Environmental Problems in Schools

Mold

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Schools across the nation have become increasingly concerned about exposure to mold in their facilities. Studies have found an association between mold and a variety of adverse health effects. Mold problems are not limited to humid states and have led to various school closings across the country. Addressing mold problems proactively is the most successful and cost-effective way to manage them.

A number of schools with severe mold problems turned to the U.S. Environmental Protection Agency's (EPA) *Indoor Air Quality Tools for Schools (IAQ TfS)* Kit for assistance. EPA's *IAQ TfS* Program offers guidance to schools on how to prevent and resolve mold problems. Schools that commit to improving their IAQ can provide staff and students with cleaner, healthier places in which to work and learn. The schools featured in this case study have developed a variety of effective strategies that have helped them to identify, mitigate, and prevent mold-related problems. These strategies include replacing standard cellulose ceiling tiles with antimicrobial tiles; appointing a staff member in each building to check for signs of mold growth; involving teachers in the process of identifying and correcting problems; and establishing a preventive maintenance program.

Blue Valley Unified School District #229, Overland Park, Kansas

Blue Valley Unified School District #229 understands the importance of good IAQ. The District's first IAQ efforts in 1997 were implemented through the Building Envelope Program, originally established to address moisture, mold prevention, and mitigation issues in the District's facilities. Extreme temperatures in the region can pose a challenge to the integrity of the building envelope (i.e., the exterior construction and roofing system), and improper building design can sometimes cause building foundations and walls to crack. In recent years, the District has renovated a few buildings to remedy poor quality design and construction. In some buildings, the District removed exterior walls and retrofitted the design to prevent water intrusion and water absorption by the structural block.

Since implementing this program, the Executive Director of Facilities and Operations, the IAQ Coordinator, and the Safety and Security Coordinator have sought advice on IAQ improvements and building design from several organizations, including EPA Region 7, the American Lung Association of Kansas, the Council of Educational Facility Planners International, local architectural and engineering consultants, and industrial hygienists. The District provides regular training to operations and maintenance staff on how to identify mold and where to find it. The IAQ Coordinator, with the assistance of the District's industrial hygienist, provides updates to all operations and management staff and also conducts training for new employees on mold identification.

When schools or school districts discover mold growth, they should react promptly and openly to resolve the problem while maintaining trust with students, staff, parents, and the community. The IAQ Team in Blue Valley Unified School District #229 used this approach in 2001 when a mold outbreak occurred in an art classroom, which resulted from a paper maché class project. The art teacher reported health concerns, including headaches and dizziness, to the IAQ Coordinator. The IAQ Coordinator responded immediately by bringing in an industrial hygienist, who tested for mold spores and carbon dioxide (CO_2) levels. The tests revealed high CO_2 concentrations in the classroom and helped to identify mold sources. The District staff responded to the results by eliminating the mold source and disinfecting the classroom. During the incident and mitigation procedures, the school principal communicated with parents via voice mail and provided contact information for the IAQ Coordinator should parents have any questions.

Also in 2001, the District responded immediately to another mold-related incident. One of the schools experienced an outbreak of Stachybotrys mold in ceiling tiles, the result of a minor roof leak through a pin-sized hole and a clogged drip pan in the ventilation system that leaked water onto a few ceiling tiles. Maintenance and custodial staff and the IAQ Coordinator responded immediately by disinfecting and cleaning the area. They notified the school community of the remedial actions being taken to resolve the problem. After disinfecting the tiles and the surrounding area, they replaced all regular cellulose tiles with antimicrobial ceiling tiles. The District also installed these tiles in all newly constructed buildings and retrofitted several buildings with the antimicrobial ceiling tiles. In addition, the district uses anti-bacterial tablets to inhibit mold and mildew growth on HVAC coils and drip pans.

These preventative measures will help the school avoid future mold problems. In October 2003, EPA recognized Blue Valley Unified School District #229 with an *IAQ TfS* Excellence Award for its proactive approach to addressing IAQ and mold growth.

Waterford Public Schools, Waterford, Connecticut

The Waterford Public Schools have undertaken proactive measures for managing IAQ issues with a focus on mold prevention. For its efforts, the District received an Achievement Award from the Connecticut Interlocal Risk Management Association and another award from the Connecticut School Indoor Environment Resource Team. In October 2003, Waterford Public Schools were recognized for their IAQ management efforts with an *IAQ TfS* Excellence Award at EPA's 4th Annual *IAQ TfS* Symposium in Washington, DC.

