

12th Annual Radon Conference



Marana Marana

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12-16 April - Victoria, BC

We are excited to be back in person!

This conference promises to be a great opportunity to reunite and network in person with colleagues in radon from across the country and around the world.



Indigenous Exhibit Destination Greater Victoria

CARST is proud to unite members from across Canada, which encompasses the traditional territory of many First Nations, Métis Peoples, and Inuit whose ancestral footsteps and rights extend beyond the colonial boundaries that exist today. We respectfully honour these Peoples' rights, history, and relationships with this Land.

As we gather for our 12th annual radon Conference, CARST respectfully acknowledges the Lək̄wəŋən (Lekwungen) peoples on whose traditional territory we gather, and the Songhees, Esquimalt and <u>W</u>SÁNEĆ peoples whose historical relationships with the land continue to this day.

Lekwungen means "place to smoke herring", and herring was an important food source for the traditional peoples of the region. Thursday's evening out will feature local indigenous cuisine at the Songhees Center, and a chance to learn more about the people who have stewarded the beautiful land on which we've gathered for generations.

ADDITIONAL PHOTO CREDITS:

Front Cover

12th Annual CARST logo design. By David Cheetham (Regehr's Printing)

Front Cover Pictures

PORTRAIT_2 Cherry Blossoms By Erin Bosworth/DGV

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CARST Radon Conference www.carst.ca

Canadian Association of Radon Scientists and Technologists (CARST)

CARST encourages you to consider becoming a member. We offer a variety of corporate packages, as well as discounts for partner associations. For more information on membership benefits and to join, visit www.carst.ca

CARST/ACSTR is a nonprofit organization dedicated to encouraging, supporting and educating radon professionals in Canada. Direct inquires may be sent to Pam Warkentin, CARST Executive Director, p_warkentin@carst.ca.

Program layout and design by David Cheetham /Regehr's Printing.

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BOARD OF DIRECTORS



David Innes - President of CARST

David is a bilingual senior sales executive with over 25 years' experience building international businesses from the ground up. David has spent most of his career in construction and construction related industries, and is Director of Sales for Radon Environmental Management Corp. C-NRPP certified in both measurement and mitigation, David is an active member of AARST with RRNC certification, and recently sat on the AARST/ANSI board that developed new guidelines for the collection of samples for radon testing in water.



Jeff LeBlanc - Vice-President of CARST

Jeff holds a Bachelor of Science (UNB) and is C-NRPP certified since 2016. Jeff and his team of mitigators at Radon Repair have over 75 years of construction experience. Jeff is a Certified Master Inspector whose team performed over 8500 residential and commercial inspections over 8 years. Radon Repair has completed residential and commercial radon projects throughout the Maritimes. Jeff is also the CEO/owner of WindowWorld in Moncton. Jeff is passionate about Radon awareness and he enjoys educating whoever will listen. "I have a Science degree but I am not a scientist, I am not a doctor of medicine, but I AM a doctor of buildings. I am a customer service expert first, then a Radon mitigator. Je suis bilingue. Keep on smiling. Peace & Love"



Mark Donohue - Treasurer of CARST

Mark Donohue is Vice President of Building Science at le Groupe Gesfor Poirier Pinchin Inc, and has over 25 years' experience dealing with environmental issues, building envelope science and occupational health and safety. Mark is C-NRPP certified in both measurement and mitigation and has designed and implemented radon mitigation systems in schools and large commercial buildings throughout Quebec.



Julie Girardeau - Secretary of CARST

Julie is a skilled and experienced professional with a diverse background in banking, finance, and administration. She is a C-NRPP certified measurement professional and currently serves as the General Manager of Operations at AccuStar Canada. Julie also oversees the day-today operations of the Pro Division Rental and Library Lending Programs at Airthings. Located in Quebec City, Julie is fluently bilingual and is dedicated to building strong relationships with her clients and radon professionals across the country. Her vision is to make equitable measurement solutions and mitigation grant programs available to all Canadians, regardless of their socio-economic status.



Andrew Arshinoff

Andrew is a Director of RadonCare, and he is a passionate and knowledgeable voice from within the radon industry. Andrew excels in problem solving and thrives off obscure mechanical and scientific problems. To him, the greater the challenge, the greater the personal fulfillment. Radon presents an opportunity for Andrew to solve these puzzles while helping others, a pursuit he greatly enjoys. Andrew has nearly a decade of experience in residential and commercial mitigations, and is a contributor to the Evict Radon confederation, and a current C-NRPP Advisory Board Member. He is heavily involved in radon projects across Canada.



Tod Boss

Tod Boss has been involved in the construction industry for the past 27 years. During this time, he has taken on various roles in the home building industry. From Site Superintendent, to Builder, to Home Warranty Inspector. Tod is currently employed by Fantech, a System-Air Company, as the Radon Sales Manager for Canada. In 2012, Tod received his C-NRPP certification and founded RadonProz Inc., a company specializing in Radon Mitigation in Manitoba, Saskatchewan, and Ontario, serving as president until 2020.

Marcel Brascoupé

A founding member of CARST, Marcel Brascoupé is a certified general contractor specializing in the installation of radon mitigation systems since 2008. Marcel is also a bilingual C-NRPP national certified trainer for radon measurement, mitigation and CRNCH courses, Marcel also participated in the development of Health Canada's guideline document for radon mitigation and participated on or co-authored several scientific papers on radon mitigation.



Graeme Cooper

Graeme is the owner/operator of Point-The-Way Radon Services located in the Okanagan in BC. Graeme is a licensed home inspector in the province of BC; he runs a large commercial/ residential renovation and cabinetry company in the Okanagan and a radon mitigation company. Graeme also finds time to make a priority of volunteering in his community to add balance to his work life, he is currently volunteers as a Group Commissioner for the 1st Summerland Scouts of Canada Group; is a certified Red Cross First Aid Trainer; and has 16 years of continual service with the Summerland Fire Department. Graeme would love the opportunity to help and be more involved with CARST on the board of directors to represent mitigation professionals across Canada.



