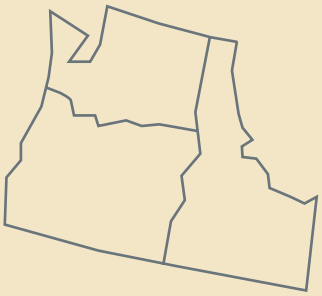
Winter 2010

IAQ News

Indoor Air Quality in Northwest Schools

> ***Teachers offered their students bonus points for home radon activities.***
>
> *James K. Faust, Radon Contact*
>
> *Idaho Department of Health and Welfare*
>
> *(For details, see page 3.)*



An electronic newsletter exclusively for Northwest schools

Why Integrated Pest Management in Schools?

By Carrie Foss, Washington State University Extension, Puyallup, Washington

Pest management in schools must be designed to protect the health and safety of children and staff and minimize damage to structure and personal property. Public school facilities can achieve these goals by adopting and implementing an integrated pest management (IPM) strategy.

Schools need to control a number of problem pests in school buildings and school grounds to maintain a healthy and safe environment for children. The cockroach, a pest in many schools, sheds a protein that is associated with an increase in asthma among young people. Rats and mice, occupants of numerous school buildings, consume and contaminate stored food and, as an added bonus, carry a host of potential diseases. Yellow jackets, through their painful stings, present a life-threatening situation to certain individuals. Carpenter ants, termites, and wood boring beetles may weaken the structural integrity of school buildings. Weeds left to grow on running tracks can trip runners. Other landscape pests are managed for aesthetic reasons.

But how should these pests be managed? Conventional methods used by schools have recently come under question by concerned parents, teachers, certain school districts, and community activists. At the center of the concern is the potential harm of chemical pesticides. Chemical pesticides vary widely in chemistry and their potential toxicity.

Pesticide use in schools can cause acute illness in children if they become over-exposed, either because the product was not used or stored

*See **Pest Management** on page 9*

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School Indoor Air Quality Monitoring Stations

By Paul Marchant, Washington State Department of Health

K-12 schools are encouraged to borrow one of our free portable indoor air quality monitoring stations to help in promoting healthy school environments.

The stations are designed to be placed in classrooms, offices, or other rooms. They provide useful information about room ventilation, cleanliness, and comfort, and they assist in evaluating the heating, ventilation, and cooling (HVAC) system. The air meters measure carbon dioxide, carbon monoxide, humidity, temperature, and airborne particulate (dust) levels.

Participating schools share their indoor air quality monitoring results with the Department of Health through a secure website. The shared data is transmitted anonymously without identifying information. The data will help us evaluate the impact of room and building characteristics on indoor air quality as well as identify general conditions and trends in schools throughout our state. To learn more about the loan program, visit *www.doh.wa.gov/ehp/ts/School/iaqmonitor/about.pdf*.

Contact a Monitoring Station Host

The following people are currently hosting an indoor air quality monitoring station. Contact the person in your area to find out about borrowing a station to use at your school.

Bremerton, Kitsap County Health Department, Bonnie Petek, 360-337-4701

Colville, NE Tri County Health District, Matt Schanz, 509-684-2262

Longview, Cowlitz County Health Department, Audrey Shaver, 360-414-5592

Mt. Vernon, Northwest Clean Air Agency, Dave Blake, 360-428-1617 x212

Olympia, Educational Service District 113, Bob Pierce, 360-464-6881

Pasco, Benton-Franklin Health District, Susan Shelton, 509-460-4323

*See **Stations** on page 10*

Getting the Word Out About Radon

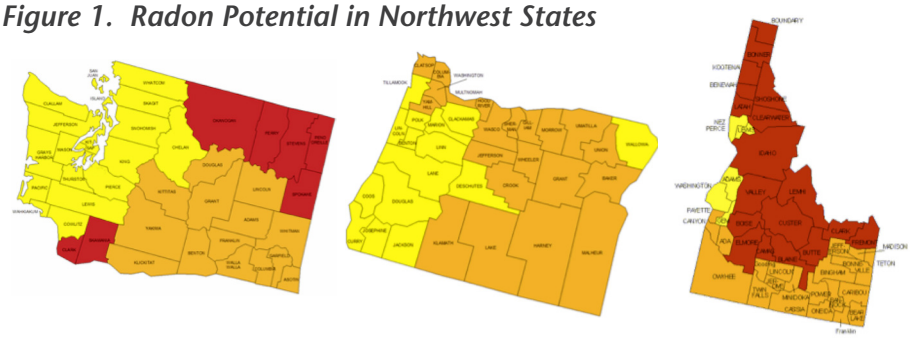
By James K. Faust, Radon Contact,
Idaho Department of Health and Welfare

