WASHINGTON STATE UNIVERSITY
EXTENSION ENERGY PROGRAM

Indoor Air Quality in Northwest Schools

An electronic newsletter for school Indoor Air Quality (IAQ) exclusively for Northwest schools

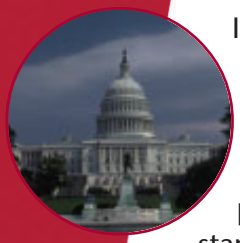
Fall Quarter 2004

As resident practitioner for indoor air quality, Dan Moberley's major objectives include leading indoor air quality workshops and seminars to raise awareness among decision makers about IAQ problems and their causes in schools.

Association Names New Resident Practitioner For Indoor Air Quality

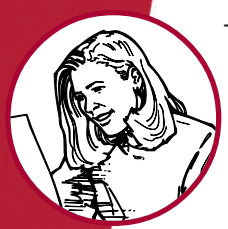
Washington State's Dan Moberly Chosen for Two-Year Post

The Reston, Va.-based Association of School Business Officials International (ASBO) announced the selection of Dan Moberly, formerly of the Kent School District, to serve a two-year term as the organization's resident practitioner for indoor air quality. Prior to his appointment, Moberly was assistant superintendent for business services for the Kent School District in Kent, Wash.



In his new full-time post, Moberly will serve as a professional resource and a peer educator for ASBO members and affiliated associations across the United States and Canada." Dan Moberly is an excellent choice for resident practitioner. He's interested in results, understands the value of teamwork in solving problems, and has been a proven leader in dealing with and resolving air quality issues," said ASBO International Executive Director Anne Miller.

"School business officials play a pivotal role in setting school policies and making purchasing recommendations," said ASBO President, William Fellmy. "By raising their awareness of IAQ and maximizing their ability to make change, this program has the potential to be one of the most systemic and sustainable initiatives possible."



The position is supported in part by a three-year $740,000 federal grant, which the association received from the U.S. Environmental Protection Agency's Indoor Environments Division. The grant also helps schools and

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School Indoor Air Quality Newsletter for Northwest Schools

A quarterly electronic newsletter exclusively for NW schools.

Please circulate this subscription opportunity throughout the Northwest to those who may be interested.

There are two ways to subscribe:

1) The newsletter is on-line at: *www.energy.wsu.edu/projects/building/IAQ_nl.cfm*

The newsletter contains a link for subscription information.

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 School IAQ Newsletter, 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.

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

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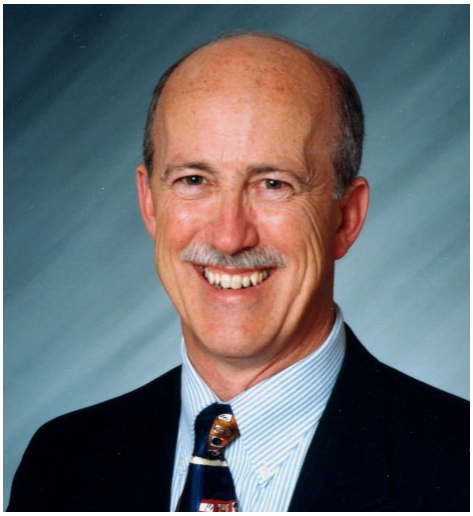
school districts improve learning environments by addressing IAQ issues.

An estimated 30 percent of U.S. schools are aging and in need of repair, and 43 percent have reported at least one unsatisfactory environmental condition, according to the National Center for Education Statistics. Education leaders say tight budgets and delayed maintenance have contributed to the problem. Poor indoor air quality in schools can lead to poor student performance and health problems such as asthma and allergies. The association has worked closely with the EPA to develop the IAQ Tools for Schools Program and facilitate its use in schools across the country.