Bruce Decker, CET, ROHT, BSSO

Bruce Decker is the Senior Indoor Environmental Specialist at BGIS with 25 years' experience in the Environmental, Health & Safety and Building Science consulting industries. Bruce is C-NRPP certified in measurement, mitigation and CRNCH and heads a national radon testing and mitigation team specializing in commercial buildings for corporate clients across Canada. Bruce brings technical committee and Director experience to CARST from his involvement with CSA and EACC (formerly EACO).



Colin Dumais, BSc.

When Colin is not obsessively sealing leaks in a basement slab or building VOC management systems in commercial buildings he is probably either mentoring a new mitigator or dreaming up a new way to make mitigations more effective. His guys no longer ask him "If we are getting good pressures why are we still sealing the cracks?"



Michael Halliwell, M. Eng, EP, P. Eng.

Michael Halliwell is a Senior Environmental Engineer at Thurber Engineering in Edmonton, Alberta. Michael has over 20 years' experience in soil and groundwater assessment and remediation, soil vapour and indoor air quality. He is certified in both radon measurement and mitigation.



Andrea Schinkel

Andrea has over 10 years experience in Facilities and Project Management for the Federal Government. She is also co-owner of an electrical contracting company and is certified in both radon measurement and mitigation.



Fisherman's Wharf Off the Eaten Track

WELCOMING MESSAGE

I would like to welcome everyone to our 12th annual CARST conference. Thank you to our attendees who have made the journey from across Canada, the US and around the world to beautiful Victoria BC. Thanks also to our generous sponsors who help make the conference possible. We have prepared what we think is a first-rate agenda of presentations with a wide range of speakers from the radon community around the globe. I encourage you to attend as many of these as possible and to be sure to visit our top-notch group of exhibitors and sponsors to view the latest in radon technology.



As we gather for our 12th Annual Radon Conference, CARST respectfully acknowledges the Låk^wəŋən (Lekwungen) peoples on whose traditional territory we gather, and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.

The last few years has seen some great progress in radon in Canada. We have seen a significant interest in radon from the real estate community, including the addition of radon to the disclosure statements in BC and interest from other provinces. We have done a lot of awareness work among elected officials across the country and were excited to see the Honorable Jean-Yves Duclos, Federal Minister of Health, issue a statement for radon action month. Additionally, we have seen a significant increase in accessibility of radon testing and mitigation for Canadians with the library loan programs, community-based radon testing programs and a national radon mitigation grant.

As you will see from our speaker line up, members of the medical community have joined us in helping to build radon awareness. We are honoured to have Dr. Khoo from the BC Cancer Centre sharing his journey with lung cancer, and Dr. Mema talking about the importance of protecting children by prioritizing radon testing in schools. We are also looking forward to building code update presentations, as we all look forward to a day when radon can be addressed from day one.

I would like to thank all those who worked so hard at the CARST Board level to make these great things happen and of course a thanks to our wonderful CARST staff.

David Innes

President CARST

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ADMINISTRATIVE STAFF



Pam Warkentin

A founding member of CARST and a C-NRPP certified measurement professional, Pam Warkentin is the Executive Director of both CARST and C-NRPP, and Project Manager of the Take Action on Radon (TAOR) Program. Pam works closely with the CARST Board of Directors, the C-NRPP Policy Advisory Board, and all CARST committees. She also coordinates with Health Canada and radon stakeholders across the country.



Erin Curry, Eng.

A Mechanical Engineer who previously ran her own building inspection and radon measurement firm, Erin is Regional Director at CARST, and also serves as Project Lead for the Take Action on Radon (TAOR) Project. Erin brings a wealth of knowledge and practical experience to bear in supporting our members. Based near Montreal Quebec, Erin is the French-speaking contact for all CARST initiatives.



Alison Ruiter

Alison Ruiter joined the CARST Administrative team several years ago, helping out with bookkeeping and administrative tasks. Alison has subsequently taken on important programs such as the White Ribbon program, supporting lung cancer patients and their families as they test for radon.



Carina Smal

Carina Smal is the newest addition to the CARST Administrative team. A recent graduate in Labour Studies from the University of Manitoba, Carina has been lending her training and talents to supporting radon professionals through her work with C-NRPP. Based in Winnipeg, Carina is also involved in many of CARST's myriad projects.



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SCHEDULE

WEDNESDAY, April 12

7:00 - 8:30 pm Conference kick off and Meet and Greet

INCHSDAT, April 1	THURSDAY, Apr	il 13
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7:30am - 8:30am	Breakfast in Exhibit Hall
8:30am - 10:00am	Conference Kick off: Radon and Lung Cancer, medical community's response to radon
	 Doctor and Patient Story of Radon and Lung Cancer, Dr. Khoo
	 Using regional smoking rates to improve estimates of radon-attributable lung cancer rates in BC, Dr. McVea
	 Tackling Radon in Schools: The Interior Health Outreach Project, Dr. Mema
	 White Ribbon and Patient Advocacy, Crystal Lytle
10:00am -10:30am	Break in Exhibit Hall
10:30am - noon	Radon in Canada - Research Updates
	 Health Canada - National Program Update, Pawel Mekarski and Kelley Bush
	 Update on RadoNorm: Overview of regulatory approaches to control radon in dwellings, workplaces and large-scale buildings: lessons learned and recommendations, Angelika Kunte
	 Radon Recommendations for BC Radon Action Plan, Noah Quastel
noon - 1:00pm	Lunch

1:00pm - 2:30pm	Practical Concurrent See	sions - Breakouts	s in the fo	llowing topics
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Practical Sessions in Mitigation: Mak

