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ESTABROOK SCHOOL INDOOR ENVIRONMENTAL CONCERNS

Commonly Asked Questions and Answers

September 6, 2010

The following provides answers to commonly asked questions regarding the presence of PCBs recently found at the Joseph Estabrook School in Lexington, Massachusetts. This is a dynamic document, and it will be updated as additional questions are asked by the community. The information reflects the current thinking in the field of environmental science and public health and incorporates guidance provided by governmental agencies, such as the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Public Health. Where relevant and appropriate, EH&E has included commentary based on our extensive experience managing this issue for over 10 years.

Is it safe for my child to be in the school?

First of all, PCBs can be harmful, but whether they are in fact harmful in this situation, and how harmful they might be depends on lots of details, like dose, and the route and time of exposure. So just hearing that PCBs are there, as alarming as that is, doesn't answer the safety question.

Second, safety is a feeling, up to each of us to judge for ourselves and our children. And there is no absolute safety, no zero risk, in this situation, or ever. Seeing airborne levels as we see in the sampling performed at Estabrook is unquestionably of concern, as is the fact that the levels we have from the previous round of tests taken last week exceed the EPA guidance levels (these are discussed in more detail below, so you can understand how those numbers were developed and what they mean.)

But at this time the evidence indicates that the school is safe to attend, at least in the short and intermediate terms (also defined in more detail below). This judgment is based on two things;

1. Our extensive inspection and testing of many buildings for PCB levels, including schools, and assessment of blood serum levels of occupants of those buildings. We have found that exposure to PCB's in indoor air, in buildings with air levels similar to Estabrook School, do

not result in increased presence of total PCBs in the blood. So in actual situations like this, with real people, exposure to the PCB vapors in the air did not contribute to a build-up of total PCBs in the body. That is a powerful indication that the PCB vapors at Estabrook School are highly unlikely to pose a risk.

2. The judgment about safety is also based on extensive consulting EH&E has done with various governmental agencies, and extensive research we have conducted on the scientific literature in this area. We have not found any report that shows any adverse health effects in children or adults who have occupied buildings with airborne levels of PCBs equivalent to those in Estabrook.

To help you make your own informed judgment about PCBs, it may help you to know that decades ago when it was discovered that this group of chemicals could pose a risk, and PCBs became a notorious pollutant, it was also learned that the major health risk comes from ingestion of PCBs in food. Though PCBs have been banned for decades, they persist in the soil and are taken up plants and animals in the human food chain. That's how they get into our food. Ingestion is a different route of exposure than inhalation of vapors, and route of exposure is a key factor for how risky, or toxic, a substance might be.

Nothing is risk free, of course, but based on our experience with cases like this, our work with government agencies, and our in-depth familiarity with the scientific literature, it is our current judgment that airborne exposure to PCB vapors, at the concentrations we are seeing, pose a negligible (if not zero then really low) short or intermediate term risk for children in the school.

Question: Then what about the fact that the levels exceed the EPA guidance levels?

Answer: Screening levels developed by EPA are intended to serve as a caution flag and an alert to help guide future actions. Screening levels are not a "bright line" above which conditions are unsafe. They are called 'guidance' numbers, and they are intended only to be a general alert that circumstances exist that require further investigation into other factors that could contribute to the risk (ventilation, hours of occupancy, nature and use of the rooms in the building, etc.). For substances like PCB vapors indoors, the EPA uses these numbers to suggest further investigation and possibly remediation, but it doesn't require action, the way it does when there is a more firm 'threshold".

EPA uses health protective approaches when developing screening levels. In other words, the Agency aims to be cautious by applying safety factors and other assumptions to scientific data. Examples of these health protective approaches are summarized below.

First, the EPA indoor air screening levels are based on a mixture of PCBs believed to be more hazardous than the mixture typically found in indoor air, including the indoor air of the Estabrook School. The type of PCB mixture used by the EPA to set the screening levels can be up to 3 times more toxic to lab animals than the mixtures typically found in indoor air, making the EPA screening level lower, and more conservative, than what would be allowed if a PCB risk level specific to airborne exposures were used.

Second, EPA applied a “safety factor” of 300 to the lowest dose of PCBs found to produce an effect during a laboratory test with animals. They fed rhesus monkeys high concentrations of PCBs in their diet for more than five years. (Remember, the route of exposure believed to be most toxic is ingestion, not inhalation.) The lowest amount of PCBs fed to the monkeys was about 1000 times higher than levels to which humans routinely encounter in food and air. EPA took the lowest dose that led to any adverse effects in the monkeys, and then divided that by 300, just to be safe, since there are uncertainties about differences between monkeys and humans, duration of the test compared to duration of exposure in the real world, and differences in how sensitive individuals might respond.

