

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
Bureau of Environmental Health Assessment
250 Washington Street, Boston, MA 02108-4619

ARGEO PAUL CELLUCCI
GOVERNOR

JANE SWIFT
LIEUTENANT GOVERNOR

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SECRETARY

HOWARD K. KOH, MD, MPH
COMMISSIONER

February 22, 2000

Jeanmarie Joyce, Health Agent
Hanover Board of Health
550 Hanover Street
Hanover, MA 02339

Dear Ms. Joyce:

At your request, the Bureau of Environmental Health Assessment (BEHA) conducted an evaluation of the indoor air quality at the Hanover Middle School on February 4, 2000. Michael Feeney, Chief of Emergency Response/Indoor Air Quality (ER/IAQ), BEHA, conducted this inspection. Concerns about pollutants generated by renovation efforts and the potential impact on occupied classrooms in this building prompted this request.

The school is currently under renovation while occupied by students, teachers and school staff. The planned renovations are to the gymnasium and the addition of a wing at the north end of the building (see Picture 1) as well as renovations to a former shop area in the south end of the building. During the assessment, a paint odor was noted in the second floor hallway in close proximity to renovation work. A building committee member confirmed that contractors were applying paint to doors in the new wing during the assessment. In addition, paint odors were also detected on the roof at the junction between the old building and the new wing.

Spaces in the temporary wall were observed. It is important to note that pollutants from renovation work could travel (see Pictures 2 and 3) through these spaces. Above the ceiling, spaces also exist between the decking and interior wall (see Picture 4) as well as in the shared old building/new wing wall where utility holes pass (see Picture 5). The light noted above the ceiling in Picture 4 indicates that no barrier exists to prevent odor migration.

Ceiling tiles in the hallway have been removed on the occupied side of the temporary wall as part of the renovations. None of the open spaces created by the lack of ceiling tiles have been sealed to prevent air movement above the ceiling tiles (see Figure 1). Dust and debris can move with drafts from the unoccupied construction section to occupied areas.

Access to the renovation area near the gymnasium can be gained through a hallway door (see Picture 6) and locker room door (see Picture 7). Access to the former shop area can be gained through a hallway door (see Picture 8). In each of these instances, areas of access were not sealed to prevent the migration of pollutants from the newly constructed wing into occupied areas of the school.

In addition to pollutants caused by renovation, there are several signs of the existence of mold growth in the school that may be attributable to the introduction of moisture into the building by the heating, ventilating and air conditioning (HVAC) system during warm months. A musty odor was detected in the main office of the school, which may indicate mold growth. In addition, signs of moisture accumulation (see Picture 9) were noted in the seams of hallway floor tiles. This type of water damage may occur by the introduction of moist air into this building through the non-air-conditioned exterior classroom windows and unit ventilators into areas that may be chilled by the air-conditioning system in the central core classrooms. If moisture was introduced into this building, mold growth in porous materials (such as carpeting and ceiling tiles) could result from repeated wetting by condensation. If this is the case, the plan to contract an environmental consulting firm to test for the presence of mold in this building is appropriate.

A number of pathways exist for pollutants to move from areas under renovation into occupied spaces. These pathways, coupled with paint odors in the second floor hallway indicate that the temporary walls are not sufficient to contain pollutants related to renovation work. The following recommendations should be implemented in order to reduce the migration of renovation generated pollutants into occupied areas and to better understand the potential for mold to impact indoor air quality:

1. Establish communications between all parties involved with building renovations to prevent potential IAQ problems. Develop a forum for occupants to express concerns about renovations as well as a program to resolve IAQ issues.
2. Develop a notification system for building occupants immediately adjacent to construction activities to report construction/renovation related odors and/or dusts problems to the building administrator. Have these concerns relayed to the contractor in a manner to allow for a timely remediation of the problem.

