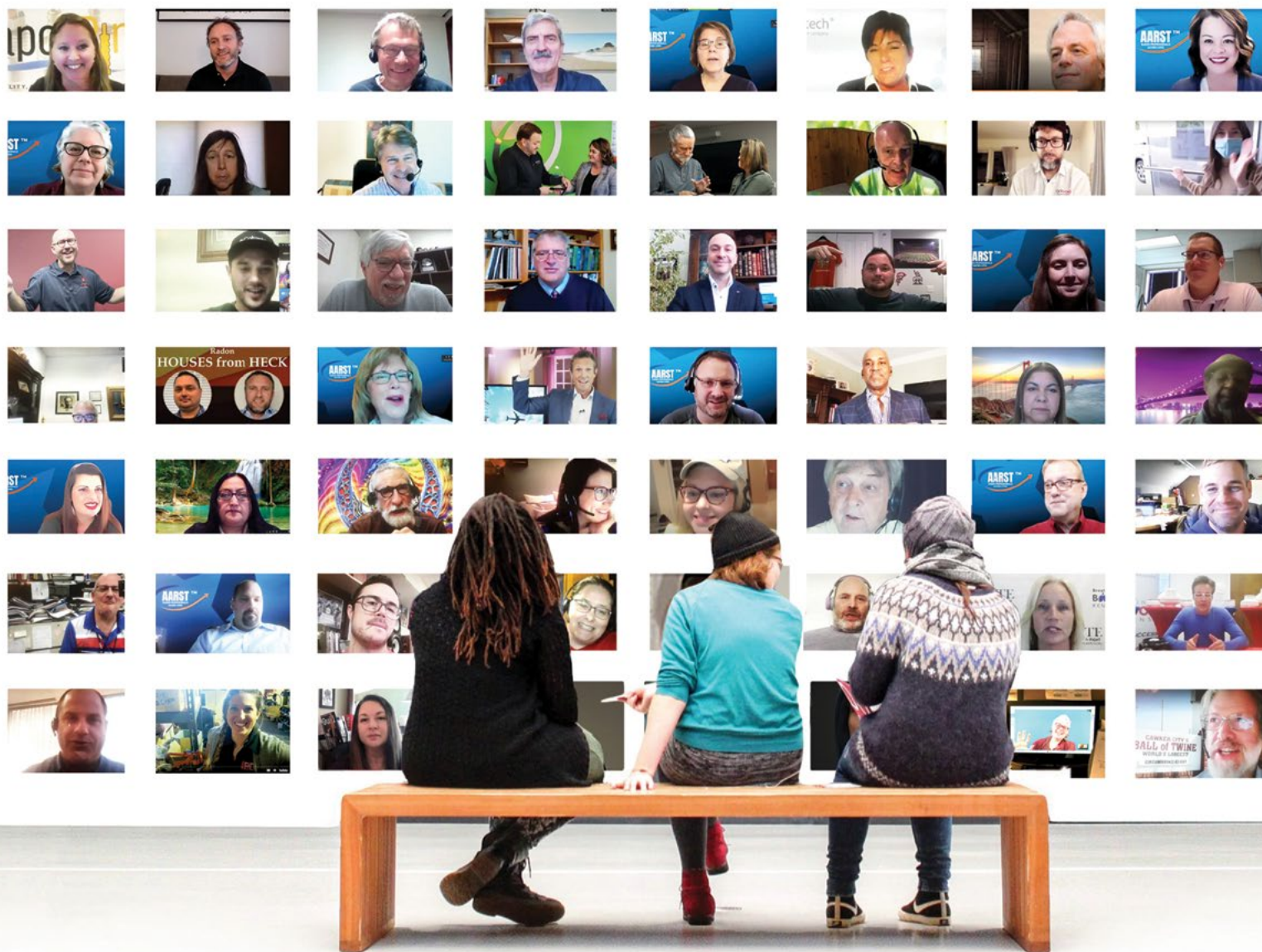


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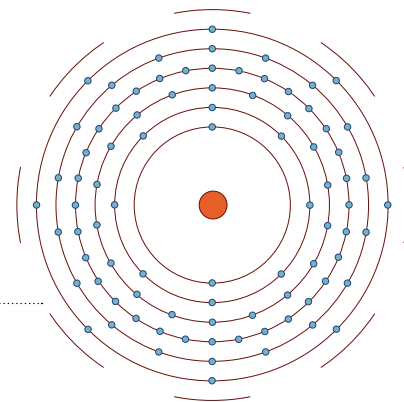
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AARST™, the American Association of Radon Scientists and Technologists, is a nonprofit, professional organization dedicated to the highest standard of excellence and ethical performance of radon measurement, mitigation, and transfer of information for the benefit of members, consumers, and the public at large. AARST's leadership is democratically elected by the members.

AARST represents your voice as we meet the wide range of challenges facing radon professionals and the community. Your membership and participation provide you a voice in the changes to come, and allows you to gain updated information, discover new techniques, learn about new problems before they occur, and hone your professional skills.

A New Year Brings an Updated Strategic Plan for Our Association

Kyle Hoylman, AARST President



The year 2020 was one of great challenges. A global pandemic, civil unrest, and deeply divided political ideologies greatly impacted each of us. I'm sure you're as anxious as I am to put the past year in the rearview mirror and focus on the future. So, just what does the future hold for our industry, our association, and our members?

In November of last year, a new president and vice president, along with five national directors, were elected to join our existing officers, directors, and chapter presidents in updating our strategic plan. As your new President, I am excited to share an overview and several key points of the plan, which highlights one core support structure upholding four strategic pillars:

Chapters and Membership (support structure)

- Work with existing chapters to develop and implement a Chapter Council for building and maintaining resilient, sustainable chapters.
- Develop leadership in targeted states for onboarding new chapters.
- Broaden our membership base to include stakeholders seeking a certification program and consensus standards for chemical vapor intrusion.

Advocacy (pillar)

- Utilize our affiliation with the AARST Foundation to coordinate with our non-profit partners, chapters, and members to deliver targeted outreach and awareness messaging that is adaptive to federal, state, and local needs and opportunities.

Policy (pillar)

- Develop a policy strategy that includes model language for key federal and state initiatives.
- Develop an annual 'report card' that tracks state policy adoption.
- Work with chapters and non-profit partners to develop and implement state-specific policy initiatives, to include regulation through certification and compliance enforcement.
- Focus on expanding radon policy within federal and state laws and regulations, lending policies, and building codes to include all building and occupancy types.

Proficiency (pillar)

- Work with the Certification Council to refine its operations, obtain ISO certification, implement tiered certifications for measurement and mitigation, implement certification for mitigation system compliance inspectors, develop our certification program for chemical vapor intrusion, and restructure our enhanced certificate program.

Standards (pillar)

- Work with the Standards Consortium to refine its operations, continue to harmonize and maintain existing measurement and mitigation standards, continue to incorporate chemical vapor intrusion within our existing standards, and complete the Action Level SAC project.

Our strategic plan is ambitious, as it should be, and its execution will require much work. I encourage you, as a member of our association, to join our efforts by becoming active in your chapter or volunteering to join one of our national committees. The year 2021 promises to be one of tremendous growth and opportunity, but only if we all work together. I, for one, am ready to roll up my sleeves and get started – join me in making this year one of our best.