- Turning Basements into Valuable, Comfortable, Healthy, and Safe Living Areas, Luis Faria
- Performance of Airwell® in Mitigating Radon (222Rn) in Water: A Real-Life Study on Two Household Wells in Georgia, USA, Dr. Uttam Saha
- Peace of Mind from The Ground Up with RadonX[™], Fadi Basmaji

Making use of Radon Data:

- Radon Mapping Update, Jean-Philippe Drolet
- From Mapping of Radon in Soil to Inventory of Radon Indoors, Linda Aguirre

2:30pm -3:00pm Break in Exhibit Hall

3:00pm - 4:30pm Making Testing for Radon more Accessible - Various Presenters

Thursday Evening Dinner Out - included with Conference Registration

FRIDAY, April 14

7:30am - 8:30am	Breakfast in Exhibit Hall		
8:30am - 10:00am	Building Today		
	 Radon and Energy Efficiency, Dr. Noah Quastel and Dr. Anne-Marie Nicol 		
	 Health Canada – Halifax Research, Robert Stainforth 		
	 Indoor radon – How do New Homes in Winnipeg Compare?, Dr. Janet Gaskin 		
	 Real Time Radon Monitoring Reveals the Influence of Building Air Dynamics on Residential Radon Levels Across Time, Dustin Pearson 		
10:00am -10:30am	Break in Exhibit Hall		
10:30 - noon	Radon and New Construction		
	 Researching BC's Building Code, Chantal Wilson 		
	 Progress of the Task Group on Radon and Soil Gas Mitigation, Corey Carson 		
noon - 1:00pm	Lunch in Exhibit Hall		
1:00pm - 2:00pm	Practical Sessions in Large non-residential Buildings		
	• Austria's new guideline for radon mitigation measures for water supply facilities, Angelika Kunte		
	 Follow-Up Measurements in Workplaces and Schools – Comparisons Between 2 and 7 Days Measurement Periods, Patrik Starck 		
	• Soil Gas Mitigation System Design Strategies for Institutional Buildings, Alexander Grams		
	 Changing activity patterns since the COVID-19 pandemic and increased radon gas exposure for some workers and younger people, Cheryl Peters 		

2:00pm - 2:30pm Break

2:30pm - 4:30pm

Looking forward to Healthy Tomorrows

- Workshop on Building a Better Tomorrow
- Lifetime radon exposure as a future lung cancer screening eligibility criterion in Canada: pilot study outcomes and upcoming clinical trial details, Dr. Aaron Goodarzi

SATURDAY, April 15

*registration for these courses is extra

Section A:

8:30am - 10:00am

• A Review of Radiation Biology, Dr. Joseph Hayward

10:00am-10:30am - Break

10:30am - noon

• Radiation As Easy As 1, 2, 3, Ali Shoushtarian and Jill Robertson

Lunch - provided

1:00 - 2:00pm

• C-NRPP Code of Ethics, Pam Warkentin

2:00 - 2:15pm - Break

2:15pm - 4:00pm

• Fan Curve Secrets, Colin Dumais

Section B:

8:30am - 10:00am

• Free Mobile Customizable Mitigation Report, Colin Dumais

10:00am-10:30am - Break

10:30 am - noon

• Commercial Building Workshop, Colin Dumais

Lunch - provided

1:00 - 4:00pm

• Controlling Radon in New Canadian Homes, Jeff Leblanc

SUNDAY, April 16

Day-long field trip with trainer Colin Dumais and guests.

The day includes transportation to an off-site location and lunch included in the registration cost.

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RADON CHAMBER

PRESENTATION ABSTRACTS

THURSDAY, April 13th

Using regional smoking rates to improve estimates of radon-attributable lung cancer rates in BC

Dr. David McVea

This presentation will discuss the impact of the combination of smoking and radon in help to improve communications with respect to this combined risk.

Radon Testing & Mitigation in Schools: The Interior Health Pilot Project

Dr. Silvina Mema

This presentation will provide an overview of the Interior Health (IH) led Radon Testing and Mitigation in Schools Pilot Project. The geography of the region served by Interior Health contains areas of higher radon prevalence than the two highest provinces in Canada. School screening in the 1990s detected concerns, but the radon level in many schools remains unknown. COVID-19 raised the importance of Indoor Air Quality (IAQ) in schools, and the timing is right to bring radon into the routine IAQ agenda. This Project recognized the competing interests faced by school management, and the longevity goal of IAQ and radon management.

White Ribbon and Patient Advocacy Crystal Lytle

The White Ribbon has long been a symbol for lung cancer, but a lung cancer advocate has used this symbol to create Ribbon-building events. Community ribbon building capitalizes on the relationships we have within our own community, including our medical teams & cancer centers. These ribbon builds are a gateway to educating our communities and humanizing lung cancer.

The exterior of Hotel Zed destinationgreatervictoria.barberstock.com

Update on RadoNorm: Overview of regulatory approaches to control radon in dwellings, workplaces and largescale buildings: lessons learned and recommendations

Angelika Kunte

In 2013, the European Council enacted the EU Basic Safety Standards 2013/59/EURATOM Directive that requires Member States to establish a national radon action plan addressing long-term risks from radon exposures in dwellings and workplaces for any source of radon ingress. As part of the RadoNorm project, data was collected on regulatory approaches to control radon in dwellings, workplaces and large-scale buildings in 22 countries (15 EUmember states and other states) through a survey. In 2022, a workshop was held where 36 representatives from 17 countries met to discuss the advantages and disadvantages of different regulatory approaches and with an aim to improve the successfulness of radon regulation measures. This presentation will summarize the results of the survey and workshop discussion.

Radon Recommendations for BC Radon Action is Plan

Noah Quastel

Many different laws and regulations cover the indoor environment from building codes to occupational health and safety regulation to residential tendencies law and more. Addressing radon requires a proactive and integrated approach. Radon action plans are a standard part of environmental and health governance in European countries and recommended by health Canada. In this presentation, Noah Quastel will discuss the efforts taken by BC lung to produce recommendations for a BC action plan and highlight key points in the recommendations.

