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HAPPY NEW YEAR

January is National Radon Awareness Month

In the mid-1980s, widespread recognition of the health threat from radon exposure created the need for a standard of competency for radon service providers. In February 1986, the U.S. Environmental Protection Agency (EPA) established the Radon Measurement Proficiency (RMP) Program to assist consumers in identifying organizations capable of providing reliable radon measurement analysis services. The Radon Contractor Proficiency Program was established in 1989 to evaluate the proficiency of radon mitigators in residences and provide information to the public on proficient mitigators. In 1991, EPA expanded the RMP Program, adding a component to evaluate the proficiency of individuals who provide radon measurement services in the home. In 1995, these Programs were consolidated to form the Radon Proficiency Program (RPP).

In September 1998 the US EPA discontinued its radon proficiency program in favor of a privatized program. The elements of a private proficiency program were developed by the Conference of Radiation Control Program Directors (CRCPD) over a two-year period in conjunction with input from stakeholder groups around the country. This formal process led to the development of a set of guidelines for the operation of a national radon proficiency program. The guidelines were utilized by the Conference of Radiation Control Program Directors in selecting an organization to pilot a replacement to the US EPA program. The National Environmental Health Association (NEHA) was selected by the CRCPD after an open-bid process and review of credentials.



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Although the pilot was successfully completed at the end of 1999, the National Radon Proficiency Program (NEHA-NRPP) continues to operate in compliance with the CRCPD guidelines and with standards that are equal to, and in some cases exceed, the former EPA requirements.

The National Environmental Health Association National Radon Proficiency Program (NEHA-NRPP) recognized the need for the highest quality and reliability of indoor radon and radon decay product measurement devices. Furthermore, it recognized that there must be a process by which new (or modified) technology can be introduced for the benefit of its certified measurement professionals as well as the general public. Consequently, NEHA-NRPP instituted a program, in conjunction with the US Environmental Protection Agency, to evaluate new radon and radon decay product measurement devices and instruments in a manner similar to methods previously used by EPA in order to instill consumer confidence in their use.

One aspect of the NEHA-NRPP is that individuals or firms who directly analyze radon or radon decay products must demonstrate their proficiency with a device by participating in a device performance test. Furthermore, they must demonstrate their proficiency with a device that has undergone extensive evaluation by the manufacturer to determine its accuracy and reliability in a wider range of conditions than are presented during a performance test. The requirements of a device performance test are placed upon an individual or a laboratory using an approved device and are not covered in this document. The requirements placed upon a manufacturer of a device prior to their device being eligible for submission by a measurement professional in a performance test are the substance of this document. In the fall of 2003, the American Association of Radon Scientists and Technologists (AARST), Price Consulting, Inc. (PCI), and the National Environmental Health Association National Radon Proficiency Program (NEHA-NRPP) signed a Letter of Intent to form a partnership. A long-term agreement was approved by all parties and signed in April 2006. The purpose of this partnership is to utilize more effectively the limited resources of both organizations to further the quality and professionalism of the radon measurement and mitigation industry. While it may take some time for the partnership to define and implement all of the roles and responsibilities of the member organizations, there is agreement that AARST should take the lead in developing standards and in conducting a program for evaluating new or modified measurement devices.

The Device Evaluation Program (DEP) is designed to support the NEHA-NRPP by evaluating new or modified radon and/or radon decay product measurement devices prior to their submittal by an individual or laboratory for a performance test. The DEP serves as a point of entry by assessing the instrumentation for suitability in the various categories of NEHA-NRPP participation and providing information to manufacturers concerning adequate laboratory testing and documentation. Participants in the Device Evaluation Program are classified by the AARST/NEHA-NRPP Partnership as device manufacturers (organizations that build or assemble radon measurement devices). Device manufacturers may or may not offer radon measurement services to the general public.

The AARST Technical and Science Committee shall be the DEP review committee and shall consist of five members of whom three (3) members shall be eligible to review any DEP application. The manufacturer/applicant has the right to know the identity of the review committee and to request up to one (1) substitution.

Meaning of "Approval" and Disclosure

Approval refers solely to the initial determination of suitability as explained above. It does not, and was never intended to, convey approval of any individual's use of a device nor the actual performance of any individual device. Responsibility for the performance of any given device, as well as the proper use of any given device by an operator, is the sole and exclusive responsibility of that operator and this shall be the case notwithstanding any initial approval given by AARST for the purposes outlined in this section and within the meaning of the term "approval" as defined by AARST. Any devices that were previously listed by NEHA-NRPP, either because they were on EPA's list of approved devices or because they were evaluated and approved by NEHA-NRPP, will remain on the list maintained by NEHA-

NRPP (unless specifically revoked, see Sections 1.3 and 1.4) but will not be considered approved unless specifically evaluated and approved through the AARST/NEHA-NRPP Device Evaluation Process (hereafter DEP.)

