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Harvard Study: 26,000 Schools Contaminated with Monsanto's PCBs

As many as 26,000 U.S. schools serving up to 14 million students may be contaminated with unsafe concentrations of toxic polychlorinated biphenyls (PCBs) leaching from caulks, sealants, and other aging building materials and fixtures, according to a recent study by scientists at the Harvard T.H. Chan School of Public Health.[1]

Sen. Edward Markey, D-Mass., analyzing the Harvard findings, has calculated that up to 30 percent of American children in elementary, middle and high school may still be exposed to these dangerous industrial chemicals, despite a 1976 ban by Congress. PCBs were the only family of chemicals for which such action has been taken.

PCBs, manufactured from the 1920s to the 1970s by Monsanto, were once used as insulators for electrical equipment, oils for hydraulic systems and motors, plasticizers in paints and caulks, components of fluorescent light fixtures, and ingredients in consumer products such as carbonless copy paper.

The World Health Organization categorizes PCBs as carcinogens. These chemicals can also cause a variety of health problems, harm to the immune system, neurological damage, learning deficits, lowered birth weight and decreased thyroid hormone function.

School children are most often exposed to these chemicals by old, PCB-laden caulk and outdated fluorescent light ballasts. They may also come in contact with PCBs that migrated into paint, floor finishes or soil outside.

According to data the Environmental Protection Agency provided to Markey's office, which was also analyzed by EWG, over the past 10 years the EPA has received 286 reports of potential PCB contamination in thousands of school buildings in 22 states. These incidents ranged from the removal of a single fluorescent light fixture to large-scale remediation undertaken by some of the nation's largest school districts. Moreover, an unknown but probably substantial number of students and teachers in numerous colleges and universities come into frequent contact with PCB-laden materials.

Dr. Robert Herrick, the primary author of the Harvard study, stated:

> These data demonstrate that PCBs in schools are a national problem. And while the scope of the problem remains poorly characterized, it is clear that where people look for PCBs in schools, they are very likely to find them. The presence of PCB contamination in our schools causes elevated blood PCB levels among both teachers and students. The effect of these PCBs on the health of people in these buildings has never been studied, but given the evidence that PCBs cause cancer, and reproductive and developmental problems, it is essential that this source of PCB exposure be eliminated from our schools.

Not long after Monsanto started producing PCBs, the company discovered they were health hazards, but hid that information from the public and regulators. This began a decades-long cover-up, the likes of which is unmatched in the annals of corporate environmental malfeasance, and was not fully revealed until internal company documents were unearthed in lawsuits. In 2003, thousands of these documents were made public in **EWG's Chemical Industry Archives,** which documented the shocking story of Monsanto's callous poisoning of Anniston, Ala.

The most urgent questions surround possible contamination in the tens of thousands of schools that may not have been tested for PCBs, but are at risk for having them. Any school building constructed between the 1950s and the late 1970s could test positive for these chemicals, potentially endangering the health of students and teachers. Schools built in this time frame should test for PCBs in caulk, dust and in the air. School systems with old fluorescent light fixtures should develop disposal and replacement plans.

Dr. David Carpenter, director of the Institute for Health and the Environment at the University of Albany and one of the nation's leading researchers of PCB impacts on human health, stated:

> PCBs are known to cause a reduction in learning ability and IQ. The last thing you want in a school is to have children exposed to a neurotoxic chemical that will reduce their ability to learn. PCBs in materials like caulk or leaking fluorescent light ballasts slowly volatilize, and children and teachers will inhale these vapor-phase PCBs continuously while in a PCB-contaminated school.

Caulk made in the 1950s to 1970s commonly contained PCBs. The material can break down to release PCBs that can migrate into air and adjacent structural materials such as bricks, mortar, concrete and soil. Under EPA regulations, materials with more than 50 parts per million of PCBs must be removed or properly remediated. In recent tests at two schools in Malibu, Calif., caulk concentrations of PCBs up to 570,000 parts per million have been found, vastly exceeding the EPA limit.[2]

Earlier this month, in response to a citizen's suit filed by parents of school children against the Santa Monica-Malibu school district, a federal judge in Los Angeles ordered all PCBs removed from two Malibu schools.[3]

However, the EPA does not require schools to test for the presence of PCBs. No national database exists that summarizes whether buildings were tested, levels of PCBs in caulk detected in various buildings that were tested, the remediation measures undertaken and whether these measures were effective.

Even when school systems remove caulk and other PCB-laden materials, the chemicals may linger in other adjacent materials, such as wooden window frames, brick and stucco, which is why confirmation testing after PCB removal is essential.

