

THE Radon Reporter



Summer 2016

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you need to succeed in the radon profession*

Radon's Risk and Other Cancers

**HUD's Multifamily Accelerated
Processing (MAP) Guide**

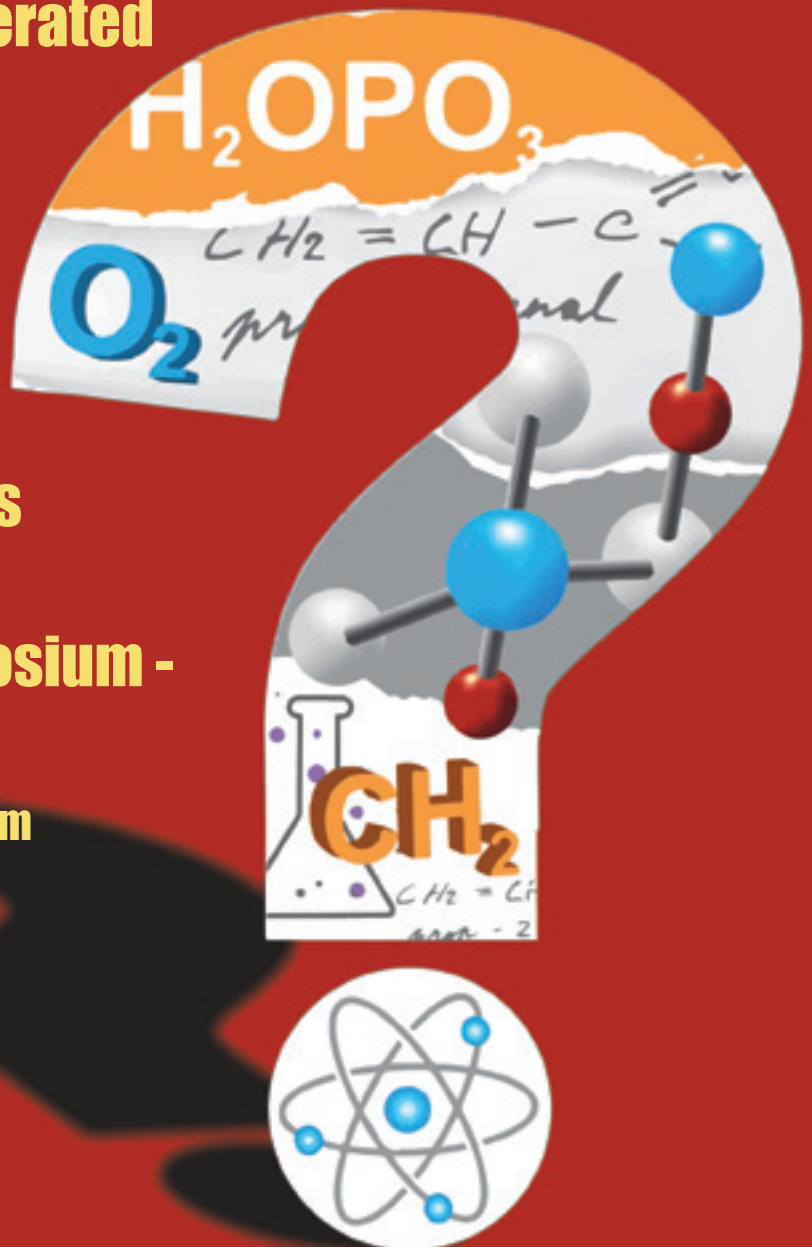
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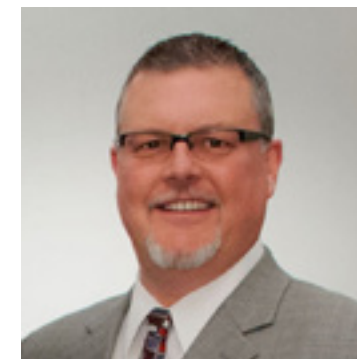


Letter from the President

The Future's So Bright, I Gotta Wear Shades

By Shawn Price, President, AARST-NRPP

I reflect back on the last 4 years as AARST President with a lot of good memories and have to say that this was the best radon job that I've ever had. It was so rewarding to meet many more members of the radon community during the Regional Stakeholder meetings, hearing your support as I explained all of the important work that AARST was tackling, witnessing many accomplishments, and learning so much about you, your businesses, and the mitigation side of the profession where I have so much more to learn.



Shawn Price,
President, AARST-NRPP

"Looking ahead, I see major breakthroughs right around the corner for all of us. The foundation that we now have with our ANSI standards, recognized certification program, and recent improvements through state laws and federal policies, give us a credible voice on Capitol Hill."

AARST has made significant advancements and I was only a tiny part of the effort. Our progress was due to the commitment and hard work of Peter, Gary, Bruce, Randy, Jane, Nicole, our dedicated staff in NC, the AARST Board, and others. Without each of you that contributed by joining or renewing your memberships and certifications, none of this would have been possible.

Looking ahead, I see major breakthroughs right around the corner for all of us. The foundation that we now have with our ANSI standards, recognized certification program, and recent improvements through state laws and federal policies, give us a credible voice on Capitol Hill. The culmination of all of the recent successes will be when single family mortgage requirements include radon testing, and when all new buildings are constructed using radon prevention techniques. I believe some changes will come sooner rather than later, while some will take a bit longer, but as these programs unfold our small, niche profession will become a real industry.

These changes will bring more opportunities to you but will also bring additional competition. I encourage you to start to consider how your company will meet these challenges. Improve your ability to properly document your procedures and installations and look to fill the gaps that can lead to missed quality. Let's make sure that the current professionals

set a good example by leading through quality. Review standards such as ISO 9001 and realize that larger companies will be bringing those quality programs with them. What will you have to improve in order to compete at that level?

I see these as good problems. QA Plans and reviewing documentation and procedures can be very boring work. However, the benefits of having happy customers, fewer headaches, and an outstanding reputation will be worth the

effort because profits will increase when the number of call-backs decline. We have many more tools available to us all now than ever before, so please take advantage of them to get ahead of the game.

I look forward to the next chapter in AARST's growth and will still be doing whatever I can to keep our momentum moving forward and help Dr Jenkins as he takes the reigns. I'll just be a little deeper in the pack for a while.

I want to say Thank You All, from the bottom of my heart. It's been a great ride! ■



In This Issue:



Radon’s Risk and Other Cancers

Current popular news articles regarding radon and its relationship to blood cancers and more have heated up the internet as of late. We examine the research and connect with those researchers in the field for a more in-depth understanding of these reports, and how we can use this information. - Peter Hendrick

page 8

HUD’s Multifamily Accelerated Processing (MAP) Guide

AARST Member Kyle Hoylman dissects the new MAP Guide. The webinars and support documents are online at <http://aarst-nrpp.com/wp/hud/> –Kyle Hoylman

page 14

Radon Testing in Multifamily Housing

AARST Vice President David Wilson has participated on many standards committees. He discusses the decisions and specifics behind the best standards of practice for multifamily radon testing to test every unit in the building - David Wilson

page 18

Catch the Radon Wave! Register for the 2016 Symposium™

Enjoy the easy new program, viewable at www.aarst-nrpp.com/wp/international-radon-symposium/ and register today for your symposium tickets and book your hotel room.

page 6

AD INDEX

- RadonAway page 2
- RCI page 5
- Radon Supplies page 9
- Festa page 10
- Radon Insurance 11
- Professional Discount Supply page 12
- AccuStar page 15
- Air Chek page 19
- University Educational Services, Inc. page 22
- Fantech page 23

AARST, the American Association of Radon Scientists & 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-NRPP represents your voice as we meet the wide range of challenges facing radon professionals and the community. Your membership and participation provides 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.