Turning Basements into Valuable, Comfortable, Healthy and Safe Living Areas

Luis Faria

This presentation will highlight the advantages of using our field-proven CABS Radon Abatement system to provide the required radon control in basements with the added benefit of increasing the R-value of the wall and potentially mitigating condensation inside the below-grade wall.

Performance of Airwell in Mitigating Radon in Water : Real-life study of Two Household Wells in Georgia, USA

Dr. Uttam Saha

In the state of Georgia, an increasing number of household wells are showing radon concentrations that exceed the U.S. Environmental Protection Agency's suggested Alternate Maximum Contaminant Level (AMCL) of 4,000 pCi/L. Mitigation of radon in water is new relative to mitigation in air inside homes. The most commonly used point of entry systems are Aeration and Granular Activated Carbon. Mitigation of radon levels in water that are higher than 100,000 pCi/L have not been well documented by any methods. Airwell® technology claims to be able to mitigate any high level of radon in water; however, there is a lack of evidence from real-life situations. In collaboration with the company, in December 2021, an onsite radon mitigation demonstration project using Airwell® technology was set up on two household wells located in north central Georgia. Up-to-date results of this demonstration project will be presented.

Peace of Mind from The Ground Up with RadonX™

Fadi Basmaji

Radon mitigation systems are life-safety systems, with severe consequences if inadequate products are used. In the absence of a performance standard in Canada specific to radon mitigation products, ABS, sewer pipe, and other PVC and DWV plumbing products are being used for radon mitigation. With no radon-specific systems (sub-slab depressurization) available in the market, radon mitigators are accustomed to installing what they are familiar with and readily have access to, taking cost considerations into account. IPEX is proud to offer RadonX™, the first engineered PVC piping solution that is specifically designed, tested and labeled to address the need for collecting and venting soil gasses from the sub-slab area to help reduce indoor radon levels. The performance of RadonX has been validated by third-party field tests in collaboration with the National Research Council of Canada.



An interesting way to inform people about their potential exposure to radon is to map the radon potential at a national scale and to directly measure radon levels in soil, water wells and indoor air. Such radon measurements can be illustrated in radon potential zones of low, medium and high levels or in areas where the prediction is uncertain due to lack of data (geological, geochemical, radiological). Machine learning algorithms are actually being tested and the output map of Canada will be available next May. An NSERC-Alliance grant proposal is under development and should be submitted in 2023 to promote radon measurements at the Canada level along with a research on estimating the effects of a thawing permafrost on indoor radon levels in Northern communities.

From mapping of radon in soil to inventory of radon indoors - The Swedish Story Linda Aguirre

Sweden has one of the longest experiences in measuring radon, both in soil and indoors. With over 30 years of knowledge and more than 3 million analyses performed, we will present the Swedish history and knowledge in the area. A detailed explanation of how you perform a quality and representable measurement according to international standards combined with Swedish methods. Also, a presentation of suggested guidelines with international status.

Making Testing for Radon more Accessible Various Presenters

This discussion will include multiple presenters sharing projects from across Canada on ways to support and assist people from across Canada test for radon. In addition, it will include a presentation from SFU Health Sciences students who created and disseminated a survey on municipal-level radon action in BC. The survey was designed to assess municipal staff and elected officials' knowledge of radon and measure existing policies or practices undertaken in their jurisdiction.

FRIDAY, April 14th

Radon and Energy Efficiency

Dr. Noah Quastel and Dr. Anne-Marie Nicol

Retrofitting existing homes and buildings is a necessary step for Canadian governments wanting to meet climate goals. However, renovations can significantly impact indoor air contaminants. This presentation summarizes the research evidence around energy retrofits and their impact on radon gas levels with a focus on the North American context.

Health Canada - Halifax Research Robert Stainforth

In order to compare radon levels in homes built before and after the implementation of the 2010 National Building Code which was adopted by Nova Scotia in 2011. Health Canada surveyed 300 residents in the Halifax Regional Municipality about their radon gas concentrations. Participants from homes from 2000 to 2020 were included with 2011 excluded. This presentation will include the results of this survey.

Indoor radon: how do new homes in Winnipeg compare?

Dr. Janet Gaskin

The requirement to install a 6 mil polyethylene radon membrane below the slab to reduce radon ingress into low-rise housing was included in the specific radon control measures introduced in the 2010 National Building Code of Canada (NBC). The aim of this study was to investigate the radon concentrations in Winnipeg housing built in the decade before and after the 2011 adoption of this building code change in Manitoba. A radon survey was conducted by the National Research Council Canada in Winnipeg, focused on areas where a substantial number of new dwellings have been built since the year 2000. Indoor radon measurements and home questionnaires were completed by 172 participants, using alpha-track radon detectors deployed for an average duration of 91 days between February and June, 2022. The results of the Winnipeg survey suggest that stronger radon control measures will be required in future building codes to reduce residential radon exposure.

Real time radon monitoring reveals the influence of building air dynamics on residential radon levels across time

Dr. Dustin Pearson

Evict Radon's National Study uses long term alpha track testing to understand the causes of Canada's rising residential radon levels. While very useful for large scale population studies, alpha track radon outcomes represent a snapshot in time and are unable to provide highly detailed information on radon fluctuations over shorter periods in a controlled, dynamic manner. Over the past several years our research team has been collecting hourly real time radon levels in a case study of 50 residential properties in both Alberta and Saskatchewan. In this presentation, we will describe outcomes from >0.6 million continuous hourly radon readings, and the combination of this information with large population alpha track radon data to develop a very detailed data perspective on how radon behaves within a property over time and as a function of air dynamics.