During 2020, the ARPC delivered:

- Continued funding for State Indoor Radon Grants
- Continued funding for the EPA Indoor Air and Radon program
- Strengthening of national multifamily loan radon policies
- Advocacy for equitable HUD radon policies
- Technical support for advancing state certification requirements

Thank you



Fred and ReveAnn
Ellrott



Gloria Linnertz



Chad Robinson

David Daniels



Join the ARPC in 2021. Contribution levels are: \$5000+ = Standard Bearer, \$2500-4999 = Elite, \$1000-2499 = Legionnaire, \$500-999 = Champion, \$250-499 = Vanguard. Find out more at aarst.org/arpc/.

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Device-Specific Training

Christina Johnson, NRPP Credentialing Coordinator

Are you an NRPP measurement certified professional using analytical testing devices? Depending on the type of device you are operating, you may be able to skip the device performance test for your certification renewal!

If your device manufacturer has created an NRPP-approved device-specific training course geared toward your analytical testing device, then you are eligible to take this course in lieu of sending your device to a test chamber for a device performance test. The current 2-hour courses are available in an online web-based format; the two hours can be used toward your renewal C.E.s as well.

PLEASE NOTE: This option is ONLY for those renewing their NRPP measurement certification with the same device registered in their NRPP certification portal. If you are applying for new certification or renewing and adding a new type of analytical device to your list, then you are still required to complete an initial device performance test for each device model.

NRPP is working with the remaining device manufacturers to add more training courses to the list. To learn more about device-specific training or device performance testing, please visit the NRPP website here: <https://nrpp.info/devices/performance-testing-calibrations/>.

Please see the current list of NRPP-approved device-specific training courses below to see if your device is listed. To enroll, please contact the device manufacturer.

AIRTHINGS CORENTIUM PRO DEVICE SPECIFIC TRAINING COURSE

Course ID#: **CORPRO-800**

Applicable to: **Measurement; 2 C.E. Credits**

This online course offers sufficient information on how to operate Corentium Pro for radon measurements. It includes info on how to use the software, as well as a walkthrough of the QA Plan specific to Corentium Pro.

Website: <https://www.corentiumpro.com/course/>.

Provided by Airthings, Geneva, IL,
Phone: (855) 561-4483, Email: procertif@airthings.com

RADSTAR 300: RADONAWAY DEVICE SPECIFIC TRAINING

Course ID#: **RS300-800**

Applicable to: **Measurement; 2 C.E. Credits**

Show your proficiency in operating the RadStar 300. This free online course guides the user/owner through operations, procedures, and troubleshooting of the RadStar 300 when performing Radon Measurements. Includes downloading, generating, and analyzing reports for your clients. It also includes requirements to generate and upload a genuine 48-hour test with quiz questions and pass an additional unique quiz for DPT. Call Spruce at 800-355-0901 to register for this course.

Website: <https://sprucetraining.talentlms.com>.

Provided by RadonAway, Ward Hill, MA,
Phone: (800) 355-0901, Email: training@spruce.com

RADSTAR 800: RADONAWAY DEVICE SPECIFIC TRAINING

Course ID#: **RS800-801**

Applicable to: **Measurement; 2 C.E. Credits**

Show your proficiency in operating the RadStar 800. This free online course guides the user/owner through operations, procedures, and troubleshooting of the RadStar 800 when performing Radon Measurement. Includes downloading, generating, and analyzing reports for your client. It also includes requirements to generate and upload a genuine 48-hour test with quiz questions and pass an additional unique quiz for DPT. Call Spruce at 800-355-0901 to register for this course.

Website: <https://sprucetraining.talentlms.com>.

Provided by RadonAway, Ward Hill, MA,
Phone: (978) 521-0901, Email: training@spruce.com

SUNRADON DEVICE SPECIFIC TRAINING COURSE: CRM:1027, 1028, 1028-XP, 1030

Course ID#: **SUNNUC-800**

Applicable to: **Measurement; 2 C.E. Credits**

This online 2-hour comprehensive course includes training on SunRADON Continuous Radon Monitors (1027, 1028, 1028-XP, 1030) and Radon Detection Software. Those who complete this training and quiz following the course, are eligible for 2 continuing education (CE) credits and will receive a Certificate of Completion.

Website: <https://sunradon.com/pages/continuing-education-certification-training-schedule>.

Provided by SunRADON, Melbourne,
Phone: (321) 255-7011, Email: support@sunradon.com



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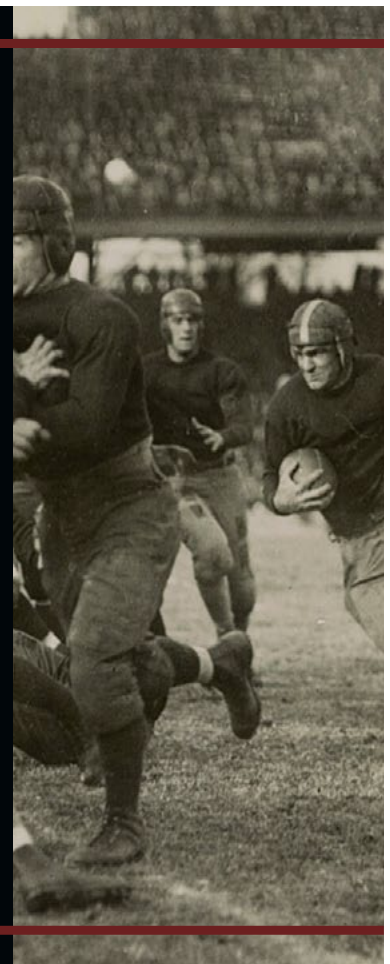


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Are You Experiencing A 2021 Hawthorne Effect?

Robin Royals, President, RC Royals & Associates, LLC

Are you tired of fixing the same problems? Just when you claim victory, the identical problem recurs. If so, maybe you are

experiencing the 2021 Hawthorne Effect.

The Hawthorne Effect¹ is the inclination of people who are the subjects of an experimental study to change or improve their behavior only because it is being studied. In other words, people only improve their performance if they are being watched. The effect gets its name from a famous industrial history experiment at the Western Electric factory in the Hawthorne suburb of Chicago in the late 1920's and early 1930's.

“ Don't be fooled by what appears to be operational improvements when you are unsure what caused the positive results. ”

Don, a small business owner, was extremely frustrated with the collections of the outstanding accounts receivable. He decided to hold a weekly meeting with the collection team to gauge their progress towards improving the collection results. Don was convinced he would achieve the desired results by focusing and applying pressure to the employees. He assumed he had a people problem. After two months of weekly meetings, he saw dramatic improvement in collections. He thought he was being a good manager. What he failed to understand was the real reason behind the improved collection results.

His employees did not want to disappoint the boss, so they neglected all of their other duties and focused solely on collections. The collection process, including all of the steps from the daily collection call list to the final resolution of the past due balance with each customer, did not change. What changed was the amount of time the employees spent working on the process.

Satisfied with the improvement in his collection effort, Don decided to stop the weekly meetings and go back to business as usual. Within two weeks, the collection performance returned to its old levels.

Don't Trust the Results Without These Three Components:

1. The Problem

Don mistakenly thought he understood the collection problem. He felt by bringing the problem in focus and challenging his employees; the outcome would improve. Don was no different from most managers- they can't see a potential process issue because the easiest solution is to blame it on people. Without clearly understanding how a process works, it is impossible to improve. Don did get a short-term gain, but a longer-term solution required a more in-depth process understanding.