OFFICERS
PRESIDENT: Shawn Price
radon.shawn@gmail.com

PRESIDENT ELECT:
Phil Jenkins, PhD
pjenkins@bowser-morner.com

VICE PRESIDENT: Matt Koch
matt@southernradonreduction.com

VICE PRESIDENT:
David Wilson
radondave@hotmail.com

SECRETARY: Arnold Drennen
jarnold@drennenc.com

TREASURER: David Kapturowski
dave@spruce.com

AARST CHAPTERS
Email: chapters@aarst.org

Heartland
Gary Boesker
boesinsp@hometelco.net

Kentucky (KARP)
Kyle Hoylman
khoylman@protectservice.com

Midwest
Eric Lewandowski
ericl@proradon.com

New England
Dave Hill
dhill@spruce.com

Ohio (OARP)
Tracey Capuano
tcap@fuse.net

Pennsylvania (formerly Tri-State)
Celia Rajkovich
celiar@comcast.net

Rocky Mountain
Tammy Linton
Tammy@rdsenvironmental.com

FORMING AARST CHAPTERS
Georgia Chapter

Minnesota Chapter

New York State Chapter
(formerly Erie Chapter)

NATIONAL DIRECTORS
Carolyn Allen
carolyn@accustarlabs.com

Jay Bauder
jay@bauderbasement.com

David Daniels
davidmdaniels@ameritech.net

Tony McDonald
tony@vaporremoval.com

William Goebel
bgdsm@aol.com

John Mallon
john@radondetectionandcontrol.com

Steve Tucker
steve@cascaderadon.com

Alexandra R. Stieff
astieff@radelec.com

Gloria Linnertz
seascape@htc.net

STAFF
Executive Director, AARST-NRPP
Peter C. Hendrick, (603) 756-9259
director@aarst.org

Jane Malone, National Policy Director
jmalone@aarst.org

Nicole Chazaud
Communications/Symposium
nicole@aarst.org

Johnna McNamara, Exam Coordinator
johnna@nrpp.info

Janna Sinclair
Credentialing Coordinator
janna@nrpp.info

Membership Inquiries
membership@aarst.org

NRPP Compliance
compliance@nrpp.info

Pat Everett, Radon Reporter, Editor
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Program Highlights



Ryan Richie, Funding Chair at CanSar & Director of Sales at Spruce Environmental Technologies: Look at the rise of cause marketing (the cooperative effort of for-profit business and not-for-profit agencies), its impact, effective tips, and how we as an industry can benefit from these efforts.



Jane Malone, AARST-NRPP Policy Director, Review the basics of the National Radon Action Plan and highlight opportunities for marketing the plan, connecting it your own community, and demonstrating to property owners that they have a role in this national strategy to end radon-induced lung cancer.



Andre LaCroix, V.P., EZ Breathe Healthy Home Solutions: Review numerous sources of contaminants to show how they contribute to a home's poor indoor air quality. Emphasis is placed on the source, source control or removal and remediation of various indoor air contaminants. Focus will also be placed on how radon professionals can position themselves to educate the homeowner on the indoor environment outside of radon.



Karen Butler, Associate Professor and Assistant Dean for Academic Operations in the University of Kentucky College of Nursing: Breathing Radon and Tobacco Smoke: A Dangerous Combination. This study examines the short-term impact of an environmental feedback intervention on perception of risk from combined exposure to radon and secondhand smoke.



David Grammer, Owner, RAdata: Learn how radon technicians can incorporate Warranty Programs into their business offerings to generate an additional revenue stream



Gary Hodgden, Consultant, AQP Inc: Clarification on the fluid mechanic fundamentals that directly influence: all indoor measurements; passive mitigation in newly constructed buildings; and pressure differential measurements and design for active mitigation technologies.



Beverly Overfield, Kentucky Geological Survey, University of Kentucky. Presentation describes impact of targeted infographic-based material on radon risk potential. Providing the public with easy-to-understand material using simple images, targeted maps, and plain language can simplify complicated scientific information and reduce obstacles to home radon testing.

Nowhere is more radon information presented in one place. If you have attended in the past, you know the value of the lineups that are presented, the 2016 Symposium is the one NOT TO MISS!

Many Symposium attendees would concur; participating in symposiums takes your business up a notch.

AARST-NRPP is leading the way in science, research, technical standard setting best practices in the field and in the boardrooms. Catch the Radon Wave! Be an active participant in your association, get the max from the tools developed for you by AARST professionals like you!

This year's program is designed for you by AARST-NRPP professionals to make the dual programming the best it can be. Tool-focused, this year, sessions are arranged in thematic blocks. Repeating again this year, opportunity to earn up to full 6 Category I C.E. credits for Monday's Programming. In addition to Monday's Category I C.E., there is a full day of Pre-Symposium C.E. courses offered as well. (Don't forget to select your free workbook for Monday C.E. in the Eventbrite.com registration Ticket Selection)

In a nutshell Certified professionals who need C.E. can earn up to 14 Category I CE credits and 8 Category II if attending the entire Symposium.

The Exhibit Hall gets better and better each year. This year, The Opening Reception and all Breaks as well as Poster Presentations will be contained in the hall. The Exhibitors go virtual this year! AARST will be interviewing all exhibitors participating in the Virtual Booth program, and the interviews will be posted on the Symposium Website at the start of the Symposium. See first-hand why exhibitors feel this is one of the most important venues for their year, and what they bring to showcase for you.

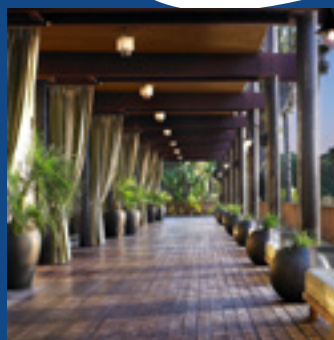
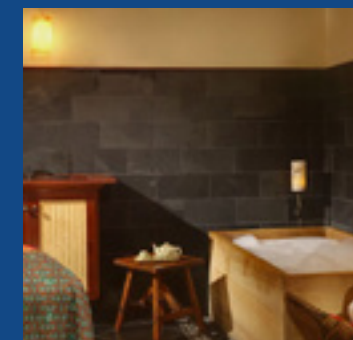
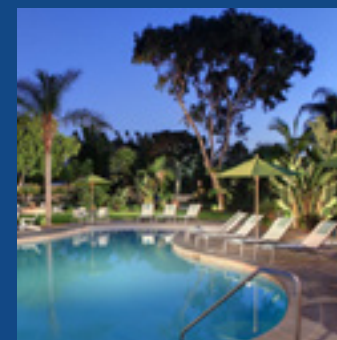
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"Learn from your colleagues: Over 16 hours of tips, tricks, case studies, and lessons learned from the field. All presented in a format that invites discussion."