Once a device, or a particular version of a device has successfully completed the DEP, it will be given a device code number that is specific to a particular configuration of that device. The device and device code will be listed by the NEHA-NRPP in its literature as being approved by the DEP for submission by individuals desiring certification as Standard and Analytical Service providers or firms desiring certification as Analytical Laboratories. **As a condition of NEHA-NRPP listing of the successfully evaluated device, the manufacturer agrees that they will not use any language referring to the US EPA or AARST or NEHA-NRPP in advertising, marketing or promoting the device until they receive a the final letter of approval from the DEP authorizing them to use the specific reference language which shall be quoted in the letter. (continued on page 11)**



New policies recently adopted by the NEHA-NRPP Policy Advisory Board

Retrieval of devices

Recently, the NEHA-NRPP has received numerous inquiries as to who is authorized to retrieve a radon measurement device at the conclusion of a radon measurement. After careful consideration and discussion, the PAB adopted the following...

Unless additional requirements are specified by state or local regulations, when a for-fee radon measurement is performed, the radon measurement device(s) shall be deployed by an individual who is certified by the NEHA-NRPP program for the specific device(s) being deployed. Furthermore, the test device(s) shall be retrieved either by that same individual or by an employee of the same company, provided that individual has received adequate training to insure that 1.) The device is properly retrieved and sampling is properly terminated; 2.) Proper testing conditions exist in the property at the time of retrieval; and 3.) Documentation retained by the employer can demonstrate who the device was deployed by and retrieved by; includes a record of the type of training the individual(s) has received - all being sufficient for the responsible certified party to validate/or invalidate the results of the measurement; and confirms that prerequisite training be provided or overseen by a NEHA-NRPP certified radon measurement professional.

The effective date of this policy is April 1, 2011.

New Requirements for Analytical Laboratories

The goal of the NEHA-NRPP participants are adhering to the strongest professional standards. The PAB has been

researching ways to achieve this goal. As a first step, NEHA-NRPP will require certified Analytical Laboratories to complete the attached NEHA-NRPP Laboratory Certification Compliance Verification for each two-year renewal period. Beginning with April 2011 renewals, the form will be sent to all ALs with their Renewal Application. This is currently a requirement of some state radon licensing programs.

Deadline Approaching

Please note that as of January 1, 2011, an entry level course for radon measurement or mitigation may only be completed for continuing education once. Also, no approved CE course may be repeated.

CT Licensed Home Inspectors,

Renewal is coming in June 2011

The "CT Law Seminar" Online!

This is the Required "Ct Law Course" (3hours) for license renewal each cycle. Take it in the confines of your office or home. No travel time or travel expenses
Top Quality at the Least Expense price anywhere!

On our web site: Click on "Select a State", "Connecticut", then select:
[Connecticut Law Seminar Purchase Page](#)

Get your Continuing Education Certificate Now!

IPG Members: \$35 Interns: \$40 Licensees: \$45

Course Developed by Bernie Caliendo (former CT Licensing Board Chairman 03-08) with impute and review by Attorney Kent Mawhinney

This course meets the minimum requirements as set forth by the CT Home Inspection Licensing Board

The benefits and savings of this course is a no brainer!

Although not required for interns, some material in this course may contain material in the CT Law Exam required to obtain your license.

\$\$\$ Special Savings \$\$\$

Join IPG now at the regular yearly price and your membership will be extended thru Feb 2012

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January 10, 2011

Regional National Radon Action Month Conference

To register for this conference, please go online to *TRAINConnecticut* at: <https://ct.train.org>. The conference can be found on the system by entering course ID #: 1025019.

Location: Lyceum Conference Center 227 Lawrence Street, Hartford, CT

Time: 8:30 am to 12:30 pm

- CE Credits: Category II continuing education credit(s) to NEHA and NRSB certified radon professionals who attend
- CT Home Inspectors pending

8:30 Registration

8:50 Welcome

- *Francesca Provenzano, Health Program Supervisor, CTDPH*
- *Dan Burke, SIRG Grant Coordinator, EPA*

8:55 Opening Remarks

- *Suzanne Blancaflor, MS, MPH, Chief, Environmental Health, CT DPH*

9:00 Keynote Address: Leveraging Radon at the National Level (TBA)

- *Gina McCarthy, Assistant Administrator, Office of Air & Radiation, EPA*
or
- *Edward Chu, Acting Director, Indoor Environment Division, EPA*

9:30 AARST Updates from National Radon Conference

- *Carolyn Allen, President, AARST*

10:00 RRNC Research

- *Maura Esposito, MPH candidate, Southern CT State University*

10:20 Break

10:30 CT Panel: Promoting Measurement & Mitigation through Public Health Partners

- *Sabine Kuzco, Bridgeport Lead Free Families*
- *Amy Salls-McLean, Lead Action for Medicaid Primary Prevention*
- *Chris Prokop, Yale/New Haven Lead Treatment Center*

11:00 Promoting Radon Through Media & Advocacy

- *Dawn Mays-Hardy, American Lung Association of New England*
- *Kristy Crocker, Maine Indoor Air Quality Council*

11:20 New England State Radon Program Updates

- CT- *Francesca Provenzano*
- RI- *David Spink*
- NH- *Owen David*
- MA - ?*William Bell*

12:00 Open Q & A with States and EPA



News Release

U.S. Environmental Protection Agency New England Regional Office

December 30, 2010

Contact: David Deegan, (617) 918-1017

Poor Air Quality Predicted in Connecticut and in Valley Areas of Massachusetts, New Hampshire, and Vermont

(Boston, Mass. – Dec. 30, 2010) – Poor air quality due to fine particle pollution is predicted for Friday, Dec. 31, in the following areas of New England: all of Connecticut; the Connecticut River Valley, including Springfield, as well as other valley locations in Mass.; populated valley locations in southwestern N.H., such as Keene; and valley locations, such as Rutland, in Vermont.