2. The Needed Change

By mapping out the process and measuring current performance levels he could determine if his employees' performances were adequate and/or if the process was working better.

3. The Desired Result

Don needed to calculate the process's capabilities (the standard) and how each employee performed against that standard. This is not to say that his baseline was an acceptable standard, but that desired results cannot be achieved without a good starting point.

Think about a weight loss program. The first step in the plan is to weigh the person, but the program's real underlying success is understanding what is responsible for the weight issue versus just looking at the end result. The same is true in our example with Don.

Without these three components of a project, it is difficult to determine if you had a successful change or if resources were just shifted from one area to another. If you can't determine your process and what actions were taken to achieve your results, you may be experiencing a 2021 version of the Hawthorne Effect.



“What if we don't change at all ... and something magical just happens?”

Cartoon Resource/Shutterstock.com

1. Investopedia, Will Kenton, Updated 11/23/20.

New Technology Provides an Easier, More Accurate Way to Optimize Radon Mitigation Systems

Hamid Massali, Radon Application Engineer, Fantech

The persistent complexity of diagnostic methods discourages many mitigators from adhering to recommended protocols. Instead, many radon mitigators rely on the “poke and hope” method of sub-slab depressurization without performing pressure field extension diagnostic testing. But new technologies could be the answer, providing an easier, accurate way to optimize fan and pipe size selection for more reliable and efficient outcomes.

The Diagnostics Challenge

The end goal of most radon mitigation is straightforward—create a negative pressure in the soil beneath the slab. If negative pressure under the slab is not generated or if too much is generated, the mitigator will have to return to the jobsite to install a larger fan or the homeowner will be saddled with a decade or more of unnecessarily high energy costs and noise levels due to an oversized fan.

“A lot of mitigators don’t think about the energy penalty associated with installing an oversized fan—and the fact that the fan can actually be pulling conditioned air out of the house,” says Chad Robinson, a certified radon mitigation and measurement specialist and Lead Radon Mitigation Trainer for Kansas State Engineering Extension.

To avoid this issue, the extent of sub-slab pressure field can be determined easily by good pressure field extension testing. In the past, however, the process was deemed too complicated and time consuming, requiring a depth of understanding and a certain amount of engineering expertise, as well as an assortment of tools mitigators often did not have.

A New Approach to PFE Diagnostics

New tools are emerging to ease the process. For example, field diagnostics using an online application facilitates fan selection and pipe sizing by accurately determining sub-slab pressure characteristics and calculating PVC pipe pressure drop (loss). The testing can easily be part of an actual radon mitigation diagnostic and performed before a system is installed.

Pressure drop across a fan with known pressure - flow rate performance for all fan speeds can be used to determine sub-slab pressure characteristic. Fan speed

can be adjusted, making sure sufficient pressure field is generated without extending beyond property footprint. Fan pressure drop and speed can then be mapped on existing radon mitigation fan performance charts currently available and recommending an appropriate fan; not too small, not too large.

Benefits of Improved Diagnostics

In Canada, where radon mitigation is consumer driven, a professional demonstration of diagnostics inspires a level of confidence in homeowners while also helping to demystify the mitigation process. The demo provides a visual aid as the mitigator explains how the systematic lowering of fan speed and checking for sufficient communication ensures the fan is powerful enough to reverse the flow of radon.

The U.S. market is a little different; because radon mitigation in the U.S. is mostly real estate driven, homeowners are more vulnerable to unskilled mitigators. Invariably, sellers and their real estate agents are enticed to hire the least expensive mitigator to facilitate the home’s sale, and little if any follow-up occurs to ensure that radon levels remain below the 4 pCi/L threshold.

Therefore, some mitigators in the U.S. have carved out a profitable niche by educating consumers about the process while garnering referrals and impressive reviews. Jesse Green of American Radon Mitigation, Inc. works almost exclusively with homeowners and homebuyers and typically charges anywhere from \$3,000 to \$6,000 for his services. He leverages the PFE diagnostic both as an educational tool and as a way to provide a fully engineered solution with less time and effort.

“I explain to the homeowner the value in achieving the lowest possible radon levels,” Green says. “I usually spend 90 minutes educating customers, explaining that the key to achieving the lowest radon levels is to get vacuum under their entire home. We do this by taking the time to test and measure so that the system we engineer works the first time.”

Green is just one example of how new technologies in radon diagnostics and mitigation have the potential to accelerate the process and elevate mitigators to a more professional position in the minds of homeowners.



Tribal Nations Combat Radon

Brandy Toft, Environmental Deputy Director, Leech Lake Band of Ojibwe

St. Croix, Bay Mills, Grand Traverse, Bad River, Ho-Chunk, Keweenaw Bay, Leech Lake, St. Croix, St. Regis Mohawk, Nez Perce—just a few of the Tribal Nations that are taking radon to task. Tribes are quietly working on radon for the protection of their citizens.

Of the 35 Tribes in Minnesota, Wisconsin, and Michigan, 19 have performed or are currently engaged in radon activities. Surprising? You may not have known because Tribes typically do their work without much fanfare, just heads down and hard work.

Their style can have a downside, as many people may not be aware, that the Tribes doing radon work would make great partners or can contribute much to the ongoing radon conversation.

Only 15 of the 35 MN-WI-MI Tribes (43%) receive EPA funding for air quality work, and just four of those (11%) receive radon specific funding through the State Indoor Radon Grants (SIRG). In context, fewer than 2% of 574 Tribal Nations received SIRG funding in 2020 even though many more perform radon work. Every EPA Region receives funding for SIRG, but in discussions, most Tribal air quality professionals were not aware of radon specific funding via EPA or how to apply.

There is a need for more radon resources, education, connections, and networking. For years, Tribal Radon Programs have been advocating to increase radon awareness, broaden resources for Tribes, and strengthen relationships with CRCPD and AARST. However, time, funding, and resource constraints limit participation in events and memberships. Tribes typically apply what little radon funding they have to perform radon testing and mitigation.

MN-WI-MI Tribes disseminate information through the Tribe's annual Tribal Air Resources Journal (TARJ) circulated among Tribes, federal and state agencies, organizations, and the business community to create awareness on air quality work in Indian Country. Tribes are great partners and experts in reaching out to their communities and finding ways to get projects done with so little. <https://tinyurl.com/y6ccxltk>

“ Without SIRG funding, we would not be able to have a Radon Program or staff to manage it. We need to continue to build capacity and grow programs. ”

-Dan Wiggins

Tribal Radon Leaders: Profiles

Environmental Outreach Specialist for the Nez Perce Tribe, **Johna Boulafentis**, has worked in air quality (AQ) for years, branching out to focus on radon in 2020 with the Tribe's first SIRG grant. Nez Perce felt it was the natural progression to shift the focus to radon and protect Tribal members' health. Attending the Radon Symposium in 2017 as an invited presenter and then as an attendee in 2020, Johna enjoyed both conferences and gained much-needed knowledge. During the virtual format in 2020, she made multiple networking contacts that have proven useful. She has formed newfound respect for how much knowledge and work radon entails and people's dedication to radon reduction. She plans to work closely with the Tribal housing office to combat radon risk jointly. "SIRG provided an opportunity for our Air Program to grow in capacity and to further protect the health of our Tribal members."