"I liked the opportunity to meet other professionals and discuss some important topics in the industry."

"The International Radon Symposium is the highlight of our year! We attend many excellent conferences in Europe; however the scale of the AARST Symposium, thanks to the breadth of knowledge and experience shared by attendees, makes it invaluable for us."





Radon’s Risk and Other Cancers:
Research and Policy Questions Linger Too Long

-By Peter Hendrick, Executive Director of AARST-NRPP

Earlier this year, a news release on cancer research by the American Cancer Society hit the internet and media circuit: “Radon in the Home May Be Linked to Blood Cancers in Women” was the headline.

To summarize the release: Radon gas causes a significantly high rate of blood cancer in women, but the bottom line was simply, *more research is needed*.

Over the years we see much research/studies which have been conducted relating cancer and radon risk. When we see these studies coming through, how do we use this information and why does nothing seem to happen more to relating radon risk to other health issues as has been in the case of lung cancer mortality?

The central tenet of radon risk reduction policy in the United States has been, and continues to be that radon’s radioactivity causes lung cancer. Radon’s causing lung cancer has been the central risk factor noted in the recommendations of the National Institute of Health’s BEIR (Biological Effects of Ionizing Radiation) VI Report on the health impacts of low level ionizing radiation.

Our professionals understand this tenet, but how do we use this additional research information?

Primary Health Research
Is Not In EPA’s Radon
Mandate

Today, the number of American radon-related lung cancer deaths is estimated by the Environmental Protection Agency (EPA) to be 21,000 annually. (Based on numbers 3 decades old.)

This lung cancer mortality factoid has initiated policies by state legislatures and by the United States Environmental Protection Agency, resulted in passage of the 1988 Indoor Radon Abatement Act and also has caused radon to be included as a noted toxin in the Toxic Substances Control Act (TSCA.) Radon exposure, via lung cancer, is the leading cause of environmental death in the United

States. So lung cancer is a driver for radon policy, but, again, why the lack of support for research in other areas?

Here is a sad truth: EPA’s radon mandate under the 1988 Indoor Radon Abatement Act did not mandate research under the Indoor Environments Division. All research is done under the auspices of EPA’s Office of Research and Development. However, without a group of stakeholders demanding research from EPA, or other health-related agencies and foundations, radon gets lost as a primary topic of health science funding.

When the EPA began the process of addressing radon, the initial research funding by USEPA was focused on the how to’s of radon technology, approaching this as an environmental problem to be measured and solved or remediated.

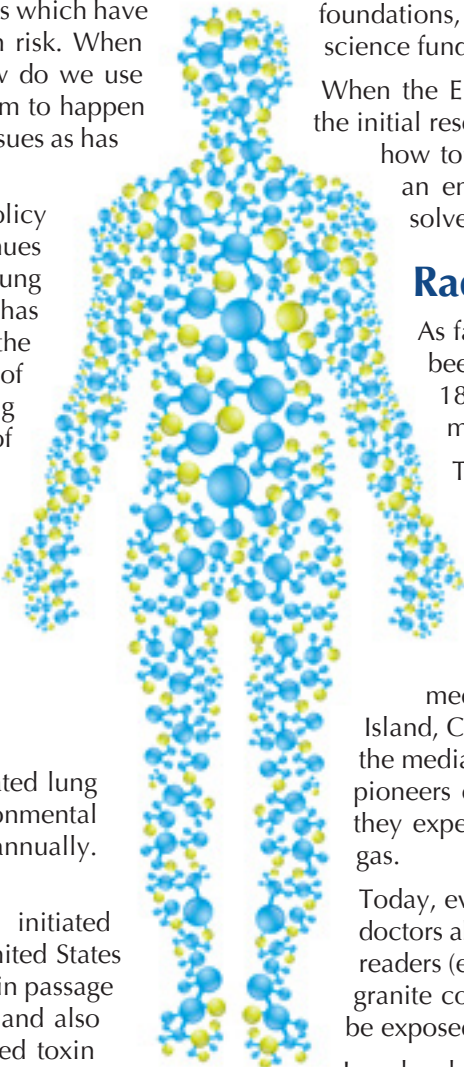
Radon’s Health Effects Known

As far as health science is concerned, radon has been known to be a carcinogen as early as the 18th Century, discovered as affecting mostly miners.

The health effects of radioactivity and radiation became better known to the American public with the advent of the nuclear age. The American public has a popular notion that certain forms of radiation can be bad for you, some of this knowledge coming from schooling, but a lot of it in the popular media. We have seen the chaos of Three Mile Island, Chernobyl and Fukushima through the filter of the media. And we have known the stories of the first pioneers of the nuclear age poisoning themselves as they experimented with radium, the source of radon gas.

Today, even when controlled, we worry and question doctors about too many x-rays, airport scanners, smart readers (energy utility readers on homes), cell phones, granite counters and other instances where we might be exposed to low-level ionizing radiation.

Low-level ionizing radiation is a killer. That’s known. BEIR VI provides a scientific assessment that may be questioned and debated, but thanks to popular media, Americans certainly understand that no one wants to be



exposed to uncontrolled radioactivity and radon is creeping into that awareness.

Ongoing Research

Research is always occurring; however, it’s also important to realize and understand its limitations. Research may be a preliminary study, or tangential to other research. That may mean; that the research is not case controlled, is limited in size (not statistically valid), or does not utilize an acceptable and objective research modality recognized by agencies and policy makers. Yes, radon research of all types still occurs on a limited basis in the United States and worldwide looking into these issues. Preliminary studies are vital to discover areas to further study.

Radon professionals, health researchers and public policy makers will need larger and better funded research that fit valid and recognized epidemiological criteria to be completed and accepted by peers in the health-risk world before we start referencing other radon cancers to the public and move on to create public policy to assist in risk reduction. It’s a question of credibility. While many such studies have been preliminary they have raised salient points and the need for additional research.

So, just a quick review of these recent studies we see that

the health effects of low-level ionizing radioactivity (radon) provide indicators to other cancers and diseases, such as thyroid and blood cancers, but all of these studies are still conjecture and the initial work may or may not be valid for reference to the public.

Historical Studies
Stomach Cancer:

As stated by the EPA, radon in water causes stomach cancer at a rate that exceeds the threshold of toxic exposure that usually generates environmental policy to protect the public, greater than the 1 in a million in a lifetime. It is estimated that up to 20 stomach cancer deaths a year and 150 lung cancer deaths may be attribute to radon in water, which seems small compared to radon in air, but this is one reason Congress passed the law in 1996 requiring radon to be cleaned up in the nation’s public drinking water supply.

EPA abandoned the rule making effort in 2007 due to a lack of resources and funding, but the risk assessment is still there and the risk is considered significant. Some states, New Hampshire and New Jersey are two, have initiated policies of radon in water both because the radon released to the air causes lung cancer and because of the risk associated with radon in water causing stomach cancer.