More than 65% of counties in Idaho have an AVERAGE radon test result above 4.0 pCi/L. However, many areas in Idaho have not been tested, so an accurate estimation based on maps shown in Figure 1 (see below) is not possible. Areas with limited testing mean greater uncertainty, and may actually have higher or lower radon potential than what is indicated by the maps.

This year the Indoor Environment Program, Idaho State Department of Health and Welfare, is focusing its efforts to raise radon awareness in areas of limited testing, as well as in counties that have a very high percentage of high radon test results. We're also working hard across the state to increase radon awareness and residential testing for radon.

Our campaign has focused on small communities. We run newspaper ads in local community papers, along with radio ads and grocery bag stuffers. The response has been tremendous! We have found that the locals read their small town community papers every week and, since the papers are small, readers usually don't miss a single ad. Not even one!

Figure 1. Radon Potential in Northwest States



The maps above are based only on measurement results to date. Areas with limited testing mean greater uncertainty, and may actually have higher or lower radon potential than what is indicated by the maps.

Zone 1 *counties have a predicted average indoor radon screening level greater than 4 pCi/L (pico curies per liter) (red zones) – Highest Potential*

Zone 2 *counties have a predicted average indoor radon screening level between 2 and 4 pCi/L (orange zones) – Moderate Potential*

Zone 3 *counties have a predicted average indoor radon screening level less than 2 pCi/L (yellow zones) – Low Potential*

We also researched which radio stations communities had access to and listened to. We ran radio ads on those stations during the same period as the newspaper ads. Another thing we tried this year was visiting local grocery stores in our target areas and talking to store managers to find out what they knew about radon. We then asked them to have their check-out staff put radon awareness "grocery bag stuffers" into everyone's grocery bag!

Since we stayed out of the bigger communities, our advertising dollars went A LOT farther and we were effectively able to reach the "hard to get to" areas that were previously difficult to penetrate!

I recently spent three full days teaching on the subject of radon at McCall High School and Riggins High School and another full day at Kooskia High School. The teachers at these schools offered their students 100 bonus points for these home radon activities:

1. Explain to their parents about radon
2. Order a radon test kit
3. Follow the kit instructions and measure their home's radon levels
4. Bring the test results to class to be added to other students' measurements
5. Understand and explain what the test results mean

Contact Jim Faust for more information: *FaustJ@dhw.idaho.gov*

Radon Could Be a Serious Threat in Your School

According to a 2005 U.S. Surgeon General health advisory, "Indoor radon gas is the second-leading cause of lung cancer in the United States and breathing it over prolonged periods can present a significant health risk to families all over the country. It's important to know that this threat is completely preventable. Radon can be detected with a simple test and fixed through well-established venting techniques."

Step 1: Initial Testing

- Take short-term tests

Step 2: Follow-up Testing

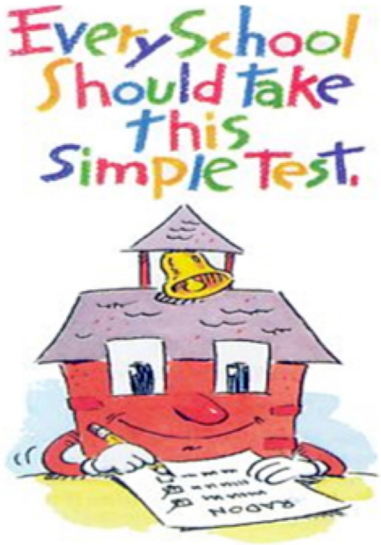
- Take a second short-term test in rooms where the initial level is 4 pCi/L or higher.
- Take a long-term test in these rooms for a better understanding of the school-year average radon level.

Step 3: Take action

- Take action to reduce levels if the average of the initial and short-term follow-up test is 4 pCi/L or greater or the result of the long-term test is 4 pCi/L or greater.

What Happens If Your School Fails the Test?

