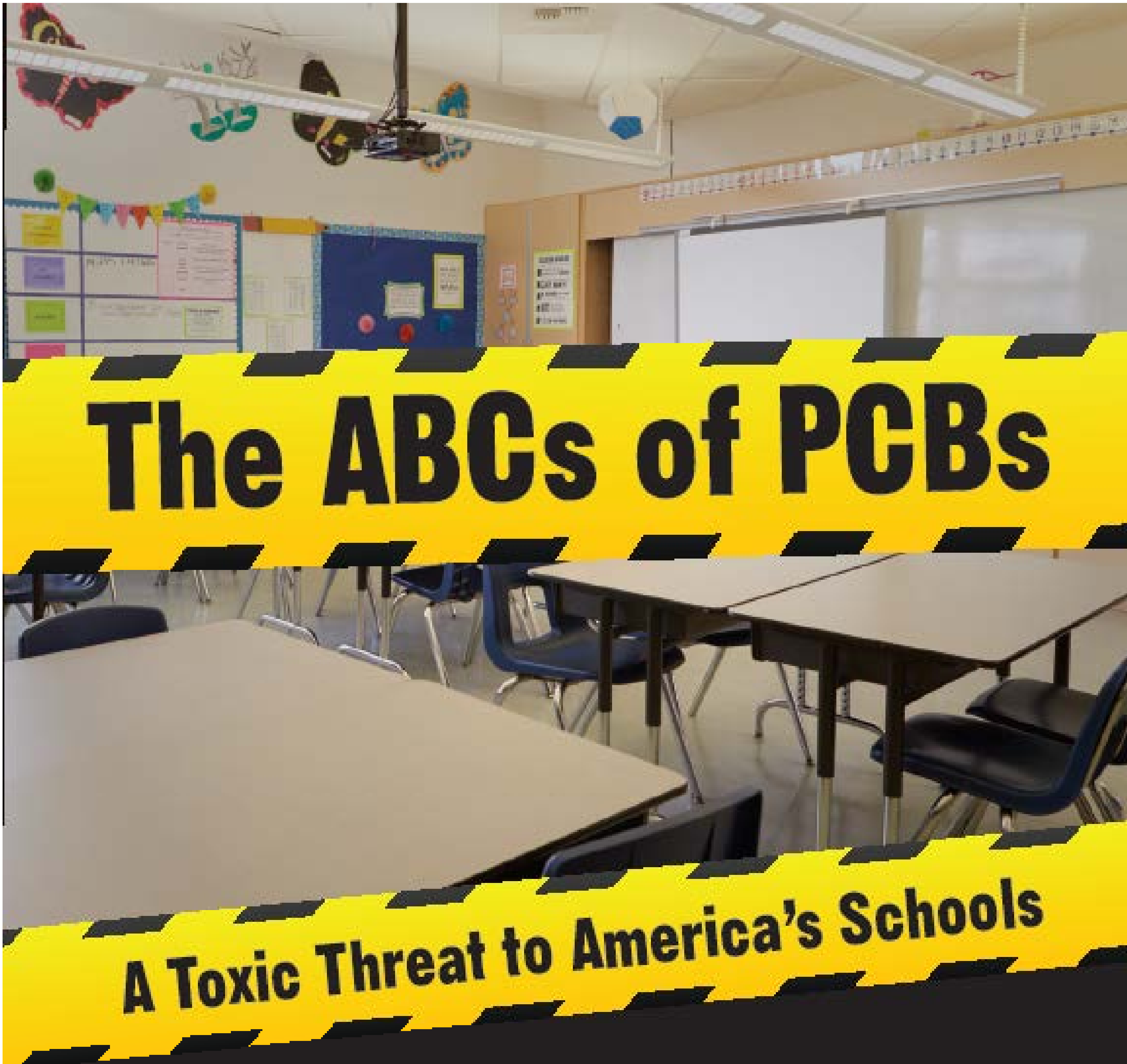

# The ABCs of PCBs

## A Toxic Threat to America's Schools

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Prepared by the office of

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## Executive Summary

Polychlorinated biphenyls (PCBs) are a man-made class of chemicals that were manufactured from the 1920s to 1970s and used as insulators for electrical equipment, oils for hydraulic systems and motors, solvents for paints and caulk, internal components for fluorescent light known as ballast, and ingredients in consumer products such as carbonless copy paper. The U.S. Environmental Protection Agency (EPA) banned PCB production and most uses in 1979. Decades of scientific research have demonstrated that PCBs can cause a variety of harmful health effects, including cancer. The health risks from PCBs have been validated by U.S. and international health agencies, such as the Agency for Toxic Substances and Disease Registry, a part of the Department of Health and Human Services, and the International Agency for Research on Cancer.

Decades after the PCB ban, people are still being exposed to these toxic chemicals from various sources, such as caulk, some oil-based paints, and floor finish in buildings constructed between 1950 and 1979; leaking fluorescent light ballast; old electrical equipment; and PCB-containing landfills. Most worrisome are PCB exposures for children in schools built or retrofitted during the period that PCB-containing materials were widely used. Up to 14 million students nationwide, representing nearly 30% of the school-aged population, may be exposed to PCBs in their schools, based on the estimated number of schools built during that time and how much PCB-containing material was used in these schools. A 2016 Harvard School of Public Health study estimates that between 12,960 and 25,920 schools have PCB-containing caulk.

PCB hazards are not the sole environmental challenge facing schools. In 2013, the U.S. Green Building Council reported that our nation's schools may need up to $542 billion in repairs and upgrades. For example, asbestos hazards are still found in schools, highlighted 2015 Report from the Office of Senator Edward J. Markey (D-Mass.) report on asbestos in schools. Radon, a cancer-causing gas, has been found at levels greater than the federally acceptable limit in schools across the country. In April 2016, the Associated Press reported[1] that nationwide, 278 schools and day care centers operating their own water systems have violated federal lead levels at some point during the past three years. Lead concerns have prompted schools across the nation to resort to the drastic measures of shutting down drinking water fountains. Schools in majority-minority communities require the most urgent attention.

While this report focuses on PCB hazards in schools, there is an urgent need for a substantial investment in America's school infrastructure, which was recently given a "D+" grade by the American Society of Civil Engineers. Specifically for PCBs, considering the number of schools potentially containing PCB caulks and other PCB-containing materials, proper remediation of these hazards could cost between $25.9 billion and $51.8 billion, as this report demonstrates.

A list of 286 cases of potential PCB hazards in schools provided by the EPA to Senator Markey demonstrated that the

primary pathways of PCB contamination in schools are caulk and leaking fluorescent light ballasts. Caulk containing PCBs in concentrations above 50 parts per million (ppm) is regulated under the Toxic Substance Control Act (TSCA), and must be removed once discovered. PCB-containing fluorescent light ballast is not regulated under TSCA unless the ballast has ruptured and leaks. PCBs are also found in certain oil-based paints, floor finish, and plastics in schools, although these are a less significant source of exposure. However, the inspection for and testing of PCBs is not required in America's schools.

As this report reveals, the response of schools, school districts, and states to the discovery of potential PCB hazards in school buildings vary. For example, a school building in Lexington, Massachusetts was demolished and rebuilt because the school could not successfully remediate the PCBs even after following the EPA guidance. All of the fluorescent light ballasts from 739 New York City public schools were required to be replaced after a lawsuit demonstrated insufficient action from the school district. A citizen's suit in Malibu, California pitted parents against a school district that spent more money on lawyers and consultants than it would reportedly have cost to remediate the entire school. In September 2016, a judge ruled in favor of the parents and banned the school district from using rooms in the affected schools after 2019 unless the windows, door systems, and surrounding caulk had been replaced. Finally, a survey of state government (including the District of Columbia) websites to assess the availability of information on PCB hazards in schools reveals that such materials are generally lacking or are not readily-available.

This report demonstrates that children in schools across the country may be unknowingly exposed to cancer-causing PCBs; that there are generally no requirements for schools to do testing or inspections to ensure such exposures are not occurring; and that even when potential exposures are identified, the manner in which reporting, communication and remediation of the hazard occurs is inconsistent and often ineffective.