When air quality is poor, EPA and the medical community suggest that people limit their strenuous outdoor activity..

Stagnant conditions in the atmosphere trap pollution from sources such as cars, trucks, and wood burning, near the ground. The greatest air quality impact will be on populous mountain valley locations. Poor air quality is expected to continue into Saturday until a cold frontal passage increases wind speeds and improves air quality.

The current fine particle standard is 35 micrograms per cubic meter averaged over 24 hours. Air quality alerts are issued when fine particle concentrations are expected to exceed this standard. At such times, people with heart or lung

disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.

When air quality is forecast to be unhealthy, EPA asks the public to take action. The public can help reduce pollution by taking steps including: using public transportation, car pooling and/or combining trips; avoiding idling of cars and trucks; following EPA Burnwise practices for cleaner indoor wood burning; and avoiding outdoor burning.

More information:

- Real-time air quality data and forecasts (<http://www.epa.gov/ne/aqi/index.html>)
- Free air quality alerts via email (<http://www.enviroflash.info/>)
- EPA recommendations for cleaner wood burning (<http://www.epa.gov/burnwise/>)

EPA Issues National Guidance to Address Proper Maintenance, Removal, and Disposal of PCB-Containing Fluorescent Lights

The guidance document is available online at <http://www.epa.gov/pcb>.

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202-564-4355

FOR IMMEDIATE RELEASE

December 28, 2010

EPA Improves Guidance for Compact Fluorescent Light Bulbs Cleanup

WASHINGTON – The U.S. Environmental Protection Agency (EPA) today updated its guidance on how to properly clean up a broken compact fluorescent lamp (CFL). Included with the guidance is a new consumer brochure with CFL recycling and cleanup tips. EPA encourages Americans to use CFLs for residential lighting to save energy and prevent greenhouse gas emissions that lead to global climate change.

CFLs contain a small amount of mercury sealed within the glass tubing. When a CFL breaks, some of the mercury is released as vapor and may pose potential health risks. The guidance and brochure will provide simple, user friendly directions to help prevent and reduce exposure to people from mercury pollution.

More information on the clean up guidance: <http://www.epa.gov/cflcleanup>

More information on CFLs: www.epa.gov/cfl



WINTER MOLD

By Edward Sobek, Ph.D.

Winter has arrived. It's cold outside. Crank up the heat. Warm yourself over the heat register and fill your lungs with a hundred thousand mold spores, that is, if mold is growing in your air ducts. If not, get nice and toasty and enjoy. But if your eyes start to itch or your nose starts to run and your asthma acts up, it's time to grab a blanket. You may have mold in your air ducts. Most people believe that mold is a summer phenomenon. That is only half of the truth.

It's actually the summer air conditioning that kicks off the molds' lifecycle in ductwork. Mold spores germinate in pockets of condensing air. Moisture saturated dust and food debris (ever lose a French fry down the air vent in your kitchen? How about candy corn?) become the molds' food source. Spores present in the air attach to dust and food particles, germinate and form colonies. A one inch diameter colony contains well over a million spores and depending on the number of cold-pocket anomalies in your air ducts, millions to billions of spores may be present.

Air duct mold exposure is often acute in the winter, especially early winter when we first switch on the heat. That's because air ducts contaminated with mold colonies are often wet with condensation from the summer AC, which retards spore release. Moreover, molds grow vegetatively in the summer, converting dust and food particles into biomass. The more biomass a mold builds the greater number of spores it can potentially produce. In some respects, a mold's life cycle is similar to a sea turtle's cycle. Perhaps one baby turtle out of a clutch of fifty eggs survives to adulthood. A lot of turtles have to lay many eggs for the species to be successful. Likewise, only into new mold colonies. A mold's lifecycle, like sea turtles, relies on sheer numbers to propagate the species.

We all know that mold needs moisture to grow. Take away the moisture and the colony stops expanding. When a mold colony detects a decreasing moisture gradient, for example, in the fall when we shut off the AC and open the window, it restricts vegetative growth and switches to spore production. Jump ahead one month—the temperature drops, and we crank up the heat. The mold colonies are now dormant. But a massive amount of spores are still present. They're waiting for the hot air to dry out their stalks, releasing them from the mother colony like balloons in the wind. That's why early winter is problematic for air duct mold. Every time we turn on the heat, a billion spores are pushed out of the air vents into our homes or offices. Eventually most of the spores are released and the concentration of spores exiting the air duct drops significantly, that is, until summer when the whole cycle begins anew. three or four spores, out of millions, will grow into new mold colonies. A mold's lifecycle, like sea turtles, relies on sheer numbers to propagate the species.

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New Data that suggests *Stachybotrys chartarum* may be airborne

By Irv Kraut

It has long been thought that the genus *Stachybotrys chartarum* is so wet, sticky and heavy that it is not likely to be airborne at any meaningful levels. Spore traps for example may find evidence of this fungus but usually in small numbers. Thus the prevailing theory that *Stachybotrys* prefers to stay on the surface where it has found a food source and where water is plentiful.