In addition to serving nine years as assistant superintendent for business services for the Kent School District, Moberly has been the chief business official in two states in schools and districts ranging in size from 800 to 26,000 students. He also served as the president of the Wisconsin and Washington State Associations of School Business Officials and was a director on the ASBO International board. He is a resident of Ocean Shores, Wash.

During the 2001 school year, Moberly supervised the day-to-day operations of the facilities department in addition to his normal responsibilities. One of the district's elementary schools, built in 1938, began to experience serious indoor air quality complaints from students, staff and the community. By becoming actively involved with indoor air quality issues and implementing Tools for Schools, Moberly



Dan Moberly

and his staff successfully dealt with the facility's problems. As a result of this experience, the school district implemented Tools for Schools in its 40 other schools. The entire leadership team, as well as teachers and all support staff, have received training and ongoing support in addressing indoor air quality issues to head off large, unhealthy, expensive issues later.

Grant Covers Most Costs to Bring Dan Moberly to Your School District

As resident practitioner for indoor air quality, Dan Moberley's major objectives include leading indoor air quality workshops and seminars to raise awareness among decision makers about IAQ problems and their causes in schools. **A**ll too often IAQ is perceived as a facilities issue rather than a teaching and learning, political and financial issue. Moberly hopes to make key decision makers more aware of how IAQ issues can affect them both positively and negatively depending on how they

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Tools for Schools National Symposium Set for December

The Fifth Annual Tools for Schools Symposium will be held Dec. 2-4, 2004, in Washington, D.C., at the Grand Hyatt Hotel, sponsored by the U.S. Environmental Protection Agency. The EPA's Indoor Air Quality Tools for Schools Program is a voluntary program aimed at helping school personnel identify and resolve problems to ensure a healthful learning and teaching environment.

At this year's symposium, nationally renowned speakers will offer plenary and breakout sessions to discuss key topics related to indoor air quality in schools, including school building design, litigation, project financing, pest management, clean school bus management, and asthma management. The annual symposium presents a valuable opportunity for your members to network with other schools and health and environmental professionals, and to learn about the importance of maintaining a healthful and safe indoor environment for the success and well-being of students and staff.

To register, go to EPA's IAQ TfS website, *www.iaqsymposium.com*. The website provides details on the event including registration and payment forms, the agenda, hotel and travel information. You can complete and submit your registration and payment on-line. The registration deadline is Nov. 5, 2004, and the fee is $250. We strongly encourage you to register now, because in the past the symposium has reached filled up early. If you have any questions, contact the IAQ Symposium Team at info@iaqsymposium.com, or call (703) 247-6194.

We hope to see you in December!

Best regards,
IAQ Symposium Team

Resident Practioners

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are handled and who is involved in the resolution of the issues.

Moberly will not only present the issues and problems, but also provide a low cost, common sense, stakeholder-involved approach to IAQ solutions both before and after they become large issues politically and financially. This can be accomplished by implementing the U.S. Environmental Protection Agency's Tools for Schools program or similar locally grown programs on a district-wide basis.

Moberly is available to deliver one- to four-hour programs or a full day seminar targeted to your specific audience. He is looking for groups that have a significant impact on decision making in this area: business officials, superintendents, school boards, risk managers, principals, maintenance and facilities supervisors, architects and engineers, union officials, teacher groups, etc. He also is hoping for the opportunity to work directly with urban school districts to establish TfS programs.

The only cost to the sponsoring organization will be his hotel expense. All other costs will be paid through the grant. If you have any questions or need additional information, don't hesitate to contact Moberly.

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Students Learn About Their Indoor Environment

Corey Siskind, a bright 16-year-old student intern, learned about indoor air quality and the Tools for Schools program and wrote an article for an on-line student newsletter called *The Green*.

The newsletter is part of the EarthTeam website (*www.earthteam.net*), an environmental network for teens, teachers and student leaders. *The Green* is 100 percent student written and edited. The editors are looking for anything about the environment – what your class or club is doing, opinion pieces, facts, actions and more.

