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THE 2021 CERTIFICATION REPORT

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RADON DOSE EXPOSURE | MEASUREMENT MISTAKES
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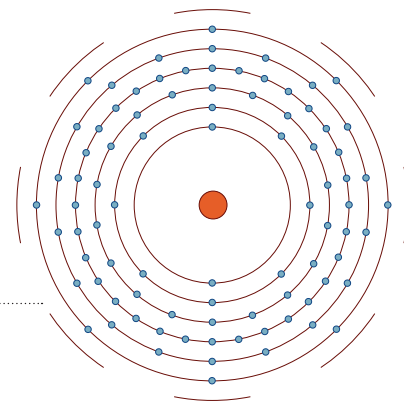
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AARST™, the American Association of Radon Scientists and Technologists, is a nonprofit, professional organization dedicated to the highest standard of excellence and ethical performance of radon measurement, mitigation, and transfer of information 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.

Saluting Victory

Dallas Jones, AARST-NRPP Executive Director



Five years – from idea to plan, from action to victory. Countless extra calls and meetings after a long day, not to mention the investment in paid expertise. It took that long, but they got it done. On May 27th at approximately, 10:38 AM, a group of committed Coloradans finally witnessed the fruits of their labor as the General Assembly passed HB 21-1195 Regulation of Radon Professionals and sent it to the governor. This new law requires Colorado radon practitioners to obtain and maintain certification, adhere to ANSI-AARST Standards, and face disciplinary action for noncompliance. Having witnessed the number of complaints that come into NRPP from Colorado homeowners, I can attest that no state needs radon work oversight more.

The success was the result of a collaborative effort led by Rocky Mountain AARST chapter leaders Terry Kerwin and Crystal Lytle and included radon professionals, manufacturers and suppliers, cancer prevention advocates, an experienced lobbying team, and effective legislative sponsors, with expert radon program director input when requested from the executive branch. As “radon professionals saving lives,” we salute their victory knowing after 35 years, we only have 30 states to go!

Yep – 30 states that have no requirement that radon testers or mitigators be trained, qualified, expected to follow consensus standards or held to any accountability.

I know many in and out of the profession wonder “what’s the point of having regulatory requirements if compliance monitoring and enforcement are missing in most regulated states?” Well, a recent partnership between the Indiana State Department of Health and AARST is modeling one strong answer.

When a state regulates through certification (RtC), since all or nearly all of the administrative responsibilities are handled by the private certification program, the state program can focus on priority activities. Indiana has decided to focus on enforcement, through a new public-private partnership initiative with AARST. (See Indiana’s Regulatory and Compliance Breakthrough, p14.)

The first round of compliance inspections in Indiana has been eye-opening. As an industry, we need to clean-up our act. Rampant substandard testing and mitigation practices are certainly unfair to conscientious professionals, not to mention occupants who breathe in the real consequences. Systematic monitoring through inspections is needed to identify and terminate bad actors.

Whether you’re a radon professional, cancer prevention advocate or state program director, if you live in one of the states that lacks enforcement - with or without regulation - I challenge you to step up. Thirty-five years is enough time to get it right.



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The International Radon and Vapor Intrusion Symposium™ brings trade professionals, scientists, educators, policymakers, advocates, consumers, and more together to learn, collaborate and connect. The Symposium attracts over 600 attendees annually from around the world. This year the Symposium will occur October 11-13, 2021, northwest of our nation's capital in Bethesda, Maryland.

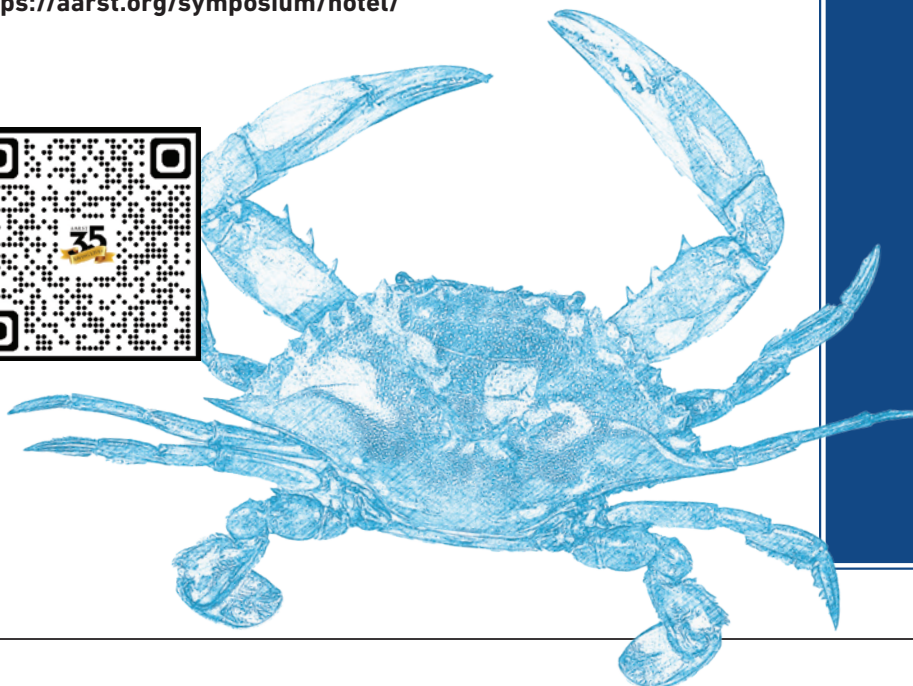
Now in the 35th year, AARST demonstrates long-term stewardship, providing its accredited professionals with the tools and education to leaders in the soil gas industry.

Check the Symposium website during the summer months to see speakers and connect with attendees as they register!

Attending the Symposium builds lasting friendships and exposes professionals to the broader scope of radon reporting and soil gas mitigation best practices, expert field educators, and speakers. Walk away with new technology practices and business-specific resources to elevate your business. The Symposium Planning Committee is committed to providing you with an educational, fun, and safe symposium.

Registration includes access to all sessions, the exhibit hall, meals, and AARST-hosted social activities. Free Continuing Education with quizzes will be available November 15th as recorded sessions and can earn attendees up to 12 Category-I CE Credits. Category-II is earned automatically, only during the live event, with registrant's check-in; no more paper cards and stamps!

Book your discounted room at the Marriott Bethesda North Marriott Hotel & Conference Center, 5701 Marinelli Rd, Rockville, MD 20852.
<https://aarst.org/symposium/hotel/>



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Lung Cancer Advocates
New Construction Builders
Encapsulation Professionals
Environmental Scientists
Geologists
Health Physicists
Educators
Oncology Specialists
Research Institutions
...and more!

Additional Radon Dose Exposure While at Home During the Pandemic

Bruce Snead and Brian Hanson – National Radon Program Services at Kansas State University.

Special thanks to Kevin Stewart of the American Lung Association for his contribution.

The leading cause of lung cancer death in people who have never smoked is the person's radon dose. The primary place people get radon exposure is in their homes. The process by which long-term lung cancer risk from radon exposure is calculated is often not understood by the radon industry or the public. Below, we look at the potential increase in radon dose from radon levels in a home due to increased time at home during the Covid-19 Pandemic.

The risk of cancer from a radiation source like radon is called 'the dose,' which is equal to the radiation level of the radon source multiplied by the time of exposure.