Dan Wiggins, AQ Technician with the Bad River Band of Lake Superior Chippewa, started his radon work in 2007 with SIRG funding. Dan believes the recognition of radon-induced lung cancer and its interlinking with environmental tobacco smoke both need to be addressed to combat lung cancer. His first home mitigation, with a reading of 32 pCi/L, sparked his drive to continue radon work. However, SIRG funding could not pay for the mitigation, and he had to struggle to finance the project. Ultimately, the Tribal leadership supported this initial pilot project. With the threat of COVID forcing people to stay inside more, he is worried that it is more critical than ever to focus on indoor air quality (IAQ). But due to a potential decrease in funds from both internal and external sources, radon may not get the focus it deserves.



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Dr. Bill Field, Professor, College of Public Health, University of Iowa

Over the past 40 years, more rigorous scientific research has been performed quantifying the risk posed by radon than for almost any other carcinogen. Findings from cohort studies of radon-exposed underground miners and direct evidence from case-control studies of individuals exposed to radon in their homes have clearly demonstrated that radon is a major cause of cancer mortality in the United States. In fact, the North American and European pooled residential case-control studies have reported a statistically significant increased risk from protracted radon (decay product) exposure below the U.S. Environmental Protection Agency's (EPA) Radon Action Level of 4 pCi/L.

Even though there is overwhelming scientific evidence that protracted radon decay product exposure is a serious health threat, even at lower concentrations, the Occupational Safety and Health Administration's (OSHA) Ionizing Radiation Standard for radon has remained unchanged since 1971 with the enforceable regulation dating back to the 1969 Atomic Energy Commission (AEC) regulation (Appendix B to 10 CFR Part 20). The OSHA radon exposure limit for adult employees is 100 pCi/L averaged over a 40-hour workweek [29 CFR 1910.1096(c) (1); 29 CFR 1926.53], which would result in a cumulative radon decay product exposure of 12 WLM/yr (assuming 100% radon decay product equilibrium) if the worker was exposed at this concentration for one working year (i.e., 2,000 hours).

Unlike federal Mine Safety and Health Administration (MSHA), Nuclear Regulatory Commission (NRC), and Department of Energy (DOE) radon regulations that cover specific workers in the nuclear industry, OSHA regulations cover most private sector employers in all the states, the District of Columbia, as well as other U.S. jurisdictions either directly through Federal OSHA or by an OSHA-approved state plan (Table 1). The potential for elevated radon exposure can occur in a variety of occupations and worksites (Table 2). However, the largest occupational workforce, not associated with the nuclear industry, at risk from radon exposure are individuals with incidental exposure at a typical workplace (e.g., office, store, etc.). Most of these worksites are covered by OSHA.

Indefensibly, based on a cumulative yearly exposure limit, the radon exposure limit for workers covered under OSHA remains as much as three times higher than for workers covered under both the MSHA and the NRC and nearly 17% higher than the DOE cumulative radon exposure limit (Table 1). For example, based on current federal occupational exposure guidelines for workers, private office workers can receive an annual cumulative radon exposure of up to 12 WLM, which is three times more cumulative radon exposure than a radon-exposed underground miner can receive.

As far back as 1987, the National Institute of Occupational Safety and Health (NIOSH) recommended lowering the permissible exposure limit (PEL) for occupational radon exposure for miners from 4 WLM/yr to 1 WLM/yr while acknowledging that exposures to 1 WLM per year over a 30-year working lifetime posed substantial health risks. Dr. J. Donald Millar, NIOSH Director and Assistant Surgeon General, indicated that although NIOSH was recommending lowering of the PEL to 1 WLM/yr for radon decay product exposure, the recommendation likely does not satisfy NIOSH's commitment to protect the health of the nation's miners. Dr. Millar concluded that, "if new information demonstrates that a lower exposure limit constitutes both prudent public health and a feasible engineering policy, NIOSH will revise its recommended standard" (<https://www.cdc.gov/niosh/docs/88-101/88-101.pdf?id=10.26616/NIOSH PUB88101>).

We now know that subsequent miner-based studies have provided compelling evidence that a PEL of 1 WLM/yr, even if promulgated, would fail to provide an acceptable health-based limit to protect workers who have long term exposure to the PEL. Unfortunately, NIOSH's recommendation to substantially reduce the radon standard has not been adopted as an enforceable standard by MSHA, NRC, DOE, and certainly not by OSHA. In fact, the OSHA Radon Standard is the least restrictive published National occupational standard globally. For example, the OSHA Radon Standard is approximately 12 times less restrictive than the occupational radon reference level 300 Bq/m³ (8.1 pCi/L) adopted by the European Union and recommended by the International Council for Radiation Protection (ICRP) and National Council of Radiation Protection (NCRP).

In June 2020, the American Lung Association, the American Association of Radon Scientists and Technologists, the AARST Consortium on Radon Standards, Cancer Survivors against Radon, Citizens for Radioactive Radon Reduction, and the Conference of Radiation Control Program Directors wrote a joint letter to the U.S. Secretary of Labor respectfully requesting that a revised rule and/or supplemental rule be promulgated since the existing rule is 1) insufficiently protective of individuals employed in those workplaces that have some risk associated with radioactive materials because

the employer possesses, uses, or transfers radioactive material in the conduct of business, and 2) not relevant to individuals employed in everyday workplaces such as schools, stores, and offices where the employer does not possess, use, or transfer radioactive material in the conduct of business. To date, no response has been received from the Department of Labor regarding the groups' request. Please share your experiences regarding the OSHA radon regulations on the AARST Radon Forum: <https://www.radonlistserv.org/categories/all>.

TABLE 1

Federal Agency	Worker Coverage	Annual Level (WLM)
OSHA	Workers not covered by the DOE, MSHA, or NRC (i.e., most of the American Workforce)	Up to 12
DOE	DOE Workers	10
NRC	Licensee Workers	4
MSHA	Underground Miners	4

TABLE 2. EXAMPLES OF OCCUPATIONS WITH POTENTIAL FOR ELEVATED RADON EXPOSURE

- | | |
|---|--|
| <ul style="list-style-type: none"> • Mine workers, including uranium, hard rock, and vanadium • School Employees • Workers remediating radioactive contaminated sites, including uranium mill sites and mill tailings • Workers at underground nuclear waste repositories • Radon mitigation contractors and testers • Phosphate fertilizer plant workers • Oil refinery workers • Utility tunnel workers • Subway tunnel workers • Construction excavators | <ul style="list-style-type: none"> • Power plant workers, including geothermal power and coal • Employees of radon health mines • Employees of radon balneotherapy spas (waterborne radon source) • Water plant operators (waterborne radon source) • Fish hatchery attendants (waterborne radon source) • Employees who encounter technologically enhanced sources of naturally occurring radioactive materials • Farming-related activities • Incidental exposure in almost any occupation from local geologic radon sources (very large population at risk) |
|---|--|

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Working with Certified Radon Contractors

Susan Martino & Patty Dooley-Strappelli, Environmental Health Specialists, Boulder County Public Health

You've likely seen the EPA Radon Zone Map and recall the concentration of red Zone 1 areas in the Northern and Central USA. Based on comprehensive radon testing, all 64 Colorado counties have been designated as Zone 1 by the Colorado Department of Public Health and Environment.

Due to many years of outreach and education, we find that real estate professionals are more radon aware and ARE discussing radon and testing during the real estate transaction with their clients. Unfortunately, in Colorado, there is no requirement for radon contractors to have any qualifications or to be NRPP (or NRSB) certified. Very few Realtors know there is a voluntary certification program that certifies radon contractors who have completed program-approved training.