Fortunately, even if your school does fail the radon test, the problem can be corrected. Proven techniques are available that will lower radon levels and lower risks of lung cancer from radon exposure.



Every Home Should Also Take This Test

School isn't the only place that students and teachers can be exposed to radon. Since children spend more time at home, high radon levels there can pose a much greater threat to their health.

Once again, testing is simple and inexpensive. After all, radon is one health problem nobody should have to live with – at home or at school.

Who Ya Gonna Call?

- The Pacific Northwest has several resources to help school districts and others identify and correct radon problems. Call your state radon office *www.epa.gov/radon/whereyoulive.html* for a list of radon device companies that have met state requirements.
- See *www.epa.gov/radon/radontest.html* for information on how to find a "qualified" radon service professional.
- For more information, call 1-800-SOS-RADON (1-800-767-7236).

A Radon testing kit.

Mold: A Continuing Problem in PNW Schools

By Dave Blake and Rich Prill

Based on our over 500 proactive school IAQ walkthrough assessments conducted throughout the PNW – and numerous technical site visits in response to concerns – mold is still a major IAQ issue for our schools.

We estimate mold was either the primary, or one of the top, issues of concern in our site problem investigations. This is true for both old and brand-new schools. The recipe for mold is "just add water," so of course buildings located on the "wet side" of the Cascades experience more challenges from wet weather. But all regions have precipitation and we find that buildings in drier climates sometimes aren't as water-resistant as those located in high moisture areas. And of course all our schools have plumbing (at least we hope so).

It's the Moisture

Unfortunately, the majority of schools we visit have water leaks. Most of these leaks are from design and construction deficiencies and deferred maintenance practices. Flat roofs in Western Oregon and Washington, lack of sufficient overhangs, walls and windows that leak, schools built in wetlands, slab-on-grade concrete floors without moisture controls, and downspouts routed through the interior of buildings are all examples of pushing our luck on design versus performance. In addition to rain and snow melt infiltration and plumbing leaks, condensation on cool indoor surfaces (below "dew point") from high relative humidity is an issue we need to keep in mind when checking around our buildings.

TAKE ACTION: Prevention Pays

It costs significantly more to fix problems than to prevent them in the first place. Fixing occupant perceptions and restoring trust is often even more difficult! Prevention of moisture problems is relatively simple:

1. Routine inspection of the building's drainage planes
   a. Roof and flashings
   b. Gutters and downspouts
   c. Siding, windows, doors, other joints and penetrations
   d. Site drainage
   e. Irrigation and sprinkler systems
   f. Concrete slab-on-grade floors

2. Routine monitoring of indoor water sources
   a. Restrooms
   b. Classroom plumbing (especially elementary schools, art, science)
   c. Locker rooms
   d. Kitchen
   e. Custodial
   f. Water fountains

3. Ventilation with outside air to control indoor relative humidity levels
   a. Flushing buildings with the recommended amount of outside air removes moisture (the cooler the outside air, the more the drying effect; see sidebar, "Ventilating With Cool Outside Air," page 8).
   b. Ensure exhaust fans are functioning properly and are effective in capturing and removing moisture before it spreads to other parts of the building

*See **Mold** on page 6.*

A moisture meter at work.

Mold

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4. Monitor indoor relative humidity levels and cold surfaces
   a. Check for high moisture levels and eliminate the moisture source
   b. Check surface temperatures and compare to the "dew point" temperature. Solutions include adding insulation to keep the surface warm, lower the relative humidity, or replace the surface material with mold resistant product (foam, masonry, plastic, metal, rubber, etc.)

TAKE ACTION: Are You Sure It's Mold?

The best way to conduct a mold investigation is with visual inspection, aided by the use of tools. Don't be afraid to use invasive techniques in order to rule-in or rule-out the existence of moisture or molds in building cavities. Invasive measures include cutting holes, removing baseboards, looking behind sidings and window casements, etc. Careful and thorough inspections are necessary to determine first if there is a problem and second the cause and extent of any contamination. The thorough inspection also leads to a permanent solution of the moisture problem, and adequate clean-up of molds.

The darkness of the bricks is a good indicator of mold at work.

If the moisture problem can't be solved immediately – and there are plenty of reasons why this is often not easy, affordable, or practical (three feet of snow on a roof) – then at least the mold food can be removed to eliminate/reduce future mold growth until the moisture problem is fixed. Wet materials aren't the problem, but wet mold foods are!