Third, the EPA screening levels for PCBs in indoor air of schools also assume a background level of exposure to PCBs through diet that may or may not be applicable to residents of Lexington. The higher the assumed dietary PCB intake results in a lower indoor air screening level. The assumed level of PCB dietary intake is based upon measurements of food made in 1997 as reported by U.S. Food and Drug Administration (FDA). Out of more than 250 food items sampled from each of four regions in 1997, FDA found trace levels of PCBs in two foods prepared with items obtained from a sample of retail stores in upstate New York, eastern Pennsylvania, and New Jersey. The items were fried eggs and dried raisins. The same set of over 250 items obtained from stores in three other regions of the U.S. in 1997 did not contain even trace levels of PCBs. But to be safe, as it developed the guidance numbers the EPA assumed all such foods contained the PCBs. At this time, EPA’s background estimate of dietary PCB intake appears to be based upon conservative assumptions applied to the fried egg and dried raisin results noted above, designed to err on the side of caution. Consequently, EPA’s

PCB intake estimates may significantly over-state actual exposures to PCBs through diet, resulting in artificially low screening levels.

In summary, the EPA process for developing screening levels produces results that are very health protective and serve as a guidepost for further attention and action. Because levels of PCBs in indoor air of Estabrook are higher than the EPA screening values, the Town of Lexington is taking action to reduce the amount of PCBs in the school. A summary of past and current actions is available on the Lexington Public Schools website (http://lps.lexingtonma.org/). To facilitate and expedite the actions, classes will not meet inside the building the week of September 6 – September 10, 2010.

Question: We hear that PCBs are supposedly only a risk if people are exposed to elevated levels over a long period of time, for several years. What does "long" mean? And if PCBs are harmful, wouldn't even a little exposure be a risk?

Answer: There are government guidelines about duration of exposure to help guide risk management policy making in general, for most risks. Two different agencies have standards that are relevant here, the EPA and the Agency for Toxic Substances and Disease Registry (ATSDR). In the ranges given below, the shorter term number is ATSDR's:

- Long term means greater than 6 months to one year,
- Intermediate = 15 days to one year,
- Short term means less than 14 -30 days.

The toxicological study of PCBs so far has indicated that the substances only start to have negative health effects after their levels have built up in our bodies. But as we assess the key question of whether it is safe for the children to attend the school, we are also guided by research on people (not monkeys) who have been in these types of environments, and inhaled PCB vapors for years at concentrations in the range of those measured at Estabrook. Even after those long term exposures, the levels of total PCB measured in their bodies (blood) were similar to what would be expected in a typical U.S. resident. And the levels found in their bodies were largely related to their age and gender, and not the PCBs breathed from the air. That evidence gives us further confidence that the risk here, if there is any, would only come from long term continuous exposure to higher levels of PCBs than those found at Estabrook.

<u>Question: But what if my kid went to the Estabrook school for a number of years? What if I worked there for years?</u>

Answer: That raises the possibility of more exposure, but we don't know what levels existed at Estabrook prior to our testing. They might have been higher, or lower, at different times of day (was the fan on or off, were the windows open or closed?), at different times of the school year, in different rooms of the building. So we can't say whether their exposure was higher or lower than the screening values, which are based on constant levels of exposure.

It should be noted that the conditions under which the first round of air samples were collected, which included the highest level found in the school (1,800 nanograms per cubic meter of air - ng/m3) were collected under summer conditions, which because of heat and humidity may represent worst-case conditions. We know from other studies that PCB levels in buildings often change with the seasons, with greatest emissions found in the heat of the summer months. As fall approaches and the temperature and building cools, the amount of PCBs emitted to the air will decrease as well. EH&E has confirmed this phenomenon in several buildings.

Again, it may help you to keep in mind that, even given years of exposure, studies of people in other schools with similar PCB vapor levels did not show levels of total PCBs in blood above what would be expected in the average person.