Also at the EarthTeam site are:

- The student-led Tools for Schools project at *www.earthteam.net/projects/action_projects/air_quality.html*
- A basic checklist for students at *www.earthteam.net/projects/action_projects/environmental_surveys/indoor.html*

We're happy to share Siskind's article with our subscribers and encourage others to get students involved in learning more about the school environment where they spend a significant amount of their time. Please direct interested students and teachers to the EarthTeam website.

Siskind's article, *My Internship at the Environmental Protection Agency*, can also be found on-line at *www.earthteam.net/green_news/issues/0804.htm*

The Green

My Internship at the Environmental Protection Agency

By Corey Siskind, Piedmont High School Piedmont, Calif.

This summer I was lucky enough to land a short internship at the U.S. Environmental Protection Agency. Working with the Indoor Environment Team, I discovered my perception of environmentalism stretched to the forests, the atmosphere and the oceans, but that was about it. All of a sudden I was learning about an environment I never knew existed, the one you and I are undoubtedly immersed in right now. Never had I considered the *indoor* environment and how much is required to keep it healthful and safe. After a few days of learning about the dangers of indoor air pollutants, mold and poor ventilation, I began narrowing my eyes in suspicion upon entering a room, searching for the air vents. When you consider that the average person spends *ninety percent* of their time indoors, it's frightening to think of the effects of an improperly ventilated room. The EPA has taken a particular interest in the indoor environment of schools, and that is why the EPA has developed a program called Tools for Schools, which can help reduce indoor pollutants and poor ventilation. When I began to research the program I had some doubts. I questioned if Tools for Schools would just be busying the already overloaded school districts with classroom rearrangements and forms. As I read through each one, I checked off on my list of checklists the ventilation checklist, the building maintenance checklist, the food service checklist, and the teacher's checklist – and I had to wonder about the costliness and time efficiency of the

program. However, as I continued to look into the program, I discovered there are inexpensive ways to prevent costly air quality problems. There are six main contributors to poor air quality that have simple solutions. To begin with, a high concentration of indoor air pollutants can affect the central nervous system of students. Keep school supplies appropriately stored and use nontoxic paints and glues. If cleaning is scheduled to take place on a Friday afternoon (rather than, say, a Monday), chemicals and moisture will have the entire weekend to disperse, thus reducing the concentration of indoor air pollutants.In addition, to prevent stuffiness and high levels of carbon dioxide, it is important to open windows and/or an effective ventilation system that is not covered or pressed up against furniture. The painting done by Jane is undoubtedly a masterpiece, but if you want her to be able to breathe well, don't use it to cover the air vent.To avoid a damp ceiling and eventual mold growth, repair leaky roofs and find ways to speed their drying after a rainstorm or any form of precipitation. This simple step could save school districts thousands or even millions of dollars in repairs.To help a school custodian become as effective at cleaning a classroom as he or she can be, it is necessary to maintain an orderly room. Avoiding clutter allows custodians, teachers, and students to move freely around the room, in addition to reducing the level of dust in the air.Many students have problems with asthma and allergies that are exacerbated by animal and biological allergens, moisture, mold spores, cleaning product chemicals and outside air pollutants, that accumulate due to inadequate ventilation. Many factors contribute to children's asthma and allergies, but by keeping animal cages clean, avoiding an excessive number of flowering plants, and removing dusty, used furniture, the indoor air quality can be drastically improved. When teachers and students can concentrate on their studies and not their runny noses or wheezing coughs, test scores are bound to improve.Lastly, and most importantly, when the school administration is communicating with the teachers and custodians, and vice versa, problems with the indoor ventilation system can be prevented, cost free. Often, the school staff either doesn't communicate with the maintenance staff or lacks the basic knowledge to understand the ventilation system's workings, leading to costly mistakes and an inefficient system. Small changes in the ventilation system can make a dramatic change in the indoor air quality, and thus a child's ability to learn. If schools take simple steps to fix minor problems, they can avoid expensive repairs later on.If you would like to learn more about your school's indoor environment, click on "Air Quality" in the "Action Projects" category of the EarthTeam website (*www.earthteam.net/projects/action_projects/index.html*), where the EPA has posted ways that students can get involved with Tools for Schools. They encourage school environmental classes and clubs to get involved with the indoor environment, and even offer awards to students who implement a program at their school. Students and teachers can call for a free Tools for Schools kit at 800-438-4318 or visit the website at *www.epa.gov/iaq*. Working at the EPA, I learned valuable information about the indoor environment and how the government works, but if I learned nothing else during my brief stay, at least I discovered that instead of the old, "my dog ate my homework" excuse, I can now proudly proclaim, "My inability to work is due to poor ventilation and the high concentration of indoor air pollutants."