Radon and the BC Building Code: Assessing Implementation

Chantal Wilson

The BC Building Code made radon rough-ins mandatory in residential buildings in 2012. This BC Lung Foundation research project assessed radon rough-ins in 89 homes to see whether they would be usable, whether the BC Building Code was being followed, whether building inspectors were catching problems, and whether there was room for improvement. The study also included interviews with radon mitigators, builders and municipal building inspectors. Come learn out about our findings, what is working well and our recommendations to improve the usability of radon rough-ins.

Progress of the Task Group on Radon and Soil Gas Mitigation

Corey Carson

Codes Canada's Standing Committee on Housing and Small Buildings (SC-HSB) struck the Task Group on Radon and Soil Gas Mitigation (TG) to address code change requests to expand on the previous soil gas control provisions added to the National Building Code (NBC) 2010. Canadian radon mapping, as well as research into passive and active radon mitigation systems is now available that was not available prior to publication of the NBC 2010. The TG's mandate also includes review of CAN/CGSB-149.11-2019: Radon control options for new construction in low-rise residential buildings for possible adoption into the NBC.

This presentation will review the revisions already made to the soil gas control diagrams found in the NBC 2020, and recommended changes to the CGSB on CAN/CGSB-149.11-2019 in an attempt to make it easier for the Codes to adopt. In addition it will review the two proposed changes put forward by the TG for review by the SC-HSB at its May 31 to June 1, 2023 meeting.



Austria's new gideline for radon mitigation measures for water supply facilities Angelika Kunte

Elevated Radon concentrations in water supply facilities can lead to a potentially high radon exposure for the employees. Due to the radon exhalation from the water, very high radon levels (> 240.000 Bg/m³) can occur and therefore radon tests in such facilities are mandatory in many countries. Once high radon levels are detected, there is usually a willingness to take action against radon. Approved mitigation measures for water supply facilities do exist, but they are relatively unknown. The new Austrian guideline presents case studies from Austria and Bavaria of different radon mitigation methods for various facilities. Radon exposures (or concentrations) from before and after the mitigation show the significant effect of (sometimes simple) measures on the radon exposure (or concentration). In this contribution, the new guideline will be presented, some examples of radon mitigation measures will be shown and case studies of remediated water supply facilities will be discussed.

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Follow-up Measurements in Workplaces and Schools - Comparing 2 and 7 day Measurement Periods

Patrik Starck

In workplaces and schools with time-controlled ventilation, the differences between radon levels during working hours and non-working hours can be large. From a short-term follow-up measurement with a continuous radon monitor, a factor between working hours and the total measurement period can be obtained which can be used together with a previous long-term measurement to get a better estimate of a longterm value during working hours. The required minimum length of such follow-up measurements are 2 days (5 days recommended) in Canada and 7 days in Sweden. If weekends are not included in the follow-up measurement, there could be a risk that the factor is overestimated since radon levels might rise more during weekends compared to during nights in the working week. This has been investigated by analysing more than one hundred follow-up measurements in Swedish workplaces for which the obtained factors with 2, 5 and 7 days measurement periods have been compared. Comparisons between schools and other types of workplaces have also been made.

Soil Gas Mitigation System Design Strategies for Institutional Buildings

Alexander Grams

The presentation will focus on the strategies used to manage radon and soil gas ingress on two recently designed healthcare facilities. The presentation will look at the following aspects of DIALOG's mitigation system approach: 1) Depressurization system design 2) Installation of the sub-slab membrane 3) Approach to locating and sizing collection pits 3) Field testing requirements during system installation 4) Measures put in place to permit future performance testing of the system. The presentation will include details on how the system was effectively communicated to the installation contractors through the project drawings and specifications, and lessons learned from the recent projects. The strategy that DIALOG uses can be effectively applied to a range of different building sizes and typologies, though this presentation will feature two recent healthcare facilities in Alberta - one a major hospital, and the other a small regional care center.

Changing activity patterns since the COVID-19 pandemic and increased radon gas exposure for some workers and younger people Dr. Cheryl Peters

The COVID-19 pandemic has produced widespread behaviour changes that shifted how people split their time between different environments, altering health risks. Here, we report an update of North American activity patterns before and after pandemic onset, and implications to radioactive radon gas exposure, a leading cause of lung cancer. We surveyed 4,009 households home to people of varied age, gender, employment, community, and income. Whilst overall time spent indoors remained unchanged, time in primary residence increased from 66.4 to 77% of life (+1062h/y) after pandemic onset, increasing annual radiation doses from residential radon by 19.2% (0.97mSv/y). Disproportionately greater changes were experienced by younger people in newer urban or suburban properties with more occupants, and/or those employed in managerial, administrative, or professional roles excluding medicine. This work supports re-evaluating environmental health risks modified by changing activity patterns.

Lifetime radon exposure as a future lung cancer screening eligibility criterion in Canada: pilot study outcomes and upcoming clinical trial details Dr. Aaron Goodarzi

Cancer screening enables earlier cancer diagnosis and has improved health outcomes for many thousands of Canadians now living with (or being cured of) breast and colorectal cancer. Lung cancer screening programs have now emerged as pilot programs in many Canadian health systems, although only people with a significant history of tobacco use are eligible. As many as 40% of people who will develop lung cancer in their life are excluded from screening programs, as they do not smoke tobacco at all or 'enough' to confer screening eligibility using current standards. Radon exposure cannot currently be used as a basis for inclusion in lung cancer screening, and this is a serious health equity problem. The Evict Radon National Study has now concluded a pilot project exploring the feasibility of measuring radon decay product accumulation in human toenails as a way to estimate lifetime radon exposure. The results and conclusions of this work will be presented, as well as the essential next steps of a newly funded, larger clinical trial. This work has the potential to establish Canadian lung cancer risk from non-tobacco sources such as radon gas, and thus include more people (who need it) in potentially life-saving lung cancer screening.