Recent studies conducted by Assured Bio Labs suggest this accepted theory may be faulty. Field studies where air samples were collected on a specialized filter cassette and analyzed by PCR (DNA) have revealed thousands of spores of *Stachybotrys chartarum* that were otherwise not found on spore traps. These studies collected air samples using both standard spore trap methods along-side a PCR sampler.

It is likely that spore traps are not able to efficiently trap these spores due to the small surface collection area. Using a filter cassette and PCR methods the laboratory has found this genus of mold along with many others that were not present in spore trap results. The importance of these preliminary findings is that when the investigator discovers *Stachybotrys chartarum* from swabs or bulk sampling that airborne levels may be much higher than anticipated and that *Stachybotrys* does indeed go airborne where disturbed or reproducing.

Web Site of the Month



www.CostOfBusiness.com

When it comes to pricing, is your head in the sand?

Is your pricing primarily based on your competition (the biggest mistake made)
Do you know how to calculate a real fee schedule, one that produces a profit?

Is your head in the sand ignoring this most important part of your business?
Are you running a business or just working way too hard for yourself?

Work smarter, not harder!

The Cost Of Business has been developed specifically for home inspectors and will educate you and give you the tools needed to easily calculate what YOUR fee schedule needs to be in order to provide YOUR business with the profit YOU need to take care of YOU and YOUR family.

Do you really think your competition has taken the time to calculate a fee schedule that is best for you? Then why do you base your fees on theirs? Be a leader, not a follower and do it right!

business

"a usually commercial or mercantile activity engaged in as a means of livelihood"



News Release

**U.S. Environmental Protection Agency
New England Regional Office
December 7, 2010**

Contact: Paula Ballentine, 617-918-1027

Pittsfield Printing Company Will Pay \$385,000 for Clean Air Violations and to Help Clean Wood Stoves in Western Massachusetts

(Boston – December 7, 2010) A printing company in Pittsfield has agreed to pay a penalty of \$80,000 and to spend \$305,000 to replace old, polluting wood stoves in western Massachusetts with new, cleaner models to settle claims by the US Environmental Protection Agency that it violated the federal Clean Air Act.

Interprint, Inc., which is owned by a German company, has agreed to help homeowners replace their wood stoves with EPA-certified wood stoves or other cleaner, more efficient home heating equipment such as gas or propane heaters.

Interprint will provide a voucher—typically for \$1,000 per household—as an incentive to replace pre-1988 woodstoves. Pre-1988 woodstoves are a significant source of indoor and outdoor air pollution. A new wood stove installation costs about \$3,000.

“The Pittsfield area will benefit from this wood stove change-out project,” said Curt Spalding, regional administrator of EPA’s New England regional office. “Homeowners will get help with buying new wood stoves, which will burn cleaner and more efficiently. This project will create green jobs, reduce fuel consumption, and improve air quality in communities by reducing the harmful pollutants that come from wood smoke.”

Interprint designs and prints decor paper used as the design layer in laminate surfaces such as counter tops, flooring, furniture, and store fixtures. In the printing process, Interprint uses large amounts of inks that contain volatile organic compounds and hazardous air pollutants.

Interprint built a new printing facility in Pittsfield in 2004 without applying for a permit required under the Clean Air Act’s new source review provisions. In addition, Interprint began operating the new facility in 2005 without complying with new source review requirements for VOC emissions, Title V operating permit requirements, and the National Emission Standards for Hazardous Air Pollutants for Printing and Publishing Facilities.

The consent decree, lodged in federal court and requiring approval by the court, requires the company to come into compliance with the Clean Air Act by getting the proper permits and significantly reducing its VOC and hazardous air pollutant emissions. Interprint has reformulated its inks to reduce VOC and hazardous air pollutant content, and has demonstrated that its new inks provide emissions reductions equivalent to those achieved through stringent add-on controls. As a result, Interprint’s new formulations represent the lowest achievable emission reductions.

Interprint began operating in Pittsfield in 1988 at 125 Pecks Road. In May 2004, the company began construction of its new facility at 101 Central Berkshire Boulevard. The Pittsfield location is Interprint’s only U.S. facility.

The EPA action grew out of a joint EPA and state DEP inspection of the facility in July 2007.

The consent decree, lodged in the U.S. District Court, will be subject to a 30-day public comment period and approval by the federal court. Once it is published in the Federal Register, a copy of the consent decree will be available on the Justice Department Web site at (http://www.usdoj.gov/enrd/Consent_Decrees.html).

Continued from page 3 RADON

Note: It is expected that this language may include the following simple reference.

“US EPA Verified – NEHA-NRPP Listed.”

However, as of June 27, 2006, this language HAS NOT BEEN FULLY APPROVED by the US EPA or AARST/NEHA-NRPP’s Device Evaluation Program. Applicants and manufacturers will be notified of the final language as soon as all authorizations are obtained from the respective organizations.

By completing this application, the applicant agrees that no provisional language referring to either the US EPA or the AARST or NEHA-NRPP may be used to market device until the applicant is in receipt of its final approval and authorization letter from the DEP.

Device Modifications

Modifications to the configuration of a currently approved device such as counting methodologies, reporting mechanisms, user interfaces, etc. constitute a change that will require resubmission of the device for re-evaluation or designation as a separate device. The extent of this review, as well as the cost, will be dependent upon the extent of the modifications. Failure to resubmit modifications of an approved device may lead to revocation of approval status.