What can you do to help yourself stand out as a certified measurement contractor in Colorado or one of the 30 other non-regulatory states? Radon test results can be contested and rejected by buyers if they are not conducted by a certified contractor. Explain the testing protocol to prospective clients. Let clients know you regularly calibrate your CRM monitor used for testing. If a CRM is not used, explain what tamper controls can be used to guarantee the test results. Let them know that the practice of 'airing the house out' can cause false test results and potentially harm the new family living in the house for years to come.

Speaking of reducing harm, thanks to our dedicated Rocky

Mountain AARST Chapter, the Colorado Department of Regulatory Agencies (DORA) published a Sunrise Review to determine if there is a need for radon contractor accountability. Due to the DORA report, the harms of non-regulation to the public have been officially identified. They include fraudulent radon measurement, false advertising related to radon measurement, improperly installed radon mitigation systems, and fraudulent mitigation systems.

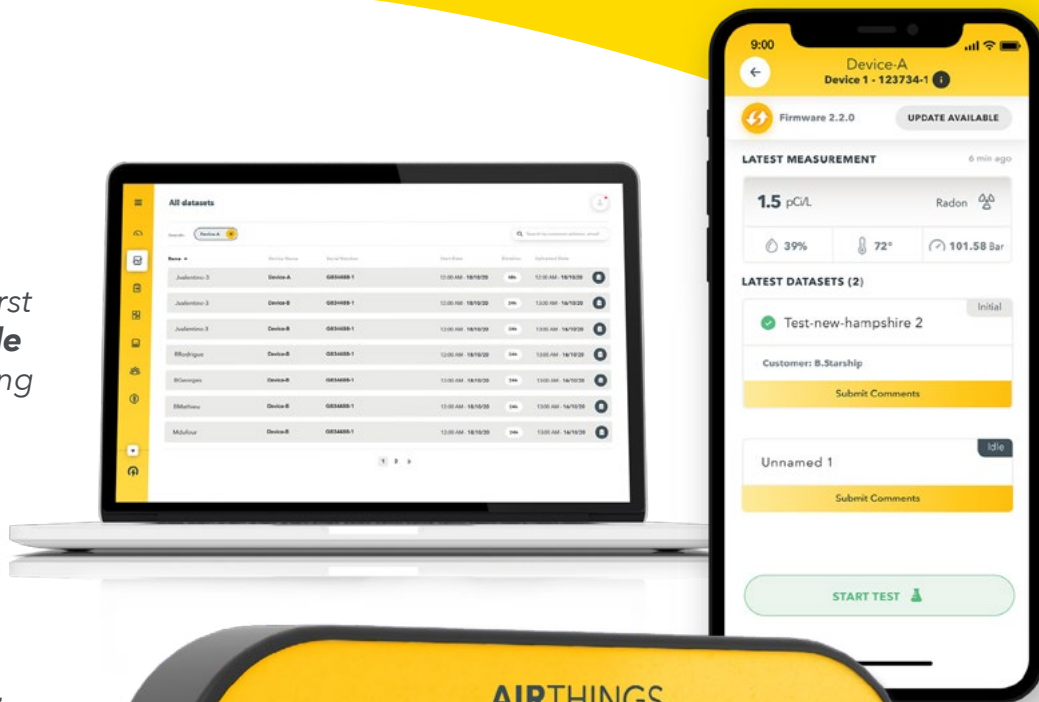
We are fortunate to have funding from the Colorado Cancer, Cardiovascular and Pulmonary Disease Grants program that supports our partnership with other local public health agencies on the Public Health Radon Reduction Roadmap project. The project goal is to provide communication materials and education to health agencies and other key influencers such as elected officials, building officials, real estate professionals, and building professionals.

It's simple: radon exposure increases the risk for lung cancer, and lung cancer continues to have the highest cancer mortality in the United States. Radon can be easily tested for and controlled (unlike other known carcinogens). Get involved with your local AARST Chapter and collaborate with your public health agencies to educate key influencers. Elected officials and decision-makers want to hear from small business owners. Thank you for your professional commitment to providing quality service to your clients. Please take care of yourselves. www.radonawarecolorado.org



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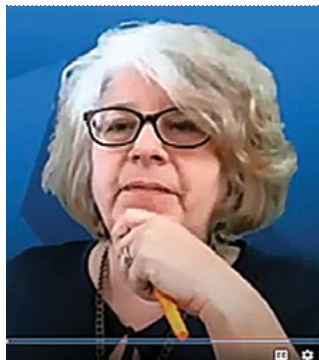
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The AARST 2020 International Radon Symposium and Trade Show Perseveres!

Nicole Chazaud, AARST Symposium Manager



Thank you to the nearly 500 attendees who participated in the 2020 Virtual International Radon Symposium and Trade Show! Like most events in 2020, our in-person conference was canceled. Despite the challenges, AARST pivoted to a virtual event with a new set of

dates, November 9th – 12th. With no concept of success and nothing to rate success on, everyone forged ahead in faith.

The Symposium Planning committee reconnected at the beginning of August to determine what kind of content is best delivered on a virtual platform. **Connect in a virtual environment** became the mantra for planning. The goal was to lower as many barriers as possible to keep the conference streamlined and engaging. The design included a modernized structure of sessions to make the virtual experience enjoyable for attending from home. The disappointment of not being able to see each other in Nashville inspired the desire to offer the conference in the most interactive format possible.

This was new territory for all involved, and the hope was that by November, everyone would be accustomed to virtual meetings. The host platform, Whova, was chosen based on the simplicity of use and ability to integrate with ZOOM. Virtual cannot replace in person, but it can bridge the gap of missing connections and can support learning at your own pace in a busy world.

With COVID-19 travel restrictions in place, schedules allowed for more availability, and the planning committee could feature not one but three top-notch keynote speakers- Jon Petz, Dr. Aaron Goodarzi, and Dr. Bill Field!

The trade show component was especially challenging for the exhibitors who were ready to embark on a virtual journey. While all missed the opportunity for hands-on demos and personal contact in a physical exhibit hall, they succeeded in making the exhibition hall platform and interaction both appealing and vibrant. Exhibitors ran contests, conducted live virtual tours, offered virtual demonstrations, and offered Virtual Learning Lab sessions. Mid-day breaks and one entire day were reserved for exhibitors, enhancing attendance during their live sessions, booth visits, and community chat rooms.

Educational sessions were offered on Monday, Tuesday, and Thursday. Friday was reserved for educators to run specially priced C.E. courses for attendees. Each block was a mix of technical, research, policy updates, state connections, round table discussions, personal interviews, and more.

Some presenters pre-recorded their sessions like Peter Hendrick's "Radon Rocky Horror Shows," a showcase of sub-standard radon work. Chad Robinson and Josh Kerber's infamous "Houses from Heck" ended each day with challenging examples and solutions. A daily business component featured Curt Drew of National Radon Defense and Robin Royals. Attendees also had access to continuing education credits and could earn up to 12 Category-I C.E. credits and 8 Category-II C.E. credits. Almost 150 certified and licensed radon professionals used the quiz sheet and took the daily quizzes online.

As we step into 2021, the uncertainty of holding in-person large events is still in question. One thing is certain; the virtual component will not go away. 2021 is our 35th Annual International Radon Symposium, and we are planning a BIG celebration! Our goal is to have even more people experience the Symposium in the best way we can offer it.