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9

Childhood Leukemia:
There are several studies on radon and childhood leukemia that may require more definitive research.
An article's abstract in the 2013 issue of Leukemia, A record-based case-control study of natural background radiation and the incidence of childhood leukemia and other cancers in Great Britain during 1980-2006,1 the authors "conducted a large record-based case-control study testing associations between childhood cancer and natural background radiation." Their initial research showed a "12% excess relative risk (ERR) (95% CI 3, 22; two-sided P=0.01) of childhood leukemia per millisievert of cumulative red bone marrow dose from gamma radiation; (however) the analogous association for radon was not significant, ERR

Radon professionals, health researchers and public policy makers will need larger and better funded research that fit valid and recognized epidemiological criteria to be completed and accepted by peers in the health-risk world before we start referencing other radon cancers to the public and move on to create public policy to assist in risk reduction.

3% (95% CI-4, 11; P=0.35)." They called for more detailed research.
Also in 2013 in an article in Radiation and Environmental Biophysics, the authors explore a number of studies.2 "Previous epidemiological studies and quantitative risk assessments (QRA) have suggested that natural background radiation may be a cause of childhood leukemia."
The authors' updated analysis of these studies calls for "the need for further epidemiological investigations of the effects of natural radiation on childhood leukemia to reduce uncertainties and help refine radiation protection standards."
Radon and Blood Cancers
In this year's American Cancer Society study on blood cancer that hit the news and is published in Residential radon exposure and risk of incident hematologic malignancies in the Cancer Prevention Study-II Nutrition Cohort,3 the authors noted that "Dosimetric models show that radon, an established cause of lung cancer, delivers a nonnegligible dose of alpha radiation to the bone marrow, as well as to lymphocytes in the tracheobronchial epithelium, and therefore could be related to risk of hematologic cancers." "Women living in counties with the highest mean radon concentrations (>148 Bq/m3) had a statistically significant

higher risk of hematologic cancer compared to those living in counties with the lowest (<74 Bq/ m3) radon levels." The findings of this large, prospective study suggest residential radon may be a risk factor for lymphoid malignancies among women. Once again, the authors note: Further study is needed to confirm these findings.

How To Use This Information

AARST's mission statement is to disseminate the best information for the benefit of our members and the public at large. Lead with what is known, established, and has been continually validated:

- Radon is the second leading cause of lung cancer mortality and the leading cause of environmental death in American homes.
- Taken alone, radon lung cancer deaths would be 9th leading cause of all cancer deaths.
- The health risk assessments on this type of radioactivity have been established and validated by such organizations as the National Institute of Health, CDC, USEPA, the World Health Organization and the United Nations.

1Kendall, G.M., Little, M.P., Wakeford, R., Bunch, K.J., Miles, J.C.H., Vincent, T.J., Meara, J.R., Murphy, M.F.G. A record-based case-control study of natural background radiation and the incidence of childhood leukaemia and other cancers in Great Britain during 1980-2006 (2013) Leukemia, 27 (1), pp. 3-9.
2Laurent, O., Ancelet, S., Richardson, D.B., Hémon, D., Ielsch, G., Demoury, C., Clavel, J., Laurier, D. Potential impacts of radon, terrestrial gamma and cosmic rays on childhood leukemia in France: A quantitative risk assessment (2013) Radiation and Environmental Biophysics, 52 (2), pp. 195-209.
3Teras LR1, Diver WR2, Turner MC3, Krewski D4, Sahar L5, Ward E6, Gapstur SM2.

- The highest and best practice is to test your home for high levels of radon and if found to be over 4 pCi/L (2.7 Bq/m3), AARST's recommendation is to fix your home.

Secondary Message:

- There are a number of credible studies that indicate that radon's low-level ionizing radioactivity may contribute to other cancers including childhood leukemia, certain other blood disorders, and other indicators.
- These studies are preliminary and require more in-depth research which should be encouraged and funded.
- It is important to note that radon gas is the leading contributor of annual radiation dose that Americans receive and that dose is accumulative.
- Therefore, lowering exposure to radioactivity may help in preventing other potential health effects that are known but not well defined.

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Advertisement for AARST Radon Insurance Program. It states 'Available to AARST Professional Level Members' and 'Apply Today'. It offers 'Liability Protection for The Radon Professional' and provides a website for quotes: www.radoninsurance.org. The Nelson Insurance Agency, Inc. in Louisville, Kentucky is mentioned.

Advertisement for AARST professional members. It highlights '24/7 access to the AARST standards in the Members Only section of AARST-NRPP.com'. It features a photo of a man and mentions a flip book format for field reference.



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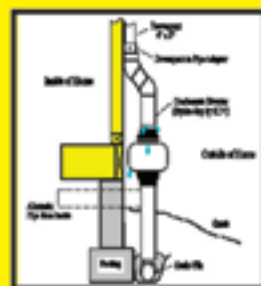
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Radon Research

continued from page 11

Comments from Researchers in the Field



Dr. R. William Field, Ph.D, M.S.

The results of the recent American Cancer Society study by Teras et al. are getting a lot of press. This study is one of an apparent series of papers that Michelle Turner and Dan Krewski (Co-author of the North American Pooled analyses) have been working on – Michelle and Dan previously reported on a potential association between COPD and radon in the same cohort. The primary weakness of the paper is lack of individual radon measurements for any members of the cohort. In addition, they used aggregate (county-based) radon measurements from the 1980s which may not represent radon exposure to individuals in the county over the past 20 years (e.g., change in the use of air conditioning, etc.). They mentioned the ecologic study (Smith et al.) we performed in Iowa that had similar findings.

One interesting aspect is that chronic lymphocytic leukemia was never considered radiogenic until the last 5 years or so. The overwhelming basis for what we know about radiation and cancer comes from the Japanese atomic bomb survivors. However, Japanese have very low rates of CLL anyway so it may have hid the potential link between radiation exposure and CLL. The ACS paper, the Iowa leukemia study (Smith et al.), and other recent studies (e.g., Schwartz et al.) suggest a link between protracted radon exposure and CLL. The bottom line is there needs to be a case-control study performed examining the potential association to further evaluate causality between radon exposure and leukemia. The study would likely have to be multi state and would cost well over a million dollars. We know radon is a substantial public health risk so one wonders if it would change momentum for policy changes if protracted radon exposure was clearly linked to other cancers and COPD?



Dr. Michelle C. Turner, Ph.D, M.S.

A large body of research conducted throughout the world in both underground miners and in the general population has demonstrated a clear link between both occupational and residential radon exposure and lung cancer risk. In our own research conducted in the U.S. using the large-scale American Cancer Society (ACS) Cancer Prevention Study-II cohort, we also observed a positive association between mean county-level residential radon concentrations and lung cancer mortality. The cohort is a unique resource with detailed information available on cigarette smoking history and other important cancer risk factors in study participants.

However, much less is understood about other possible adverse health effects of residential radon exposure including whether radon may be associated with cancers at other sites besides the lung or whether it may have other non-cancer impacts on health as few studies exist. In an extension of our previous research on lung cancer mortality, we also observed some evidence for a positive association between radon and chronic obstructive pulmonary disease (COPD) mortality (a 13% increase in risk per each 100 Bq/m³ radon) in the cohort, but not with mortality from other respiratory diseases. Though these results are yet to be confirmed in other studies, this finding may suggest that radon may play a role in other important diseases of the lung beyond lung cancer, and that associations with COPD mortality may represent an earlier effect of radon on health.