Every mold problem is a contamination problem. Schools need to first decide whether the problem is to be handled in-house or in conjunction with an outside contractor. Both approaches need a well-thought-out plan of action. The plan should include a communications component at all phases.

TAKE ACTION: Get Outfitted

OK, we all know facilities and custodial staff are over-worked as it is. We need to provide these professionals with professional equipment in order for them to work smarter not harder. They can't work any harder, so here are the tools needed:

- Moisture meters: pin-type and contact-type (approx. $200-$300)
- Laser surface temperature meter (less than $100)
- Digital relative humidity and dew point meter (less than $100)
- Infrared camera – excellent tool but expensive. Saves time and is very useful for other tasks such as energy savings, electrical problems, water savings, etc. ($3,000 and up)

TAKE ACTION: How Much Mold Can We Handle Ourselves?

Follow the Environmental Protection Agency (EPA) or other equivalent methods of remediating mold. The publication ***Mold Remediation in Schools and Commercial Buildings*** is available at *www.epa.gov/mold/mold_remediation.html* or call 1-800-438-4318 to request a free copy.

Table 2 in the mold publication offers the following EPA *"Guidelines for Remediating Building Materials with Mold Growth Caused by Clean Water"*:

SMALL - Total Surface Area Affected Less Than 10 square feet.

- Minimum Personal Protective Equipment (PPE) – N-95 respirator, gloves, goggles
- No containment required

*See **Mold** on page 7.*

Mold

Continued from page 6.

If you can write on your windows, it's too moist in the room.

MEDIUM - Total Surface Area Affected Between 10 and 100 square feet.

- PPE – limited or full = N-95 respirator, gloves, goggles, coveralls
- Limited containment = polyethylene sheeting, HEPA filtered negative-air fan, block supply and return ducts

LARGE - Total Surface Area Affected Greater Than 100 square feet. (or potential for increased occupant or remediator exposure estimated to be significant)

- Full PPE – fully body clothing, head gear, foot coverings, full-face respirator with HEPA filter
- Full containment – two layers fire-retardant polyethylene sheeting, air lock chamber plus HEPA negative-air fan, block HVAC vents

TAKE ACTION: Respond to Fungal Problems

IDENTIFY

- Extent of moisture damage and contamination
- Dynamics of moisture sources
- Appropriate containment and worker protection

DRY wet areas in the short term

- Use heat to evaporate the moisture and exhaust ventilation to remove this moisture-laden air. Dehumidifiers may be needed. Be sure to contain the work zone!! And direct the exhaust to a safe outdoor location.

DESIGN

- Long-term intervention to address the moisture dynamics
- Fungal clean-up procedures and clearance criteria

DISCARD - DECONTAMINATE contaminated material

- Poly BAGS
- Dispose as regular construction waste

IMPLEMENT repairs and program changes to prevent future problems

VERIFY that the work was complete, the containment adequate, and the space thoroughly cleaned

The first consideration is to protect occupants, workers, and contain the mold contamination – and prevent future exposures. Unless it's a minor (10 square feet) area, treat the job like an asbestos job – careful containment, personal protection equipment, negative air, thorough disposal and final cleanup.

Make absolutely sure you know the cause of the mold growth and institute a permanent fix – if not, remove mold food from the source of moisture. Contain, capture, re-direct the moisture or water entry until a permanent fix can be provided. Again, keep mold food away from the moisture and maintain a careful watch on the situation.

Remember, even dead and dormant molds pose an exposure issue. Dry molds are easily dispersed into the air. So, don't just dry moldy materials, but promptly clean and discard moldy materials while they are still wet to avoid increasing exposures due to airborne molds.

Cleaning molds doesn't mean killing molds. Cleaning basically means getting the mold out of the building safely. Think about containment of the

*See **Mold** on page 8.*

Mold

Continued from page 7.

work area, personal protection for the cleaning crew, and the proper cleaning equipment and supplies.

Most guidance does not recommend bleach as a cleaning agent. Bleach kills molds, but is not an effective cleaning agent. Use a dilute solution of biocide and detergent. The goal is removal and cleaning, not killing the molds. "Clean-enough-to-eat-off-of" is a good rule to follow. Detergent is generally sufficient to clean surfaces.