Specifically, the key findings include:

# Key Findings

**#1** The scope of PCB hazards in schools in the United States is likely widespread, potentially affecting up to 30% of the school-aged population, but it is difficult to quantify the exposure from the variety of potential sources of PCBs. The cases of potential PCB hazards in schools provided by EPA reveal a variety of different sources of PCB contamination.

**#2** Because there is no federal requirement for the inspection of schools for PCB hazards in schools and in most cases no state-level requirements or even publicly-available guidance for testing or inspections for PCB hazards, schools often appear to learn of PCB hazards by chance, and it is likely that additional cases of PCB hazards remain undetected.

**#3** There is a lack of transparency and inconsistent communication between schools with a potential PCB hazard, the EPA, states, and those who may be affected by a PCB hazard in a school.

**#4** There appears to be inconsistency in the way each EPA region handles enforcement activities and communication with schools and local educational agencies within the Region, and variability in the way each EPA Region keeps track of potential PCB hazards in schools.

**#5** There are many examples of improper and ineffective responses to and remediation of PCB hazards in schools. Failures to fully remediate PCB hazards have also occurred in cases of schools following EPA guidance, raising questions about the adequacy of such guidance. The lack of requirements for the testing of PCBs during or after remediation projects also limits certainty of the effectiveness of most remediation efforts.

**#6** Many states and local education agencies do not have the funds necessary to perform testing, response to or remediation of PCBs in schools.

Recommendations developed to address the findings in this report include:

# Recommendations

**#1** The EPA should survey school systems nationwide and update its records to better assess the scope of potential PCB hazards in schools. The Asbestos Hazard Emergency Response Act (AHERA) should be amended to require recordkeeping by state and local educational agencies of testing for, response to, and remediation of PCB hazards in schools to be submitted to and approved by appropriate state officials, and should also require status reports from each state to the EPA both for asbestos and PCB hazards at least every ten years.

**#2** Inspections and testing of schools for PCB hazards should be mandatory to ensure that the identification of such hazards is not left to chance. This could be accomplished through an amendment to AHERA to extend and update requirements that are already in place for asbestos in schools to PCBs. In the meantime and at a minimum, the EPA should update its testing guidance to encourage inspections of all schools built or retrofitted between 1950 and 1979, and improve its efforts to communicate testing guidance to states, local education agencies, and schools with potential PCB hazards.

**#3** The EPA should immediately develop guidance regarding the means by which parents, teachers, and employees should be notified of potential PCB hazards. In addition, AHERA should be amended to make such notification to parents, teachers, and employees mandatory, as is the case for asbestos, and to require states to notify the EPA whenever a PCB hazard that requires remediation is identified, prior to beginning remediation efforts.

**#4** The EPA should immediately develop and implement guidance to enhance consistency in recordkeeping, sharing of best practices and other information, outreach to states and school districts, and enforcement activities related to PCB hazards in schools across all EPA regions. EPA regional offices should increase their outreach to states and local education agencies to make them aware of available EPA's PCB regulations, guidance and resources.

**#5** The EPA should update its current guidance on PCB hazards in schools to incorporate lessons learned from previous remediation projects and best available science. The EPA should quickly update its TSCA regulations to prohibit the continued use of PCB-containing fluorescent light ballast, and require – not just recommend – the removal of all PCB-containing ballast from schools. Schools should also be required to have detailed plans before starting a PCB remediation project. This could be accomplished by amending AHERA to require schools to create, submit, and maintain a management plan for PCB hazards, including testing for PCB hazards post-remediation.

**#6** Congress needs to immediately authorize and appropriate money for the testing for, response to, and remediation of PCB hazards in schools.

## Introduction

Polychlorinated biphenyls (PCBs)[2] are a tasteless and odorless class of man-made industrial chemicals manufactured in the United States from the late 1920s until 1979. PCBs can withstand high temperatures and are not very flammable, which made them useful for a variety of commercial processes and products. Uses included electrical equipment such as transformers, oils for hydraulic systems and motors, solvents for caulk, certain oil-based paints, floor finishes, plastics, and internal components in fluorescent lights known as ballast (the device that regulates the amount of energy flowing to the lighting fixture). In the Toxic Substances Control Act (TSCA) of 1976 (for which PCB regulations came into effect in 1979),[3] Congress banned most of the manufacturing, processing, or distribution of PCBs. The law also provided EPA with the authority to regulate the disposal and remaining authorized uses of PCBs through reporting, record-keeping, testing, and other restrictions of their use.[4] The EPA is currently in the process of updating its PCB regulations under TSCA.[5]

PCBs are known to cause a variety of adverse health issues, including cancer. The EPA has listed PCBs as a "probable human carcinogen"[6] and the World Health Organization (WHO) International Agency for Research on Cancer (IARC) has listed PCBs as a Group 1 Carcinogen, meaning that the material is "carcinogenic to humans."[7] Studies have linked PCB exposure to increased risk of melanoma, brain cancer, and stomach, intestinal, and thyroid cancers.[8] High-level exposure may cause immune system suppression, elevated risk of cardiovascular disease, hypertension, and diabetes, hormonal effects, and asthma. In addition, PCBs have been shown to cause negative effects on birth weight, infant motor skills, and cognitive growth problems.[9]

Schools built or retrofitted between 1950 and 1979 are likely to contain PCB hazards, most commonly found in caulk and fluorescent light ballast, but also in other building materials such as adhesives, oil-based paint, and floor finish. A recent Harvard School of Public Health study[10] estimates the number of schools to have PCBs in building caulk to be between 12,960 and 25,920. In 2010, the average number of students per school was roughly 550 students according to National Center for Education Statistics[11], adding up to the potential of 7 - 14 million elementary or secondary school students that could be exposed to PCBs through caulk. This accounts for 15-30% of the total schools in the United States and up to 30% of the school-aged population. In addition to elementary or secondary schools, there are likely numerous colleges and universities with PCB-containing caulk. Additionally, the total number of impacted schools and students would also be expected to increase with an estimate that included potential PCB exposures from fluorescent light ballast and other building materials.

### The EPA[12] has identified some of the uses of and potential problems surrounding PCBs in schools:

- Since most new manufacturing of PCBs has been banned since EPA finalized regulations under TSCA in 1979, any PCB-containing building materials or fluorescent light ballast in schools must be at least 37 years old.
- Fluorescent light ballast that contains PCBs is likely past its usable lifespan, increasing the chance of rupture and subsequent PCB exposure for occupants in a building. Any rupture of PCB-containing ballast puts those exposed to the material at risk, and subsequent cleanup costs are significant. The EPA recommends that any ballast containing PCBs be removed, but current regulations do not require removal unless the PCB-containing liquid is leaking out of the ballast.
- Caulk applied between 1950 and 1979 may contain PCBs. PCB-containing caulk can emit PCBs, contaminating the surrounding air and adjacent building materials. Under EPA's current regulations,

caulk containing PCBs at concentrations greater than 50 ppm is not authorized for use, but EPA does not enforce this regulation at schools, only requiring it to be removed after an identified problem or exposure.

- Even when PCB-containing materials such as caulk are removed, materials that were adjacent to the contaminated materials may have become contaminated and still emit PCBs. For example, the wooden framing around a window where PCB-containing caulk was located can become contaminated and release PCBs even after the caulk has been removed.
- For materials with low levels of PCBs, covering a PCB-containing material with another material, a process known as encapsulation, may be an appropriate containment technique that can be chosen on a case-by-case basis. However, choosing the correct material and application technique is essential. Laboratory tests published by the EPA in 2015 ranked various coatings for their ability to prevent PCB migration; however, none of coatings tested were completely effective in ensuring no level of PCB exposure.[13]
- To reduce risk of exposure, the EPA recommends indoor air exposure levels for schools that are "likely to be without an appreciable risk of harmful effects during a lifetime"[14] as a means "to guide thoughtful evaluation of indoor air quality in schools."