Most recently, we reported a positive association with incident hematologic cancers in the cohort, particularly among women, where each 100 Bq/m³ increase in radon was associated with a 38% increase in risk for all hematologic cancers combined. There was no clear association among men. Though it is unclear why findings were observed only among women it may be due to larger amounts of time spent in the home and greater radon exposure among women or to a lower baseline hematologic cancer risk.

Nevertheless, results from these studies suggest that further to both confirm these findings and to fully understand the possible full range of radon effects on health in both occupational and residential settings is needed including further studies of other non-lung cancer disease incidence with objective measures. Further studies using potential biological markers of early radon effects may also be useful. Finally, results also provide some support for further and continued radon mitigation efforts as the potential burden of disease related with radon may be greater than previously thought.

Turner's References:

Teras LR, Diver WR, Turner MC, Krewski D, Sahar L, Ward E, Gapstur SM. 2016. Radon exposure and risk of hematologic malignancies in the Cancer Prevention Study-II Nutrition Cohort. *Environmental Research*, 148:46-54.

Turner MC, Krewski D, Chen Y, Pope CA III, Gapstur S, Thun MJ. 2011. Radon and lung cancer in the American Cancer Society cohort. *Cancer Epidemiology, Biomarkers & Prevention*, 20:438-448.

Turner MC, Krewski D, Chen Y, Pope CA III, Gapstur SM, Thun MJ. 2012. Radon and COPD mortality in the American Cancer Society cohort. *European Respiratory Journal*, 39:1113-1119.



2016 Revisions and Updates: HUD’s Multifamily Housing Policy Policies Require National Radon Certification

-Kyle Hoylman, AARST Member, Protect Environmental

This past May HUD announced its Multifamily Accelerated Processing (MAP) Guide. The guide was updated to include revisions to the radon testing and mitigation policy outlined in Mortgagee Letter 2013-07. These updates supersede the following:

Mortgagee Letter 2013-07

- Firm Commitment Applications (and Pre-application) submissions on or after Monday morning May 30, 2016, are required to comply with the new Guide
- Loans where the Firm Commitment application was submitted before the effective date of REV-2 are subject to the provisions of the MAP Guide published in 2011 and all applicable Mortgagee Letters and Housing Notices.
- Multifamily Regional Center and Hub Directors will have authority for a limited time period to consider waivers to delay implementation on a case-by-case basis where imposition of REV-2 standards would be unreasonable due to specific transaction history.

AARST member Kyle Hoylman assembled all the update information and in June conducted two webinars, one for operational training staff and the second for Stakeholders and technicians. Both webinars can be found on the AARST-NRPP website in the Standards and Policy Section (<http://aarst-nrpp.com/wp/hud/>).

As with the initial requirements set forth in 2013 these new updates replace requirements previously indicated, while keeping intact the whole set of requirements, which is applicable to all FHA multifamily transactions. The MAP Guide is for multifamily projects only.

It is required that all multifamily testing and mitigation HUD work is done by nationally certified professionals, and in accordance with AARST-ANSI Standards both for Measurement (MAMF 2012 Multifamily Measurement) and Mitigation (RMS-MF 2014 Mitigation Multifamily Buildings). As before, HUD staff reviews the application (pre-app) for compliance.

The radon report (if required):

1. Must be included in the pre-application or application (as required)
2. Responsibility of the lender
3. Added as addendum to the Environmental Report
4. Content:
 - Results of testing
 - Mitigation details, including timing
 - Must be amended to include any post-application testing and/or mitigation

Exceptions:

1. General exceptions with valid justification determined by Radon Professional
2. Projects under 223(f) at low risk areas and available local maps/data
3. Projects under 223(a)(7): no report required
4. In general, where the Radon Report is not required, testing is still encouraged

In addition to the above, the new guide requires the following:

1. Firm Commitment Applications (and Pre-application) submissions on or after Monday morning May 30, 2016, are required to comply with the new Guide
2. Loans where the Firm Commitment application was submitted before the effective date of REV-2 are subject to the provisions of the MAP Guide published in 2011 and all applicable Mortgagee Letters and Housing Notices.
3. Multifamily Regional Center and Hub Directors will have authority for a limited time period to consider waivers to delay implementation on a case-by-case basis where imposition of REV-2 standards would be unreasonable due to specific transaction history.



Dave Rowson, Director of the Indoor Environments Division of the US EPA says, there are as many homes now with high radon as ever in the United States (since the Radon Abatement Act of 1988). And that about 7 million or nearly 1 in 15 homes, are highly likely to be at or above EPA’s action level for radon (4 pCi/L or 148 Bq/m3). The IED agrees and supports radon risk and reduction.

“We know how to reliably test for and reduce radon in homes, these technologies are simple, proven and readily available. This simply means: Acquire radon measurement/mitigation services from a qualified provider, which we have identified as AARST-National Radon Proficiency Program (NRPP) and National Radon Safety Board (NRSB). Mitigation is largely straightforward and relatively inexpensive.

We know there are only two ways to prevent radon-related lung cancer: Fix existing homes by installing a radon mitigation system and build new homes with radon-resistant construction techniques.

An estimated 1,300,000 homes as of 2014 have had systems installed, an estimated 2,250,000 homes as of 2014 have been built using radon-resistant construction techniques. More than 1,000 lives are saved (deaths from radon-induced lung cancer averted) annually due to the 3,600,000 actions to fix or build radon-resistant.”

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14

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15

Other changes made to Mortgage Letter 2013-07

Kyle Hoylman, AARST Member and “X Role” at Protect Environmental of Kentucky, outlined all technical elements of the requirements for review as well as to educate professionals as to the specific changes (MAP) and where those changes fit into the protocols.

1. **The Radon Report** – Required and must be Included in the pre-application or application. The report must be prepared, signed and certified by the Radon Professional. The report Content includes: Testing results, Mitigation details, including timing and cost estimate, Amended to include post-application items. Exceptions may include: Valid justification as stated by the Radon Professional, for low-risk areas with no report required but testing should be encouraged regardless of exceptions

2. **The Radon Professional** – Must be credentialed by National Radon Proficiency Program (NRPP) or National Radon Safety Board (NRSB) and certification / licensure for state where work is being done (if applicable). **NEW UPDATE: the radon professional must provide DIRECT (onsite) supervision for all radon testing and mitigation.** The Radon Professional is Responsible for preparing and certifying the Radon Report.

3. **Standards** - The following standards must be adhered to in all HUD Multifamily work: ANSI/AARST MAMF 2012 – multifamily testing, **NEW UPDATE: ANSI/AARST RMS-MF 2014 – multifamily mitigation, existing buildings, ASTM E2121-13 – single family mitigation, existing buildings, ASTM E1465-08a** – new construction, the most current version of these standards is applicable

4. **Testing** - The certified Radon Professional must directly supervise all testing, adhering to ANSI/AARST MAMF 2012. Prior to the application. 1 year – testing threshold (prior to application) Key items: Upper floor testing (10%), Non-residential areas – ground contact, Closed building conditions (short term testing), Resident notification, Exceptions include: **NEW UPDATE 25% screening option**, Mitigation is required greater than or equal to 4.0 pCi/L.
 - **About the New 25% Screening Option:** The only exception to ANSI/AARST MAMF 2012 – Section 3.1. It is required that: 25% of all ground contact units in each building, 10 % of upper floor testing (10%), non-residential areas, and Residents are notified of closed building conditions.
 - If screening indicates elevated radon concentrations exist on the property, conduct a full assessment, and 100% of all ground contact units in all buildings on the property must be included in the screening
 - If a full assessment is not conducted, all units in all buildings will require mitigation.