Radon Dose = Radon Level x Time of Exposure

In Kansas, approximately 38% of all radon measurements reported are at or above the EPA Radon Action Level of 4.0 pCi/L. The average radon level for all reported Kansas measurements is 4.6 pCi/L. Approximately 2% of Kansas homes have radon levels above 20 pCi/L.¹ Under normal circumstances, many people would spend 8-12 hours/day outside the home working, attending school, running a household, and other errands, etc. However, during the pandemic, many have spent those same hours at home for the past several months.

Consequently, we can estimate how much one's radon dose has changed based on radon levels in the home and the likely increase in the hours at home. Another factor in the radon dose change is the radon levels in the locations now being avoided due to Covid-19. EPA lung cancer risk estimate tables are based on 18-hour per day average annual exposure at home and use 1.3, 4.0, 8.0, and 20.0 pCi/L as common radon levels in homes.

The primary radon exposure comes from the proportion of the two polonium particles produced in the air during the ongoing radioactive decay of the radon gas in the home. The unit of measurement for these decay products is the **Working Level (WL)**, which is the amount of polonium available in the environment to be inhaled. 100 pCi/L of radon will produce one working level of the decay products. How much of those decay products are airborne and breathable is determined by the **Equilibrium Ratio (ER)**. To calculate the WL from a known radon concentration, the Equilibrium Ratio (ER) of the building must be known or assumed; in general, an ER = 0.5 is assumed for most residences. An ER = 0.5 indicates that approximately 50% of generated polonium is airborne and available to be inhaled by occupants, so that a radon level of 200 pCi/L results in 1 WL of the decay products. This relationship is shown in the formula:

$$WL = (ER \times \text{Radon Concentration (pCi/L)})/100$$

Long-term lung cancer risk from residential radon exposure then is equal to the WL of the residence multiplied by the time of exposure. This calculation is known as the **Working Level Month (WLM)**. The number of hours in a working month is 170 (based on 8 hours a day for 21 working days per month). Lung cancer risk over time is calculated based on an individual's cumulative WLM value.

$$WLM = (WL \times \text{Hours of Exposure})/170 \text{ working hours in a month}$$

Table 1 presents the radon dose for various radon levels for various hours spent at home assuming an ER = 0.5 meaning half the radon-released particles are in the air available to breathe. The calculations are based on radon exposure in working level months (WLM) for four common indoor radon concentrations: 1.3 pCi/L (the EPA's estimated national indoor radon average), 4.0 pCi/L (the EPA's Radon Action Level), 8.0 pCi/L and 20 pCi/L. The dose is calculated for four levels of average daily exposure durations: 8, 12, 18 and 24 hours at home/day.

If time at home for an entire year increases from an average of 12 hours/day to 18 hours/day, the annual radon dose in WLM from the radon levels in the home increases by 50%!

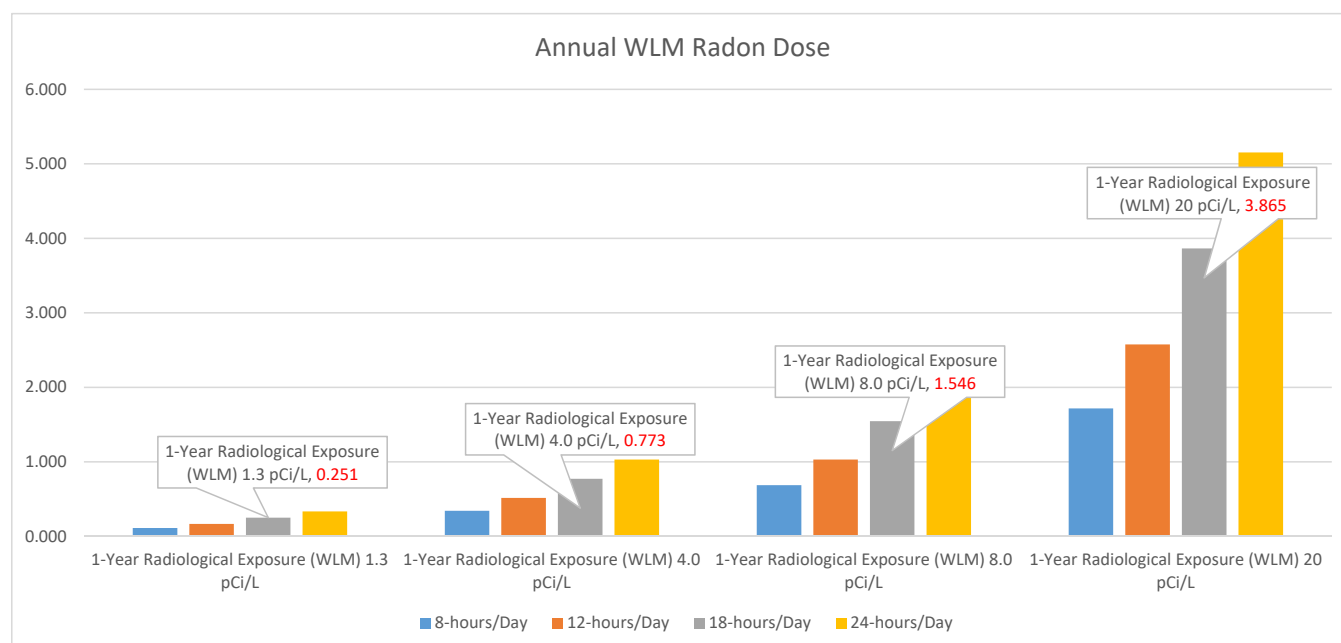
For every additional hour per day spent at home at the same radon level, the annual radon dose increases by about an average of 7%.

¹ KS Dept of Health and Environment; <https://kansasradonprogram.org/county-map>

TABLE 1. ANNUAL RADON DOSE WHEN SPENDING 8-, 12-, 18-, OR 24-HOURS IN A HOME WITH 1.3, 4.0, 8.0, OR 20.0 pCi/L RADON LEVELS. ER = 0.5

TIME AT HOME	1.3 pCi/L	4.0 pCi/L	8.0 pCi/L	20 pCi/L
8 HOURS/DAY	0.112 WLM	0.344 WLM	0.687 WLM	1.178 WLM
12 HOURS/DAY	0.167 WLM	0.515 WLM	1.031 WLM	2.576 WLM
18 HOURS/DAY	0.251 WLM (12 hrs +50%)	0.773 WLM (12 hrs +50%)	1.546 WLM (12 hrs +50%)	3.865 WLM (12 hrs +50%)
24 HOURS/DAY	0.335 WLM	1.031 WLM	2.061 WLM	5.153 WLM

CHART 1. ANNUAL WLM RADIOLOGICAL DOSAGE AT FOUR COMMON RADON CONCENTRATIONS AND FOUR AVERAGE RESIDENTIAL TIME EXPOSURE PERIODS.



The local, state, and national level response to the current pandemic conditions has radically changed how many families spend their time. It is the responsibility of the radon industry (public and private sectors alike) to help clients understand how shifting use of residential spaces can impact their long-term lung cancer risks from radon exposure. Although, as a general approximation, a 50% increase in annual dose over a year might result in a 1-3% increase in lifetime lung cancer risk due to radon, bear in mind that the additional risk will continue to increase should that higher dose become persistent over many years.