PRESENTATION ABSTRACTS

SATURDAY, April 15th

Radiation; As Easy As 1, 2, 3

Ali Shoushtarian & Jill Robertson

This course will explain radiation in simple terms and will provide a general overview of the important aspects of radiation. The course will cover the characteristics and health risks of ionizing radiation, the different types of radiation, units of radiation dose and quantities, and biological hazards., the health risks created by exposure to ionizing radiation including radon and explains the dose coefficients for radon progeny. The course is structured in both lectures and hands-on sessions.

A Review of Radiation Biology

Dr. Joseph Hayward

Learn about the fundamentals of radiation biology including carcinogenesis, modeling of radiobiological effects and case studies involving human cohorts involved with the epidemiological effects of radiation.

Free Mobile Customizable Report Colin Dumais

Don't be left out! Bring your iOS device and receive a free copy of a "CARST compliant" closeout report. Delight your customers and retain a detailed observation of site conditions and work from all of your jobs. Stay compliant with the latest CGSB requirements for documentation. In this course we will provide a report for your mobile iOS device and show you how to modify the report to fit your business. Requirements: iOS device – iPad preferred. Load FormConnect Pro (\$21.99 on app store – not included in course)

Commercial Building Workshop

Colin Dumais

Based on a plausible scenario, this course will walk you through the process of bidding and designing a solution for work on a large commercial building. Information will be provided in stages and you will have to make decisions without all of the information. So fun – just like the real world! Interactive.

Fan Curve Secrets

Colin Dumais

Actually not a secret but sometimes tricky and always useful. Knowing how to read and incorporate fan curves into your design process and documentation can be useful and rewarding. This course will demonstrate some tools that you will find useful. Avoid lost time and get to a solution faster when you can hear what the fan curve is trying to tell you.

Controlling Radon in New Canadian Construction

Jeff LeBlanc

Get more information about the new building codes across Canada and best practices for new construction. Jeff will lead you through the radon basics for new homes while sharing some of his experiences in helping builders make homes safer for their new owners. This course will have an exam so you can add the CRNCH certification to your C-NRPP listing.



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FEATURED SPEAKER

Dr. Kong Khoo, BSc, MD, FRCPC

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This year we are honoured to welcome Dr. Kong Khoo as our featured speaker. As a doctor specializing in cancer who has himself been diagnosed with radon-related lung cancer, Dr. Khoo will share his unique perspective and compelling story.

Kong Khoo is a medical oncologist based in Kelowna. His expertise is in rare cancers, teleoncology and community oncology delivery models. Dr. Khoo holds an undergraduate degree in Pharmacology and Toxicology (University of Toronto), a medical degree (McMaster University), an Internal Medicine and Hematology fellowship (Dalhousie University), and a Medical Oncology fellowship (BC Cancer, UBC). He was medical oncologist and Director of the Clinical Investigations Office at Cancer Care Manitoba before moving to Kelowna in 1997 to help open the Cancer Centre for the Southern Interior. Dr. Khoo has been involved in cancer advocacy to improve access to new cancer drugs.

Kong, Noelle and Oliver live in West Kelowna. They renovated their 1990's vintage house in West Kelowna in 2018 as part of a reality TV show, attempting to achieve NET zero and increase awareness for climate change and sustainability. Kong was diagnosed with radon- related lung cancer in 2019-2020, and will speak to his personal cancer journey as cancer physician, patient and now advocate for radon awareness.



PRESENTATION SPEAKERS

LINDA AGUIRRE

Linda has a Masters in Science in Business and Economics with a major in marketing. She works as a Project Manager for The Eurofins Global Radon Competence Center located in Sweden. Linda is responsible for global marketing and business development. Linda's suggestions as to the most cost-effective way to measure radon indoors is implemented all around the world.

FADI BASMAJI

Fadi Basmaji is a Product Specialist for Soil Gas Venting Applications at IPEX Inc. He holds a Masters of Applied Science and a Bachelor's degree in Materials Science and Engineering. Fadi has over 7 years of project management experience in various sectors, including automotive, material testing industry, and product management, and 5 years of experience as R&D Engineer/Tech lead for digital radon sensors at Radonova Laboratories, Sweden.

KELLEY BUSH

Kelley Bush is Manager of Radon Outreach and Stakeholder Engagement with Health Canada. Prior to joining Health Canada Kelley worked in the private sector as a marketing and sales management professional. With over 20 years of progressively more senior management and leadership roles she has a strong acumen for converting ideas into plans and ensuring their successful execution. Kelley holds a Bachelor of Commerce with honours in Marketing from Concordia University.

Prince of Whales Whale Watching destinationgreatervictoria.barberstock.com

COREY CARSON

Corey is a technical advisor with Codes Canada, a division of the National Research Council. Corey's primary focus is his work supporting the Standing Committee on Housing and Small Buildings, which oversees Part 9 of the National Building Code.

Prior to his time with Codes Canada, Corey spent 18 years in residential design and construction starting as an engineered wood product designer, and finishing his time as a structural engineer. Corey spent part of his time in the field trouble shooting on-site concerns.

LUIS FARIA

Luis Faria is a professional engineer with over 15 years of experience in Building Science focused on Residential and Commercial construction, Hydrology Analysis and O&G exploration in Canada and in various countries across the globe. Luis resides in the lower mainland of BC with his family and works extensively across Western Canada, helping the AEC community design and build low-carbon and energyefficient buildings, which also provide comfortable and healthy living spaces for the occupants.

DR. JANET GASKIN

Dr. Janet Gaskin is a Research Officer at the National Research Council of Canada, having previously been part of the radon group at Health Canada. Her research includes population health risk assessment and evaluating the impact of interventions to reduce burdens from environmental exposures, with a focus on indoor exposure to radon.