Carpets Meet Science in Moses Lake

Summary: Particulate Loading of Carpets

Moses Lake School District, Moses Lake, Wash. September 2004

Study Director: *Paul Clark, CIAQM, Maintenance Manager, MLSD, Moses Lake, Wash.*
Principal Investigator: *Miles Athey, PhD, ACS Indoor Air Quality, Ritzville, Wash.*
Technical Advisor: *David Beard, PE, CIH, Life Energy Associates, Concord, Mass.*
Technical Advisor: *John Roberts, MS, PE, Engineering Plus, Sammamish, Wash.*

The Moses Lake School District has been consistently monitoring the indoor environment of its school facilities since 2000. By March 2003, after testing numerous indoor air quality parameters, the district determined that particulate loading of carpets was the most frequent source of their IAQ problems.

Nearly all the symptoms from poor indoor air quality are associated with dust levels on surfaces and in the indoor air. Dust in carpets and indoor air contains a large number of pollutants that usually exceed several U.S. Environmental Protection Agency health- based standards and include lead, cadmium, mercury, chromium, pesticides, Benzo-a-Pyrene, other carcinogens, volatile organic compounds, endocrine disrupters, allergens, bad bacteria and mold (Roberts 1998).

This information increases the value of keeping carpets clean and choosing surfaces that are easy to clean. The preferential track-in of small particles on shoes with their higher surface area and toxicity per unit mass may increase the toxicity of carpet particulate compared with outside soil by a factor of two or three (Roberts et al. 1998, 1996).

The increased particulate loading of the carpets comes from several sources including, but not limited to: inadequately filtered outside air, introduction of outside contaminants from foot traffic, chafing of suspended ceiling tiles, products used to clean the carpets, insufficient daily vacuuming, and insufficient periodic water extraction of the carpets.

A Met One GT-331 Aerosol Mass Monitor (laser particle counter) was used to measure carpet particulates of 10, 7, 2.5 and 1 micron(s) in diameter at carpet level. Aggressive sampling consisted of hand slapping a 2-foot-by-2-foot area of the carpet surrounding the particle counter for the first 20 seconds of the four-minute sampling period forcing particulates to dislodge from the carpet fibers and become airborne.

Only 2.5 micron particulates (PM 2.5) are reported here since they are of the greatest health concern. The California Air Resource Board, as a result of that state's Children's Environmental Health Protection Act, has established the most stringent criteria for children at 24-hour averages of 12 ug/m3 for PM 2.5. The Moses Lake School District has adopted this standard as its guideline.

Based on success stories from Spokane School District 81 custodial and maintenance staff, the "environmentally friendly" carpet cleaning product, Procyon by Plus Manufacturing, Inc. was tested for its ability to *deep clean* carpets. Aggressive particulate measurements were taken before and after the application of Procyon. The product was able to chemically separate the entrapped particulates including previously applied cleaning product residuals from the carpet fibers and backing without damage or leaving additional residues, something other tested carpet cleaning products and procedures

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were unable to accomplish.