As always, when your clients ask questions to which you may not know the complete answer, please feel free to refer them to the National Radon Program Services (NRPS) and our hotline (800.767.7236) or www.sosradon.org.





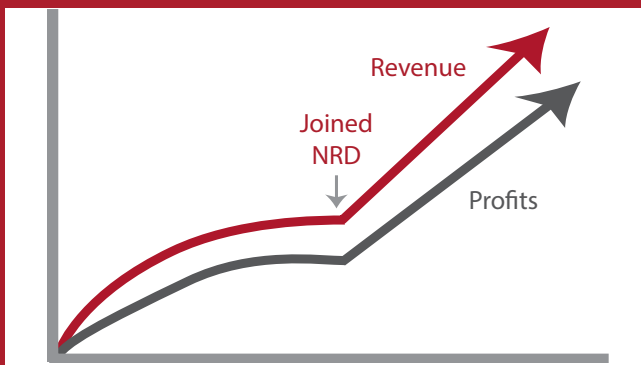
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Common Measurement Mistakes and How to Avoid Them

Deborah Madsen, Radon Specialist, Minnesota Department of Health

On the surface, radon testing in single-family homes seems simple. Place monitor, start test, retrieve monitor, and print out the results. However, there is much more involved in conducting a radon test. The current single-family testing standard (ANSI/AARST MAH 2019) was published in 2019. All standards can be viewed at standards.aarst.org.

Licensing has been required to conduct radon testing in Minnesota since January 1, 2019. Minnesota Department of Health (MDH) reviews templates and Quality Assurance (QA) Plans prior to issuing licenses. MDH has developed documents and resources compliant with ANSI/AARST MAH 2019, which can be found at mn.gov/radon. In talking to measurement professionals about their testing procedures and reviewing test reports, we have compiled a list of commonly made mistakes and ways to avoid them.

1. **Test conditions communications:** Section 8.3 of the standard discusses prior notification requirements, and Section 8.4 discusses requirements to verify test conditions. These are sometimes skipped or not completely followed. Door hangers usually include a statement to keep exterior doors and windows closed except for normal entry and exit, but more communication is needed, such as pre-test notification, during-test notice, and a signed non-interference agreement. Compliant notification templates are in the ANSI/AARST standards. If using a custom template or one from a Continuous Radon Monitor (CRM) manufacturer, compare it to the ANSI/AARST standard to make sure it meets requirements.

Methods for handling communication:

- a. Emailing Test Conditions/Non-interference Agreement to listing agent with request to forward to seller.
- b. Working with real estate agents to include Non-interference Agreement with purchase agreement documents.
- c. Custom window clings and door hangers with test conditions.
- d. Electronic signature program to email test conditions when scheduling test.
- e. Web posting the Test Conditions and Non-interference Agreement.
- f. Leaving Test Conditions and Non-interference Agreement in the home next to CRM.

2. **Test conditions verification:** Everyone checks outside doors and windows to ensure closed building conditions

are met but other conditions, such as the air exchanger setting are often missed. Having a checklist when placing and retrieving devices ensures all the items are checked each time.

3. **Test report:** Section 8.5 discusses reports requirements. None of the current CRM or lab test reports meet the ANSI/AARST standard requirements "out of the box" without additional steps. Some CRMs' reports can be customized to meet requirements by uploading additional forms, creating a custom template, or customizing the questions/language.

Some methods people use to create compliant reports include:

- a. A test reports template filled out by hand.
- b. CRM printout with test conditions included in the comment section and a separate document with required advisories emailed to the client.
- c. Create custom tracking/home inspection software to create a report.
- d. Use a placement/retrieval checklist in field that is included in the report to client.

We look forward to a the NRPP Certification Council's coordinated effort to engage states and CRM manufacturers on criteria and specifications for compliant radon reporting software.

4. **Quality Assurance/Quality Control (QA/QC) Program:** Failing to follow QA/QC protocols is the issue seen most often. Following QA/QC is vital to ensure equipment is maintained and working properly, testing is done according to the standard, and everything is documented correctly. Without documented QA/QC, radon measurements are not defensible.

Setting up a system and compliant templates takes time and effort. Still, once the system is in place, you can confidently conduct radon measurement work that is documented to be reliable, accurate, and defensible.

While these experiences are centric to Minnesota, all NRPP certified radon professionals must follow the ANSI-AARST standards to maintain their certification. If your current radon measurement procedures and QA/QC plan are not compliant, now is the time to get them into compliance by conducting a thorough review of your policies and procedures.



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Status Report: Regulated States' Adoption of the ANSI-AARST National Radon Standards

In August 2019, EPA issued "Guidance on the Use of Voluntary Consensus Standards for State Indoor Radon Grant Recipients" to alert states to the Agency's recommendation to reference the most current voluntary consensus-based standards (VCS) when implementing their radon programs. The notice stated that citing or incorporating current radon VCS is a best practice for SIRG recipients and advised that use of VCS in radon programs across the country will help ensure public health protection by incorporating current science and technology, as well as potentially reducing marketplace confusion.

STATE	Current Standard(s) in Effect	
	ANSI-AARST	EPA, ASTM, other
California, Colorado*, Connecticut, Indiana, Kentucky, Minnesota, New Hampshire, Rhode Island, Utah, Virginia, West Virginia	All	
Kansas, Maine, Nebraska, Ohio		All
Florida, New Jersey	(rule proposals underway)	All
Illinois, Pennsylvania	Multifamily	Single Family
Iowa	Measurement	Mitigation

* Effective July 2022



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THE 2021 CERTIFICATION REPORT

The biennial report on radon credentialing in the US;
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and federal action.