EPA is evaluating its current PCB regulations and published an Advanced Notice of Proposed Rulemaking in 2010.[15] This announced the EPA's intent to update the authorized uses of PCBs, including the possibility of phase-outs for certain currently authorized uses of PCBs and a change to the level at which products with PCBs are subject to federal regulation.[16]

According to data provided to Senator Markey's office by the EPA (Attachment 1), EPA has been made aware of 286 cases of potential PCB hazards in 20 states affecting thousands of school buildings in the past ten years. The cases ranged from the remediation of a single leaking PCB-containing fluorescent light ballast to the remediation of PCB-containing materials across some of the largest school districts in the country. This report discusses and illustrates the tremendous variation in how each case was discovered and responded to by the State, school district, and EPA. For example, a school building in Lexington, Massachusetts was demolished and rebuilt because the school could not successfully remediate the PCBs even after following the EPA guidance. All of the fluorescent light ballasts from 739 New York City public schools were required to be replaced after a lawsuit demonstrated insufficient action from the school district. A lawsuit in Malibu, California has pitted parents against a school district that spent more money on lawyers and consultants than it would reportedly have cost to remediate the entire school. In September 2016, a judge ruled in favor of the parents and required the district to replace all caulk and surrounding windows and door systems by 2019 to continue using the affected schools.

The need for investment in school infrastructure is not a new concern. A February, 1995 Government Accountability Office (GAO) report on school facilities' conditions[17] found that our nation's schools needed $112 billion ($178 billion in 2016 dollars) to repair or upgrade facilities. A follow-on GAO report[18] found that although there are schools all over the country in need of repair, the largest percentage of schools needing repairs were located in central cities, which generally served a majority-minority population. Additionally, only nine states reported to GAO that at least 50% of their schools had satisfactory environmental conditions. The remaining states reported that less than 50% of their schools had satisfactory environmental conditions. A 2000 report by the National Education Association estimated the cost of fixing and modernizing our nation's schools at $332 billion.[19]

The 2013 Report Card for America's Infrastructure by the American Society of Civil Engineers gives America's schools a grade of "D+" and notes that more than half of them were built to educate the Baby Boomer generation. In 2012, approximately $10 billion was spent on school construction, which is half the amount spent prior to the recession.[20] Recent calculations show that America's schools are facing $271 billion in deferred maintenance now, and estimated costs to address repairs and modernization will require $542 billion over the next ten years.[21] It is unclear if current estimates would include potential PCB-mitigation projects. An estimate of $2 million in PCB remediation costs per school[22] for the estimated 12,960 to 25,920 schools that include PCB-containing caulk yields a potential total cost of $25.9 billion to $51.8 billion, nationally.

# Methodology

In order to gauge the extent to which public information is available on PCBs in schools, Senator Markey's staff conducted an internet search of each state's government websites (including the District of Columbia) on relevant topics. While the survey was not exhaustive, staff would expect these searches to be similar to that which a teacher, school administrator, parent or guardian may do to ascertain information on PCBs. An internet search was performed for each topic below for each state using a general internet search engine and also within the educational, environmental, and health agency website(s) of each state:

- General information on PCBs in schools, or information applicable to all state agencies.
- School PCB testing guidance, or guidance applicable to all state agencies.
- School PCB reporting guidance, guidance applicable to all state agencies, or reporting guidance for citizens on a potential PCB-exposure event.
- PCB disposal guidance for schools, or information applicable to all state agencies.
- PCBs in fluorescent light ballast.
- PCBs in caulk.

See Table 2 on *page 12* for a complete list of what states had information in each category and Appendix A for the list of web addresses where information was found.

In addition, the EPA provided Senator Markey's office with a list (see Table 1 on *page 11* for a summary of the 286 cases of potential PCB hazards in schools in 20 states and Attachment 1 for the complete document) of cases involving schools, including colleges and universities, which worked with the EPA regarding potential PCB hazards in the past ten years. The list of potential cases ranged from a PCB spill in a single room in a single school building to district-wide remediation actions for some of the largest school districts in the United States. Senator Markey's staff sought further information, including press reports and discussions with individuals who worked on some of these incidents, when available. Details not footnoted in the report are from the information provided by the EPA, which is provided as an attachment to this report.

# Findings and Recommendations

## KEY FINDING #1

**The scope of PCB hazards in schools in the United States is likely widespread, potentially affecting up to 30% of the school-aged population, but it is difficult to quantify the exposure from the variety of potential sources of PCBs. The cases of potential PCB hazards in schools provided by EPA reveal a variety of different sources of PCB contamination.**

The Asbestos Hazard Emergency Response Act (AHERA) requires detailed record-keeping of asbestos hazards in schools. Records must be kept at each school and school authority, including details of inspection dates, plans for inspections, the locations of asbestos-containing building materials within a school, measures taken to reduce asbestos exposure, any analysis on materials in the school, and ways in which workers, teachers, students or their legal guardians have been notified about inspection and response activities.[23] No such recordkeeping or reporting related to PCB hazards in schools is required of schools, states or EPA. While the total number of schools that contain PCBs in decades-old building materials may exceed 25,000, there has been no effort to survey school systems or develop a comprehensive estimate of the scope of potential PCB hazards in schools.

A Harvard School of Public Health study[24] estimates that the number of schools with PCBs in caulk is between 12,960 and 25,920, and the average number of students per school is roughly 550 students, according to the National Center for Education Statistics.[25] Consequently, between 7-14 million students across the United States, accounting for up to 30% of the elementary and secondary school population, may be exposed to PCBs through their school environment. This calculation relies upon an estimate of the number of schools built or renovated from 1950 and 1979, and the exact number is not known. In addition, it does not take into account schools with PCB-containing fluorescent light ballast or other PCB-containing materials, which could add to the numbers of potentially impacted schools and students.

The last federal government survey of school infrastructure was completed more than 20 years ago,[26] and the 2013 Report Card for America's Infrastructure by the American Society of Civil Engineers gives America's schools a grade of "D+." More than half of America's schools were built to educate the Baby Boomers generation, and substantial repairs and upgrades are needed to provide a modern and safe learning environment for all students.[27]

According to materials Senator Markey's staff requested from EPA, there have been 286 cases of PCB hazards in schools in 20 states across thousands of school buildings in the past ten years (Table 1 on *page 11* and Attachment 1). Some cases involved single leaking fluorescent light ballast in a classroom, while the most significant were remediation projects for the largest school districts in the nation. The vast majority of the cases dealt with PCB-containing caulk. Additional PCB hazards identified in the records provided by EPA included soil, paint, adhesive, and window glazing.

**Table 1.** *Summary of cases involving PCB hazards in schools provided by EPA*

| | Cases* | States | |
|---|---|---|---|
| Region 1 | 186 | 5 | (CT, MA, ME, NH, RI) |
| Region 2 | 15 | 2 | (NY, NJ) |
| Region 3 | 7[!] | 2 | (MD, WV) |
| Region 4 | 1 | 1 | (GA) |
| Region 5 | 4[&] | 2[&] | (IN, OH) |
| Region 6 | 1 | 1 | (LA) |
| Region 7 | 2 | 2 | (NE, MO) |
| Region 8 | 0 | 0 | |
| Region 9 | 2 | 1 | (CA) |
| Region 10 | 69 | 4 | (AK, ID, OR, WA) |
| TOTALS | 286 | 20 | |

* *A case is defined as a PCB-involving incident as reported by the EPA, which ranges from a single classroom to a city-wide or school district-wide action*

! *The John F. Kennedy Center was mistakenly added by the EPA to the list and is not counted in this total.*

& *One case was worked on by both Regions 5 and 10, so only 3 cases for Region 5 were geographically within Region 5.*

**RECOMMENDATION #1: The EPA should survey school systems nationwide and update its records to better assess the scope of potential PCB hazards in schools. The Asbestos Hazard Emergency Response Act (AHERA) should be amended to require recordkeeping by state and local educational agencies of testing for, response to, and remediation of PCB hazards in schools to be submitted to and approved by appropriate state officials, and should also require status reports from each state to the EPA both for asbestos and PCB hazards at least every ten years.**

# KEY FINDING #2

**Because there is no federal requirement for the inspection of schools for PCB hazards in schools and in most cases no state-level requirements or even publicly-available guidance for testing or inspections for PCB hazards, schools often appear to learn of PCB hazards by chance, and it is therefore likely that additional cases of PCB hazards remain undetected.**

There is no federal requirement for testing or inspection of schools for PCB hazards. Inspections for asbestos, by comparison, are required to be conducted by an accredited inspector under AHERA[28] at least every three years. Additionally, under AHERA, schools are also responsible for documenting exactly where asbestos is located within school buildings, while no such documentation is required for PCB-containing materials in schools.