The EPA acknowledges that all fluorescent lights that contain PCBS currently in use have exceeded their designated life spans. It is unknown how many of these light fixtures have already been removed and how many remain in use. These lights are at a heightened risk of

rupture, leaching and crumbling, increasing the chance of subsequent PCB exposure for people in the buildings. Cleanup costs after a rupture could be significant.

The EPA recommends that any fluorescent light fixture that contains PCBs should be removed.[4] But the agency does not require removal unless PCB-contaminated liquid is leaking out of the light fixture.

The EPA also recommends schools should remove caulk, paint and other building materials that contain PCBs during renovations and repairs.[5] While planning for long-term remediation, school administrators may consider mitigation measures such as covering a PCB-containing material with another material, a process known as encapsulation.[6] However, scientists do not know whether covering PCB sources such as caulk, contaminated masonry, or wood, can effectively contain the spread of PCBs.[7] According to Herrick, the Harvard scientist, "The verdict on PCB encapsulation is still out and school administrators should approach it very cautiously."

Children may be exposed to a wide range of environmental hazards in schools – not only PCBs but also asbestos, radon, mold, cleaner chemicals, pesticides, and lead in drinking water. Like PCBs, asbestos and radon are still found in schools across the nation.[8] A 2012 report by CNN estimated that one-third of U.S. schools have mold, dust and other indoor air pollution problems.[9]

With the exception of asbestos, in most cases schools are not required to regularly monitor or remediate these environmental hazards, nor are they required to even notify parents that these hazards may exist. While this report focuses on the health risks of PCBs in schools, American school systems and the communities that support them need a substantial investment in school infrastructure to eliminate many types of environmental hazards.

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[1] Robert F. Herrick et al. 2016. Review of PCBs in US Schools: A Brief History, an Estimate of the Number of Impacted Schools, and an Approach for Evaluating Indoor Air Samples. Environmental Science and Pollution Research, 23(3):1975-1985.

[2] Complaint at 30, Am. Unites for Kids v. Lyon, 2016 U.S. Dist. LEXIS 118447 (C.D. Cal. Sept. 1, 2016) (No. CV 15-2124). See also, Susan Klosterhaus et al. 2014. Polychlorinated Biphenyls in the Exterior Caulk of San Francisco Bay Area Buildings, California, USA. Environment International, (66):38–43.

[3] Am. Unites for Kids v. Lyon, No. CV 15-2124, 2016 U.S. Dist. LEXIS 118447 (C.D. Cal. Sept. 1, 2016).

[4] U. S. Environmental Protection Agency. 2016. Polychlorinated Biphenyl (PCB)-Containing Fluorescent Light Ballasts (FLBs) in School Buildings. Available at www.epa.gov/pcbs/polychlorinated-biphenyl-pcb-containing-fluorescent-light-ballasts-flbs-school-buildings

[5] U. S. Environmental Protection Agency. 2015. Fact Sheet on Practical Actions for Reducing Exposure to Polychlorinated Biphenyls (PCBs) in Schools and Other Buildings. July 28, 2015. Available at www.epa.gov/sites/production/files/2016-03/documents/practical_actions_for_reducing_exposure_to_pcbs_in_schools_and_other_buildings.pdf

[6] Kathleen W. Brown et al. 2016. PCB Remediation in Schools: A Review. Environmental Science and Pollution Research, 23:1986-1997.

[7] U.S. Environmental Protection Agency. 2015. Laboratory Study of Polychlorinated Biphenyl (PCB) Contamination in Buildings: Evaluation of the Encapsulation Method. Available at www.epa.gov/sites/production/files/2015-08/documents/pcb_encapsulation_fs.pdf

[8] Report written by the staff of Senator Edward J. Markey using the responses from a survey sent by Senator Markey and Senator Barbara Boxer. Failing the Grade: Asbestos in America's Schools. December 2015. Available at www.markey.senate.gov/imo/media/doc/2015-12-Markey-Asbestos-Report-Final.pdf. See also,

U. S. Environmental Protection Agency. 2016. Radon in Schools. Available at www.epa.gov/radon/radon-schools

[9] David S. Martin, Are Schools Making Kids Sick? CNN, Jan. 14, 2012. Available at www.cnn.com/2012/01/14/health/school-indoor-air-pollution/index.html

PCBs in Schools: Solving the Problem on a National Level

Polychlorinated biphenyls, better known as PCBs, are toxic chemicals that were manufactured by Monsanto and used in a range of industrial applications until they were banned by Congress under the Toxic Substance Control Act of 1976. PCBs can cause cancer and also pose multiple other health risks affecting the immune, endocrine, reproductive and neurological systems.