STATE CERTIFICATION AND LICENSURE LAWS 101

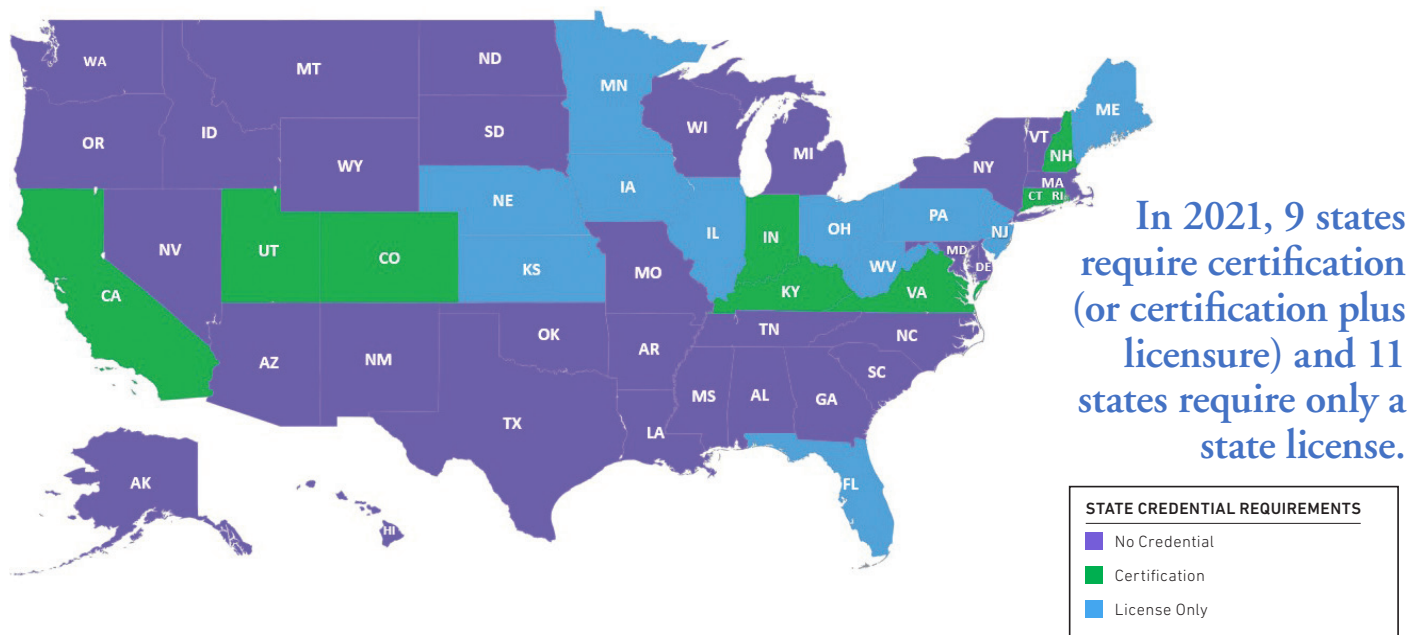
In the United States, 19 states (with one pending) have laws or regulations in place that require some form of proficiency qualifications for professionals doing radon work in the marketplace. Nine states offer regulation through certification, requiring that radon work be performed by persons who have earned certification from an EPA-recognized proficiency program (National Radon Proficiency Program and National Radon Safety Board). Some of the “regulation through certification” states require a state-issued credential (license or certificate) that documents state oversight of the credential provided by the proficiency program. Eleven states operate state-based licensing systems, through which state regulations define state-specific terms and conditions (rules) under which licensees will secure, renew, and retain radon credentials.

States’ continuing oversight of professionals’ radon credentials is a central element of radon risk reduction. These regulatory structures encourage compliance with recognized standards of practice and ethical professional behavior to ensure citizen protection and enable enforcement. Some of the trouble spots for state regulatory programs can be statutory and regulatory references to outdated standards, failure to ensure that multifamily projects comply with 100% testing of ground floor units as required in the ANSI-AARST standard, and the absence of requirements pertaining to approved radon measurement devices and/or quality control.

While all EPA-funded radon programs publicize listings of radon professionals credentialed by the EPA-recognized proficiency programs, in 30 non-regulated states untrained contractors have unlimited access to unsuspecting consumers. The absence of proficiency requirements in these states allows unqualified personnel to conduct radon-related services and disregard established consensus standards.

To counter the proliferation of fly-by-night contractors performing substandard, unprofessional radon work, AARST Chapters, state leaders and others have been working to secure recognition of national consensus standards and regulation through recognized private certification programs that require adherence to such standards. As the Radon Reporter goes to press, the Colorado legislature has taken the final step to enact regulation through certification as requested by Rocky Mountain AARST; New Jersey’s Department of Environmental Protection has proposed adoption of the ANSI-AARST standards; the task force in New York State is gearing up to review radon credential options; and regulators and chapters in other states are considering related policies.

STATE CREDENTIALING POLICIES



Spotlight: Indiana's Regulatory and Compliance Breakthrough

In 2020, both the Indiana legislature and the Indiana State Department of Health (ISDH) recognized the need to sharpen the state radon program's relevance and effectiveness. The statute specifically required the use of outdated and retired EPA protocols that even EPA no longer maintains; it was necessary to amend the statute to allow adoption of the EPA-recommended ANSI-AARST standards. Also, the state needed to modernize and clarify certain details of the program.

In February, **to authorize regulatory updates, the General Assembly enacted HEA 1334**, which was signed by the governor and enacted as Public Law 25.

Since before the legislative process unfolded, the leadership of ISDH's Lead and Healthy Homes Division had been working on a major overhaul to its requirements to bring the program into the 21st century. Statutory authorization enabled rapid executive branch action to implement change in 2020.

Key elements of Indiana's regulation via certification policy include:

- As a condition of licensure, radon contractors are required to maintain certification through a certification program recognized by the EPA.
- All measurement, mitigation, and QA/QC activities must be conducted in accordance with the applicable AARST/ANSI standard.
- A non-licensed person may only perform measurement and/or mitigation on a building that they own and occupy.

Also in 2020, ISDH took action to confront a long-term gap in the radon program: **the lack of any mechanism for compliance monitoring of mitigation services** to ensure radon mitigation systems are installed in a high-quality professional manner in accordance with industry standards. ISDH issued a request for proposals for contract radon inspection services. First, the program needed a baseline assessment of the quality of work being performed by Indiana radon mitigators and specifically its compliance with the old EPA protocols. Second, it needed to evaluate how much of a performance leap would be necessary for compliance with the ANSI-AARST Soil Gas Mitigation Standard. Third, it wanted to establish a means for ongoing compliance monitoring.

Since AARST had recently taken steps to strengthen its capacity for radon compliance enforcement and had developed initial plans for a mitigation compliance inspection credential, AARST submitted a proposal to provide contract radon inspection services for ISDH in a pilot project utilizing experienced trained professionals to inspect systems based on ISDH's random

selection of addresses from mitigator reports. ISDH accepted the proposal. Following development of a detailed checklist and electronic form, the pilot project was implemented January - April 2021. AARST contacted the current occupants of homes on the ISDH address list and obtained permission for radon system inspection. AARST contractors inspected 53 mitigation systems and documented (numerous) observed deficiencies, which covered the entire spectrum of components from labels and alarms to sealing and installation. ISDH and AARST are discussing expansion to measurement inspections.

Spotlight: Colorado's New Regulation through Certification Law

In response to longstanding concerns about careless and/or incompetent performance of radon measurement and mitigation in Colorado, the Rocky Mountain Chapter of AARST won state regulation of CO radon professionals through certification.

Timeline and Milestones

2019

- Rocky Mountain Chapter of AARST obtained a "sunrise" review of radon regulation by the Colorado Office of Policy, Research and Regulatory Reform within the Department of Regulatory Agencies (DORA) to explore whether there is a need to regulate the profession.
- DORA uncovered "significant evidence of harm to consumers in Colorado" from unregulated radon measurement and mitigation specialists and concluded that regulation is necessary against "unscrupulous service providers."

2020

- Rocky Mountain and its lobbyist worked with its legislators, legislative counsel, allies and AARST to craft and perfect a proposed bill.
- Although there were willing bill sponsors and substantial agreement, COVID shut down the CO legislature before it was possible to introduce the bill.

2021

- March 4: Radon Measurement and Mitigation Licensing Act, HB 21-1195, was introduced in the House, HB 21-1195, was introduced in the House.
- April 29: HB 21-1195 passed the House (after approvals by the House Committees on Public and Behavioral Health and Human Services; Finance; Appropriations).
- May 27: HB 21-1195 passed the Senate (after approvals by the Senate Committees on Business, Labor and Technology; Finance; Appropriations).
- TBD: HB 21-1195 signed into law by Governor Jared Polis.