5. **Mitigation** – Design, Operation, Maintenance and Monitoring - Active mitigation – required for duration of insured mortgage (condition, Firm Commitment) (NEW), ANSI/AARST RMS-MF 2014 – guidance (Section 12.0) Key components: Routine maintenance schedule, Non-routine repairs – i.e. blower replacement, Ongoing monitoring (testing), Records management, Inclusion in amended Radon Report – required, Protect building occupants by minimizing the potential for exposure to radon gas – primary objective

6. **Sub Rehab and Conversions** - Applies to all radon zones - Direct supervision - Radon Professional, Design oversight and approval, Direct onsite supervision, mitigation, Early Testing Feasible (minimal HVAC, building envelope rehab), < 4.0 pCi/L – no further action required, > 4.0 pCi/L – mitigation required in design, Early Testing Not Feasible (typical gut rehab) Letter of determination – Radon Professional, Option to include mitigation in design – high risk areas. Post-construction testing required – mitigation required > 4.0 pCi/L, ANSI/AARST RMS-MF 2014 or ASTM E2121-13 – active mitigation standard requirement.
 - **Mitigation timing** – prior to Final Closing, Reporting requirements – no mitigation, Testing assessment report – 1 year threshold
 - **Reporting requirements** – mitigation: Mitigation design and cost estimate – initial application, Cost estimate (may require pilot test to determine), Deferred design submittal – permitted, Post-mitigation testing assessment, Certificate of completion – Radon Professional

7. **New Construction** - Applies to all radon zones, Direct supervision - Radon Professional, Design oversight and approval, Direct onsite supervision, mitigation
 - Zone 1 requirements – ASTM E1465-08
 - Zone 2/3 requirements – Sections 6.2-6.4 of ASTM E1465-08a
 - ***NEW UPDATE:** 6.2 – Ground cover, 6.3 – Foundation walls, 6.4 – Gas-Permeable layer (includes soil-gas collection system)
 - In addition to the Zone requirements, the following is also required: Non-residential areas – included (clubhouse, maintenance), Post-construction testing, Activation of passive system > 4.0 pCi/L, and Reporting Requirements: Mitigation design and cost estimate – initial application, Deferred design submittal – permitted, Activation details, if required, Post-construction testing assessment, and the Certificate of completion – Radon Professional
- 

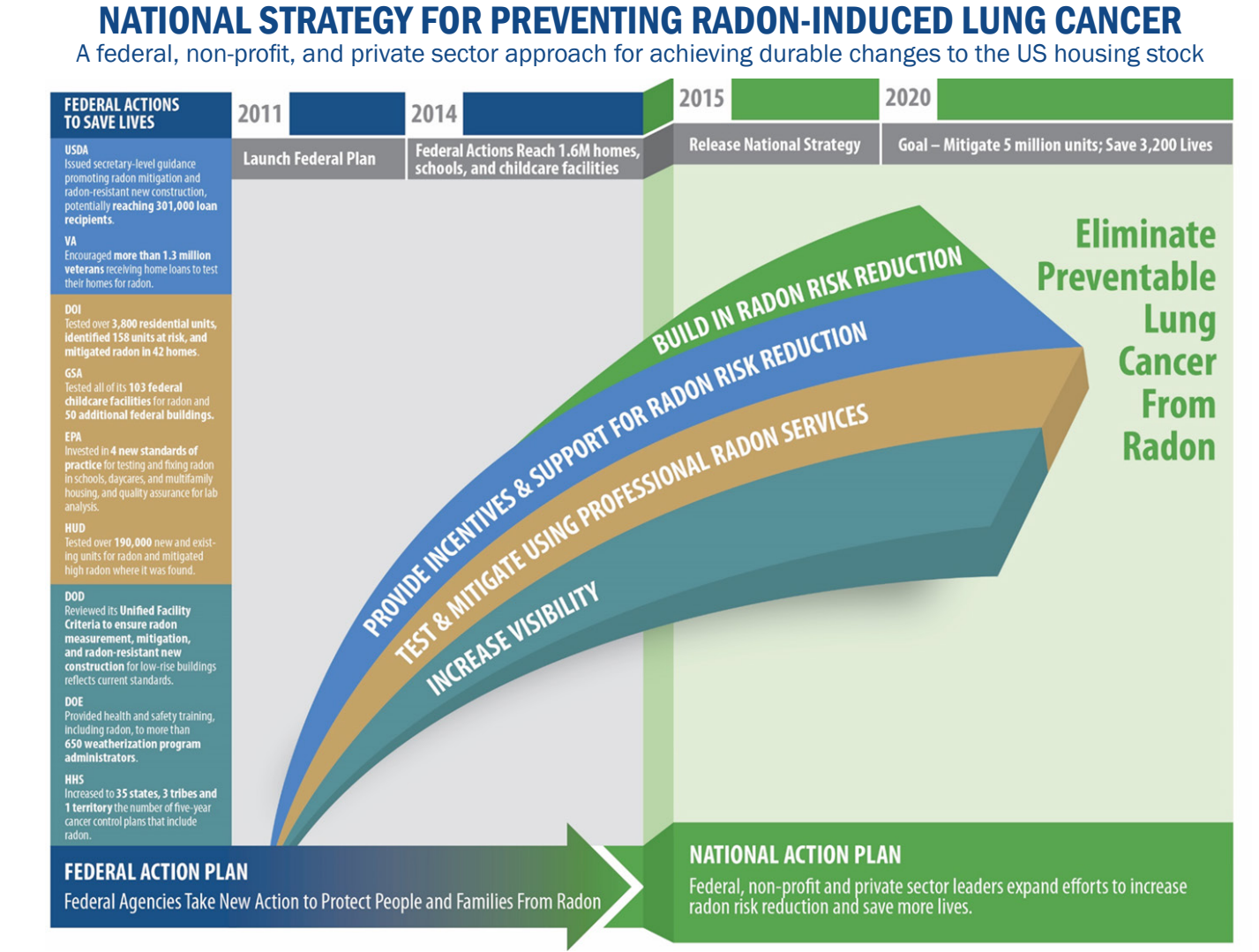
Certified professionals may learn more about multifamily techniques by taking appropriate certified courses, and educating themselves on the standards. If you take extra course work and add the NRPP Certificate for MFM and MFMT to your credentials, you are taking steps to raise your professional profile for those who might be looking to hire a qualified and experienced professional. Our search on the new website clearly indicates by use of visual icons professionals’ accomplishments. To be clear, the MFM and MFMT Certificate is not your National Radon Proficiency Certification, it is extra. Your requirements with working on Multifamily HUD Properties only requires the NRPP Certification. AARST-NRPP is working on creating an easy

reference search for environmental companies to find our qualified professionals.