In August 2003, the district purchased two high-flow extractors (Steamin Demon, John Downey Company) and two high-temperature rotary steamers (CleanMaster CMX-20). Using Procyon and the new equipment, the carpeting was deep cleaned throughout the district before the start of the new school year.

Prior to and after the deep cleaning, the aggressive particulate sampling procedure was used in one classroom at each of five elementary schools: Midway (Room 15 – M 15), Garden Heights (Room 204 – GH 204), Knolls Vista (Room 4 – KV 4), Peninsula (Room 4 – P 4) and Larson Heights (Room 4 – LH 4). All of the measurements in this series of testing were taken when the classrooms were unoccupied. All carpets had been vacuumed prior to testing and deep cleaning.

Each measurement with the Met One laser particle counter lasted four minutes and was taken in the center of the classroom. Four sets of additional particulate measurements were taken in the five test classrooms, one set every two months, to determine the long term effectiveness of only daily vacuuming, no deep cleaning.

Aggressive Particulate Measurements Before and After Deep Cleaning, August 2003

Before	M 15	GH 204	KV 4	P 4	LH 4	Average
PM2.5	52	33	48	32	33	40
After						
PM2.5	3	1	3	3	2	2

2 Months After Deep Cleaning – Oct. 2003						
	M 15	GH 204	KV 4	P 4	LH 4	Average
PM2.5	9.4	19.1	8	7.3	21.8	13.1

4 Months After Deep Cleaning – Dec. 2003						
	M 15	GH 204	KV 4	P 4	LH 4	Average
PM2.5	140.1	103.7	38.9	31	19.2	66.6

6 Months After Deep Cleaning – Feb. 2004						
	M 15	GH 204	KV 4	P 4	LH 4	Average
PM2.5	213.7	326	38.9	29.9	248.1	171.3

8 Months After Deep Cleaning – April 2004						
	M 15	GH 204	KV 4	P 4	LH 4	Average
PM2.5	49.6	65.6	27.7	17.4	12.3	54.5

These data adequately demonstrated that present carpet vacuuming equipment and/or procedures were unable to maintain desirable levels of particulate content in the carpets. The April 2004 measurements were taken after spring break and demonstrated that when the custodians had more than 10 mianutes to vacuum each room the particulate loads in the carpets dropped significantly.

Conclusions

The deep cleaning process developed by the district appears to be very effective. Based on the results of this study, the deep cleaning process should be implemented on a more frequent basis to offset the ineffective daily vacuuming of the carpets. The primary reasons for continual carpet loading appear to be a combination of several factors.

1. *Most of the classrooms have direct access to the outdoors with only 6-foot walk-off mats to clean foot traffic prior to entering. The district is considering installation of larger walk-off carpets that have the potential of removing up to 93 percent of the shoe sole residue.*

2. *Custodians have very limited time, about 10 minutes per room, to vacuum the carpets after classes. This only allows one quick pass over the carpets. As demonstrated in the April 2004 measurements, a vacuum cleaner making a slow deliberate pass over the carpet twice (once in each direction) was substantially more effective than the standard practice presently used, but even then not all of the loose particulates were pulled from the fibers.*

3. *The present vacuum cleaners may not be as effective as desired. The district is reviewing the possibility of upgrading to more efficient models and establishing efficiency testing protocols to help maintain consistent standards.*

Each of the three issues cited above have merit for serious consideration by the district, which is committed to reducing all health and safety risks to students and staff that may result from classroom carpeting.

Replacement of carpeting with tile, and fiberglass ceil-

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Regional Indoor Air Quality Program Coordinator Leaves After Four Years of Leadership

On Sept. 3, we bid farewell to Ann Wawrukiewicz, who served as U.S. Environmental Protection Agency Region 10 Indoor Air Program Coordinator for four years. Wawrukiewicz (pronounced vahv-rook-cave-itch) came to the position with lots of energy and enthusiasm, which she poured into leading the ongoing effort to implement EPA's IAQ Tools for Schools program in every school in Washington state.