The **key rationales** in both the DORA report and the chapter's advocacy were:

- Radon is a health risk.
- Not requiring a license for measurement and mitigation places families at risk of inaccurate testing and incorrect mitigation systems, which escalate the risk of developing lung cancer.
- Requiring that radon professionals follow standards developed by a process accredited by the American National Standards Institute (ANSI) ensures that commonly accepted, evidence-based methods are used.
- Requiring that radon professionals possess certification by an EPA-recognized proficiency program is the optimum way to ensure that professionals are qualified for the work.

**First Regular Session
Seventy-third General Assembly
STATE OF COLORADO**

REREVISED
*This Version Includes All Amendments
Adopted in the Second House*

LLS NO. 21-0707.01 Yelana Love x2295 **HOUSE BILL 21-1195**

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A BILL FOR AN ACT

101 **CONCERNING THE REGULATION OF RADON PROFESSIONALS, AND, IN**

102 **CONNECTION THEREWITH, REQUIRING LICENSURE TO PRACTICE**

103 **AS A RADON MEASUREMENT PROFESSIONAL OR RADON**

104 **MITIGATION PROFESSIONAL, AND MAKING AN APPROPRIATION.**

Bill Summary

(Note: This summary applies to this bill as introduced and does not reflect any amendments that may be subsequently adopted. If this bill passes third reading in the house of introduction, a bill summary that applies to the reengrossed version of this bill will be available at <http://leg.colorado.gov>.)

The bill creates a regulatory framework for individuals interested in practicing as a radon measurement professional or a radon mitigation professional. On and after July 1, 2022, an individual is prohibited from

Shading denotes HOUSE amendment. Double underlining denotes SENATE amendment.
Capital letters or bold & italic numbers indicate new material to be added to existing statute.
Dashes through the words indicate deletions from existing statute.

SENATE
3rd Reading Unamended
May 27, 2021

SENATE
2nd Reading Unamended
May 26, 2021

HOUSE
3rd Reading Unamended
April 28, 2021

HOUSE
Amended 2nd Reading
April 28, 2021

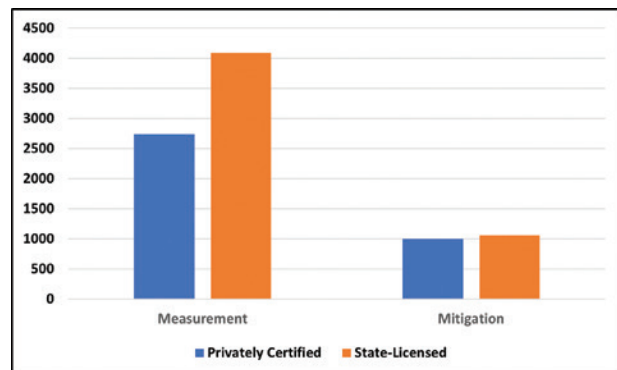
THE STATE OF THE INDUSTRY:

RADON PROFESSIONALS

NRPP's ISO 17024 Application Update

The International Standard ISO/IEC 17024 was developed to fill the need for public protection by establishing how individuals have the required competencies to perform their work. Accreditation is recognized worldwide as a critical requirement for personnel certification bodies that offer certification in many industries, including public health, environment, and national security services.

The NRPP took its first steps toward ANSI-ISO 17024 accreditation in 2018. With the assistance of psychometrician consultants, a new certification scheme, job task analysis, exam content development (aligned with the relevant ANSI-AARST consensus standards), and standard setting for pass/fail have all been completed. The new Radon Measurement Professional and Mitigation Specialist Exams went live on May 1. The Measurement Field Technician and Mitigation Installer Certifications and Exams will launch on August 1.



In 2021, nearly 8000 individuals possess certification, license, or both.

To build internal capacity, four staff completed the ANSI Personnel Certification Accreditation Workshop. This spring, NRPP underwent a preliminary internal audit of policies, practices, and procedures as NRPP prepared to provide ANSI with the necessary evidence of compliance with its specific eligibility requirements. This preparation and scrutiny facilitated the submission of NRPP's initial application for ISO 17024 accreditation at the end of June.

Once that preliminary application is approved, NRPP will have a maximum of 12 months to complete the formal application process, including a detailed onsite assessment and evaluation. The NRPP Certification Council and staff expect to achieve the goal of ANSI-ISO Accredited radon certification credentials by early 2022.

Third-party recognition of compliance to an ISO standard is a prestigious accomplishment. Accreditation under an ISO standard is used by government agencies and multinational employers as a reliable way to ensure that personnel certifications are sufficiently rigorous.

NRPP Certifications in 2021

Measurement Certifications

Radon Measurement Field Technician

The NRPP Radon Measurement Field Technician (RMFT) certification is geared toward a measurement technician who deploys and retrieves approved measurement devices, implements device placement, and insures building conditions for residential testing and assessment. A Certified RMFT must work under the direction and QA/QC oversight of a Certified Measurement Professional.

Radon Measurement Professional (equivalent to current Radon Measurement Provider certification)

The NRPP Radon Measurement Professional (RMP) certification is designed to assess the knowledge and skills necessary for the evaluation of residential radon measurement results, including but not limited to client report generation, development and execution of QA/QC plans and worker exposure surveillance. A Certified RMP may function as the key person for analytical labs and oversight of work conducted by Radon Measurement Field Technicians.

Mitigation Certifications

Radon Mitigation Installer

The NRPP Radon Mitigation Installer (RMI) certification is geared toward individuals who install soil depressurization systems in residences and implement measures to protect themselves, co-workers, and occupants from hazards related to the mitigation process. A Certified RMI must work under supervision provided by a Certified Radon Mitigation Specialist.

Radon Mitigation Specialist (equivalent to the current Radon Mitigation Provider certification)

The NRPP Radon Mitigation Specialist (RMS) certification is designed to assess the knowledge and skills necessary for the design and ultimate compliance of residential radon reduction systems, and for the implementation of worker safety/ surveillance programs. A Certified RMS may provide supervision and oversight of work conducted by Radon Mitigation Installers.

ON THE HORIZON:

EPA RECOGNITION OF CERTIFICATION BODIES

EPA announced its plan to establish new voluntary criteria outlining a standard of competence for organizations that credential radon service providers in “Voluntary Criteria for Radon Credentialing Organizations,” Docket ID EPA-HQ-OAR-2017-0430, at 82 FR 39993-39997, on August 23, 2017, and invited public comments. Four years later, radon stakeholders still await the emergence of EPA’s plan based on its review of the submitted comments as well as further research.

EPA’s most recent recognition of credentialing bodies occurred in 2002.

- In 1988, Congress directed EPA to operate “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.” (P.L. 100-551)
- EPA operated proficiency services for a couple of years, then abandoned its operation in 1998.
- In 2002, NRSB and NRPP were recognized by EPA and became responsible for credentialing radon service providers in any state that lacked a state run regulatory program.

Renewed EPA action on credentialing is certainly overdue, and not a radical change but rather a continuation of the 1988 Congressionally directed policy intended to ensure that consumers have access to a proficient and qualified workforce of radon professionals nationwide.

- Congress has never rescinded the directive for an EPA-led proficiency program.