Period of Approval & Revocation

After a device has successfully completed the DEP, the device will continue to be listed by NEHA-NRPP as long as its configuration and components remain unchanged in their design (see Section 0). However, the AARST/NEHA-NRPP DEP reserves the right to request re-submittal of any approved or listed device for re-evaluation should updated performance criteria render this necessary.

The AARST/NEHA-NRPP reserves the right to revoke listing or approval of any device as a result of the following circumstances:

- A significant failure rate of individuals or firms submitting the device for performance tests.
- Modifications to the design and operation of the device.
- Improper representation or disclosure of AARST or NEHA-NRPP approval or results of the DEP.
- Failure to re-submit device for evaluation upon request from the AARST/NEHA-NRPP DEP.

It is assumed that the manufacturer has a common interest in providing quality instruments and will work with AARST/NEHA-NRPP in resolving any of the issues identified above or may arise in the future. AARST/NEHA-NRPP agrees that it will not revoke any approval without making efforts to resolve any deficiencies or concerns that may arise.

Responsibilities

It is the responsibility of the manufacturer to insure that there are no patent or intellectual property rights violated in the design or manufacture of its equipment.

It is the responsibility of the manufacturer to provide a safe and operable product. AARST, NEHA, NEHA-NRPP or its subcontractors or agents do not assume any liability for the manufacture and sale of the device.

It is the responsibility of the manufacturer to continue to manufacture its equipment to the same quality (or higher) that was used when the devices evaluated by this program were manufactured.

It is the responsibility of the Chair of the AARST Technical and Science Committee to secure confidentiality agreements from each member of the committee and each DEP staff member and to maintain these on file.

It is the responsibility of the manufacturer to advise AARST/NEHA-NRPP of any change in manufacturing techniques, design or ownership of the submitting firm that may significantly alter the operation or manufacture of the approved device.

It is the responsibility of the manufacturer to exercise its objection vote before the application process to allow for the replacement of one of the AARST Technical and Science Committee, which consists of 3 voting members and 2 alternates.

It is not the responsibility of AARST/NEHA-NRPP to market the device other than to list it on AARST/NEHA-NRPP's literature for suitability for submission (in the configuration that it was originally submitted) by individuals desiring certification for its use. This condition is separate from any special listing services that AARST or NEHA-NRPP may make available to manufacturers.

The applicant and AARST agree that in the event of a dispute regarding the device approval process, the parties will agree to binding arbitration using one technical arbitrator under American Arbitration rules for a "fast-track" arbitration with the applicant paying for 80% of all associated costs.

Representations During Evaluation Period

At no point during the DEP period is the applicant to indicate to potential users that the device is approved by AARST or NEHA-NRPP or that approval is pending until the full process has been completed and the final letter of approval has been received by the manufacturer. Representations that would imply device approval prior to actual approval will halt any evaluations in process with no refund of fees.

Indicating that the device is undergoing AARST/NEHA-NRPP evaluation or has been submitted for evaluation is reasonable and allowed.

DEP Elements:

The following steps are to be taken to successfully complete the DEP. These are summarized below with additional details in latter sections for clarification. For easy reference, please refer to the DEP decision tree flow chart.

Step 1: Manufacturer Investigations

It is incumbent upon the manufacturer to conduct an evaluation of the device's accuracy and durability under a number of different circumstances. The objective of this is to ensure that the manufacturer can adequately inform users of the device of any and all limitations of the device as well as identify any problems that require design modifications prior to DEP submission. The manufacturer will provide documentation, as part of the application process, that the device has been tested over the range of parameters given in Table 1. In addition, the manufacturer must document satisfactory performance of the measurement system as given in Section 2.0. Since verification of the manufacturer's thorough testing of the device under these protocols by AARST/NEHA-NRPP DEP is not practical, manufacturers are essentially self-certifying that they have met the requirements as put forth in this document.

The extent of these investigations shall be sufficient to instill adequate confidence by the manufacturer that the device will accurately measure radon or radon decay products.

Step 2: Submit Manufacturer Field Testing Data

The results of the applicant's field-testing are to be submitted to the DEP staff and AARST Technical and Science Committee (TASC.).

Section 0 provides device manufacturers guidance about the documentation that shall be submitted to AARST/NEHA-NRPP when a measurement system is entered into the DEP. This includes guidance on the laboratory and field tests for which data shall be provided, as well as the format for reporting data. The documentation that shall be submitted includes complete schematics and technical discussions of the operating principles and the limitations of the measurement system. After reviewing the documentation, DEP staff acting on behalf of the AARST Technical and Science Committee (TASC) may contact the manufacturer for any missing information or areas that require clarification.

The manufacturer will use the Performance Matrix (Table 1) to verify the completeness of the testing data submitted, and the Performance Criteria (described in Section 0) as a guide for the satisfactory performance of the measurement system. The AARST TASC uses EPA's Indoor Radon and Radon Decay Product Device Protocols *EPA 402-R-92-004 July 1992* (hereafter referred to as the Device Protocols) and other supporting documents deemed appropriate by the AARST/NEHA-NRPP DEP to assess the material submitted by the manufacturer to determine a device category. Should application deficiencies be identified or clarifications needed, the DEP staff will request further information on behalf of the TASC or submission of a sample device before proceeding to the next phase or will inform the manufacturer of the need to work with the TASC to establish another device category,

Step 3: Device Exposure

After a review of manufacturer's field data has been completed and the TASC has determined the proper device category, the TASC will coordinate with the manufacturer and the US EPA to send measurement equipment to the EPA's Radiation and Indoor Environments National Laboratory (RIENL). There, EPA will expose 5 devices (if devices are defined as active) and 20 devices (for passive radon devices) to known radon environments. In general, RIENL will be exposing passive and active devices to three different exposures.