Wawrukiewicz was instrumental in responding to heightened public concern about mold exposure and moisture-related building failures. She brought world-renowned experts to the region to present affordable, annual'"Mold and Moisture in Buildings" workshops to sellout crowds of builders, designers, realtors, insurers and school folks.

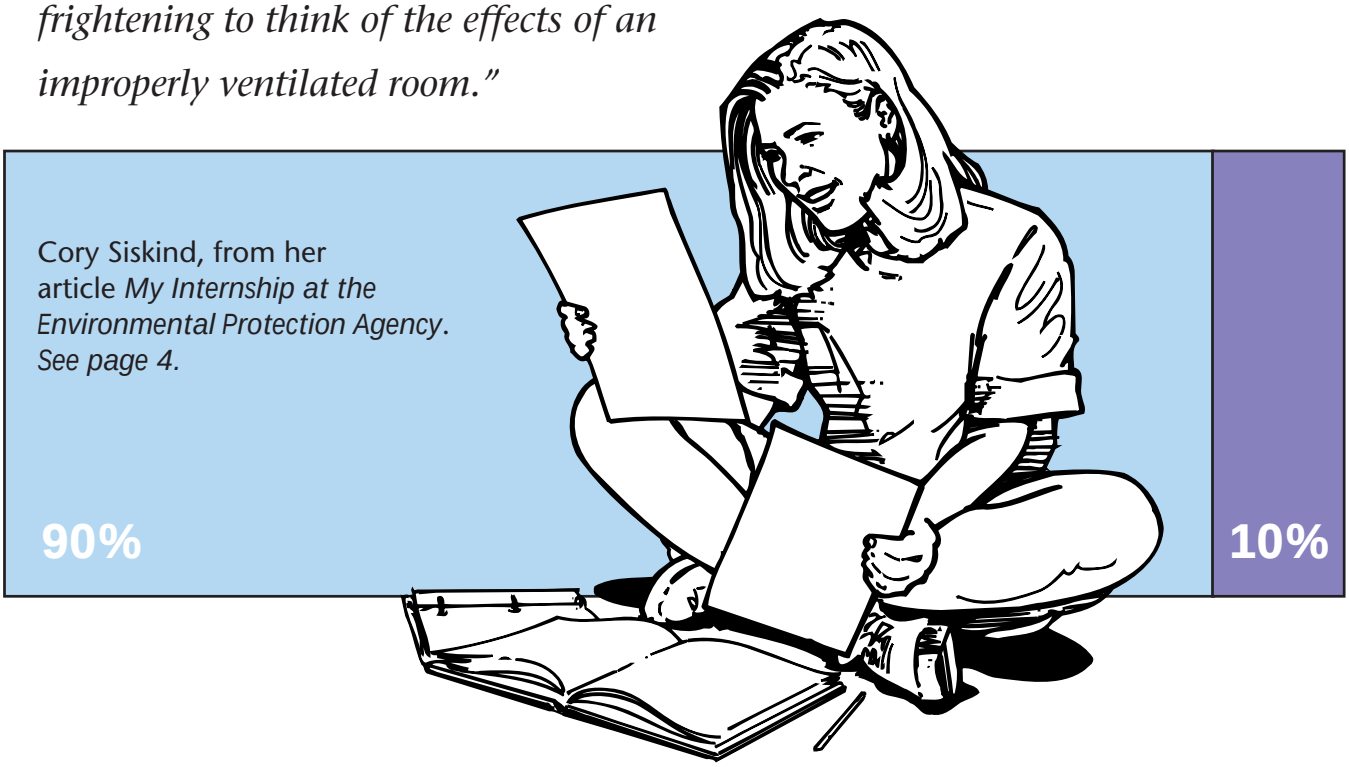
Wawrukiewicz continually looked for creative ways to fund and support indoor air projects in Region 10 and brought federal grants to the region. She used her management skills to stretch this funding and provide the biggest possible bang for the taxpayers' buck. Wawrukiewicz says, "The Northwest has one of the strongest networks in the nation of public and private individuals working together to tackle indoor air quality problems and it's been a great place to work. Our grant recipients are fantastic. Our local health agencies (and one local air agency!) are extremely proactive, as are many of our school districts. I could not have done this work without you all, and I'll miss working with such tireless advocates for healthy schools."