Congress instructed EPA in appropriations bill report language to **create criteria and recognize proficiency programs**. **Consistency across credentialing bodies** will be central to the likelihood of success for this next installment in EPA’s approach to fulfilling its statutory responsibility, especially in foundational components such as:

- **Standards:** ANSI-AARST voluntary consensus standards, which are not only EPA-recommended, but also have been adopted by HUD, most regulatory states, and other standards bodies. There are no other current standards.
- **Accreditation:** Credentialing body accreditation under the ANSI standard ISO 17024 Conformity assessment: General requirements for bodies operating certification of persons. Using third party, private sector accreditation systems, consistent with the 1996 Technology Transfer Act (P.L. 104-113), EPA can increase accountability and transparency quality assurance for well-qualified radon service providers offer services.
- **Scope:** Certification “schemes” and job-task-analyses for positions such as technicians and specialists.

A new EPA framework will build upon existing resources such as state regulatory programs, current training providers and courses; proficiency program-approved device lists, exams, and course approvals; the ANSI-AARST standards. By effectively defining the expected standard of competence for entities that credential radon service providers, EPA will be positioned to increase accountability and consistency across the US, facilitate constructive change where needed, and encourage progress in the 30 states that lack credentialing programs.

US Congress, Interior-Environment Appropriations Act House Report 114-632

*Indoor Air and Radiation...*the Administrator shall take the following actions to meet the increased demand for radon services as a result of the National Radon Action Plan:

- (1) establish criteria for recognition of national proficiency certification programs that use ongoing performance review processes, with provision for discontinuation of certifications for cause, to ensure the effectiveness of private firms and individuals offering radon-related measurement and mitigation services utilizing consensus American National Standards; recognize qualified programs; and encourage States to require certification by qualified programs.

P.L. 115-31; continued by P.L. 115-141, P.L. 116-6

Are You Really a Certified Professional?

NRPP Staff

You may think you are certified, but in reality, you might not be. Find out if you are actually certified and avoid any problems with your customers, employer, or state.

Becoming certified as a radon mitigation specialist or measurement professional is an essential step in one's career. If you are not certified, you may be missing out on critical skills and knowledge that can help reduce the instances of radon-induced lung cancer. Hiring a certified professional gives homeowners peace of mind that they will be living in a safe environment, confirms your competence, and elevates your reputation in the radon industry.

We have encountered more than one person believing they were certified when, in fact, they were not. Some have mistakenly concluded that taking an introductory class or passing an NRPP exam equals certification. While these are the first steps to becoming NRPP certified, it is necessary to go through the application process outlined on our website [NRPP.info](https://nrpp.info). Others have thought that becoming a member of AARST, a professional association, provides certification. AARST and NRPP serve two very different functions in the

radon industry and are not interchangeable. There have also been instances when people believe they are certified if their boss or co-worker has a certification. Certifications are only for individuals and cannot be shared or transferred.

There is an entire process that one must complete before receiving credentials from the NRPP. Earning these credentials indicates that the individual has demonstrated accomplishment of the specific skills required to complete radon testing and mitigation successfully. Learn the requirements for each type of certification at <https://nrpp.info/certification/types-of-certification/>.

A list of certified professionals by state may be found at <https://certifiedradonpros.org/>. Visit the site to verify that you are certified, and if you do not see your name, contact NRPP and find out what you need to complete the certification process. Be aware that some states require that radon professionals be certified and/or licensed. We recommend that you contact your state radon office to verify the specific requirements.



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Process Is My Passion

Robin Royals, President, RC Royals & Associates, LLC

Why Is Process My Passion?

As a young athlete and future college quarterback, I discovered that I improved with more practice. At first, I was ineffective in my ability to throw the football accurately. I needed to control it to make it easy for someone to catch. I found out that by doing the same thing "over and over" again, that not only did I improve, but it became much easier.

During my time spent as an auditor with an international accounting firm, we would create a flow chart of operations within a department of a client. The client's employees would explain their job responsibilities, making them sound highly complicated and complex. These employees were viewed as being subject matter experts and highly valued within the organization. Once that mapping exercise was complete, it was clear that many of these jobs were straightforward, and in many cases, someone with less experience could accomplish these jobs and be compensated at a much lower level. Today, this is known as process mapping.

From that point on, I became committed to taking the mystery out of understanding processes. Is everything that we do in our lives important? No. Then why do we view every process in our business as being critically important?

What Is Process?

Think about the repetitive activities in your business. These redundant activities are considered processes. Your ability to do them well and efficiently is often the difference between success and failure. Suppose your company handles thousands of similar transactions every day, every month, and every year. Shaving a few seconds off the handling time of each transaction could save the company a significant amount of money.

Why Are All Processes Not Equal?

Every business is organized into front-office and back-office activities.

- Front Office: Customer-facing employees (such as the marketing, sales, and service department) who are responsible for generating the bulk of revenues.
- Back Office: Administrative assistants, human resources staff, and accounting staff.

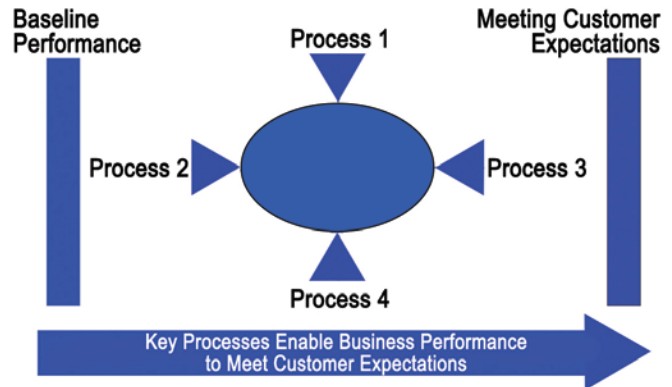
For example, consider the accounts payable process, a back-office activity. Every business must mail out invoices to get paid. If a company has the best accounts payable

process imaginable, would that make your company the best in your industry? No. When was the last time a customer called your business about how beautiful your invoice looked, that the information on that invoice was correct, and they received it on time? Ridiculous, right?

The key is to determine the processes in your business that matter most because only a vital few make a real difference. It begins with understanding what your 'secret sauce' is, or identifying what attributes of your product or service separate you from your competitors and what core competencies make that separation possible.

What Processes Matter Most?

The most critical processes in your business are those that enable you to meet your customer expectations. For example, if your customer wants their kitchen remodel to be completed in 90 days (as promised by your company), failure to do so drives customer dissatisfaction, a bad customer review, and loss of future business. The process failure must be addressed and improved, or your business will not be around for long.



Call to Action

Repetition doesn't always maximize our performance. As a young athlete, when I practiced without any coaching, I did improve but reaching my full potential had limitations. The difference between those who excel is often learning the proper technique through coaching, training, and instruction. Without a formal coaching or training program that focuses on the vital few processes, your efforts will only lead to continual inefficiencies in your company.

If you struggle with understanding what matters in your business or want to improve your profitability and customer satisfaction, please contact me at Robin Royals, RC Royals & Associates, LLC, www.robinroyals.com, (913) 963-3848.



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Brent Ulbert, Owner/Partner, Professional Discount Supply; Secretary of Rocky Mountain AARST Chapter



Mitigators, I'm sure by now you've received a call like this, "Uh, yeah, I got this radon monitor from Amazon, and it says my radon is above 4. I need you to come fix my system."