Waterford formed its IAQ Team after their Assistant Superintendent attended the *IAQ TfS* National Symposium in 2002. When he returned to the District, the Assistant Superintendent requested that staff members and parents volunteer to serve on an IAQ Team. He assured them that no crisis situation existed and explained that this was a proactive venture to improve air quality for everyone and to make schools healthier places to work and learn.

Waterford Public Schools have flat roofs, which is typical of construction in the area. Because these roofs can lead to problems with leaks and mold, all new schools will have pitched roofs. A leaky roof was discovered during a walkthrough at Waterford's Oswegatchie Elementary School, which was replaced at a cost of approximately $300,000.

In addition to changing the construction of roofs, a "mold patrol" has been established in each school to inspect carpeting on a daily basis. When mold or fungus (which can grow up to half an inch overnight) is discovered, the area is closed, the mold is remediated, and the area is kept off limits until it is safe to use. Air conditioning can help maintain appropriate humidity levels

and prevent similar situations. Therefore, the Board of Education's commitment to improve IAQ has led to revised renovation plans that include air conditioning for all schools. In addition, no new schools will contain carpet. These preventative measures will help the schools avoid future mold problems.

Salt Lake City School District, Salt Lake City, Utah

Because of mold problems in some of its schools, Salt Lake City School District learned the importance of establishing and maintaining good public relations. When teachers suspected mold growth at two elementary schools, the IAQ Team cut holes in sheetrock walls, made visual inspections with the teachers, took mold samples and photographs, and then repaired and painted the walls. Although the teachers' suspicions were unfounded, involving them in the investigation process helped to resolve their concerns.

A mold problem was discovered and remediated in Emerson Elementary School between 1997 and 1998. Numerous reports of moisture in the building brought the problem to the District's attention. An investigation showed that the flat roof trapped water, which then migrated through the masonry walls, causing mold growth. To address this problem, the District installed a new roof on the building (at a cost of $200,000) and cleaned up areas contaminated with mold.

The District addressed another mold problem at Indian Hills Elementary School between 2000 and 2001. In addition to monitoring and investigating the odor reported by a teacher after heavy rains or flooding incidents, the school requested that the Department of Health inspect the building. The investigation revealed that a school addition (where the teacher consistently detected an odor) had been built over a stream that rose during heavy rains. After redirecting the stream, the District cleaned the crawl space and received assurance from the Department of Health that the problem had been resolved. The teacher declared that her "asthma had been cured."

In October 2003, Salt Lake City School District received an *IAQ TfS* Excellence Award at the U.S. EPA's 4th Annual *Indoor Air Quality Tools for Schools* National Symposium in Washington, DC. This award recognizes Salt Lake City School District's commitment to improving IAQ in its schools and to protecting the health and safety of students and staff.

The School District of Palm Beach County,West Palm Beach, Florida

The School District of Palm Beach County in Florida experiences an average temperature of 78° F and relative humidity of almost 75 percent – environmental conditions conducive to mold growth. The newest school buildings in the District have central HVAC systems that use humidistats to regulate humidity levels during unoccupied periods. However, the older schools use unit ventilators, separate air conditioning units, and Bard units. Thus, many older facilities were subject to inadequate dehumidification that, in addition to leaking roofs, contributed to mold growth and other IAQ problems.

When the District began to investigate and target IAQ problems in their schools, no maintenance procedures were defined for addressing mold growth. In addition, IAQ remediation efforts were often delayed due to limited budgets and other maintenance priorities. The District recognized the importance of maintaining and improving facilities and equipment, and developed a prioritized maintenance schedule for IAQ-related improvements.

To address long-term IAQ issues, the School District of Palm Beach County developed a preventative maintenance program for HVAC systems. The program includes strategies for cleaning and preventing mold growth and damage, as well as communications strategies for informing the community, parents, and students of the District's efforts. For example, the District uses checklists to conduct regular inspections of the HVAC systems and sends newsletters to students and parents.

Implementing the *IAQ TfS* Program helped the District reduce the number of IAQ complaints dramatically. Due to its hard work and achievements over the past 15 years, Palm Beach County was awarded the *IAQ TfS* Excellence Award in 2003 for leadership in improving IAQ in their schools.

Summary

These examples of mold problems in schools demonstrate the importance of controlling moisture to prevent mold growth. In addition, acting to avoid mold problems can save schools money and help them avoid negative publicity. For more information on mold and moisture, visit EPA's Web site at www.epa.gov/mold. Schools and districts can find more information about EPA's *IAQ TfS* Program, including the *IAQ TfS* National Symposium and the *IAQ TfS* Awards Program, at www.epa.gov/iaq/schools.