The 2021 Call for Radon Abstracts is open. Visit aarst.org/symposium/.

“GREAT info, GREAT speakers, and GREAT platform! **Loved it!**”

Mary McCormick

“Virtual tours were awesome!!!”

Jessica Hammons



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Radon Survey in Israel Using Schoolchildren and Innovative Tools

Konstantin Kovler, Andrey Tsapalov, Yevhenii Shafir, Technion – Israel Institute of Technology

It is well known that indoor radon has a lognormal distribution, therefore high indoor radon levels can occur not only in radon-prone areas, but also in any territory. This means that any existing building has a potential for radon risk and must be tested. What is the most effective way to organize a survey of a district, city, region, or country to detect hazardous buildings?

Involving schoolchildren in the measurements of radon in their homes seems to be an effective instrument, which can provide two important conditions for the representativeness of the sample of buildings: (i) the random sampling principle, and (ii) the distribution of measurement points in proportion to the population density. This gives an accurate assessment of the parameters of the lognormal distribution of indoor radon. Thus, already at the initial stage of the survey, it is possible to reliably estimate the proportion of hazardous buildings, and the impact of radon on the population - to compare the risks and, consequently, to take necessary actions at the administrative level.



Furthermore, older schoolchildren are quite capable to perform a simple procedure for recording test conditions and passive exposure, using the simple and user-friendly sensors. The participation of schoolchildren can be regarded as a national educational project providing important information to the public about the radon risks.

Radon survey involving more than 14 schools located in different regions of Israel was started in January 2019. To implement this project, the following main actions were required:

- (a) participation of researchers from the Technion as project initiators supported by the European Commission in the framework of the "RadonACCURACY" grant (No. 792789);
- (b) participation of the Taking Citizen Science to School (TCSS) center (www.tcass.center) as a communicator between the schools and the Technion team;
- (c) permission from the Israeli Ministry of Education to involve schoolchildren in the survey, subject to the consent of their parents and the protection of personal data;
- (d) development of miniature charcoal flacons (20 ml) type of CF-13 for passive sampling (from 3 to 6 days) and sticking them with QR-code that is scanned by a mobile phone to access the "RadonTest" website; highly sensitive and inexpensive detector - to measure the radon activity in charcoal, which is controlled online via Wi-Fi (instrumental uncertainty is ~15 Bq/m³ at zero radon level); and
- (e) creating the "RadonTest" online system (www.radontest.online) based on a special mobile application associated with a laboratory database via a website.

Before indoor radon tests were conducted, the number and initial mass of the CF-13, as well as the corresponding number on the label with the QR-code, were registered in the "RadonTest" system in the Technion lab. Then boxes containing about 50 samples each were transferred to the school. Scanning QR codes allowed identification of the sample, geolocation, the beginning and end of the sampling. In addition to the detailed sampling guide, the mobile application's questionnaire collected information about the building characteristics and testing rooms. Our experience shows that the use of a mobile application is not difficult, even for schoolchildren.

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IMPACT OF STACK EFFECT REDUCTION IN SINGLE STORY RESIDENTIAL BUILDINGS

David L Wilson, Sobran Inc., Oak Ridge, Tennessee

It has been well established that stack effect in homes can increase the influx or draw of radon from the soil under a home. In theory, if the primary thermal bypasses in the home could be identified and corrected, the draw upon the soil would be decreased potentially reducing the radon level in the home.

To evaluate this hypothesis, a study was performed on 486 identical single-story duplex units located in EPA Zone 3. The early 1960's wood frame duplexes had 4/12 roofs, with a foundation to roofline concrete masonry fire wall between the duplex units. Each unit was built on a monolithic slab with an average centerline depth of 6 in. The 1,200 ft² 3-bedroom units were heated and cooled by a central forced-air system with the duct work running through the attic. The air return in the hallway wall was hard-connected to the blower unit. The exterior wall materials consisted of a lower half wall brick veneer and upper half wood siding over 1 in. x 6 in. diagonal wooden subsiding. The bottom course of brick was laid on the monolithic foundation. None of the units had any appreciable exterior wall contact with the soil. Initial radon testing during 1994-1995 (1-year ATD) identified 57 units with radon levels ≥ 4 pCi/L (highest result 15.3 pCi/L, Table 1).

Table 1. Radon test result summary

	Number of Units	Average pCi/L	Standard Deviation	Variance	Units ≥ 4 pCi/L	Highest Result pCi/L
Prerenovation	486	2.4	1.9	79%	57	15.3
Post-renovation	486	1.6	1.0	63%	14	9.3

During the winter of 1997, radon diagnostics were performed in 12 of the 57 units. The diagnostics performed were subslab permeability/communication, blower door, episodic air-exchange, radon entry pathway and shell differential pressure. Measurements performed on all potential pathways identified no significant entry points except concrete slab cut outs under sinks and bathtub which averaged about 100 pCi/L. Shell differential pressure measurements found no issues (e.g., < 1 Pa) even with all home exhaust systems on (bathroom fan and range hood). All blower door tests failed to meet the 50 Pa threshold (highest shell pressure was 23 Pa); episodic air-exchange measurements using an inert tracer gas were performed. Air exchanges per hour (ACH) for the 12 homes ranged from 0.9 to 1.2 ACH with an average of 1.0 ACH. The subslab diagnostics found 8-10 in. of $\frac{1}{2}$ in. to $\frac{3}{4}$ in. of pre-washed limestone aggregate with high permeability. Also, the subslab communication test found 100% coverage under the entire floor from a single suction point. Soil pressure under the floor was also found to be + 3 Pa on average. Wall outlets on exterior walls had considerable outdoor air infiltration. Tracer gas investigations found home infiltration within a matter of minutes and attic infiltration from the living area after an additional 5 minutes in most cases. Smoke pencil measurements confirmed air movement from the exterior wall openings (windows, doors, exterior wall outlets) and from the living area into the attic via the ceiling light openings, plumbing pipe chase and the mechanical room closet. It was concluded that a single penetration subslab depressurization system equipped with a high flow fan would be the logical choice for mitigation.

Shortly after the diagnostics had been completed, the property owner conducted a multi-year whole house revitalization project in all 486 homes to modernize the homes and significantly reduce electrical usage. This renovation project entailed removal and replacement of interior walls and ceiling, windows, doors, and mechanical systems plus the addition of a new master bathroom. The renovation created an opportunity to observe conditions such as the absence of exterior wall installation; gaps in the 1 in. x 6 in. diagonal wooden subsiding; monolithic slab in reasonable shape with minimal stress cracking, and 12 in. x 12 in. openings in the subfloor under the bathtub, bathtub sink and the kitchen sink.