The EPA provides guidance on "How to test for PCBs and characterize suspect materials,"[29] but states do not appear to require the use of these materials. A survey conducted by Senator Markey's staff of the information publically available on state websites on PCB hazards (Table 2) also indicates that states typically do not have requirements for or in most cases even provide guidance on inspections for PCB hazards to school systems or the public. The internet search survey identified only five states - Connecticut, Massachusetts, Minnesota, New Jersey, and Vermont - that directly provide some sort of testing guidance for schools (or guidance that is generally applicable to any state agency) and one state, Tennessee, that provided links to other websites where testing information was available. The only state with an identifiable inspection requirement is Connecticut, but the requirement is tied to funding of potential construction projects within a school and is not a general requirement to test all schools for PCBs.

**Table 2.** *Availability of PCB information on state websites. Results of internet search for information on official state websites on PCBs in schools. A ✓ indicates that information is directly available on an official state government website, and a ✓ (gold) indicates that information is available through links to other websites, most generally the U.S. Environmental Protection Agency, and an ✗ indicates that information was not readily available.*

| | General Information | Testing Guidance | Reporting Guidance | Disposal Guidance | PCBs in Ballast | PCBs in Caulk |
|---|---|---|---|---|---|---|
| Alabama | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Alaska | ✓ (gold) | ✗ | ✗ | ✗ | ✗ | ✗ |
| Arizona | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Arkansas | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| California | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ |
| Colorado | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Connecticut | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Delaware | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| District of Columbia | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Florida | ✓ | ✗ | ✗ | ✓ | ✓ | ✗ |
| Georgia | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Hawaii | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Idaho | ✗ | ✗ | ✗ | ✓ | ✓ | ✗ |
| Illinois | ✓ | ✗ | ✗ | ✓ | ✓ | ✗ |
| Indiana | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Iowa | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Kansas | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ |
| Kentucky | ✗ | ✗ | ✗ | ✓ (gold) | ✗ | ✗ |
| Louisiana | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Maine | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Maryland | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Massachusetts | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ |
| Michigan | ✗ | ✗ | ✗ | ✓ | ✓ | ✗ |
| Minnesota | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Mississippi | ✓ (gold) | ✗ | ✗ | ✓ | ✓ | ✓ (gold) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Missouri | ✗ | ✗ | ✗ | ✓ (yellow) | ✗ | ✗ |
| Montana | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Nebraska | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Nevada | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| New Hampshire | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| New Jersey | ✓ (yellow) | ✓ | ✓ | ✓ (yellow) | ✓ (yellow) | ✓ (yellow) |
| New Mexico | ✓ (yellow) | ✗ | ✗ | ✓ | ✗ | ✗ |
| New York | ✓ | ✗ | ✗ | ✓ (yellow) | ✓ | ✓ |
| North Carolina | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| North Dakota | ✓ (yellow) | ✗ | ✗ | ✓ | ✓ (yellow) | ✓ (yellow) |
| Ohio | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ |
| Oklahoma | ✓ (yellow) | ✗ | ✗ | ✓ (yellow) | ✗ | ✗ |
| Oregon | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ |
| Pennsylvania | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Rhode Island | ✗ | ✗ | ✗ | ✓ (yellow) | ✓ (yellow) | ✗ |
| South Carolina | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| South Dakota | ✓ (yellow) | ✗ | ✗ | ✗ | ✗ | ✗ |
| Tennessee | ✓ | ✓ (yellow) | ✗ | ✓ (yellow) | ✓ (yellow) | ✓ (yellow) |
| Texas | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| Utah | ✓ (yellow) | ✗ | ✗ | ✗ | ✗ | ✗ |
| Vermont | ✓ | ✓ | ✗ | ✗ | ✓ | ✓ |
| Virginia | ✓ | ✗ | ✗ | ✗ | ✗ | ✓ |
| Washington | ✓ | ✗ | ✗ | ✓ | ✓ (yellow) | ✗ |
| West Virginia | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Wisconsin | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| Wyoming | ✓ | ✗ | ✗ | ✓ | ✓ | ✗ |

Absent a requirement to test or inspect schools for PCB contamination, the discovery of PCB hazards in schools occurs by chance and differs from case to case. In most cases, PCB hazards are found after an exposure event occurs, during renovations, or prior to school demolition. In addition, there have been cases in which parents, teachers, or staff insisted a school test for PCB hazards or performed their own testing. There are even examples of school districts publically stating that the EPA advises school not to test for PCBs, as is the case for Worcester, Massachusetts just this year.[30] The *Worcester Telegram and Gazette* reported, "According to the School Department, the EPA advises schools not to test for PCBs."

The EPA provided 17 cases in which the PCB hazard was specifically reported as being from fluorescent light ballast.[31] Of those 17, only one case was clearly initiated through a preventative and systemic testing of a school district. The Los Angeles Unified School District (LAUSD) collaborated with the EPA in 2015 to develop guidelines in order to upgrade its lighting, first by surveying all school buildings for PCB-containing fluorescent light ballast, then by creating a clear plan to remove all identified PCB-containing lighting, ultimately approving $30 million to replace nearly 40,000 PCB-containing fluorescent light ballast.[32,33] A concerned parent or other unplanned event caused the initiation of the remainder of the cases.

While a leaking PCB-containing ballast is a clear sign of a potential PCB hazard and the basis of many parent-led reporting of potential PCB hazards, PCB-containing caulk is not readily identifiable by visual inspection.[34,35] While there may be cases of schools proactively testing caulk for PCBs, the cases identified in this report were found because a parent or teacher reported something out of the ordinary or because there were several reports of similar but unusual health issues within a school. For example:

- The New York City Public Schools case began in 2008 when a group of parents and concerned citizens provided test results of caulk from schools to the EPA and the *New York Daily News*. Ultimately, a lawsuit filed by the New York Lawyers for the Public Interest compelled New York City Schools to conduct a pilot study and test a subset of schools. A more detailed account of the New York City Schools case is provided on *page 25*.

- In Lexington, Massachusetts, an article in *The Boston Globe*[36] prompted parents to request information regarding the status of PCB hazards within the city's schools. This led to the testing of caulk within the schools, where PCBs above allowable levels of 50 ppm were found (this case is included on *page 15*).[37]

- In Newburgh, New York, a parent notified the EPA in 2013 of leaking fluorescent light ballast that led to prioritization of the school for lighting replacement.

- The 2005 case in Yorktown Heights, New York involved a parent who continuously pushed for the school to address concerns about possible PCB hazards after independently testing scraps of caulk found on the school grounds revealed levels of PCBs above 50 ppm. This led to the school district removing the PCB-containing caulk from the school. The Yorktown Heights case is highlighted on *page 25*.

- The 2013 case in Malibu, California began with the reporting of illnesses within the school. In Malibu, several teachers reported concurrent diagnoses of thyroid cancer (an increased risk for thyroid cancer has been linked to PCB exposure).[38] When PCBs were found in the caulk, EPA did not enforce removal and instead agreed that the school did not need to test any further caulk in the area where it was found.[39] In March 2015 legal action under TSCA's citizen suit provision was taken against the school district, which ultimately required the testing and removal of all PCBs from two schools (details of this case are included on *page 25*).[40]

- In the 2015 case in Monroe, Washington several teachers and students reported mysterious illnesses. This led to the discovery of several fluorescent lights with PCB-containing ballast around the school that had leaked over many years. After the EPA got involved, the school hired a consultant that found PCB-containing caulk in the school as well. In May 2016 the school submitted a plan to EPA to replace the caulk and remove PCB-containing light fixtures by September 2016.