If the mold is consuming gypsum wall board, ceiling tiles, and other "paper" products, it's generally best to discard these materials. Valuable books and papers can sometimes be rescued by freeze-drying and HEPA vacuuming. Solid lumber and other materials with surface mold can generally be salvaged. Start with a HEPA vacuum followed by thorough scrubbing. Moisture can compromise the structural integrity of particle board, plywood, oriented strand board and other such materials – get professional advice on whether to salvage or replace.

You want to put the issue to bed once and for all – don't leave any skeletons in the closet or invite second-guessing. Do the remediation once and do it right. Again, your best investment is in prevention.

TAKE ACTION: Communicate

Always keep occupants informed of your approach, timelines, and quality assurance measures to alleviate any misunderstandings, skepticism, or rumors. If, for whatever reason, your credibility is in question, involve concerned staff in the decision making and protocols and monitoring of the process to ensure satisfaction. Invite inspections and other participation by skeptics. Offer to show them the area after cleaning and before renovation to satisfy their need to know (or curiosity) that all contamination has been addressed.

Get expert help when needed, and since water management can be as much an art as a science, don't be afraid to seek more than one opinion.

Again, follow EPA or other equivalent methods of remediating mold. EPA's *Mold Remediation in Schools and Commercial Buildings* is available at *www.epa.gov/mold/mold_remediation.html* or call 1-800-438-4318 to request a free copy.

The Authors:

Dave Blake *is an indoor air quality specialist with the Northwest Clean Air Agency located in Mount Vernon, Washington. He can be contacted at (360) 428-1617, ext. 212 or his email at* ***dave@nwcleanair.org****.*

Rich Prill *is an IAQ Specialist with the Washington State Univeristy Extension Energy Program. His office is located in Spokane, Washington, and he can be contacted at (509) 477-6701 or email at* ***prillr@energy.wsu.edu****.*

Ventilating with Cool Outside Air

Reducing indoor relative humidity levels reduces the possibility of condensation on surfaces. Ventilating with cool or cold outside air has more drying potential than warm outside air. As cold or cool air is brought into buildings and warmed, the relative humidity of that air is automatically reduced – it's just physics, the laws of nature.

Worst case example: If we bring 100% relative humidity outside air (aka "fog") into a building on a 40°F day and warm this sopping wet air to 70 degrees, the result is 35% relative humidity air. This drier air can now absorb some of the excess moisture from the building. And, in order for outside air to enter a building, the same amount of indoor air has to be exhausted, taking moisture with it. So, ventilation is good, even when it's cool and sopping wet outside.

Pest Management

Continued from page 1

properly. Examples of illness from pesticide use include asthmatic children reacting to the spray of an aerosol pesticide in their classroom, and teachers complaining of headache and nausea after returning to a school building that was not well-ventilated after an insecticide was applied inside.

For immediate safety and long-term piece of mind, it is prudent to be cautious and minimize student exposure to pesticides on school grounds. IPM is an approach to pest control that can help maintain a safe and healthy environment, and reduce exposure to potentially harmful chemicals. IPM emphasizes long-term prevention of pest problems through:

- Good sanitation in kitchens and garbage areas
- Physical barriers such as screens and caulk to keep pests out of buildings
- Use of natural predators to control landscape pests
- Selection of disease resistant landscaping
- Baits or traps to take care of emerging problems

If a chemical pesticide is deemed necessary to manage a pest outbreak, then the product with the least potential hazard should be used. The potential hazard of pesticides can be further reduced when:

- They are applied by trained and licensed persons reading and scrupulously following the label directions
- They are not applied when children are present
- They are applied to areas where children cannot access them (e.g., wall voids)
- Products are formulated in baits and gels and do not contain solvent carriers or become volatile
- Treated areas are posted and access to the area restricted until ventilation or drying is complete

IPM Resources

For more examples, go to the Washington State Department of Health "*Pesticide Illnesses in Schools"* page: *www.doh.wa.gov/ehp/Pest/pest-school.htm*

For model school policies and programs, go to the U.S. Environmental Protection Agency website "Pest Control in the School Environment: Adopting Integrated Pest Management" at *www.epa.gov/pesticides/ipm/brochure/*.

