A story of Impact

NIOSH-funded Research Helps Reduce Occupational Exposure to PCBs When Renovating Schools

Polychlorinated biphenyls (PCBs) are toxic organic compounds once used in a variety of products ranging from transformers to oil based paints and plastics. Exposure to PCBs has shown multiple adverse health effects.[1] Due to high toxicity and harmful environmental effects, Congress banned the production of PCBs in 1978. Despite the ban, occupational exposures to this toxic compound still occur regularly. This includes when working with older products, buildings, equipment, and materials that were created with or used PCBs and still have the compound embedded in them.[2]

Research funded by the National Institute for Occupational Safety and Health (NIOSH), and conducted within the Education and Research Center at the Harvard School of Public Health, focused primarily on the blood PCB levels of construction workers who renovate schools built before 1978 in the eastern United States.[3] Many buildings constructed prior to 1978 have PCBs in the paint and the caulking material used to seal joints, especially around

▲ PCB caulk was commonly used to seal the joints of brick, masonry, stone, and metal window frames.

Relevant Information

Occupational studies have indicated that PCBs have negative health effects on the immune system, reproductive system, nervous system, and endocrine system.[6]

NIOSH has determined that PCBs are potential occupational carcinogens.[10]

In the United States, PCBs are referred to by many other names including asbestol, aroclors, pyrenol and therminol.

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windows and pipes.[4] As aging schools are renovated, construction workers are disrupting, breaking, or grinding areas where PCBs are located. Dust containing PCBs can be released into the air during these activities contaminating the building and surrounding area, which puts not only construction workers at risk of respiratory exposure but also schoolchildren, teachers, and other workers. Research has shown levels of PCBs reaching as high as 81 parts per million (PPM) in the dust inside ventilation systems; however, the limit for bulk materials such as caulk and dust set by the Environmental Protection Agency (EPA) is much lower at 50 PPM.[5] Further, related studies have found an increase in PCB plamsa levels for both teachers and construction workers.[6]

Impact

This research has received widespread media attention, leading to an increase in public knowledge and awareness of PCB presence in older school facilities. Additionally, the topic has received coverage by local northeastern newspapers and television stations. As a result, there has been an increase in the testing of schools built before 1978 for PCBs before renovations begin. Furthermore, these research findings propelled some building owners and contractors to even require this testing be done as part of construction planning, and then require the use of full abatement procedures if PCBs are found. This testing helps inform employers about any potential hazards, allows them to take the necessary precautions to protect the workers, and increases the likelihood for preventing contamination.[7]

Concerned parents, teachers, and school workers have pushed to test not only the schools, but also the surrounding soil and playgrounds for sources of potential PCB exposures. Additionally, in early 2010 New York City and the EPA began a pilot study in 5 New York City schools investigating PCBs in the caulking. This study found PCB levels in both caulking and air that exceeded EPA guidelines.[8] This pilot effort led to an unexpected and surprising discovery that many schools are also leaking PCBs from certain components of old fluorescent light fixtures—a problem thought to have been resolved decades earlier. As a result, steps are being developed by the EPA to safely replace lighting systems in affected schools.[9]

For more information about NIOSH and occupational safety and health topics visit www.cdc.gov/niosh. To learn more about PCBs in schools or the Harvard Education and Research Center visit www.hsph.harvard.edu/faculty/robert-herrick, www.pcbinschools.org, or www.hsph.harvard.edu/research/erc/.

[1-10] For a complete list of references, see www.cdc.gov/niosh/docs/2012-170/.

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