Other HUD News for Large Buildings

The Office of Residential Care Facilities is drafting a rule for the facilities that it oversees to parallel the multifamily standard for residential/senior living housing. AARST supplied ORCF with comments for their draft proposal.

Guidance for HUD’s Section 242 Loan program is being updated to address radon in the hospital loan insurance program for hospitals, structured after MALB standards. ■



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Radon Testing in Multifamily Housing



-By David Wilson, Research Staff
Oak Ridge National Laboratory, Oak Ridge, Tennessee

In recent years, perhaps one of the most debated decisions by the AARST Radon Standards Committee was the endorsement of performing radon testing within every ground contact unit in a multifamily housing neighborhood. Although it is true that there are ways to statistically screen a fixed population of multifamily housing at a known degree of confidence, there are sampling considerations that mitigate the potential cost savings of not testing all the testable units.

For one, to ensure that the measurement uncertainties are well established, a much higher frequency of duplicates, blanks and spikes is required (i.e. 100% duplicates, 5% blanks and 10% spikes within the range of interest (i.e. 3-6 pCi/L). With respect to sample density (i.e. the number of units to test in the neighborhood), an assumption must be made based on the estimated frequency of elevated radon in the population (e.g. 1%, 10%, 15% etc.).

“...elevated radon is rarely an all or nothing proposition, sometimes the frequency can be as low as 1 in 1000. Therefore, extrapolation of the frequency can be problematic especially if there are limited data near the site to be sampled.”



The problem with making this key assumption is that within a population of family housing, elevated radon is rarely an all or nothing proposition, sometimes the frequency can be as low as 1 in 1000. Therefore, extrapolation of the frequency can be problematic especially if there are limited data near the site to be sampled. In addition, considerable thought must be invested into which particular units to select for testing to ensure both a good geological coverage of the site and different unit location within the multifamily building (e.g. unit A, B, C, D). Last but not least is the importance of proper data interpretation.

Although it might be tempting to assume that if the highest result of 30 of 100 units sampled was 2.0 pCi/L that the odds of having a single unit ≥ 4 pCi/L would be small, statistically speaking you would be wrong over 50% of the time if one of the 70 untested units had elevated radon. Another statistical approach is to model the screening data distribution to predict the presence or absence of elevated radon potential in the entire population of interest.

The weakness in this approach is that typical measurement uncertainties (i.e. $\pm 15\%$ to $\pm 25\%$), usually results in a curve showing some elevated radon potential for any single result between 2.7-3.3 pCi/L. When all of these considerations and their associated costs are taken into account, typically for most populations of < 400 testable units the costs of statistical screening vs. full testing is about the same.

“...considerable thought must be invested into which particular units to select for testing to ensure both a good geological coverage of the site and different unit location within the multifamily building.”

With respect to testing individual units within multifamily buildings (i.e. duplex or townhouses) there is still some lingering debate within the radon industry as well. For argument sake let us consider the following radon survey data collected at 3 different sites within 3 different EPA Radon Zones (Table 1). To aid in comparison, all the radon data:

- Were long-term measurements (180-365 day) placed and retrieved at each site within 30 days of each other.
- Were collected within a 10 mile radius of each other at each site.
- Were all collected in slab on grade homes.
- At each site, the data were collected within multifamily buildings that were identical in construction, age, appliances, and heating and cooling systems.
- Were from a minimum of 50 units of each type at each site.
- Were from the same detector laboratory/manufacturer.

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Table 1. Single vs. Multifamily Radon Survey Data

Site 1 (EPA Zone 1)	Single Detached	Duplex	Townhouse	Total/ Averages
Number of Units Sampled	165	122	120	407
Number of Buildings	165	61	30	256
Number Units ≥ 4 pCi/L	14	26	13	53
Percent Units ≥ 4 pCi/L	8%	21%	11%	13%
Number buildings with 2 units ≥ 4 pCi/L	N/A	3	2	5
Number of buildings with all units ≥ 4 pCi/L	N/A	3	0	3
Highest Single Result (pCi/L)	66.7	8.5	26.3	2.3
Site 2 (EPA Zone 2)	Single Detached	Duplex	Townhouse	Total/ Averages
Number of Units Sampled	70	510	247	827
Number of Buildings	70	255	38	363
Number Units ≥ 4 pCi/L	0	14	57	71
Percent Units ≥ 4 pCi/L	0%	3%	23%	9%
Number buildings with 2 units ≥ 4 pCi/L	N/A	0	4	4
Number of buildings with all units ≥ 4 pCi/L	N/A	0	0	0
Highest Single Result (pCi/L)	3.3	9.3	27.1	2.3
Site 3 (EPA Zone 3)	Single Detached	Duplex	Townhouse	Total/ Averages
Number of Units Sampled	60	120	852	1032
Number of Buildings	60	60	213	333
Number Units ≥ 4 pCi/L	1	2	51	54
Percent Units ≥ 4 pCi/L	2%	3%	6%	5%
Number buildings with 2 units ≥ 4 pCi/L	N/A	0	2	2
Number of buildings with all units ≥ 4 pCi/L	N/A	0	0	0
Highest Single Result (pCi/L)	4.4	6.5	36.7	1.5

As can be seen in Table 1, despite the presence of elevated radon potential at each site sampled, none of the townhouse buildings had elevated radon within all units of the building. Therefore, a statistical sampling approach where sampling only one or 2 units per building in a fourplex building would have missed the elevated units most of the time. A similar conclusion can also be reached with respect to duplex buildings, where only Site 1 had 2 of 61 buildings (5%) with elevated radon in both units.

However, it is important to note that finding elevated radon in all units within a multifamily building is not unheard of. For example, in one survey with buildings with similar

characteristics as those in Table 1, 34 of 36 buildings (300 units) had elevated radon in all the units in the building. In another survey 5 of 35 buildings (140 units) had elevated radon in all the units in the building as well.

In summary, like single detached units, there is no known way to predict in advance if a particular home has elevated radon. Multifamily housing is no different. Therefore, the only way to know if elevated radon is present is to test each unit in the building. ■

Mitigators Need QA Plans, Too!

AARST-NRPP Mitigators Are Required to Have a Quality Assurance Plan and to have checklists for quality control – called a Quality Management System.

Early this year, the NRPP Policy Board and the AARST Board approved policies requiring that Mitigators also have a QA/QC Plan on file. The NRPP certification program is encouraging that all current members develop a plan and have on it on file within the next year, and that new Mitigators create a plan immediately. By 2018, professionals not having plans may be subject to remedial action, including additional continuing education requirements. To make it easy for AARST Members and NRPP professionals, QA plan templates are available for free on their members only, tool kit section of the aarst-nrpp.com web site.

So, what’s in a mitigator’s tool kit for quality?

Most seasoned professionals already track any number of details from job sites. When calls come for fan replacements or problems, these sheets are critical. Most seasoned professionals also use job site tracking sheets to identify and correct repeated mistakes. That action is the essence of a "quality management system."