- In some cases, PCB hazards are not discovered until schools are slated for demolition. For example, Montgomery County Schools in Maryland had several cases in which PCBs were discovered during due diligence sampling prior to demolition.

Absent a systemic inspection and testing effort, the identification of PCB hazards in schools will continue to rely on chance, highly engaged parents and teachers, or the discovery of avoidable exposures or illnesses after they occur, and potential PCB hazards are all but certain to remain undetected in schools across the nation.

## Lexington, Massachusetts

Joseph Estabrook Elementary school was built in the early 1960s in Lexington, Massachusetts.[98] Nearly 50 years later, in 2009, the EPA publically released guidance regarding PCBs in caulk in buildings built between 1950 and 1979.[99,100] A *The Boston Globe* article on PCBs caused parents within the Town of Lexington to push for testing of PCBs in their town's schools. The town subsequently contracted a team from Environmental Health and Engineering to test the caulk in Estabrook for PCBs. The surface tests revealed some samples of caulk with PCB concentrations above 50 ppm, the maximum acceptable standard under TSCA. The town requested further air sampling, which also revealed PCB concentrations in the air above the EPA's advised maximum.[101] The town worked quickly with the EPA to remove the contaminated caulk in the rooms with dangerous-levels of PCBs.[102]

The town, in cooperation with the EPA, set a target air concentration at which children six years old would be safe at or below 230 nanograms per cubic meter (ng/m$^3$).[103] This level is based on the youngest students in the school and length of time spent in the classroom, as per EPA's guidance. In considering the uncertainty in a single air test, the school district and the environmental consulting group hired by the school further decided that only classrooms in which a single air test had PCB levels below 75% of the target level (173 ng/m$^3$) would not require further testing or followup.

When air samples still measured PCBs above 230 ng/m$^3$ after the contaminated caulk was removed, the town sealed the remaining interior caulking and flushed the school with air from the outside, per EPA recommendation. Estabrook closed for a full week surrounding Labor Day in 2010 until the process was complete.[104] The town continued to take air samples regularly and adhere to EPA's best management practices for ventilation and cleaning thoroughly for the next year. Such testing revealed mixed results as PCB air concentrations in most of the school were largely reduced below the target 230 ng/m$^3$ but specific rooms and areas still contained higher and unsafe concentrations.[105,106] Ultimately, the town decided to tear down the original building and built a new Estabrook Elementary School that welcomed students in time for the 2014-15 school year. This marks the first time in the United States that a school was torn down due to PCB contamination.[107]

Throughout the process, the town communicated its findings, options for how to proceed, and EPA recommendations and procedures to parents, guardians, and teachers[108] through community meetings, direct mailings, press releases, and an FAQ page on the school website.[109,110,111]

In 2012, the Town of Lexington filed suit in the U.S. District Court in Boston against Monsanto Company (the sole producer of PCBs), Pharmacia Corporation, and Pecora Corporation, the companies that made and distributed the PCBs, and also sought class action status.[112] The suit claimed that the producers of PCBs should have known the health risks of using PCBs in construction materials and failed to provide adequate warnings, and sought to have Monsanto reimburse Massachusetts school districts for the cleanup[113,114] In 2015, the court rejected the class action certification and also the suit itself, ruling that Congress did not outlaw PCBs until 1979 and that Lexington did not provide sufficient evidence that Monsanto knew of the dangers of the substance before it was banned.[115]

**RECOMMENDATION #2: Inspections and testing of schools for PCB hazards should be mandatory to ensure that the identification of such hazards is not left to chance. This could be accomplished through an amendment to Asbestos Hazard Emergency Response Act to extend and update requirements that are already in place for asbestos in schools to PCBs. In the meantime and at a minimum, the EPA should update its testing guidance to encourage inspections of all schools built or retrofitted between 1950 and 1979, and improve its efforts to communicate testing guidance to states, local education agencies, and schools with potential PCB hazards.**

# KEY FINDING #3

**There is a lack of transparency and inconsistent communication between schools with a potential PCB hazard, the EPA, states, and those who may be affected by a PCB hazard in a school.**

Asbestos Management Plans required under AHERA[41] provide parents, teachers, and other school employees with the opportunity to learn of the actions taken to prevent or reduce an asbestos hazard in schools. In addition, schools must annually notify parents, teachers, and employee organizations on the availability of a school's plan and any action taken or planned with regards to an asbestos hazard. However, there are currently no similar regulations that govern the communication of PCB hazards in schools. Except under specific cleanup and disposal circumstances, schools are not even required to notify the EPA of PCB hazards in schools, and most states have no requirement to notify anyone else. As a result, there are many examples of schools and school districts not being transparent with teachers, parents, and employees during PCB-remediation projects. For example:

- In the 2013 Malibu High School case in California, parents have raised concerns with a lack of communication and parental notification throughout the case, and a non-transparent remediation planning process.[42]
- In summer 2016 in Boulder, Colorado, school officials publically stated that a PCB hazard was "contained," but did not reveal the exact remediation steps that were taken.[43] Questions of who is ultimately responsible for ensuring student safety by a news outlet reveal a lack of communication among all agencies involved, and also reveal that no federal or state agency is clearly taking responsibility for inspection of and remediation for PCB hazards in schools.
- Parents protested outside a New York City Council meeting in September of 2011 urging the Council to take up bill that would require parents, teachers, and employees to be notified if a PCB hazard is found in their school in response to PCB-containing fluorescent light ballasts being found in schools across the city. The bill's consideration occurred when the city was also facing criticism because parents and teachers were reportedly not notified for over six months when trichloroethylene (a known carcinogen) was discovered in a Bronx school.[44] The bill passed the Council and was signed into law in December 2011.[45]

States also generally do not have information readily available on PCB hazards. The survey of state (including the District of Columbia) websites (Table 2 on *page 12*) revealed the following regarding the communication of PCB hazards:

SIDEBAR

## New York City, New York

A 2008 *New York Daily News* investigation found that eight of nine randomly-selected schools had PCB-containing building materials or fluorescent light ballast,[91] first revealing the problem of PCBs in the New York City School district, the largest public school system in the United States.[92] The investigation was based on tests provided by a third party to the newspaper. As a result, the City of New York, the New York City School Construction Authority, and the EPA agreed to conduct a pilot study to survey five New York City Schools to test for the presence of PCB hazards in the schools.[93] This was the first official PCB investigation of a whole U.S. school system. The study found PCB-containing caulk and in fluorescent light ballast in the first three schools they tested and PCBs in the air above safe levels as determined by the EPA.

The EPA then went on to collect 145 samples from light fixtures at seven New York City School locations. After the EPA confirmed PCB concentrations above the EPA regulatory limit in 113 of the samples,[94] the New York Department of Education (NYDOE) conducted a series of surveys, concluding in June of 2011, and found that 754 school buildings had light fixtures with potentially-PCB-containing ballast.[95] The NYDOE initially set a ten-year timeline to allow for the replacement of all PCB-containing light fixtures in the public school buildings. They stated that the light fixtures would all be replaced by December 31, 2021.

In June of 2011, New York Lawyers for the Public Interest and the New York Communities for Change sued the City of New York seeking to impose a faster remediation timeline. The court ruled that the deadline for replacing light fixtures must be five years sooner, and set a deadline of December 31, 2016 for the removal of all PCB-containing light fixtures across the school system.[96] As of August 18, 2016, 697 school buildings had completed their lighting fixture replacements, leaving only 57 to be completed in the last four months of 2016.[97]

- Only 20 states had general information on PCB hazards in schools available, eight states provided links to outside websites (mostly EPA), and 23 states did not have information on PCB hazards in schools available at all.
- 33 states had no specific information readily available on the potential hazard associated with PCB-containing fluorescent light ballast and 40 states had no specific information readily available on potential concerns with PCB-containing caulk.
- 46 states did not have any readily available reporting guidance or information on how to report a potential PCB hazard either to the EPA, states, or those who may affected by a PCB hazard, leaving only four states [Connecticut,[46] Minnesota,[47] New Jersey,[48] and Oregon[49]] that had such information available on a state government website.
- Even information related to the disposal of PCBs, which is regulated under TSCA, was only directly found on the websites of 18 states, and was linked to indirectly on seven states' websites. There were 26 states that did not have any information on disposal of PCB-containing materials readily available.
- No state had both clear reporting guidance for communicating information about PCB hazards to parents, teachers, and employees, and reporting guidance to state officials or the EPA.