Floor patching for the new subslab drainage piping and the older plumbing cutouts was performed, including a skim coat of epoxy overlapping patches by 12 in. The older piping was abandoned in place, but their openings were patched

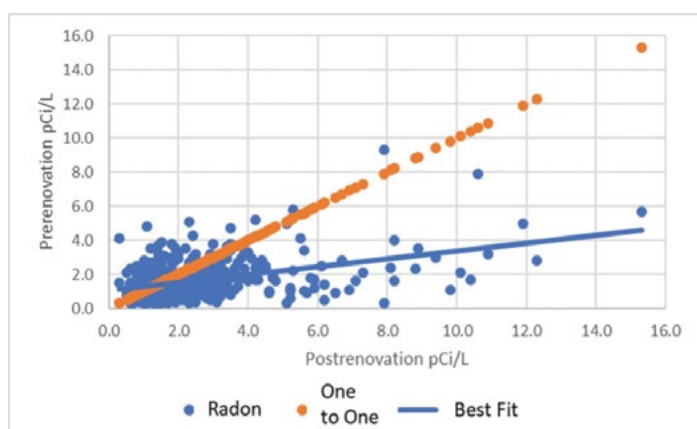


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over with concrete and epoxy. However, the new 12 in. X 12 in. plumbing cutouts were not sealed. As before, all forced air duct work ran through the attic with the return through a full-sized louvered door on the mechanical room closet in the hallway. The project energy engineer projected a 50% reduction in air exchange. On this basis, it was assumed that all homes that tested previously ≥ 2 pCi/L (202 units) had the potential to be > 4 pCi/L (half the air exchange, double the radon level).

At the conclusion of renovations, all homes were retested using 1-year ATD (2001 to 2002). The test data (Table 1) found significantly fewer homes (14 units) with elevated radon than predicted, including only 9 of the original 57 units. With respect to all the test data (Figure 1), the average relative percent difference (RPD) was 31% lower than pre-renovation. However, the RPD range was quite broad (-185% to 178%). Among the 9 homes which still had elevated radon, the average RPD was 28% lower. In short, the correlation between pre- and post-renovation results for all the test results was extremely poor.

Figure 1. Pre vs Post Renovation Radon Test Data



To determine the impact that the renovations had on the observed stack effect, air exchange and smoke pencil tests were reperformed in the original 12 homes. Soil pressure under the slabs was found to be unchanged. The air-exchange was 0.4 ACH to 0.6 ACH. Tracer gas investigation found no exterior infiltration and transport into the attic was > 1 hr. in most cases. These data were consistent with the fact that the interior wooden subsiding had been covered with plywood, fiberglass installation and sheetrock. The duct work from the mechanical closet into the attic, pipe chase, light fixtures and outlets were all sealed. Smoke pencil tests found no significant movement towards the ceiling. It is interesting to note that the total openings in the new slab plumbing

cutouts were twice as large (6 ft²), unsealed, and radon levels went down on average.

In summary, even though the average air exchange in these homes was reduced by 50%, the radon levels in most of the homes decreased. Negating the most likely causes for the observed stack effect reduced radon levels but not in a predictable or reproducible manner. Correlation between pre- and post-renovation radon data was random making accurate predictions impossible. The only way to know is to test.

Code Change Proposals for 2021

Jane Malone, AARST National Policy Director

Building codes drive whether radon control is installed in new buildings. Most states and local jurisdictions rely on the International Code Council (ICC) codes for the contents of their codes. In past years, an effort has been made to improve the International Residential Code's Appendix F. A testing requirement was added to Appendix F in 2019, thanks to a coordinated effort by CRCPD, EPA, and AARST.

In 2021, we have an opportunity to influence the ICC codes that affect large buildings, including schools and multifamily housing, which currently lack any meaningful provision for code officials to oversee soil gas control. American Lung Association, Conference of Radon Program Directors, EPA, Environmental Law Institute, National Center for Healthy Housing, and AARST joined together in January to submit six code change proposals:

- Adding a new section of the International Building Code (IBC) that requires adherence to ANSI-AARST CC-1000 in **any installation of radon control in a new building** (except 1- and 2-family dwellings where ANSI-AARST RRNC would be required); this provision would write soil gas control into the code without imposing a requirement.
- Adding a new section of the IBC that **requires installation of radon control in new schools** according to ANSI-AARST CC-1000.
- Adding a new section of the IBC that **requires installation of radon control in new apartment buildings** according to ANSI-AARST CC-1000.
- Adding a new **Appendix** to the IBC that requires adherence to ANSI-AARST CC-1000 in **any installation of radon control in a new building** (except 1- and 2-family dwellings where ANSI-AARST RRNC would be required); this provision would create the equivalent of IRC's Appendix F for large buildings – an optional appendix that the state or locality would adopt.
- Modifying Section 512, Subslab Soil Exhaust Systems, of the International Mechanical Code to require **adherence to ANSI-AARST CC-1000** for any soil gas control in a new building. Currently, 512 only addresses the vertical duct and its grade, termination point, and identification label.
- Adding a new section to the International Property Maintenance Code to **require radon testing in apartment buildings** according to ANSI-AARST MAMF and, if needed, mitigation according to ANSI-AARST RMS-MF.

Discussions with code officials at hearings in April (online) and September (in Pittsburgh or online, TBD) will determine the fate of these proposals. Radon professionals and allies are encouraged to promote these with local building code officials. The proposals and updates are posted at <https://aarst.org/policy-work/>.

Radon Test Disclosure for Short-Term Rentals

Jane Malone, AARST National Policy Director

In enacting a new licensing ordinance to regulate vacation and short-term rental units in unincorporated areas of its county, the Boulder County Board of County Commissioners established a requirement that rental property owners provide occupants with a copy of a radon test performed by a certified measurement professional during the previous five years. The Boulder County Health Department staff requested this addition to the December 2020 ordinance, in keeping with the stated intention to protect the health, safety, and welfare of the public. Violations of the licensing ordinance may result in fines, license suspension/revocation, and/or other remedies. The effective date was January 2, 2021.

BOCO-Ordinance-2020-1

Section 6.A.2. *Guest Information. In the rented Dwelling Unit, the Licensee must provide the following documents to all guests:*

x. An indoor radon gas testing report including the indoor radon gas testing results issued by a certified Radon Measurement Provider for the Licensed Premises. Indoor radon gas testing results shall be less than 5 years old and must be performed by a NRPP or NRSB certified Radon Measurement Provider. The Licensed Premises shall be retested for indoor radon gas every 5 years, and the most recent indoor radon gas testing report including the indoor radon gas testing results must be provided to guests.

Welcome New Members to AARST!

September

Aaron Pennington
Adam Dudson
Adam McBurnett
Albert Short
Alec Stevenson
Alyssa Morales
Amy Mowre
Antonio Perez
Ben Daniels
Brandon Caldwell
Brandon Wittmann
Branwell
Vandergaast
Brent Garcia
Brett Bostic
Brian J Cobb
Bridget Siebert
Casey J Bechler
Chris Lemcke
Clyde R. Gould
Craig Felt
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Dan Druml
Dao Vang
Davelle Brooks
David Pali
Derek Mitchell
DeSean Stid
Donald Herron
Doug McCullough
Dylan Szews
Eddie Wetzel

Gary Nelson
Gary R. Manyak Jr.
Gavin Kosek
Harley Schwarz-
Decker
George R. Booth V
Jack Joseph
Jacob Korinek
Jacob VanderVeer
James Contee
James Keating
James Stober
Jamile Applewhite
Jason Loyd
Jason Nachreiner
Jeff Houghton
Jeffery Finken
Joe Young
Joel R Harrison
John Borges
John Marinakis
Jon Heiny
Joseph Brooks
Joseph Harr
Josh Ostby
Joshua Finchem
Justin Inboden
Justin R Berard
Justin Smith
Kathryn O. Hubicki
Kenneth Spear
Kevin Fouts
Kevin Jones