DR. AARON GOODARZI

Dr. Aaron Goodarzi is the Canada Research Chair for Radiation Exposure Disease. He has a doctorate in protein biochemistry, a post-doctorate in radiation biology and has his own laboratory at the University of Calgary's Charbonneau Cancer Institute. Dr. Goodarzi is the founder and scientific director of The Evict Radon National Study, a pan-Canadian research initiative aimed at enabling research into radon gas exposure and induced lung cancer by encouraging citizens to test for radon and share their findings with researchers.

ALEXANDER GRAMS

Alexander Grams is a Professional Engineer, Certified Specifications Practitioner, Radon Mitigation Professional, and Associate at DIALOG. He has been involved in the design of radon and soil gas mitigation systems for commercial, industrial and institutional buildings for 5 years.

DR. JOSEPH HAYWARD

Joseph Hayward has a PhD in Engineering Physics, and is a Member of the Canadian College of Physicists in Medicine and Associate Professor in Radiology at the School of Interdisciplinary Sciences at McMaster University. Joseph has been delivering radiobiology lectures to residents as well as graduate and undergraduate students for over 15 years.

Father and son walking across driftwood - Dallas Road destinationgreatervictoria.barberstock.com

DR. SELIM KHAN

Dr. Khan is currently working as a postdoctoral fellow at the University of Calgary and applying advanced data analytics to radon health risk evaluation over time in Canada and Sweden. Dr. Khan holds a PhD from the University of Ottawa with research on radon health risk perception, and a Master's from Walden University, MN, USA with a thesis on community remediation of indoor radon. Dr. Khan has worked with the WHO and UNDP on public health programs and project management.

ANGELIKA KUNTE

After graduating in 2006 with a degree in landscape architecture from the University of Applied Life Sciences, Vienna. Angelika worked 15 years in various aspects of radiation protection with the Bavarian Environmental Agency and then moved to the Austrian Agency for Health and Food Safety (AGES) where she has specialized in the field of radon for the last 11 years. Her work with AGES has included hands-on experience in creating and designing info materials for radon risk communication, organizing and teaching at radon courses for building experts, drafting and upgrading national regulations and regulatory guides on radon protection, measuring radon in water supply facilities and underground workplaces, and presenting at international conferences. She is a member of the European Radon Association (ERA) and in 2021 she founded is the leading coordinator of the Austrian Radon-Network which includes approximately 70 experts, professionally involved with radon issues.

CRYSTAL LYTLE

Crystal is the Radon Sales Manager for Fantech, Past President of the AARST Board and the appointed Chairperson of the AARST Foundation. As a certified measurement and mitigation specialist, she is a strong advocate for radon awareness, and is passionate about educating people about the risks and longterm effects of radon. Crystal is one of the founding members of Women Against Radon (WAR), a campaign for CanSAR (cancer survivors against radon.

DR. MCVEA

Dr. David McVea is a Public Health Physician in Environmental Health Services at the BC Centre for Disease Control. Key areas of his work include heavy metal exposures, radiation safety, poison centre surveillance, food and water safety, and wastewater based epidemiology. Before joining the BCCDC, he was a member of the Public Health Agency of Canada Field Epidemiology Program where he focused on environmental health surveillance.

DR. PAWEL MEKARSKI

Dr. Pawel Mekarski heads the Radon Technical **Operations Section at the Radiation Protection** Bureau, Health Canada where he is jointly responsible for the National Radon Program (NRP). First joining Health Canada in 2009, Dr. Mekarski has specialized in the measurement of environmental radioactivity from both naturally occurring sources and human nuclear activities. He draws from his many years of experience in guantifying radioactive gasses within the atmosphere, such as radon, to lead the technical work of the NRP that aims to answer the remaining guestions about the challenges that Canadians face from radon exposure in their homes. This datadriven approach informs the development of future guidance on radon action as Health Canada continues its efforts to protect Canadians from the hazards of radon.

DR. SILVINA MEMA

Dr. Silvina Mema is a Medical Health Officer with Interior Health. She joined the health authority in 2016 and held a number of portfolios including communicable disease, immunizations, and harm reduction. Currently Dr. Mema provides leadership to the Environmental Public Health portfolio where she works closely on radon prevention and mitigation initiatives.

DR. DUSTIN PEARSON

Dr. Dustin Pearson is one of the senior scientists in the Goodarzi laboratory, and is the Research Operations Manager for the Evict Radon National Study. His work focuses on the biology of alpha particle exposure, as well as the study of real-time, residential indoor air dynamics of radon. Dustin is the primary manager for all radon databases, masterminding the security, annotation and analysis of our complex datasets relating to radon exposures, participant demographics, building metrics and more.

DR. CHERYL PETERS

Dr. Cheryl Peters is the Senior Scientist for Cancer Prevention at the BC Centre for Disease Control and BC Cancer. She received her MSc in occupational and environmental hygiene from the University of British Columbia, and her PhD in population and public health, also from UBC. She is the principal investigator and scientific director for CAREX Canada, a national carcinogen exposure surveillance program. Cheryl is a national expert in occupational exposure to ionizing and non-ionizing radiation.

JILL ROBERTSON

After completing her Bachelor of Science at Dalhousie University, Jill Robertson joined the world of radiation and radiation safety when she entered the diploma of Nuclear Medicine Technology program through the School of Health Sciences at Dalhousie University, more than 23 years ago. Jill worked in health care as a pediatric nuclear medicine technologist at the IWK Health Centre for 12 years. Jill's career then shifted to academia and safety, when she returned to Dalhousie University full time as the Radiation Safety Manager at the Environmental Health and Safety office. She manages all safety programs related to ionizing and non-ionizing radiation, to include nuclear substances, x-rays, lasers, and radon. Jill continues her professional involvement as a member of the Canadian Radiation Protection Association (CRPA), the Canadian Association of Radon Scientists and Technologists (CARST), the Canadian Association of Medical Radiation Technologists (CAMRT), and the Laser Institute of America (LIA).