3. When possible, schedule projects which produce large amounts of dusts, odors and emissions during unoccupied periods or periods of low occupancy.
4. Disseminate scheduling itinerary to all affected parties, this can be done in the form of meetings, newsletters or weekly bulletins.
5. Obtain Material Safety Data Sheets (MSDS) for all construction materials used during renovations and keep them in an area that is accessible to all individuals during periods of building operations as required by the Massachusetts Right-To-Know Act (MGL, 1983).
6. Consult MSDS' for any material applied to the effected area during renovation(s) including any sealant, carpet adhesive, tile mastic, flooring and/or roofing materials. Provide proper ventilation and allow sufficient curing time as per the manufacturer's instructions concerning these materials.
7. Use local exhaust ventilation and isolation techniques to control for renovation pollutants. Precautions should be taken to avoid the re-entrainment of these materials into the building's HVAC system. The design of each system must be assessed to determine how it may be impacted by renovation activities. Specific HVAC protection requirements pertain to the return, central filtration and supply components of the ventilation system. This may entail shutting down systems (when possible) during periods of heavy construction and demolition, ensuring systems are isolated from contaminated environments, sealing ventilation openings with plastic and utilizing filters with a higher dust spot efficiency where needed (SMACNA, 1995).
8. Seal utility holes, spaces in roof decking and temporary walls to eliminate pollutant paths of migration. Seal holes created by missing tiles in ceiling temporarily to prevent renovation pollutant migration.
9. Seal hallway doors with polyethylene plastic and duct tape. Consider creating an air lock of a second door inside the renovation space to reduce migration.
10. If possible, relocate susceptible persons and those with pre-existing medical conditions (e.g., hypersensitivity, asthma) away from areas of renovations.
11. Implement prudent housekeeping and work site practices to minimize exposure to renovation pollutants. This may include constructing barriers, sealing off areas, and temporarily relocating furniture and supplies. To control for dusts, a high efficiency particulate air filter (HEPA) equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended.
12. Consider continuing with the plan to contract with an environmental consultant to conduct mold tests in the school.

We suggest that these steps be taken on any renovation project within a public building. Please feel free to contact us at (617) 624-5757 if you are in need of further information or technical assistance.

Respectfully,

Suzanne Condon, Director
Bureau of Environmental Health Assessment

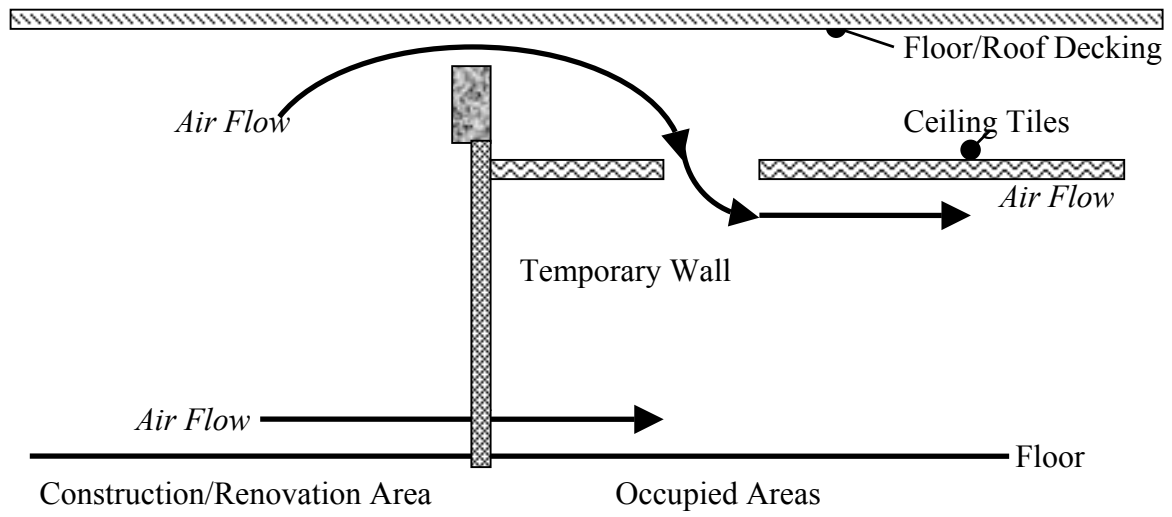
cc/ Mike Feeney, Chief, Emergency Response/Indoor Air Quality
Ken Johnson, Superintendent, Hanover School Department
Thomas LaLiberte, Principal, Hanover Middle School
Dan Pallotta, School Building Committee, Hanover Middle School

References

MGL. 1983. Hazardous Substances Disclosure by Employers. Massachusetts General Laws. M.G.L. c. 111F.

SMACNA. 1995. IAQ Guidelines for Occupied Buildings Under Construction. 1st ed. Sheet Metal and Air Conditioning Contractors' National Association, Inc., Chantilly, VA.

Figure 1



(Figure Not To Scale)