The environmental parameters for these exposures are determined using the information submitted by the manufacturer and are within ranges shown in the Performance Matrix (Table 1). Manufacturers of active devices must provide instructions regarding data retrieval for their equipment. Manufacturers of passive devices provide packaging and instructions for mailing the devices back to the analysis laboratory; the US EPA will return the devices and the manufacturer is requested to transmit results to RIENL within two weeks.

Step 4: Final Report

AARST/NEHA-NRPP will assemble summary data of both field and chamber exposure evaluations in a report describing the DEP evaluation process and conclusions. A separate report is prepared for each evaluation. The reports describe the results of the documentation review and the technical evaluation, including the conditions during and the results of the radon chamber exposures and its recommendations for approval or further study.

Step 5: Approval

After successful completion of the DEP, the manufacturer will be provided a letter indicating the device's approval for submission by parties desiring certification with the device. Once a NEHA-NRPP certified individual passes a device

performance test with the device, a NEHA-NRPP device code will be assigned and the device will be added to the list of approved devices. At that point, the manufacturer may indicate to prospective users that the device is approved for certification submission.

Performance Criteria for Radon and Radon Decay Product Measurement Systems The performance criteria used in the DEP provide a benchmark for evaluating the results of testing by both manufacturers and personnel at NEHA-NRPP-approved chamber facilities under a wide variety of environmental conditions. The criteria are designed to provide assurance that the measurement system has the capability to perform measurements that meet minimum standards of participation in the NEHA-NRPP.

There are three performance criteria used in the DEP:

- The first criterion is a limit on the total error for individual measurement results.
- The second is a limit on the precision error exhibited by sets of simultaneous measurements in the same environment.
- The third criterion is that the measurement systems must be able to meet the limits for total and precision error in a variety of environmental conditions.

The criteria are discussed in detail in the following sections.

First, the manufacturer and AARST/NEHA-NRPP verify that the data submitted to the DEP are complete (see the Performance Matrix shown in Table 1) and that each result satisfies the criterion for total error. Second, manufacturers and the DEP verify that sets of multiple, simultaneous measurements meet the precision error criterion. The manufacturers report both statistics with their data on measurements under a variety of environmental conditions. Finally, and only after the data and documentation review is satisfactorily completed, the performance criteria are applied to the results from the chamber exposures.

Total Error Criterion (Accuracy)

The radon measurement devices must demonstrate their capability to produce results that have an individual relative error of less than or equal to 25.0% in radon or decay product concentrations that are near the U.S. EPA action level. The total error criterion is consistent with the Individual Relative Error statistic used to evaluate proficiency in NEHA-NRPP performance tests conducted by individuals desiring certification with the device. The statistic is calculated as follows:

$$\text{IRE} = \text{abs val}(\text{MV}-\text{RV})/\text{RV} * 100\%$$

where:

IRE = the absolute value of the individual relative error for the measurement result, in percent

abs val = the absolute value of the following expression

MV = the measured value, as reported by the participant's system

RV = the reference value, as measured by the chamber facility

The measurement results provided by manufacturers must meet this criterion. This criterion is also used for the results of the U.S EPA exposures for the DEP tests. Note that this criterion is applied to individual measurement results.

Total Precision Error Criterion

The radon measurement systems must demonstrate their capability to produce results that have a precision error less than or equal to 25.0%, as measured using a relative standard deviation of at least four simultaneous measurements in a radon or radon decay product concentration that is near the action level. The statistic of relative standard deviation is calculated as follows:

$$\text{RSD} = (s/\text{avg}) * 100\%$$

where:

RSD = relative standard deviation

s = the sample standard deviation of a set of n simultaneous measurements in the same environment

avg = the mean of the n measurements

The precision criterion is designed to assess the capability of the measurement system to produce multiple, consistent results. It is applied to both the data supplied by the manufacturer as well as to the results of sets of measurements made in the U.S. EPA chamber for the DEP test.

Limits for Effects of Interfering Factors Criterion

The third criterion is that the measurement systems must be able to satisfy the above criteria for measurements made in a wide variety of conditions. The range of potential testing conditions is shown in the Performance Matrix (Table 1). Manufacturers are expected to submit results of measurements made in the wide variety of conditions shown in the matrix.

Note that manufacturers are not expected to complete the matrix in the format shown in Table 1; the actual material presented by a manufacturer may span many pages. The Performance Matrix is shown as in Table I to indicate the range of parameters and data to be included. The device exposures performed by the U.S. EPA chamber facilities will be used to spot-check the data provided by the manufacturer, rather than to reproduce tests already conducted. The measurements conducted in the U.S. EPA chamber facilities may be minimal or may be extensive (see Section **Error! Reference source not found.**)

Documentation Requirements

General Documentation Requirements for All Methods

The following information is required from manufacturers for all methods. It is general information that is used to help the AARST/NEHA-NRPP DEP work with the manufacturer to document the measurement system, place it in the context of other systems already evaluated in the DEP, and assist in the development of the DEP chamber testing protocol for the system. The Appendix to this Handbook provides a DEP Application Form for manufacturers to use when providing AARST/NEHA-NRPP with information about their systems.