The process of formalizing a QMS provides an opportunity to re-evaluate procedures. Are we meeting standards, codes, customer satisfaction, worker safety and needs for each building's design? As procedures are improved, document them in the QMS manual. A QMS compares input information (e.g. the quality policy) to output results (e.g. successes and failures in meeting quality goals). Regardless of the style or the size of your organization, this process will improve long-term quality and long-term profits.

All quality assurance plans for any product, service, laboratory or other endeavor have similar components that are customized with procedures specifically critical to the task or product:

- Essential information regarding the roles of responsible parties;
- Procedures required to achieve quality objectives;
- Control activities to validate both performance of responsible parties and effectiveness of current procedures in achieving the objectives.

Each plan is individually tailored to fit the organizational structure and goals of the business. Controlling quality includes tracking of activities and failures to identify needed improvements in procedures and staff interaction with procedures. Besides being evidence of defensible practices if called to task, most seasoned professionals already evaluate activities and failures in order to enhance net income and customer satisfaction.

Steps to Take

1. Establish a Quality Manual (e.g. Quality Assurance Plan). The quality aspects of the plan begins by defining a) Minimum quality for the system installation and installation process and b) The quality objective (e.g. enhanced safety for the building occupants). The plan then documents the processes and procedures aimed at meeting those goals. From ISO 9001, Section 4.1 "General Requirements": a) determine the processes needed for the QMS (Quality Management System) and their application throughout the organization, b) determine the sequence and interaction of these processes, c) determine criteria and methods needed to ensure that both the operation and control of these processes are effective, d) ensure the availability of resources and information necessary to support the operation and monitoring of these processes, e) monitor, measure where applicable, and analyze these processes, and f) implement actions necessary to achieve planned results and continual improvement of the processes.
2. Thereafter maintain, document and control quality; monitor and manage the results from work performed. When called to task, it is documentation of control activities that validate, if defensible actions have been taken to consistently maintain quality.

Regardless of the style or the size of your organization, this process will improve long-term quality and long-term profits.

Quality Management Systems protect you and your profession and will keep your insurance rates low. They protect the consumer from radioactivity. They are vital and required tools to have in your business files when you go into the world of large and multifamily buildings and schools. And it is now required that you have one in your office. Beginning in 2017, AARST-NRPP will begin conducting spot audits to make sure professionals have the plans. In the initial audit phase, we'll be leading professionals and helping pros come into compliance. By 2018, the compliance audits will become more disciplined.

We are all committed to excellence at AARST. QA/QC is one component to achieve that excellence. Begin today, go to www.aarst-nrpp.com and log into your members only tool kit for the free QA/QC tools that are online 24/7.

Radon Professionals Saving Lives with QA/QC! ■

Language in the house appropriations subcommittee report affirms \$8 million for SIRG; the full committee passed the bill June 15

The House Appropriations Committee approved the Interior-Environment subcommittee bill and report June 15. It affirms Congress' continued support for EPA's State Indoor Radon Grants (SIRG) Program and recommends that EPA help expand qualified radon capacity to meet demand generated by the National Radon Action Plan. While the entire bill is not likely to survive budget negotiations, House Committee provisions for SIRG have been included in the final Appropriations Act in the past. ■

Fiscal Year 2017, Interior-Environment Appropriations Committee Report:

(1) The Committee continues to support State Radon Program efforts, provides \$8,051,000, equal to the fiscal year 2016 enacted level, and directs that EPA award priority to State applicants that have adopted or seek to adopt radon building codes for single family homes, conduct programs providing radon awareness and education for homebuyers, or have certification requirements according to national consensus standards for radon measurement and mitigation professionals: \$3,500,000 to promote radon awareness; \$1,000,000 to inform local school systems about radon exposure risk and to provide sample school testing and mitigation plans; and \$3,551,000 to offer training and technical support on radon measurement and mitigation and radon-resistant new construction techniques and best practices

(2) The Committee recommends the Administrator take 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 recognize qualified programs; and encourage States to require certification by qualified programs;
2. promote train-the-trainer courses in radon measurement, radon mitigation, and radon resistant new construction
3. recognize consensus American National Standards and support their completion and adoption;
4. support dialogues to add up-to-date methods of reducing radon in new buildings to model building code requirements ■

Rn in Water – The Wild West

Unfortunately for all of us, as some states develop stricter guidelines for radon in drinking water, there are no rules or standards governing the measurement and mitigation of radon in drinking water. Techniques and remedies exist but there are no national standards (AARST is working on the first consensus measurement document). The real problem and folly here is a lack of standards and certification requirements for radon in water mitigation equipment. Radon in water systems that utilize activated charcoal should have a maintenance and disposal plan. CDC even issues a web site advisory about activated charcoal systems requiring ongoing maintenance plans. Why? If not properly maintained, a granulated charcoal system could generate significant gamma radiation. In some cases, enough to cause imminent harm to an entire household. ■

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Important Tax Information for AARST members



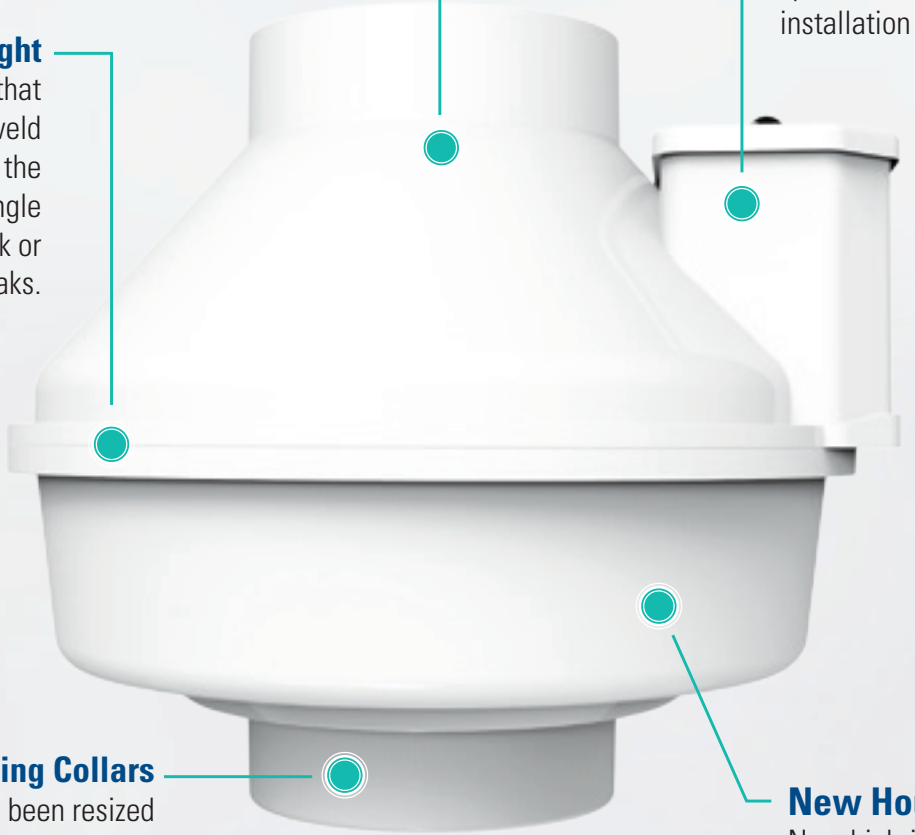
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