most thorough EPHT test data results above the action level and maximum radon level can be useful indicators of an area's risk potential. Mean and median radon levels should not be used to define whether an area is impacted by high radon levels since they mask measurements above the action level.

Mitigation. The mitigation plan must be developed under the supervision of a certified or licensed radon mitigation professional. The mitigation plan, when implemented, shall be implemented by or under the supervision of a certified or licensed radon mitigation professional in accordance with the applicable ANSI/AARST mitigation standard. Post-mitigation clearance must indicate that the radon level is below 4 picocuries per liter.

> **"HUD must ensure that all HUD programs test for and mitigate radon consistent with industry standards and insist that the disparate treatment of HUD program recipients ends."**

Frequency of High Radon Levels and Mitigation Costs

HUD program staff and partners of HUD have expressed concerns about the frequency that radon will have to be mitigated and the incremental cost of testing and mitigation. AARST members are informed of these same concerns every day from customers in the field, on the phone, and by email. We offer the data below to help HUD partners and others quantify risk and potential costs.

Frequency of High Radon Levels - HUD FHA Multifamily Properties

HUD's Office of Environment and Energy provided the following results from radon testing reports, which indicate that approximately half of the properties tested July 2017 through April 2022 contained at least one building with radon levels greater than or equal to the EPA action level.

Time Frame	Ground Contact Testing Required	Properties Tested	Properties with Radon > 4.0 pCi/L	% Properties with Radon > 4.0 pCi/L
7/7/17-3/17/21[1]	25%	810	393	48%
3/18/21-4/30/22[2]	25% or 100%[3]	204	103	50%

Notes

1 Does not include Zone 3 properties – the 2016 MAP Guide excluded testing of these properties.
2 Includes Zone 3 properties – the 2020 MAP Guide requires testing of these properties.
3 A number of loans included in the 3/18/2021-4/30/2022 time frame were processed under the 2016 MAP Guide due to the queue.

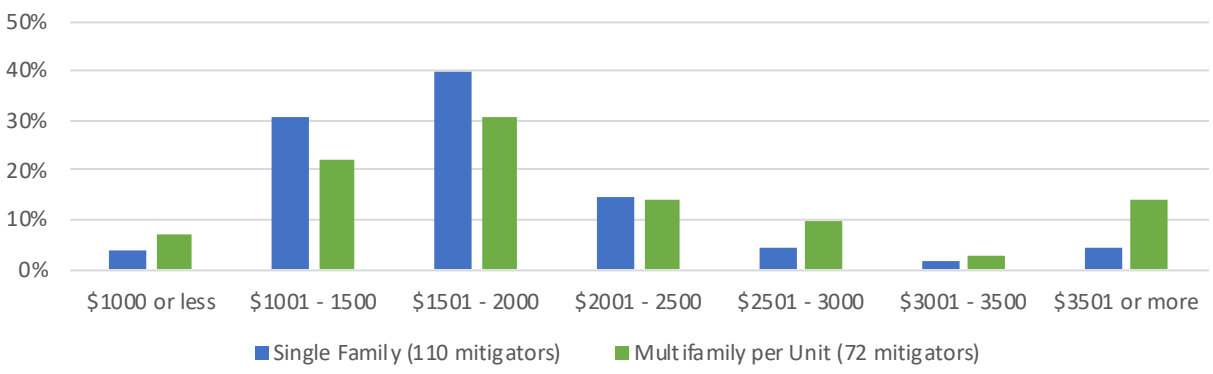
Frequency of High Radon Levels - CDC Environmental Public Health Tracking

Analysis of the pre-mitigation test results available at https://ephtracking.cdc.gov/DataExplorer/ indicates that more than 1/3 of single-family homes contained radon levels greater than or equal to the EPA 4.0 pCi/L action level.

Radon Level	# Test Results	%Test Results
> 4.0	718,943	35.7%
> 2.0 and < 4.0	497,754	24.7%
< 2.0	796,847	39.6%
Total	2,013,544	100.0%

Mitigation Cost Range - AARST Industry Survey (2022)

AARST asked radon professionals about costs in September 2022. The below chart presents mitigators' response to the question: "What is the typical cost of mitigation in 2022?"



THAT'S RIGHT, OUR FANS SUCK...

A LOT OF AIR, MOISTURE AND RADON GAS.