General Information

The following information can be provided in letter format from the manufacturer to AARST/NEHA-NRPP:

- The manufacturer name, location, and the identification of the line of detectors to be evaluated, and the name of a contact person to answer technical questions;
- References in published journals (including copies of reprints if available);
- Unpublished technical reports;
- A description of the device's history in terms of EPA RPP, NEHA-NRPP or AARST/ NEHA-NRPP experience (e.g., whether the manufacturer has submitted a similar system for evaluation in the EPA's Radon Proficiency Program or the NEHA-NRPP Device Evaluation Program or the AARST/NEHA-NRPP Device Evaluation Program); and
 - Information regarding the results of participation in any performance evaluations, such as those sponsored by other Federal agencies or states.

Technical Information

- A complete description of the design of the system is required. For passive systems this includes the devices as well as the analysis equipment, and for active systems this includes all components. Features particularly important to the operation of the system shall be described, with schematics and the materials used.

- The procedures for using the measurement system to perform measurements, including any time requirements (e.g., deploying the instrument or device for the appropriate time period, starting and ending the measurement, and obtaining the measurement results).
- If a pump is used, the technical specifications for the pump operation, the procedures for verifying and adjusting pump flow rate, checking the filter(s) and the entry pathway for radon decay products and surfaces they may encounter in passage to the filter(s), if appropriate.
- The radon entry method, either pump or passive diffusion and the method for eliminating the entry of radon decay products into the sensitive or detecting volume, if appropriate.
- A complete description of the various options for performing measurements with the equipment (e.g., various measurement durations).
- A complete description of the calibration and recalibration process, including:
 - the procedure for determining the calibration factor (or sensitivity) of the system to radon and/or radon decay products
 - the procedure for obtaining and rechecking the background of the system (and components, if appropriate); and
 - the recommended frequency of the recalibration procedures.
 - A general description of the technical basis for the calibration factors and background used, including:
 - the range of detector sensitivities and efficiencies;
 - the results of studies of background and the range of values generally found; and
 - the results of studies on the effects of parameters that may affect the system's efficiency, such as humidity, temperature, barometric pressure, radon decay product equilibrium, concentration of condensation nuclei, etc.
 - The results of field studies on the ability to store measurement information during shipping.
 - The effects of thoron and procedures for its discrimination.
 - The routine equipment performance checks that are recommended with the system, including:
 - the corrective action limits used for assessing the results of the checks; and
 - the frequency and recommended documentation for the results.
- A description of other quality control procedures that are not already covered.
- Tamper-detection features and recommended procedures, including guidelines for recommending a retest.
- A general description of the system's ability to perform properly in a wide range of conditions, including:
 - A range of temperature, relative humidity, and barometric pressure including field data (see the Performance Matrix);
 - effects of concentration of condensation nuclei and/or radon decay product equilibrium, if appropriate;

- effects of shock (e.g., the results of drop tests);
- effects of vibration (e.g., operation in an industrial setting);
- effects due to external electromagnetic fields; and effects from other sources of ionizing or non-ionizing radiation.
- The limitations of the measurement system in terms of the lower limit of detection, dead time, minimum and maximum exposure times, and the system's response time to changing concentrations.
- Complete test results for the various parameters described in the Performance Matrix (see Table 1), with the results of individual measurements, the type and location of the controlled environment (chamber) where the measurements were conducted, the type of instruments used to measure the various parameters, and references to or descriptions of their calibration schedules.
- A summary of the information described above in the general format of the Performance Matrix (see Table 1). Participants are required to provide a brief explanation for any areas where test results are not given. The explanation should present the physical principles of the device or components that prevent any effects from that particular parameter.

Requirements for Providing- Devices

After the TASC has reviewed the documentation provided by the manufacturer, and assigned a device category, the DEP staff will request that the participant ship 5 active or 20 passive devices to the US EPA's RIENL. Manufacturers must provide complete instructions for set up, deployment, starting, stopping and downloading (or printing) the test data, as appropriate. The TASC will provide instructions to the chamber staff for the device evaluation criteria based on the Device Protocols and AARST Measurements Standards and the 1995 US EPA draft Instrument Evaluation Process. The chamber facility staff records the data produced by the manufacturer's device for the DEP evaluation against the known concentration. Passive devices or active devices that are designed to have limited access to test data may be shipped to the manufacturer for the calculation of the measured value. Manufacturers are requested to transmit results to the US EPA's RIENL within two weeks.

Applicants Using Activated Charcoal Devices

In addition to the information described in Section 0, manufacturers or users of activated charcoal devices must provide the following information:

- A complete description of the design of the device and the procedures for its use. This includes:
 - the type, amounts, and sources of activated charcoal;
 - an annotated schematic of the device, including dimensions and information on any critical features that affect performance or analysis (such as desiccant or a diffusion barrier);
 - the procedures for storing, deploying, resealing, packaging and labeling the devices, and returning them to the analysis laboratory;
 - whether and how the devices or materials are recycled, and data from studies used to conclude the methods are adequate; and
 - if a pump is used, the technical specifications for the pump operation, including routine checks.