Luke Jorae
Martn Rob Blotcher
Marvion Criddle
Matthew
MacKinnon
Matthew White
Maurice L Childs
Meredith White
Michael Powers
Mike Green
Nathan Turner
Nicholas Auchstetter
Nicholas Thelen
Nick Marks
Nicole Truskowski
Patrick Miller
Randy Hicks
Ray Ismail
Ray McLaughlin
Robert Stargel
Robert Venable
Ross Scharf
Ryan Brown
Ryan Dilyard
Ryan Hall
Ryan Kasten
Seth Nti-Danquah
Sherry E Whiteside
Stephen L Reker
Tasha P Forshee
Taurance Carey
TC Copa
Terry Sanders

Tim HusVar
Timothy Millege
Timothy Walker
Tommy Kosek
Tony Miller
Tony Mowrer
Troy Abeyta
Wes Reeves
William Dubus
William Littlemeyer
Zach Neideffer

October

Anthony Vero
Avery Dinn
Bettina Worsley
Chris Fisher
Joy Cordell
Justin McClellan
Michael Patton
Russell DeinStadt
Sandy Scheibeler
Terry Finklea
Tyler Lincoln
William Branch
Zachary Hagedorn

November

Alex Alford
Betsie L. McAfee
Bradley Convis
Carter Kash
Christopher Shinall

Clark Arana
Conor Crawford
Eric Roth
J.D. Pope
Jeff Cobb
John Russell
Johnny B Hull
Jon M Onyett
Linda Hiatte
Mark Whitehead
Mike Pozzi
Natalia Deardorff
Nataliya Cullen
Nicholas Combs
Sherif Khalifa
Stacy M Cam
Steven May
Susan Anderson
Tony Pierce
Tyler Huff

December

Greg E Johns
Joe R Palmer
Lyndell Johnson
Stephen Green
Steven Lawrence
Tony Conners
Tracey Rigel

January

Abigail L Carroll
Anthony P Olenik

Brian Goretzki
Christine Arruda
Colleen A Fried
Deise Rezende
George Simpson
Gregory Phillips
John McCormack
John Schauer
Joseph T Allbritton
Jourdan Dunn
Keith Bartlett
Kevin Stauff
Mark W Meier
Martin Moyer
Michael Bonita
Michael Neyhart
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Coronavirus Tax Relief for Small Business

Andika Susanti, AARST-NRPP Finance Manager

Small businesses may claim tax credits that reduce the amount of tax paid to the government. Businesses of all sizes usually file for tax credits and tax deductions as part of their annual tax filing process. This year's conversation with your tax professional could be especially important. The tax implications of the Coronavirus Aid, Relief and Economic Security (CARES) Act for small business owners, plus the Tax Cuts and Jobs Act, continue to affect how businesses calculate income, the deductions you can take, and more.

Two New Coronavirus Tax Credits

In response to the coronavirus emergency, new tax credits are available to businesses:

1. An employee retention credit to give businesses an incentive to keep employees working, and
2. Tax credits to help employers pay for sick leave and family leave for employees affected by COVID-19.

You can take these tax credits quickly by deferring payment of your employer part of Social Security taxes withheld from employees on Form 941, the quarterly payroll tax report.

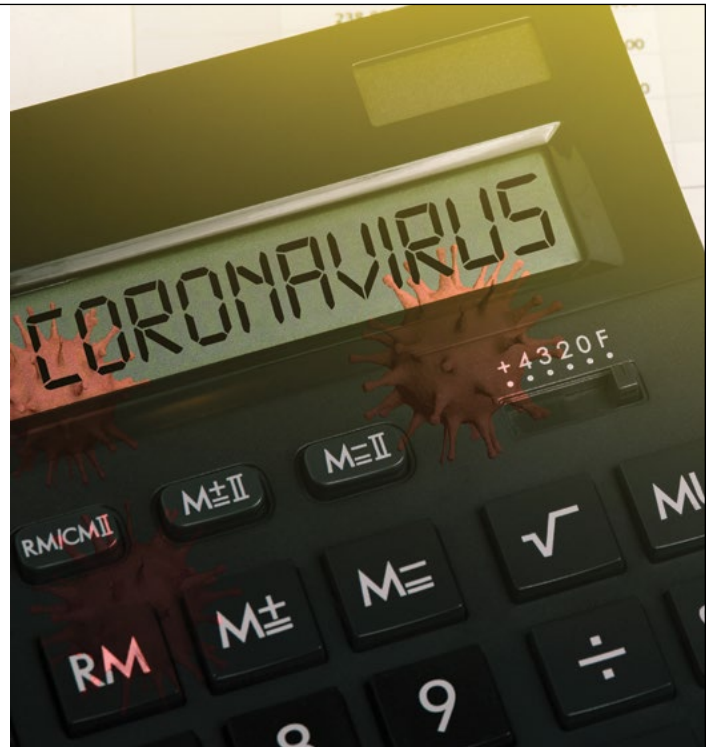
Employee Retention Tax Credit

As part of the 2020 CARES Act, the IRS has created an employee retention tax credit to incentivize employers to keep paying employees. Your business can get a fully refundable tax credit for 50% of qualified wages up to \$10,000 paid between March 12, 2020, and before January 1, 2021. The maximum credit amount per employee is \$5,000. You can continue to be eligible for the credit while you continue to give health insurance benefits to employees who have been laid off.

Tax Credits for Paying Employees on Sick Leave and Family Leave

The 2020 Families First Coronavirus Response Act (FFCRA) helps employers provide sick leave and family leave to employees.

Paid Sick Time: Small and mid-size employers (those with fewer than 500 employees) must give up to 80 hours of paid sick time to employees for coronavirus-related issues for staying home for their illness or someone who needs care.



Anton Brehov/Shutterstock.com

Paid Family Leave: Also, employers must give employees paid family leave to care for a child who needs care. This requirement is a part of the Family and Medical Leave Act, which requires larger employers to give unpaid leave to employees.

Employers who have these expenses can get tax credits for part of the cost of providing these payments to employees. They can take the tax credits by deferring the employer's portion of Social Security benefits on the employees' wages. The tax credit program ends on December 31, 2020.

The Affordable Care Act includes a small employer health insurance tax credit to encourage small employers to offer health insurance for the first time or maintain coverage they already have.

The credit is available to small businesses that pay at least half the cost of single coverage for their employees. If your business and plan meet the qualifications, you can get a credit of up to 50% of the health insurance premiums you paid for employees, but not for yourself as the business owner. To be eligible for the credit, you must:

- Have fewer than 25 full-time equivalent employees,
- Average wages must be less than \$54,200 for the tax year, and
- Pay for these premiums using an IRS-qualified arrangement.

Always consult a professional accountant before filing your taxes. For more information visit

<https://www.irs.gov/coronavirus/coronavirus-tax-relief-for-businesses-and-tax-exempt-entities>.

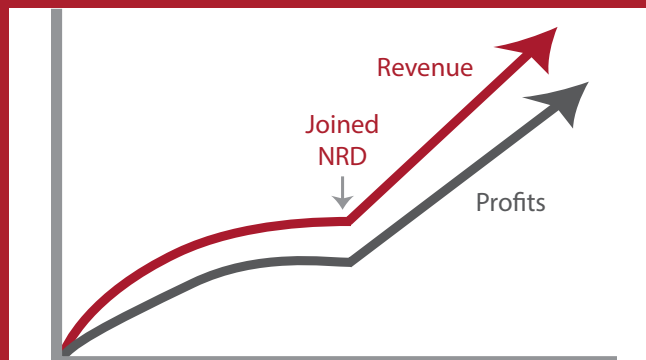
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