Continuous radon monitors for homeowners (HCRMs) have flooded the market due to low price points and the Amazon marketplace. Unfortunately, many homeowners do not understand

the monitors very well and even more misunderstand the long-term health risks of radon. These calls are currently viewed as a nuisance by many mitigators, but how do you go about telling someone that they are relatively safe when their monitor is telling them differently?

Get Ahead of the Wave

Some brands are launching informational campaigns to try and educate their end-users and are asking for help from radon professionals. The Amazon marketplace, while the largest in the world, is not the ideal place to roll out these products. Savvy manufacturers are attempting to get their HCRMs into the hands of homeowners through radon professionals!

Imagine this- you have finished a radon system and are collecting payment from the homeowner. You remind them that the EPA recommends retesting their home every two years. Then you say these words, "If you'd like, we can handle the testing and maintenance of your system. Would you like to hear about our extended maintenance programs?"

Have you ever said anything along these lines to a customer? Chances are you have not, but make no mistake, homeowners hear them from every other contractor that has repaired or installed a home appliance.

Protect Your Customer and Generate Revenue

Consider a "good, better, best" program to appeal to the consumer. For instance, **Good:** "EPA Special," a mitigation professional does a ten-point inspection on your system and gives the homeowner a short-term radon test with a prepaid mailing envelope every two years. **Better:** Same as above, but it is every single year, and the homeowner gets a sixth year on your fan warranty (all reputable fan

manufacturers have five-year warranties, and fans, on average, last about eight years). **Best:** the homeowner gets a free HCRM, two extra years on your fan warranty, and a 90-day radon level guarantee.

Do you see the opportunity the "best" program has? Even if the consumer does not take you up on the offer, you have a few minutes to explain that long-term averages are the radon levels to keep track of. Radon is a carcinogen and doesn't have the toxic mortality level that will kill quickly like carbon monoxide. These maintenance agreements take up less than an hour each year, but mitigation can quickly accrue thousands of dollars in recurring revenue. The best part: your service call customers will often provide referrals to family and friends. You see them every year, you keep them safe so of course, they want to have you visit everyone on the block!

Big Hearts, Open Minds

Programs and conversations like these are not complicated. HCRMs are not a nuisance; they are an opportunity. As one of my customers said to me just the other day while reflecting on his decades of service before retirement, "Radon mitigators have big hearts, and they sometimes let that get in the way of running a business."

HCRMs are helpful. They spread radon awareness incredibly effectively. Educating your customers and protecting them in the long term is compassionate. Accepting reasonable compensation is required to keep gas in your truck and keep that soil gas out of homes!

Since publishing this article in RMAARST in January of 2021, I have coached several mitigation companies into starting service programs. Early results are very promising. This is no longer theory.

I believe mitigation professionals have a moral and ethical obligation to offer long-term radon system service and testing. Homeowners need to be educated that radon systems need maintenance and testing. At a bare minimum, a mitigation professional should be leaving the EPA Homeowners Guide and stressing bi-annual testing to every homeowner they install a system for. Radon system servicing is a paradigm shift for our industry. We will look back on the time before routine servicing and wonder, "why the heck did this take us so long?"

Protect and educate your customers. Don't let dead fans lead to dead customers.



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Impact of Weatherization on Indoor Radon Levels in Multi-Family Housing

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

The need to perform post-weatherization radon testing within multi-family housing (MFH) is a hotly debated topic. In particular where pre-weatherization radon data found radon levels significantly < 4 pCi/L within all the units. Application of the 50% reduction/double the radon level rule would only apply when the weatherization had no or little impact on the overall radon flux into the home. In some cases, the process of weatherization can alter the dominant mechanism for radon flux into the building.

For example, in cases where stack effect is the dominant mechanism for radon flux into the home, eliminating it can reduce radon levels (Radon Reporter March 2021). However, in other cases, the reduction in air exchange can enhance the retention of radon soil gas from other sources can result in a higher-than-predicted radon level (Radon Reporter October 2020).

The argument has also been presented that within identical housing, testing a subset of the units (e.g., highest 10%) would provide a strong indicator of the overall impact of the weatherization for all the units present. However, even within non-weatherized MFH, this testing approach does not provide the needed confidence that radon levels ≥ 4 pCi/L are not present in the untested units (Radon Reporter March 2020).

For this study, 166 identical multi-family units (17 duplex and 33 quadplexes) located at an EPA Zone 3, 35-acre site were selected. The 2-story, flat roof units were built during 1978-1980 and had three upper floor bedrooms, 2 ½ baths (1/2 bath was on the first floor) and a ground floor great room (kitchen, living room, eating area) and laundry room/pantry. Each unit was constructed on a monolithic slab with an average centerline depth of 8 in. The 1,250 ft² units were heated and cooled by individual ducted forced air systems. The exterior walls of the units were made of solid concrete with a decorative stucco coating. None of the units have any appreciable exterior wall soil contact.

In 1997, an energy conservation contractor conducted a weatherization study on the units. The findings recommended that all windows and doors be replaced (the first floor had four jalousie windows) and that the existing exterior package heating/cooling unit be replaced with an interior split unit. Air exchange measurements performed on a subset of the units found on average 0.8 air exchanges per hour (ACH) with a range of $\pm 35\%$. The study concluded that if the weatherization recommendations were followed, the average air exchange rate would be around 0.4 ACH.

These recommendations were implemented in all 166 units during 2002-2004.

Subsequent air exchange measurements performed on a subset of the units found 0.4 ACH with a range of $\pm 15\%$. It is important to note that no structural changes occurred due to this weatherization project, only windows, doors, and heating/cooling units were replaced. Also, other than routine upkeep (e.g., painting, replacement of flooring), no significant changes were made to the units between the initial radon test and the weatherization project and after the weatherization project was completed.

Radon testing on the 166 pre-weatherization units was performed during 1992-1993 with 1-year alpha track detectors. Analysis of the data found no units ≥ 4 pCi/L (Table 1). Using this data and applying the 50% air exchange reduction/double the radon rule, it was predicted that seven units would be ≥ 4 pCi/L with an average result of 2.2 pCi/L for all 166 units. However, post-weatherization testing in the 166 units during 2016-2017 (1-year ATDs) found only two units ≥ 4 pCi/L with an average result of 1.4 pCi/L (Table 1).

Although both data sets illustrate the traditional log-normal distribution seen in most radon surveys (Figure 1), it is apparent that weatherization has impacted the radon distribution within all the units. The one-to-one plot (Figure 2) shows that most of the units did undergo an increase in radon levels because of the weatherization. With respect to overall change, 31% of the units tested lower (-0.4 pCi/L on average), 61% testing higher (0.7 pCi/L on average), and 8% were unchanged. As for the impact on an individual unit basis, looking at the highest 10% (17 units) of the pre weatherization results (all were between 1.7 and 2.3 pCi/L initially) finds that 11 of these units actually underwent a decrease in radon levels (-0.8 pCi/L), one unit remained unchanged, and with five units having an 0.8 pCi/L on the average increase. None of the 17 units were ≥ 4 pCi/L. However, the two units identified as now having radon levels ≥ 4 pCi/L after the weatherization were well initially below 2 pCi/L and were significantly higher than the predicted 200% increase (Table 2).