Ann Wawrukiewicz

Wawrukiewicz will be moving to Portland this fall to pursue her newfound interest in grant writing. We wish her well.

"When you consider that the average person spends ninety percent of their time indoors, it's frightening to think of the effects of an improperly ventilated room."

Cory Siskind, from her article *My Internship at the Environmental Protection Agency*. *See page 4.*



Carpets Meet Science

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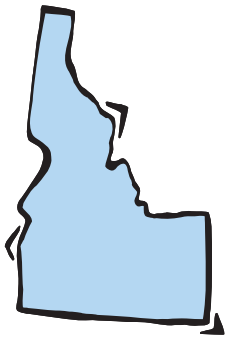
ing tiles with plastic ceiling tiles are also alternatives that have been implemented in some isolated classrooms already. However, this is not a popular option with teachers for acoustical reasons. An additional advantage to replacing carpeting with tile in several classrooms at each elementary school is that it provides alternative classrooms for chemically sensitive staff and students.

The Moses Lake School District is continuing this and several other health-based studies to secure the safest possible learning environment for its students and teachers. Questions regarding these studies and their results can be forwarded to Paul Clark at *pclark@mlsd.wednet.edu*, or Miles Athey at *docmac@centurytel.net*.

NEWS FROM IDAHO



By Kara Stevens, program manager

School walk-throughs

To date, the Idaho Indoor Environment Program and the Washington State University Extension Energy Program have conducted school indoor air quality walk-throughs in 13 schools districts (117 schools total) with the potential effect of improving air quality for over 66,000 students in Idaho. The walk-throughs include working with maintenance and administrative staff to identify potential indoor air quality issues such as mold, dust and animals in the classroom, ventilation rates, and containment of chemicals and cleaning products. We provide recommendations to schools who in turn agree to implement an IAQ program in their schools. If you are interested in having a school walk-through conducted in your district, please contact me at 1-800-445-8649 or *stevensk@idhw.state.id.us*.

Mold and moisture

The Idaho Indoor Environment Program, Division of Health, is sponsoring a half day course titled *Mold and Moisture in Buildings* in two Idaho locations: Coeur d'Alene on Nov. 4 and Lewiston on Nov. 5. The course is targeted to anyone who deals with moisture and mold problems in buildings including, school personnel; maintenance supervisors; building inspectors; architects; contractors; insurance personnel; heating, ventilation and air conditioning companies; homeowners; weatherization personnel and environmental consultants. Participants will gain an understanding of the types of excess mold and moisture problems in new and existing homes, the health effects of mold, the most practical diagnostic tools for detecting moisture and mold, sources of moisture, and practical and cost effective ways to prevent or remediate mold and moisture problems. The presentation will include handouts and the opportunity to have your questions answered. For more information or a registration form, please contact me at 1-800-449-8647 or *stevensk@idhw.state.id.us*.

Lesson plans

The Idaho Environmental Health Education and Assessment Program, Division of Health, has developed a binder called *Environmental Health Lesson Plans for Educators*. The binder is intended for use by all Idaho educators and focuses on human health as it relates to interaction in the environment. Program staff is in the process of separating the existing binder into three (K-6, middle school, and high school). In addition, new sections related to indoor air quality are being developed including information on radon/radiation, lead and mercury. Schools interested in getting binders can contact Chris Corwin at (208) 334-5508, or *corwinc@idhw.state.id.us.*