In addition, although remediation of disposal of PCBs must comply with TSCA regulations,[50] the EPA is only required to be notified of PCB hazards in schools under some, but not all, cleanup circumstances This not only creates a challenge in determining the extent of PCB hazards in schools, but also removes the potential opportunity for the EPA or state officials to provide guidance before or during a PCB remediation project.

**RECOMMENDATION #3: The EPA should immediately develop guidance regarding the means by which parents, teachers, and employees should be notified of potential PCB hazards. In addition, AHERA should be amended to make such notification to parents, teachers, and employees mandatory, as is the case for asbestos, and to require states to notify the EPA whenever a PCB hazard that requires remediation is identified, prior to beginning remediation efforts.**

# KEY FINDING # 4

**There appears to be inconsistency in the way each EPA Region handles enforcement activities and communication with schools and local educational agencies within the Region, and variability in the way each EPA region keeps track of potential PCB hazards in schools.**

The 286 cases provided by the EPA regarding PCB hazards in schools generally dealt with compliance activities for schools that did not follow proper EPA guidance when remediating PCB hazards. Rarely did the cases describe requests for assistance in handling a PCB remediation project in advance of its commencement. Exceptions to this lie in Region 1 (New England) and Region 10 (Pacific Northwest and Alaska). For example, the Connecticut Department of Energy and Environmental Protection regularly appears to share proposed remediation projects with EPA Region 1 for input, including projects that do not fall under federal regulations, which seems to be the case with Massachusetts as well. In

Oregon and Washington, there are numerous examples of cases that, with a status of "advisement only, no action," indicate that the EPA was consulted prior to a remediation action for a PCB hazard. While there are other examples of schools or local education agencies reaching out to the EPA for assistance (a notable case is the Los Angeles Unified School District in Region 9), these appear to be infrequent compared to those within Regions 1 and 10.

Additionally, in at least one EPA Region, EPA recordkeeping appears to be haphazard at best and also reflects poor communication and coordination with the state agencies in the Region. Region 8 of the EPA (which includes Colorado and North Dakota) did not list even a single instance in which the EPA was involved in a case of PCBs found in schools in the submittal to Senator Markey; however, an August 2016 *Boulder Weekly* article noted that the Boulder Valley School District in Colorado has found PCBs in some buildings, and asked the EPA for regulatory information but did not request remediation assistance or consultation on its proposed remedy.[51] In the article, the Colorado Department of Education and Department of Public Health and Environment stated that the responsibility for addressing PCB hazards was with EPA Region 8 and local educational agencies, saying that it had no responsibility for investigating PCBs and had no intention of doing so. The fact that Region 8 did not provide a single case in response to Senator Markey's request is even more troubling considering a 2010 EPA[52] press release that states that the same EPA Regional office also worked with schools in North Dakota to address PCB-containing fluorescent light ballast.

Based on the presumed scope of potential hazards of PCBs in schools, there may be large numbers of instances of PCB hazards in schools that are not reported to or recorded by the EPA. In addition, each regional EPA office appears to maintain different record-keeping protocols. Some EPA regions provided specific details regarding EPA's response to each case of PCB hazards in schools, while other Regions just noted that EPA's response was "complete." The lack of consistent recordkeeping created challenges in determining the scope of PCB hazards in schools about which EPA is aware. Uniform recordkeeping and increased awareness within and between EPA Regions could augment EPA's ability to assist schools in the identification of best practices and in the avoidance of mistakes.

**RECOMMENDATION #4: The EPA should immediately develop and implement guidance to enhance consistency in recordkeeping, sharing of best practices and other information, outreach to states and school districts, and enforcement activities related to PCB hazards in schools across all EPA regions. EPA regional offices should increase their outreach to states and local education agencies to make them aware of available EPA's PCB regulations, guidance and resources.**

# KEY FINDING #5

**There are many examples of improper and ineffective responses to and remediation of PCB hazards in schools.** Failures to fully remediate PCB hazards have also occurred in cases of schools following EPA guidance, raising questions about the adequacy of such guidance. The lack of requirements for the testing of PCBs during or after remediation projects also limits certainty of the effectiveness of most remediation efforts.

Under AHERA, schools are required to take action and have detailed plans on any response actions or measures to reduce asbestos exposure in accordance with EPA guidelines. The detailed plans must include the identification of the specific locations of asbestos within a school and plans for re-inspection at least once every three years. Such plans must be made available upon request, and parents, students, and staff must be notified of the plans.

There are currently no such requirements for PCB hazards in schools. The EPA provides several documents on "PCBs in Building Materials" on its website,[53] which include details on actions for reducing exposure to PCBs, how to properly address the hazard of PCB-containing fluorescent light ballast, and guidance for contractors on proper PCB abatement, but it is unclear how effectively these materials are provided to or used by schools. There appears to be minimal availability of EPA's PCB guidance on state websites, and a review of the cases provided by EPA also raises questions as to the adequacy of the guidance in the first place.

States do not generally provide information on handling the most common PCB hazards in schools: fluorescent light ballast and caulk. Based on the internet search of state websites, only 13 states had direct information on PCB-containing fluorescent light ballast and seven had information on PCBs in caulk. Five states had links to external websites for information on PCB-containing fluorescent light ballast and four for PCBs in caulk. All of the states with only external links connected to EPA's PCB website or specifically to EPA's guidance on PCBs in caulk or fluorescent light ballast. Most states that provided their own information on the hazards also linked to the EPA recommendations and guidance.

EPA's guidance document entitled "Practical Actions for Reducing Exposure in Schools and Other Buildings"[54] recommends that all PCB-containing fluorescent light ballast be removed and that testing for PCB-containing caulk and other building materials be performed prior to remodeling or renovation. However, a review of the 286 cases involving potential PCB hazards in schools received from the EPA revealed that once a school with a PCB hazard is identified, the response action varies greatly based on the assumed scope of the problem and the initiative of the involved local educational agency. EPA guidance does not appear to be consistently used or followed. If a single leaking PCB-containing fluorescent light ballast is found within a school, removed, and the affected areas cleaned up, the testing and removal of other potentially PCB-containing ballast is not automatically triggered or required under federal regulation, and may or may not be undertaken by the impacted school or school district. The extent of remediation activities undertaken often seems to be driven by litigation or EPA enforcement actions. For example:

- In 2009, New York City Public Schools discovered 767 schools with PCB-containing ballasts, with "widespread" leaking causing PCBs to be released into the air. Due to the slow response of the City to the discovered hazard, a third party filed a lawsuit that ultimately compelled the schools to remove all fluorescent light ballast by the end of 2016, much faster than the original ten year timeline proposed by the City. Remediation efforts are still ongoing at the time of this report's publication.
- In 2014 in Anderson, Indiana, a teacher reported a foul odor from a failed light fixture. The EPA inspected and found several leaking PCB-containing fluorescent light ballasts across the school. The district did not follow EPA's guidance on removal and cleanup. Over the following year, the EPA had to take multiple enforcement actions to force the school to replace the affected light fixtures after multiple failed attempts to have the school remediate the problem voluntarily.
- In 2015, in Monroe, Washington, the EPA found several instances of leaking PCB-containing fluorescent light ballast around Sky Valley Education Center. The EPA considered the school's response inadequate after finding PCBs on light fixtures at levels above the decontamination standard for spills. The EPA required an inspection of the school and also found PCB-containing caulk, ultimately requiring the school to submit a remediation plan for both caulk and the removal of PCB-containing light fixtures. The plan set a deadline of September 2016 for the work to be completed.