PCBs were widely used in schools built between 1950 and the late 1970s. They served as a plasticizer in caulk and heat conductors for fluorescent light fixtures. PCBs are notoriously difficult to contain and they can leach from caulking and fixtures into other building materials and soil.

The 1976 ban prohibited the manufacture of PCBs and phased out most uses, except in "totally enclosed equipment" by 1979. Current federal regulations make it unlawful to continue using any materials, such as caulk, with PCBs in concentrations exceeding 50 parts per million. Fluorescent light ballasts that contained PCBs were part of an excluded list of PCB uses since they were seen to be "totally enclosed." However, these old ballasts have now exceeded their useful life and are failing, potentially causing PCBs to leak out and expose kids.

If a school's caulk is tested and contains more than 50 parts per million of PCBs, the school administration has a legal obligation to remove it and any contaminated surfaces. However, the law does not require schools to test or monitor for PCBs. To adequately protect schoolchildren and personnel, inspections and testing of schools at risk for PCB hazards should be mandatory.

If PCBs are found in one part of a school, school officials must presume that the entire school also has PCB-laden materials. They must order comprehensive testing to characterize the extent of the problem. In the absence of a federal mandate, the EPA and state public health agencies should be encouraging inspections of all schools built or retrofitted between 1950 and the late 1970s. The EPA must improve its efforts to communicate this obligation to test to local education agencies, school districts and schools with potential PCB hazards.

The EPA acknowledges that all fluorescent light fixtures made with PCBs are past their designated life spans and are at heightened risks of leaking or rupturing. It recommends that these fixtures be replaced, but it does not require schools to do so. The EPA has begun a rule-change process to make it illegal for schools to continue using light fixtures with PCBs. The agency should quickly conclude this process, update its regulations and

mandate an immediate inspection of fluorescent light fixtures in schools and quickly remove those with PCBs.

In addition, the EPA should require that schools characterize all building materials containing PCBs and create detailed plans before starting a PCB remediation project. These plans should account for remediation of secondary sources of PCBs such as paint, masonry and soil that may have been contaminated by leached PCBs. Schools should also have plans to monitor buildings and grounds regularly for any residual PCB hazards after remediation.

The EPA should require that the results of testing and plans to remediate are shared with parents. The agency should coordinate with its regional offices so they can work together to make sure all the nation's schoolchildren are protected from PCBs.

PCBs in Schools: What Can Parents Do?

Polychlorinated biphenyls, or PCBs, are toxic industrial chemicals that were produced by Monsanto and used in caulk and other building materials until they were banned by Congress in the late 1970s. Caulking laced with PCBs is most likely to be found in schools and other buildings constructed or remodeled between 1950 and the late 1970s.

In addition to caulking, old fluorescent light fixtures may contain PCBs in ballasts, components that regulate the current to the lamp. These fixtures with PCBs are past their useful life spans and could rupture, which would expose kids and teachers in the buildings to PCBs.

There are tens of thousands of schools built during the PCB era that have not been tested for PCBs, and which are highly likely to contain these chemicals, potentially endangering the health of students and teachers. Schools should test for PCBs in caulking, air and dust. School systems with older fluorescent light fixtures should develop disposal plans.

Concerned parents should ask these questions of a school or school district:

- When was the school built?
- Were there any major renovations during the 1950s through the 1970s, when PCBs may have been used in caulk and other building materials?
- Has the school or school district conducted a PCB survey?
- Were any major renovations undertaken after 1979? If so, did anyone test for PCBs and remove contaminated materials?
- If PCB testing was done, what type was it: air testing, dust sampling or caulk testing?
- Has the school publicly released all testing results, the testing method and the name and accreditation of the testing lab?
- If PCBs were found above the legal limit of 50 parts per million, what actions were taken to test the rest of the building?
- Has the school conducted an inventory of all fluorescent lights to identify which ones might have ballasts made with PCBs and should be removed immediately?

- What is the school's overall plan for removal and disposal of all PCB-contaminated fluorescent light ballasts?
- If the school building was constructed or renovated during the 1950s through the 1970s and no testing has been done, ask them to test caulk, air and dust.
- If any PCB sources are detected, ask the school to develop a public, transparent PCB removal and remediation plan.

PCB contamination is not the only environmental challenge facing schools. School administrators must cope with wide range of other environmental hazards, including asbestos, radon, mold, toxic cleaning chemicals, pesticides, and lead in drinking water. While this report focuses on the health risks of PCBs in schools and what parents can do to find out about them and reduce their children's exposures, America must make a substantial investment in school infrastructure to address school environmental health issues.