<u>Question: If you already removed the caulk that contained the PCBs, why are the levels still high?</u>

Answer: There are several factors that need to be considered here. First of all, even though the PCB source that was identified in the window caulking was removed, that source may have off-gassed over the years and the vapors adsorbed onto – stuck onto - various porous surfaces in the building. Examples of these porous surfaces could be ceiling tiles, insulation, cork boards, etc. that then can be releasing the vapor back into the air. While we expect to see an immediate reduction in levels once the source is removed, it can take several days or even weeks in some cases to fully rid the building of the PCB residues under standard ventilation conditions.

Another possibility is that the building has not yet had enough ventilation since the caulk removal concluded, on Friday August 27, to get the levels down to what they might reach with the caulk gone. For instance, in Room 6, the levels dropped by more than half in just a couple days. We think this may be because Room 6 has better ventilation than the other three rooms we tested. This is why we did the enhanced “flushing” of the building over the Labor Day weekend bringing in high-flow ventilation units.

It is also possible that there may be other sources of PCBs yet to be identified. There could be additional sources of PCBs in the building that are contributing to the levels we have identified in the air. PCBs were used in many other materials and equipment in the past including electrical equipment, glues, and paints, and others. We have already checked common sources such as the light ballasts for fluorescent lights. The search is not completed yet and we are aggressively working to identify any additional sources of PCBs.

We have done work like this in many buildings. We have never failed to find the sources of PCBs contributing to the levels in indoor air.

Question: What do you mean by a primary source of PCBs?

Answer: Primary sources are products or materials that contain PCBs as a result of the manufacturing process. PCBs were added to these products or materials intentionally to provide certain properties, such as elasticity or flexibility in caulk. PCBs generally account for 1% to 10% of the weight of a primary source, which equates to 10,000 to 100,000 ppm. Some oils formerly used in electrical equipment such as capacitors and transformers were are nearly 100% PCBs by weight; PCB oils do not appear to be present in the school. Some examples of primary sources include; caulking, capacitors, and fluorescent light ballasts. Identifying these materials is an important first step in reducing PCB levels indoors. Given the relatively high levels of PCBs in these products, they can be the principal, or “primary”, contributor to airborne PCBs. These materials need to be removed, sealed, or isolated from the environment to prevent PCBs from off-gassing indoors as has already been done with the window caulk.

Question: What do you mean by secondary sources of PCBs?

Answer: Secondary sources of PCBs are products or materials that contain PCB residues released from a primary source of PCBs; either through direct or indirect contact. Some materials were manufactured with low levels of PCBs due to contact with PCB-containing oil or other PCB substances when the product was being made. In this case, the PCBs are a by-product of the manufacturing process and the PCBs were not intentionally added to the material. The PCB levels in these materials generally range from 0.0001% to 0.01% PCB (1 to 100 ppm), although higher levels, near 1% (1,000 ppm) can sometimes be found. Other materials that were not manufactured with PCBs may adsorb, or accumulate, PCBs released from primary sources. Porous materials, such as foam, may adsorb PCBs from the air and re-emit, or release, the adsorbed PCBs back into the indoor environment. The resulting airborne levels from PCBs emitted by secondary sources are generally much lower than from primary sources, and additional remedial options, such as enhanced ventilation, may be used to reduce the airborne PCB levels from secondary sources.

Question: What about PCBs in the soil outside, or the dust on the surfaces of things in the rooms, or in the duct work or unit ventilators in each room? Couldn't that be a source of ongoing contamination?

Answer: Possibly, but any emissions from those sources alone are unlikely to be a cause of levels measured in the building. While PCBs can be both a solid (attached to airborne particles) and a vapor (gas) at room temperature, typically we find PCBs in environments such as the school to be in the vapor phase, since they are generally from the off-gassing of molecules of PCBs from materials such as caulk. Particularly in this climate and under the test conditions found in Estabrook, we know from previous investigations that nearly all the PCBs will be in the vapor phase.

But just to be sure, the rooms have undergone extensive cleaning to remove particles from surfaces. After cleaning the surfaces will be sampled to ensure the cleaning was effective. Additional cleaning will be directed if PCBs are found above levels recommended by EPA.

We have tested the soil around the school and found PCB levels to be quite low, although one location did contain PCBs above a health protective screening level provided by EPA. That area has been covered to prevent children or staff from contacting the underlying soil. Given the low levels of PCBs found in the soil samples, the test results indicate that it is unlikely that PCBs in the soil are off-gassing up into the atmosphere and, via the ventilators, being drawn into the rooms inside the building, at levels any higher than PCB found in the ambient air.

The ductwork and ventilation units were sampled on September 2 – 3, 2010 and the unit ventilators were cleaned on September 5, 2010. The ducts will be cleaned if found to contain elevated levels of PCBs.