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## Yorktown Heights, New York

The first PCB cleanup and remediation project in New York occurred at French Hill Elementary School in Yorktown Heights in 2005. The father of a student at the school, Dr. Daniel Lefkowitz, brought attention to the PCB contamination in French Hill when he had scraps of caulk found around the school's window independently tested. The caulk scraps remained around the school property after a 2003 window replacement project. He decided to act after reading a 2004 Harvard University study on PCB-contaminated caulk in Boston area schools and buildings. His tests revealed the caulk had PCB concentrations 350 times the federal limit of 50 ppm.[83]

Although the Westchester County Health Department originally stated that the PCB contamination did not pose a health risk, the contamination levels were sufficient under state and federal guidelines to require a cleanup. Dr. Lefkowitz continued to press for further testing at French Hill, but limited funding hindered further testing.[84] The initial estimates for the cost of cleanup and remediation were between $100,000 and $400,000, leading members of the community to question if it was worth dealing with the PCB contamination since the school district was already dealing with budget cuts.[85] In removing the contaminated soil and the caulk associated with the window project from the school, the Yorktown Central School district ultimately spent about $100,000 on cleanup and remediation.[86,87,88]

In 2008, Yorktown Central School District sued Monsanto Company, Pharmacia Corporation, and Pecora Corporation, amongst others, seeking remediation and indemnification costs relating to PCBs in Yorktown school buildings. Yorktown Central School District alleged that Monsanto was the exclusive manufacturer of PCBs and that the other defendants in the suit were distributors, suppliers, marketers, and sellers of products containing PCBs.[89] The case was settled out of court when Monsanto Company paid an undisclosed amount to the Yorktown Central School District.[90]

Additionally, there are cases in which remediation that did follow EPA's guidance did not entirely mitigate the PCB hazards within a school:

- In the 2010 case of Estabrook Elementary School in Lexington, Massachusetts, the school was ultimately demolished after remediation efforts proved after subsequent testing to be ineffective at lowering the air levels of PCBs in the school below federal guidelines. The case is further detailed on *page 15*.
- In 2015, in Hartford, Connecticut, Clark Elementary School was indefinitely closed and students sent to nearby schools after the discovery of PCB-containing materials *prior to* a construction project was initiated.[55] The state of Connecticut requires the inspection for PCB hazards in schools before a construction project begins in order to properly plan any needed remediation efforts. However, after more than a year of remediation efforts following EPA guidance, the Hartford schools superintendent recommended tearing down the school and rebuilding after it was determined that PCB levels were still above federal guidelines.

Without a requirement to test for residual PCB contamination after remediation is complete, the effectiveness of remediation projects remains unclear. In 2010 Worcester County, Massachusetts school teachers protested the lack of testing in schools for PCBs.[56] As a result of the protests, the school district began replacing PCB-containing light fixtures, optimizing air intake, and undertaking targeted surface cleaning and window weatherization in the summer of 2012. In addition, the school district began longer-term projects including window replacements to address the potential of PCB hazards.[57] However, the school district did not test the schools in which the work was being performed for residual levels of PCBs after the remediation projects were completed. The Educational Association of Worcester, the local teachers association, sued the school district ultimately winning the right to have the schools tested for PCBs post-remediation.[58]

Since the primary pathway of exposure for PCBs is through their inhalation, testing the air for PCB levels is the recommended method for ensuring an area that has been remediated is safe.[59] The EPA provides different warning levels for different age groups for PCBs in the air based on approximate time of exposure (or time in the classroom).[60] A 2012 report by EPA's Office of Research and Development stated that "inhalation was estimated to be responsible for over 70% of the exposure" for the six cases they examined," but that "following mitigation of primary sources it may, in some cases, be necessary to consider mitigation actions for secondary sources." EPA's guidance documents focus on PCB air levels, but it is clear that non-inhalation pathways and secondary sources, such as materials that may have been contaminated by a primary source like caulk, may be important to consider as well.

There are no clear requirements or recommendations to test the air for PCBs after a remediation project is completed to ensure that an action sufficiently reduced the PCB hazard.

**RECOMMENDATION #5: The EPA should update its current guidance on PCB hazards in schools to incorporate lessons learned from previous remediation projects and best available science. The EPA should quickly update its Toxic Substances Control Act regulations to prohibit the continued use of PCB-containing fluorescent light ballast, and require – not just recommend – the removal of all PCB-containing ballast from schools. Schools should also be required to have detailed plans before starting a PCB remediation project. This could be accomplished by amending Asbestos Hazard Emergency Response Act to require schools to create, submit, and maintain a management plan for PCB hazards, including testing for PCB hazards post-remediation.**

# KEY FINDING #6

**Many states and local education agencies do not have the funds necessary to perform testing, response to or remediation of PCBs in schools.**

According to the Center for Green Schools at the U.S. Green Building Council, America's schools are already facing a $271 billon maintenance backlog, and the estimated costs to address repairs and modernization will require $542 billion over the next ten years.[61] A majority of the schools needing work are in lower-income areas and communities of color.[62] The mechanism for an individual school or school district to obtain funding with which to address a potential PCB hazard is not clear, especially if the district is already under financial strain. Using an estimated cost of $2 million per school for PCB remediation across the 12,960 to 25,920[63] American schools estimated to have PCB-containing caulk,[64] PCB remediation could cost $25.9 billion to $51.8 billion (and this does not even include a consideration of additional schools that may require the removal of PCB-containing fluorescent light ballast or other materials).

While there has historically been some federal funding available to address PCB regulation compliance efforts, the levels are not sufficient. Under TSCA, State and Tribal Assistance Grants (STAG) funds are made available to support compliance activities. For fiscal year 2015, $4.9 million total was made available for grants, with only $914,000 going towards state-sponsored activities that enforce compliance with PCB TSCA regulations in nine states. In the past six fiscal years, the EPA has provided only $6,159,000 for state-sponsored compliance activities through STAG grants, leading to between 323 and 365 state inspections per year. The EPA has done less than 60, 65, and 68 inspections in fiscal years 2015, 2014, and 2013, on its own, respectively. At this rate of state and EPA inspections, it would take more than 32 years to inspect the lower end of the range of each of the 12,960 – 25,920 schools that are believed to include PCB-containing caulk, and this estimate does not include schools with other potential PCB hazards

By contrast, Hartford, Connecticut spent $53,000 on initial testing and environmental consultants in the first six months after PCBs was discovered in Clark Elementary and Middle School in 2015.[65] The cost of remediation also varies tremendously depending on the scope of the problem. Based on the cases in which remediation costs were provided or identified for PCB hazards, the average cost was roughly $2 million per school. Projects to remediate PCB hazards in schools in Connecticut varied from $2.5 million to more than $10 million per school.[66] Cost estimates of New York City Schools remediation project started in 2008 range from $700 million to $1 billion across 739 city schools that had some PCB-containing lighting,[67] costing $875,000 to $1.25 million per school. In the case of Estabrook School in Lexington, Massachusetts, after remediation efforts failed to lower levels of PCBs measured in the air, the school had to be demolished and rebuilt, which cost $43.4 million. In the 2013 Malibu case, the school district reportedly spent more than $8 million on environmental consultants, testing, legal fees and public relations, while estimates of the costs for the complete removal of all PCBs from the school have been estimated to cost $1.5 million.[68] These costs dwarf the amount of federal funding that has been historically made available for PCB compliance efforts.