Enter the realm of radon mitigation fans, the unrelenting powerhouses that redefine the very concept of air suction. Engineered to perfection, these fans have emerged as the go-to solution for anyone seeking unparalleled control over their indoor environment. With sheer force and unyielding determination, inline fans effortlessly tackle the challenges posed by radon gas, excess moisture, and stagnant air.

Explore our product line at fantech.net/Rn

fantech®
a systemair company

The Top 3 Radon Insurance Questions Asked by Radon Contractors

by Mike Zitek, Ragnar Group

The Ragnar Group receives calls every week from radon contractors across the nation who are looking for advice on radon insurance and among those calls are several recurring questions. As a professional working with radon insurance every day, I want to take the time to share the three most commonly asked questions and my answers to help share valuable insights about radon contractor insurance.

1. Why Do I Need General Liability, Pollution Liability and Professional Errors & Omissions Liability?

Upon entering a home or business you are exposed to claims. The question is, how do I know which coverage would pertain? Is it a general, pollution or professional liability claim? We get calls from radon contractors who want only General Liability and believe they need nothing else. When a claim is filed, it will be specific, laying out the damages and the demand. Maybe it will fall under the General Liability, but what if the claim comes in as you designed the system wrong, back drafting? What if you told your client that you would get their radon levels under 2.0 picocuries and the system you installed originally brought the home down from 15 picocuries. Six months later, a claim arises indicating the homeowner contracted lung cancer and the latest radon test shows a level of not 2, but 30 picocuries. Would this be a General Liability claim or is it Pollution or Professional? What if you installed a low voltage system, or you did the electrical work yourself and the home burned down? Was it a product defect or an installation error? You provided your client a written bid indicating you were professional with all the designations to prove you knew and understood how to completely remove radon. The reason we have all three coverages is we don't know with 100% accuracy how a claim will be filed, so ensuring to protect yourself and your business by having all three coverages is important.

2. My Business Is Radon Measurement. Why Am I Paying The Same Premium As A Mitigator?

This answer is not an easy one. It has to do with making money. Insurance companies are financial institutions. They collect premiums, invest, and pay out claims. They are focused on their owners, the shareholders. Every quarter, they need to give their shareholders a Return on Investment (ROI). To do so, they offer insurance products to the masses so they can collect the most in premiums. If they determine the amount of premium is sufficient, they will invest time and talent in those industries. When they do, they will come up with insurance products and rates. The radon industry is a new and not large market. Getting insurance companies to break down separate products and rates between radon mitigation and testing is far from happening.

3. I Just Won A Bid From The Local State/County/Housing Authority And Need A Certificate Of Insurance To Comply With The Insurance Requirement. How Do I Comply With These Requirements?

This question is a growing question for radon contractors. Radon contractors need to be aware that there may be an additional premium associated with the bids they are submitting. It would be nice if General Contractors (GC's) were aware of what they are requesting. The GC's insurance requirements are usually for those subcontractors whose work is structural in nature, not a non-structural subcontractor like a radon mitigator. These GC's bid specs may want high primary and umbrella limits, Commercial Auto and Workers Compensation policies, maybe Cyber. They want specific General Liability endorsements, and 30-Day cancellation notice. When the radon contractor contacts us with the GC's insurance requirements, we have that tough conversation about the additional premiums to comply. The additional premium could be more than the job itself.

I hope these top three questions answered help you understand radon insurance a little better. Helping radon contractors make the right decision for their insurance coverage is vital.

LOWE'S MVPs
PRO REWARDS & PARTNERSHIP PROGRAM

NEW in 2022!

AARST MEMBERS ONLY EXCLUSIVE

COUNT ON US TO HELP YOU SAVE TIME AND MONEY.

Check out these benefits just for AARST Members

EVERYDAY SAVINGS
Get bulk savings when you buy contractor packs or place large orders and save every day. Receive discounts up to 10% on certain products when shopping on Lowes.com

CONVENIENT ORDERING AND PICK UP
Stay on time and get everything you need without having to leave the jobsite by ordering online, or by phone or fax. Plus, we have dedicated Pro loaders, pro parking and curbside pickup.

DEDICATED PRO ASSOCIATES
Pro associates help expedite your order, source materials, and provide you with solutions to get you back to the job.

FIND WHAT YOU NEED.
Get the supplies and materials you need with thousands of in-stock products and job-lot quantities.

Here's your deal!