Question: What about PCB's that might have been absorbed by the bricks next to the caulk. Couldn't that be a continuing source?

Answer: The investigation found very low levels of PCB's in the brick, in most cases below 1 part per million (ppm), the lowest and most stringent regulatory level. The highest level of PCBs in the brick recorded to date is 4 ppm. These levels are far lower than those typically found by EH&E in other buildings with PCB caulk, and this indicates that only a very limited amount of the PCBs migrated from the caulking into the surrounding brick.

The areas where this occurred are being sealed with an epoxy to prevent any PCB residues from coming out of the brick. This approach has been used successfully on other buildings.

Question: What about asbestos? If it was in the caulk couldn't it be in the school? Did you test the air inside the building for asbestos?

Answer: The investigation found low levels of asbestos in the caulking (3-5%), which is not unusual for this age of building. It was removed by a licensed specialist following Massachusetts Department of Environmental Protection (MADEP) requirements, Occupational Safety and Health Administration (OSHA) regulations, and EPA guidelines. All of the work was conducted outside, and the openings to the building, such as the outdoor grilles for the unit ventilators and window seams, were sealed with plastic sheeting, duct tape, and/or caulking to prevent air (and potentially minute quantities of asbestos) into the building. Further, the workers were only allowed to use hand tools to remove the caulk and clean the residues, limiting the chance that any dust would be generated. Vacuum cleaners equipped with high efficiency filters (HEPA) were used for any cleaning operation.

Question: Why can't you get the PCBs out of there altogether? Make the risk ZERO.

Answer: Our efforts can reduce the concentration of PCBs but it is not possible to reduce PCB concentrations to zero because PCBs are ubiquitous in our environment. In fact, because of the prevalence of PCBs in the environment most humans, animals and even polar bears have low levels of PCBs in their bodies. While the goal is to reduce the levels in the School to below the EPA screening guidelines, getting the levels of PCBs down to zero is not achievable due to the continued presence of PCBs at low levels in our environment

Question: If there is a risk from long term exposure, why not find the high school students or others who went to Estabrook and study them?

This is typically referred to as a retrospective epidemiological study, and it is useful for looking back in time to see if a particular exposure or set of exposures resulted in an increase risk of disease or a particular health outcome. These studies typically take years to conduct, are very difficult and complex to execute, and can be very expensive. This type of study does not provide any value in making near term decisions regarding Estabrook, as it assesses historical exposures and outcomes.

Question: Why not do a risk assessment?

A risk assessment is a tool that used to assist public health professionals, regulators and scientists in setting guidelines for human exposure to chemicals or other potentially harmful compounds. This is in fact what the EPA did in establishing the screening levels for PCBs. Given the Town's desire to get the PCB levels at Estabrook to be consistent with EPA targets, a site specific risk assessment is not particularly helpful at this time. However, a risk assessment that considers background exposure to PCBs specific to the Estabrook school community may be useful, and this will be considered if the circumstances warrant.

Question: The EPA website says to clean the air ducts. Will you be cleaning the air ducts?

Answer: The ventilation systems for the classrooms are called cabinet ventilators or unit ventilators. These units do not have air ducts. That said, these units were inspected and, as a precaution, cleaned during the ongoing investigation. A sample of dust and debris was obtained from the ducts that connect some areas of the school. The ducts will be cleaned if found to contain elevated levels of PCBs.

Question: My child has asthma. Will the PCB's trigger a reaction?

Answer: PCBs are not recognized as asthma triggers. As with any medical condition, if you have a question regarding your child's asthma you should work with your health care provider or treating physician to resolve the question.

Question: When will the project be done?

Answer: The project will be considered complete when the sampling results confirm the effectiveness of the effort underway to lower the levels of PCBs in the air. Much progress has been completed already. The window sealant encapsulation and the removal of the exterior window frame caulk are complete. An investigation of additional sources in the building began on September 2, 2010. The enhanced ventilation flushing was completed on September 5, 2010. Existing ventilation systems in the building were inspected and put back in operation on September 5, 2010. Another round of indoor air testing was conducted was conducted on September 6, 2010. Looking ahead, we expect to complete the next phase (brick encapsulation) of the current abatement work plan by September 10, 2010. The results of our various additional tests are expected between September 7 and 10th. Of those, the air testing to measure the results of the ventilation and additional cleaning are expected on Friday, September 10, 2010.