In summary, even though the air-exchange rate in this population of units was reduced by 50%, the changes in radon levels did not, on average double. Within the 61% units that did test higher, the average radon levels in the two units was about 30% lower than predicted. In addition, the two

Continued on page 26

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units which did test ≥ 4 pCi/L were well over the 200% projected increase from the original level. Correlation between individual unit pre- and post-weatherization radon data was random, making accurate predictions impossible. The only way to know is to test.

TABLE 1. COMPARISON OF THE PRE- AND POST-WEATHERIZATION RADON DATA FOR THE 166 UNITS.

Survey	Average pCi/L	Standard Deviation	Variance	Units ≥ 4 pCi/L	Highest result (pCi/L)
1992-1993	1.1	0.4	0.4	0	2.3
2016-2017	1.4	0.7	0.5	2	4.5

TABLE 2. PERCENT INCREASE IN RADON LEVELS IN UNITS ≥ 4 pCi/L.

1992-1993 (pCi/L)	2016-2017 (pCi/L)	Percent Increase
1.6	4.5	281%
1.0	4.0	400%

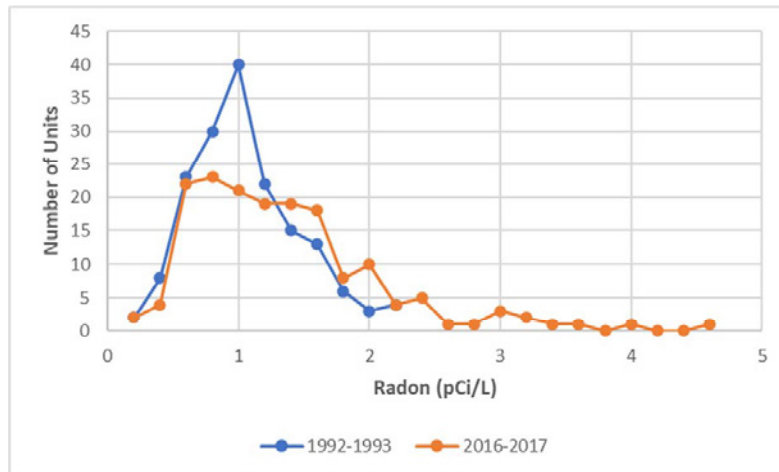


Figure 1. Pre and Post Radon Data Distribution.

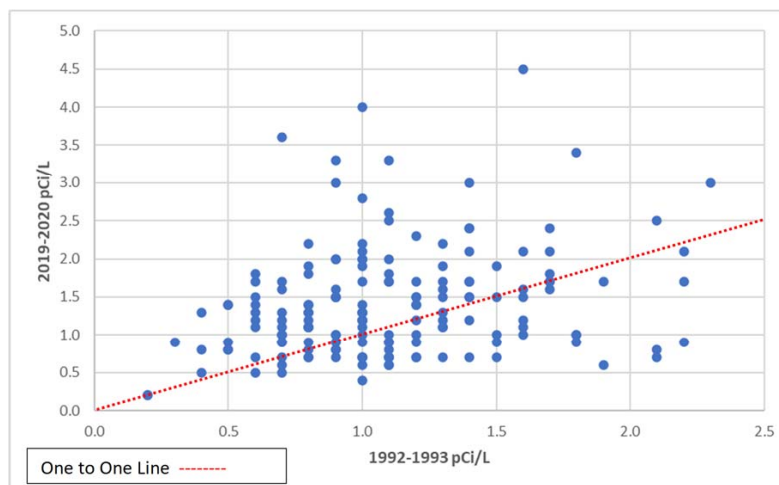
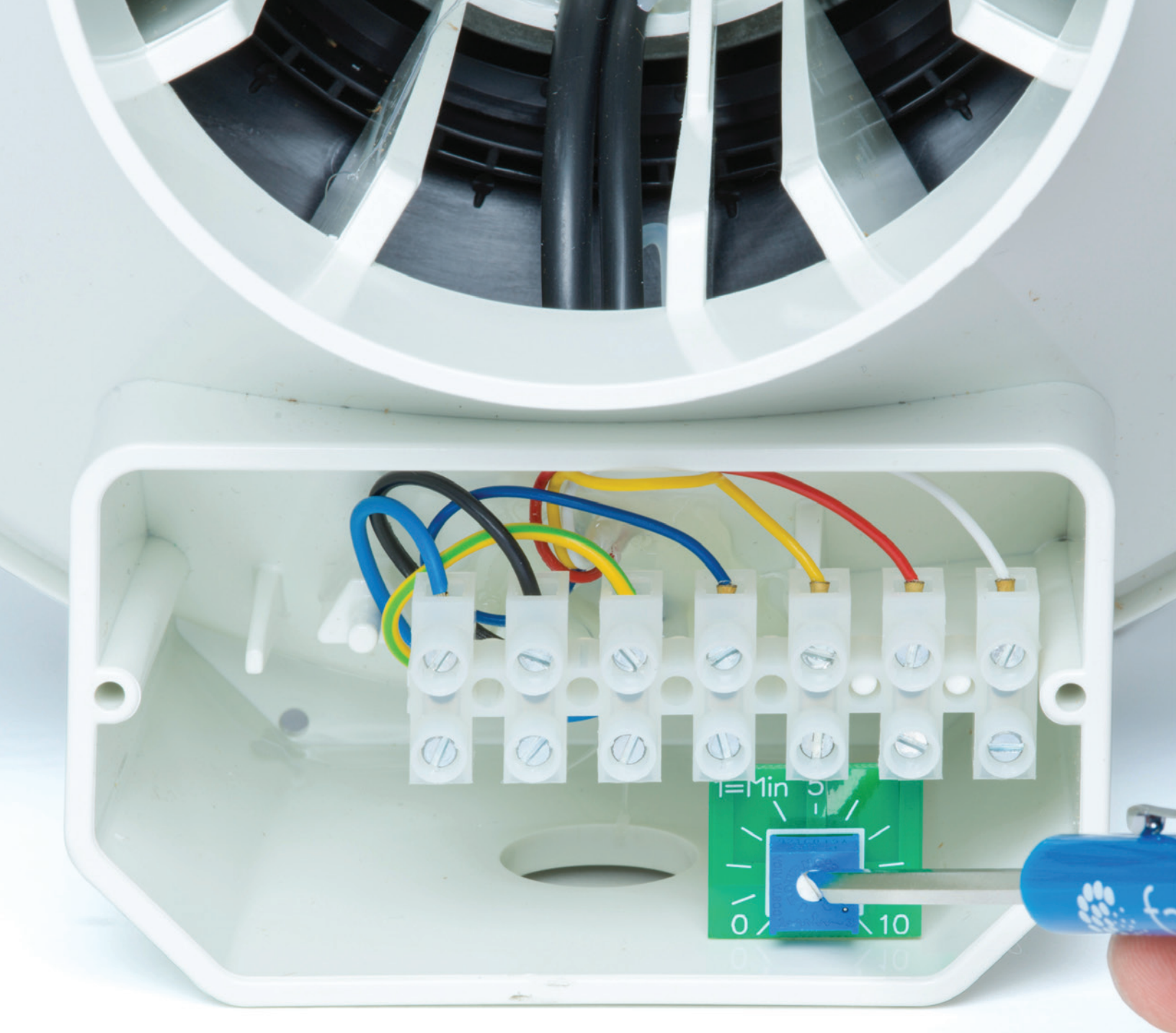


Figure 2. One to One Plot.



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