DR. UTTAM SAHA

Dr. Uttam Saha is a Senior Public Service Associate, equivalent to a Full Professor, at University of Georgia. Before moving to the United States, Dr. Saha worked as a scientist at University of Saskatchewan and Agriculture and Agri-Food Canada for a total of 6 years. He has been the Co-Principal Investigator of the EPA funded State-Indoor-Radon-Grant and Multi-Purpose Grants to Promote Radon Research, Education, and Mitigation in the State of Georgia.

ALI SHOUSHTARIAN

Ali Shoushtarian obtained an Honours BSc in biochemistry from the University of Ottawa and a graduate certificate in forensic science from Mount Royal University. Currently, he is a senior radiation safety specialist with the Ottawa Hospital; his portfolio includes monitoring the radiation safety of the departments of clinical nuclear medicine and the hospital's research laboratories. He is both Registered Radiation Safety Professional and Certified Radon Measurement Professional. He is the past president of Canadian Radiation Protection Association (CRPA).

DR. ROBERT STAINFORTH

Dr. Robert Stainforth is a physical scientist at the National Radon Lab (NRL), Radiation Protection Bureau, Health Canada. Robert has a background in experimental particle physics with a focus on characterizing radon background signals. Since joining Health Canada in 2019, Dr. Stainforth has performed research to estimate doses to the lung from radon and conducted surveys assessing radon levels in buildings across Canada. As the current Co-Chair of the Canadian General Standards Board (CGSB) Committee on Radon Mitigation, and with input from industry professionals, his current focus is updating CGSB standards 149.11 and 149.12 for radon control options in new and existing buildings.

CHANTAL WILSON

Chantal Wilson is a professional mechanical engineer with Falcon Engineering specializing in radon mitigation and energy efficiency consulting. Chantal has over 20 years of engineering experience and became a C-NRPP Radon Measurement and Mitigation Professional in 2017. She previously owned an engineering firm that designed and installed radon mitigation systems. Since integrating her firm with Falcon Engineering, Chantal has been focussing her radon expertise on assisting school districts address their radon issues and large building radon rough-in design. Chantal has been a member of the C-NRPP Policy Advisory Board since 2020 and was a co-researcher on the BC Lung Association funded study "Radon and the BC Building Code: Assessing Implementation". Chantal is also a Certified Energy Manager, NRCan Certified Energy Advisor and trainer with the Canadian Institute for Energy Training.

NOAH QUASTEL

Noah Quastel is the Director of Law & Policy for the Healthy Indoor Environments Program at the British Columbia Lung Association. He is a practicing lawyer and member of the Law Society of British Columbia. Dr. Quastel also holds a PhD in Human Geography and is a Postdoctoral Fellow at Simon Fraser University. Dr. Quastel's research spans sustainability, the built environment, and radon exposure law and policy.



Our MISSION...

CARST's mission is to bring together individuals and organizations who are driven to help Canadians reduce their radon exposure and prevent lung cancer from radon.

We provide a place where Canadians can find information, resources and professionals to help them understand how to reduce their radon risk.

We provide our members with radon-relevant resources, opportunities to learn more about radon research, standards and best practices, and a place to connect with other stakeholders across the country.

Notre MISSION...

La mission de CARST est de rassembler des individus et des organisations déterminés à aider les Canadiens à réduire leur exposition au radon et à prévenir le cancer du poumon dû au radon.

Nous fournissons un endroit où les Canadiens peuvent trouver de l'information, des ressources et des professionnels pour les aider à comprendre comment réduire leur risque de radon.

Nous fournissons à nos membres des ressources, des opportunités d'en apprendre davantage sur la recherche, les normes et les meilleures pratiques sur le radon, et un endroit pour se connecter avec d'autres parties prenantes à travers le pays.

Night Out Thursday, April 14th :

This year's night out will be at the Songhees First Nation, located on the traditional territories of the Lək ^wəŋən people. We look forward to having the chance to reconnect with colleagues from across the country and around the globe in a relaxed setting, while enjoying a buffet meal inspired by traditional indigenous cuisine.

This Thursday evening dinner, including bus transport from the Conference location, is included in your Conference registration.

We look forward to seeing you there!







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EVICT RADON

A CANADIAN CANCER PREVENTION STUDY

The **Evict Radon National Study** is a publicly-funded, Canadian research program whose goal is to use interdisciplinary approaches to **understand and prevent lung cancers** caused by repetitive exposure to alpha radiation from radon gas

www.evictradon.org

DID YOU KNOW?

- 1. All of the research that we have produced to date is available for <u>free download</u> via the national study website (link above).
- In the first 5 years of this research, >33,000 'citizen scientist' households from all across Canada have worked with us to complete >10 original studies that are revealing many of the underlying causes of Canadian radon exposure, and the impact of this on lung health.
- 3. Anyone can help move this work forward by sharing information about the National Study amongst those in their professional and personal circles.
- 4. This work involves Canadian scientists at universities in BC, YK, AB, SK, ON, QC and NS. If you are a university-based researcher interested in joining one of our teams, please contact us!

OUR NEXT FIVE YEARS:

Between now and 2028, the Evict Radon National Study has multiple goals. These include:

- Determining how better to enable radon awareness and reduction for Canadians experiencing disability, heightened occupational exposure, and/or who live in rural and remote communities.
- Development and use of a new lifetime radon exposure test using measurement of radon decay products that accumulate within human toenails (yes, toenails!).
- Using our new approaches to measure lifetime radon exposure (and other lung cancer risk factors), we aim to make lung cancer screening more accessible to ALL people who need it.

THE EVICT RADON NATIONAL STUDY IS MADE POSSIBLE BY GENEROUS SUPPORT AND GRANT FUNDING FROM:

















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- Access resources to maintain quality level of services

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This course is designed to teach you how measure radon levels in a residential or commercial buildings.

MITIGATION COURSE

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Controlling Radon in New Canadian Homes

This course is designed to teach you how to properly incorporate the new soil gas building code changes into new home construction.

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