Illinois Department of
PUBLIC HEALTH

Pat Quinn, Governor
Damon T. Arnold, M.D., M.P.H., Director

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Case #:703100901

March 26, 2009

Mr. Richard Kaffka
Roman Catholic Diocese of Joliet
402 S. Independence Blvd.
Romeoville, IL 60446

Dear Mr. Kaffka:

On March 10, 2009, you contacted Mr. Thomas Baughman, Ph.D., Environmental Toxicologist, West Chicago Regional Office, with concerns about possible mercury emissions from an old rubber gymnasium floor in St. Joseph Catholic School, 4832 Highland Ave., Downers Grove. A laboratory analyzed a sample from the floor and found that it contained mercury. A sample of the floor also failed the TCLP (Toxic Characteristic Leaching Procedure) test, indicating that the flooring will need to be disposed as hazardous waste if it is removed. You were concerned that the floor may be emitting harmful amounts of mercury vapor into the school air.

In the 1950s, the 3M Corporation developed flexible polyurethane floor coverings for indoor or outdoor (track) use and marketed them until the 1970s under the Tartan brand. These floorings used phenyl mercuric acetate as a catalyst, at 0.1% to 0.3% by weight. The available literature has extremely limited information on the emission of mercury from these gymnasium floors. Phenyl mercuric acetate itself has low volatility; however, one study showed that phenyl mercuric acetate breaks down with time to produce mercury vapor, as well as negligible amounts of benzene and acetaldehyde. The only two available studies showed that the concentrations of airborne mercury in schools with these floors were less than our clearance level for schools, 3,000 nanograms per cubic meter (ng/m^3). However, the 3M Corporation reported that airborne mercury concentrations in buildings of 22,000 ng/m^3 were possible. For the 3M Corporation testing, the volume of the room, ventilation, and condition of flooring were not reported, and all these factors could markedly affect airborne mercury concentrations.

On March 13, 2009, Mr. Baughman sampled St. Joseph Catholic School for airborne mercury using a Lumex RA915 Mercury Vapor Analyzer (Lumex). This instrument was calibrated by the factory on November 18, 2008 (annual calibration recommended). The gymnasium was about 100 feet long by 50 feet wide. The flooring was in good condition and not deteriorated. The outside air temperature was too low to measure the outside airborne mercury concentration, but it

typically is about 5 ng/m^3 to 15 ng/m^3 in the Chicago area. Inside the school, the Lumex detected the following concentrations at floor level, with multiple readings:

Location	Mercury Concentration (ng/m^3)	Clearance Level (ng/m^3)
Hallway by gym entrance	31, 31, 29	3,000
Southeastern corner of gym	178, 182	3,000
Northeastern corner of gym	175, 176	3,000
North central side of gym	188, 175	3,000
Center of gym	195, 203, 179	3,000
Northwestern corner of gym	159, 178, 184	3,000
Southwestern corner of gym	170, 176, 173	3,000
South central side of gym	205, 190, 199	3,000

ng/m^3 = Nanograms per cubic meter.

All measured airborne mercury concentrations were well below our clearance levels for schools, by a factor of about 15. Inhalation is the main route of concern because 80 percent of inhaled mercury is absorbed. Absorption of mercury after ingestion is low. Some exposure through skin can occur, especially if cuts are present. Because the body slowly eliminates mercury, cumulative exposure is important. At the measured concentrations, adverse health effects in students or employees are not expected. At this time, the flooring is intact; however, if the flooring should deteriorate, that could cause increased mercury emissions and, consequently, increased airborne mercury concentrations.

You reported that you may remove the mercury-containing flooring. One study found that disturbance associated with the removal of this flooring can cause high airborne mercury concentrations up to 74,000 ng/m^3. This exceeds the Threshold Limit Value (TLV) established by the American Conference of Governmental and Industrial Hygienists (ACGIH) for worker protection, 25,000 ng/m^3. This TLV is for 8 hour exposure of healthy adult male workers and would NOT be protective of a pregnant woman or a child. Children are more sensitive to mercury than adults, and mercury absorbed by a pregnant woman readily crosses the placenta and enters the fetus. The TLV also has an almost non-existent safety margin, with neurological effects reported in workers exposed (for years) to an average concentration of 26,000 ng/m^3. Consequently, should you remove the flooring, you will need to prevent the dispersal of mercury in the school and provide protection for the removal workers.

Specifically, should you decide to remove the old gymnasium floor, we recommend:

- Have the work done by a firm familiar with and licensed to remove flooring that may release hazardous materials such as asbestos or mercury (there is licensing for asbestos, but not for mercury).
- If your contractor is unfamiliar with mercury cleanups, we recommend that they consult with a hazardous waste firm familiar with mercury cleanups to ensure proper engineering of the project. Hazardous waste firms familiar with mercury cleanups are listed below.

- Dust suppression during removal may reduce the dispersal of contaminated material.
- Use containment and negative pressure to prevent the contamination of other areas of the school and the ventilation system.
- Use a charcoal filter on the negative air machine(s) to trap mercury, particularly if the air machine(s) discharges near building air intakes or areas frequented by children.
- Workers should use appropriate (for mercury) PPE (personal protective equipment, i.e., respiratory protection and chemically-protective clothing).
- After the removal of the flooring, clean the floor with a HEPA vacuum equipped with a charcoal filter (commonly called a mercury vacuum), followed by a mercury removal solvent or mercury spill kit.
- Complete the cleanup and perform clearance sampling for airborne mercury before the removal of all critical barriers.
- Because a sample of the flooring failed the TCLP test, waste from the removal will need to be handled and disposed as hazardous waste.

Hazardous waste cleanup firms in the area familiar with mercury cleanups include:

Clean Harbors	Heritage Environmental	IT	SET
773-646-6202	800-487-7455 630-739-1151	630-250-7788	847-537-9921

Please feel free to contact Mr. Thomas Baughman, Ph.D., at our West Chicago Regional Office at 630-293-6800 or Tom.Baughman@illinois.gov if you have any questions.

Sincerely,

Joe O'Connor
Senior Public Service Administrator

cc: West Chicago Regional Office
Environmental Toxicology, Springfield ✓
DuPage County Health Department