The IPM Institute of North America has started a monthly newsletter. You can view January's newsletter at *www.ipminstitute.org/school_ipm_2015/Jan10_eNewsletter.htm*

The Urban Pesticide Education Strategy Team (UPEST), formerly known as the Urban Pesticide Initiative, was formed in 1991 by EPA Region 10, state agencies, and Washington State University Extension to jointly address urban pesticide issues. The UPEST website is *www.ecy.wa.gov/programs/swfa/upest/*.
For a tri-fold brochure, "*Promoting IPM in Washington Schools*," visit: *www.ecy.wa.gov/programs/swfa/upest/fact_sheets/BrochureIPMSchools.pdf*.

Urban Pesticide Education Strategy Team (UPEST)

For information on the UPEST program, please contact any of the following UPEST representatives:

Agency	*Contact Name*	*Phone/Email*	
WA Department of Agriculture	Dan Suomi	360-902-2044	*dsuomi@agr.wa.gov*
	Dave Zamora	509-663-9616	*dzamora@agr.wa.gov*
WA Department of Ecology	Marni Solheim	509-329-3564	*msol461@ecy.wa.gov*
WA Department of Health	Jennifer Sievert	360-236-3338	*jennifer.sievert@doh.wa.gov*
WA State University - Extension	Carrie Foss *(Chair)*	253-445-4577	*cfoss@wsu.edu*
	Becky Hines-Maguire	253-445-4595	*hinesre@wsu.edu*
Environmental Protection Agency	Juliann Barta	206-553-1495	*Barta.juliann@epa.gov*

MEETING NOTE: *UPEST will hold a School IPM Coalition meeting in the Bellevue, Washington, area on May 5. We hope to get attendance from area school administrators, nurses, and maintenance workers. Contact an UPEST team member for more information.*

Spokane Public Schools Honored for Exemplary IAQ Program

Spokane Public Schools was honored with the U.S. Environmental Protection Agency's (EPA) 2009 Indoor Air Quality (IAQ) Tools for Schools "Model of Sustained Excellence Award" for its exemplary efforts to improve indoor air quality for students, teachers and staff. The award was presented in January 2010 at the IAQ Tools for Schools National Symposium in Washington, D.C.

The award recognizes U.S. school districts that show ongoing exceptional commitment and achievement in maintaining healthy educational facilities while institutionalizing comprehensive IAQ management practices. EPA created the IAQ Tools for Schools Program in response to studies drawing attention to the range of indoor air quality and related problems in school buildings, the alarming rise in asthma and allergies among school children, and the knowledge that indoor air pollutants can bring about a variety of health effects.

Spokane Public Schools also won an excellence award in 2004 recognizing the development and implementation of its IAQ management program along with a commitment to a healthy learning environment.

"Since 2005, the year we started recognizing Model of Sustained Excellence Award winners, we have awarded 16 districts across the United States," said Jennifer Lemon of the EPA's Indoor Environments Division. "Spokane is truly in the elite when it comes to IAQ management."

For more information about the EPA's Indoor Air Quality Tools for Schools Program, visit *www.epa.gov/iaq/schools*.

Stations

Continued from page 2

- Seattle/North Puget Sound area, State Department of Health, Nancy Bernard, 360-236-3072
- Seattle Public Schools, Troy White, 206-252-0528
- South Puget Sound Area, State Department of Health, Paul Marchant, 360-236-3363
- Spokane, Educational Service District 101, Eric Dickson, 509-789-3518
- Tacoma-Pierce County Health Department, Tim Hardin, 253-798-6466
- Vancouver School District, John Weber, 360-313-4767
- Wenatchee, North Central Educational Service District, Suzanne Reister, 509-667-7100

A quarterly electronic newsletter exclusively for Northwest schools.

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www.energy.wsu.edu/pubs/default.cfm#iaq_schools

2) Or, send a blank email message to: *subscribe-iaq@listserv.energy.wsu.edu*

You will receive a confirmation message. When you reply to that message you will be subscribed and will receive all future postings. You can easily unsubscribe at any time.

This broadcast email list not only provides automatic delivery of the quarterly ***IAQ News***, but includes announcements about news of interest, training events, grant opportunities, and other information useful to school districts, agencies, and stakeholders involved in school IAQ and operations and maintenance.

IAQ News is an opportunity for all interested parties to communicate, and add to the collective wisdom.