In Store:

5% off all in store LAR/LCA transaction (Lowe's Account through Synchrony).
$20 dollar delivery fee for all orders through your Lowe's LAR/LCA account.
Pro Deck – access to Lowe's Value Savings Programs (VSP), which provides quotes on orders $1,500.00 or more.
Locations – LAR/LCA and VSP programs can be used at any of our over 1,700 stores nationwide.

Online:

5-10% tier discount on all orders placed on our Lowe's For Pros platform at www.lowes.com.
Note: Tier discount program can be used with any registered tender (including non-Lowe's LAR/LCA accounts).
Enjoy $20 dollar delivery fees for all Lowe's For Pros orders.
Ability to select either "in-store" or "delivery" options.
You can select the store you want to shop at online.

https://aarst.org/memberships/

The National Radon Action Plan 2021–2025

TABLE 1. NRAP | 2021–25: STRATEGIES FOR EXPANDING PROTECTIONS FOR *ALL BUILDINGS*

GOAL AREA	NRAP STRATEGIES, 2021–25	OUTCOMES WE SEEK
Build In Radon Risk Reduction	1.1 Embed comprehensive radon notification and health risk warning statements, and radon test result disclosure, in real estate sales and rental transactions.	Prospective buyers, tenants and loan borrowers receive and acknowledge receipt of information that equips them to take self-protective actions, including obtaining radon testing and mitigation.
	1.2 Work with government, quasi-governmental and private sector lending entities to adopt radon testing and mitigation requirements.	Lending entities require radon testing and mitigation in all residential, educational and commercial buildings.
	1.3 Promote radon control requirements for new construction within building codes and standards.	State and local building codes require that buildings be built to allow for radon control.
	1.4 Seek local, state and federal policies and codes that require all existing buildings to be tested for radon and mitigated as needed.	Building owners and managers, employers, and school districts ensure that the radon levels in their buildings are protective of occupant health.
Support Radon Risk Reduction	2.1 Increase access to government-backed and other sources of housing financing for property owners of low-income housing to cover radon testing and mitigation.	Property owners are able to obtain financing for radon testing and mitigation in low-income housing from new and existing funding sources.
	2.2 Support establishment of tax incentives to cover radon mitigation costs.	Tax incentives exist that increase voluntary radon testing and mitigation.
	2.3 Increase radon testing and as-needed mitigation by local, state and tribal programs that conduct physical upgrades of existing housing.	Radon testing and mitigation is routinely addressed by housing rehabilitation, home repair, energy upgrade, weatherization and similar programs.
	2.4 Support state cancer control programs to include radon indicators and interventions.	All state cancer control programs include radon risk-reduction interventions in their primary prevention strategies for lung cancer.
Build Capacity to Test and Mitigate Using Professional Radon Services	3.1 Expand the scope and usability of radon testing data in the National Environmental Public Health Tracking Network by increasing the number of participating states and laboratories.	Decision-makers nationwide have access to a robust national data set for use in characterizing radon exposures, quantifying risk reduction actions and informing a research agenda.
	3.2 Continue to promote adherence to consensus standards for testing, mitigating and measurement device accuracy.	Quality professional standards to support the effectiveness of radon services are widely recognized, disseminated and adopted.
	3.3 Support issuance and implementation of a federal framework to align private and state radon credentialing programs.	A clear standard of quality for assessing radon service provider competencies and skills is widely recognized and adopted, and credentialing programs are more consistent in standards and practices used to license and certify service providers.
	3.4 Promote the adoption of radon credentialing by states that do not currently regulate radon service providers.	Radon testing, mitigation and laboratory services nationwide are provided by credentialed professionals.
	3.5 Expand the availability of credentialed radon practitioners through the training and certification of qualified professionals.	Credentialed radon professionals are available nationwide to meet increasing demand.
Increase Awareness of Radon Risk and Control Strategies	4.1 Promote integration of radon into coordinated messaging to decision-makers about health risks in housing, schools and workplaces.	Decision-makers with responsibility for occupant health in housing, schools and workplaces include radon risk reduction in their policies and practices.
	4.2 Promote radon awareness through nontraditional radon stakeholders—including clinical, health equity, social service and faith-based organizations—through consistent outreach using targeted materials.	Nontraditional radon stakeholders educate and equip their constituents to take radon risk-reduction action.
	4.3 Tailor effective radon messaging to underserved racial, ethnic and low-income populations.	Culturally competent information about radon risk reduction is available to underserved racial, ethnic and low-income groups.