Picture 1

New Wing



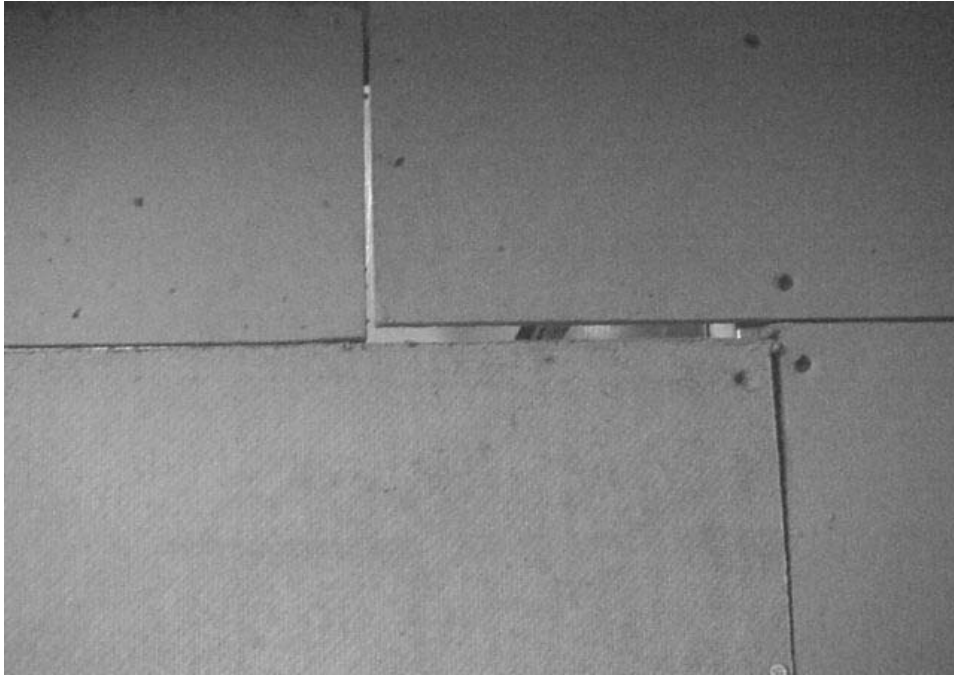
New Wing Added To North Wall Of School

Picture 2



Temporary Wall Sealing Renovations From Occupied Area Of School

Picture 3



Spaces In Temporary Wall That Are Not Sealed

Picture 4

Light from Renovation-side of Decking



Spaces In Decking And Interior Wall, Note Light Above Ceiling Tiles

Picture 5

Utility Hole



Utility Holes In Wall Through Which Odors May Pass

Picture 6

Hallway Door To Locker Room



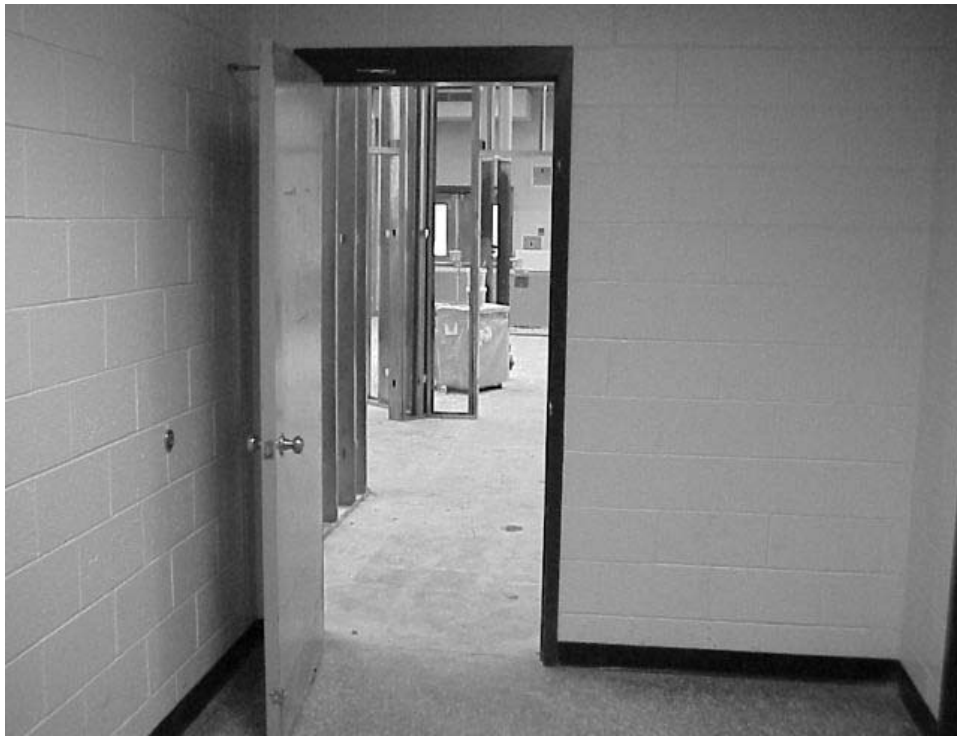
**Hallway Door To Gymnasium Under Renovations Left Ajar,
Note No Containment**

Picture 7



Hallway Door To Locker Room Under Renovation, Note No Containment

Picture 8



Hallway Door To Former Wood Shop With No Containment

Picture 9



Signs of Dried Moisture in Hallway Floor Tiles near Gymnasium Locker Room