- A complete description of the method of analysis, including:
 - for liquid scintillation analysis, the radon elution procedures; and
 - the general procedures for radiation analysis, including sample and background counting time, equipment used, etc.
- A description of the quality control procedures used in each step of the analysis, including:
 - the procedures used to check the internal variability of efficiency and background of new charcoal;
 - the type and frequency of quality control measurements made during each step of the analysis process; and
 - the corrective action limits used for assessing the results of the quality control measurements.
- A general description of the technical basis for the calibration factors and background used in the analysis, including:
 - the typical range of efficiency;
 - the method for adjusting efficiency to account for increase in weight due to water adsorption (provide calibration curves or factors);
 - the results of field studies on various exposure durations, delay times (times from ends of exposures to analysis times), and temperatures; and
 - the algorithms used for calculating results.
- The limitations of the measurement system in terms of the lower limit of detection, minimum and maximum exposure times temperatures, humidities, airflow, etc.

3.3 Applicants Using Electret Ion Chamber Systems

In addition to the information discussed in Section 3.1, manufacturers or users of electret ion chamber (EIC) devices who wish to have their measurement system evaluated in this program must provide the following information:

- A complete description of the design of the device and the procedures for its use. This includes:
 - an annotated schematic of the device and the analysis equipment (reader), including dimensions and information on any critical features that affect performance or analysis; and
 - the procedures for storing, deploying, packaging and labeling the devices and, if appropriate, returning them to the analysis laboratory.
- Complete procedures for using the reader.
- A description of the quality control procedures recommended for routine use, including:
 - the procedures used to check for voltage drift of stored devices;
 - recommended checks of electrets (e.g., for dust);
 - the type and frequency of quality control measurements made to check the stability of the reader; and
 - the corrective action limits used for assessing the results of the quality control measurements.
- A general description of the technical basis for the algorithms used to determine the calibration factors used in the analysis.

- The results of field studies in a wide range of strengths and energies of gamma field (various sources, at various elevations, etc.).
- The results of field study in a wide range of barometric pressures and the correction equations for barometric pressure.
- A description of the recommended methods for measuring the contribution to the voltage lost due to gamma exposure, and an informal sensitivity analysis of the potential errors involved in estimating gamma contribution from elevation or location (e.g., by state).
- The algorithms used for calculating results.
- The limitations of the measurement system in terms of the lower limit of detection, minimum and maximum exposure times, and ambient temperatures, etc.

Testing Protocol Design

An evaluation program will be designed by the TASC on a case-by-case basis for each device submitted by a manufacturer. The testing program is designed to evaluate the ability of the device to function as specified in the information from the manufacturer. The testing program includes sets of exposures in a variety of environmental conditions. In general, the testing protocol evaluates the ability of the device to operate in environments typical of indoor residences. The evaluation will, however, focus on those parameters (humidity, temperature, delay time, etc.) that present the greatest possibility of interference, or for which data are most limited. Testing will be conducted within the parameters specified as upper and lower bounds in the Performance Matrix (see Table 1). After the review of the documentation and data submitted by the manufacturer, AARST/NEHA-NRPP requests 5 active or 20 passive devices from the manufacturer to be sent to US EPA RIENL.

Evaluation of Passive Devices

The evaluation of passive devices is conducted with a minimum of 20 devices (several are used as blanks. The radon chamber facility staff follows the manufacturer's instructions regarding the deployment of the devices for exposure. Labels are completed by radon chamber staff to the extent necessary for identifying the devices. The devices are packaged and returned for analysis according to instructions from the manufacturer. The manufacturer is requested to transmit the measurement results to US EPA RIENL within two weeks.

Evaluation of Active Instruments

The evaluation of active devices is conducted with an initial 5 instruments. The devices are deployed and results obtained in accordance with the instructions from the manufacturer.

AARST/NEHA-NRPP Reporting

The measurement results are entered into a database for the manufacturer and device. US EPA staff analyzes the results in terms of the criteria described in Section 0. (These criteria include the limit on the total error for individual results and the limit on the precision error for sets of simultaneous measurement results.) In some cases, the chamber staff will request additional devices for further exposure and analysis. The US EPA staff sends the results of the data obtained from the device evaluation process to DEP. DEP will document all exposures; including radon and radon

decay product concentration, other environmental parameters, and additional pertinent information in a report for each measurement device. This report includes the results of the analysis of individual error and precision error, as well as other relevant testing results. The report does not contain the technical material and the results of previously conducted testing as submitted by the manufacturer. The DEP report is sent to the manufacturer as soon as the report has undergone internal review. External requests for evaluation reports are referred to the manufacturer of the device.

If the results of the evaluation pass the criteria established by the AARST TASC, they are forwarded to DEP (NEHA-NRPP) administrative staff. If not, the manufacturer is informed by AARST TASC and must reconfigure the device for further evaluation. AARST/NEHA-NRPP (DEP) staff uses the results of the technical evaluation to categorize radon and radon decay product measurement devices and for updating technical guidance documentation.

References

US EPA 1995 U.S. Environmental Protection Agency, Office of Radiation and Indoor Air, 1995 IEP

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