**RECOMMENDATION #6: Congress needs to immediately authorize and appropriate money for the testing for, response to, and remediation of PCB hazards in schools.**


MALIBU HIGH SCHOO

## Malibu, California

The need for clear standards on testing, notification, and remediation of PCBs in schools is highlighted by the case at Malibu High School. In 2013, three teachers at the high school were diagnosed with thyroid cancer. The concentration of diagnoses over a relatively short period of time in individuals all connected to the high school prompted further investigation by the school district.[69] Upon testing, PCBs were found in the caulk around a few windows at Malibu High School in concentrations higher than allowed by TSCA (50 parts per million, ppm). Concerned parents began pulling students out of the high school over fears of exposing their children to the dangerous chemical, opting for private schools or home schooling.[70]

The Santa Monica-Malibu Unified School District (SMMUSD) tested samples from caulk around the school in 2014. When the samples of caulk from four rooms were found to contain PCBs in concentrations above 50 ppm, SMMUSD hired defense attorneys and not a remediation company to identify the extent of the PCBs and remove them.[71] On July 3, 2014, SMMUSD sent a proposal to EPA's Region 9 office suggesting that nothing be done about the PCBs for at least 15 years.[72] In late July 2015, independent test results showing caulk that contained 7,400 times the legal limit of PCBs was delivered to the EPA and SMMUSD. EPA responded with a letter to the school district recommending no further testing.[73,74] The school district then made a commitment to remove the caulk in the summer of 2015, as required under TSCA, but only addressed windows and door units (and adjacent units) and not all potential PCB-containing caulk in the school.[75] When parents filed a citizen's suit in an effort to compel further remediation, the school district reported that conditions within the affected met EPA's "standards and guidance" and pledged to follow the EPA's Best Management Practices to further reduce PCB exposure risk.[76] The EPA supported the school district's efforts and conclusions that as long as airborne concentrations remain low, the students and teachers are not at risk of exposure.[77] However, due to what many parents considered a non-transparent and problematic testing and remediation process, the parents of the schoolchildren were still concerned, particularly since not all classrooms had been tested.

Parents and coordinated to pressure the school district to act in a manner that satisfied their concerns beyond just removing the caulk in the specific locations that had been tested and found to have levels of PCBs greater than 50 ppm. In addition, the parents reported that samples of the caulk parents had collected independently prior to the summer 2015 removal revealed much higher levels of PCBs than the school had previously reported.[78] In fact, SMMUSD sought criminal vandalism changes against one parent for the samples they took and tested.[79] Charges were not filed.

The school district maintained, with the EPA's concurrence, that just because the caulk contains PCBs at levels above 50 ppm, this does not mean that they pose a direct health risk, and that there was no need for additional testing until the school was renovated or demolished.[80] The school had a planned upgrade for two of the 13 buildings under question. However, many parents believed the school was not going far enough to protect the health of their children and filed a citizen's suit against the school district.

Ultimately, SMMUSD reportedly spent more than $8 million on environmental consultants, testing, legal fees and public relations, while estimates of the costs for the complete removal of all PCBs from the school have been estimated to cost $1.5 million.[81] A judge ruled in early September 2016 that SMMUSD must remove all PCB-containing materials from the two Malibu schools by the end of 2019 and that "it is more likely than not that caulk containing PCBs in excess of 50 ppm remain in 'use' at the Malibu Campus in areas that have not been tested or repaired"[82]

# Appendix A: State Websites

## Alaska

General Information

http://dec.alaska.gov/spar/glossary.htm#pcb

## California

General Information

https://www.dtsc.ca.gov/Schools/upload/SM_FS_PCB_Schools.pdf

http://www.cdph.ca.gov/programs/hesis/Documents/pcbs.pdf

PCBs in Ballast

https://www.dtsc.ca.gov/Schools/upload/SM_FS_PCB_Schools.pdf

## Connecticut

General Information

http://www.ct.gov/deep/cwp/view.asp?a=2710&q=324254&deepNav_GID=1638%20

Testing Guidance

http://www.ct.gov/dph/lib/dph/environmental_health/eoha/pcb/100115_pcb_fluorescent_light_dph.pdf

http://www.ct.gov/dph/lib/dph/environmental_health/eoha/pcb/100115_pcbs_in_caulk_epa.pdf

Reporting Guidance

http://www.ct.gov/deep/cwp/view.asp?a=2710&q=324252&deepNav_GID=1638

Disposal Guidance

http://www.ct.gov/dph/lib/dph/environmental_health/eoha/pcb/100115_practical_action_schl_pcb_v7.pdf

http://www.ct.gov/deep/cwp/view.asp?a=2710&q=324258&deepNav_GID=1638

PCBs in Ballast

http://www.ct.gov/dph/lib/dph/environmental_health/eoha/pcb/100115_pcb_fluorescent_light_dph.pdf

PCBs in Caulk

http://www.ct.gov/dph/lib/dph/environmental_health/eoha/pcb/100115_pcbs_in_caulk_epa.pdf

## Florida

General Information

http://www.dep.state.fl.us/waste/quick_topics/publications/shw/mercury/wastedi.pdf

Disposal Guidance

http://www.dep.state.fl.us/waste/quick_topics/publications/shw/hazardous/fact/c&dwaste.pdf

http://www.dep.state.fl.us/waste/quick_topics/publications/shw/mercury/wastedi.pdf

PCBs in Ballast

http://www.dep.state.fl.us/waste/quick_topics/publications/shw/hazardous/fact/c&dwaste.pdf

http://www.dep.state.fl.us/waste/quick_topics/publications/shw/mercury/wastedi.pdf

## Idaho

PCBs in Ballast and Disposal Guidance

http://www.deq.idaho.gov/media/532176-lamp_and_ballast_fs_0509.pdf

http://deq.idaho.gov/media/532180-bulb_crusher_fs_0110.pdf

## Illinois

General Information

http://www.idph.state.il.us/envhealth/factsheets/polychlorinatedbiphenyls.htm

Disposal Guidance

http://www.epa.illinois.gov/topics/waste-management/factsheets/pcb/index

PCBs in Ballast

http://www.epa.illinois.gov/topics/waste-management/factsheets/pcb/index

http://www.idph.state.il.us/envhealth/factsheets/polychlorinatedbiphenyls.htm

## Indiana

General Information

http://www.in.gov/isdh/18880.htm

http://www.in.gov/isdh/18969.htm

http://www.in.gov/idem/files/factsheet_pcbs.pdf

## Kansas

Disposal Guidance

http://www.kdheks.gov/waste/p_pcbregsandstatutes.html

## Kentucky

Disposal Guidance

http://waste.ky.gov/RLA/Pages/Fact-Sheets.aspx

## Maryland

General Information

http://www.mde.state.md.us/programs/Water/TMDL/ApprovedFinalTMDLs/Documents/PCB_fact_sheet_final.pdf

## Massachusetts

General Information, Testing Guidance, PCBs in Caulk

http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/pcbs-in-building-materials.html

Disposal Guidance, PCBs in Ballast

http://www.mass.gov/eea/docs/dep/recycle/laws/ballasts.pdf

## Michigan

Disposal Guidance, PCBs in Ballast

http://www.michigan.gov/documents/deq/deq-ead-tas-wmd-pcbflour_320904_7.pdf

## Minnesota

General Information

https://www.pca.state.mn.us/sites/default/files/w-hw4-48a.pdf

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Testing Guidance

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Reporting Guidance

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Disposal Guidance

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PCBs in Ballast

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Disposal Guidance

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PCBs in Ballast

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PCBs in Caulk

https://www.deq.state.ms.us/mdeq.nsf/pdf/SW_PreventingExposuretoPCBsinCaulkingMaterial/$File/caulkexposure.pdf?OpenElement

## Missouri

Disposal Guidance

http://dnr.mo.gov/pubs/pub929.htm

## New Hampshire

General Information

http://des.nh.gov/organization/commissioner/pip/factsheets/ard/documents/ard-19.pdf

## New Jersey

General Information

http://www.state.nj.us/education/facilities/memos/060111PCB.pdf

http://www.state.nj.us/drbc/library/documents/PMP_Resources/chapter4_EPAmanual.pdf

http://www.state.nj.us/health/healthyschools/pcb_weblinks.shtml

Testing Guidance

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http://nj.gov/health/healthyschools/documents/fluorescent_lights.pdf

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## New Mexico

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Disposal Guidance

https://www.env.nm.gov/HWB/data/Fact_Sheets/FACT%20SHEET%20FOR%20FLOURESCENT%20BULBS%20AND%20BALLASTS.doc

## New York

General Information

http://www1.nyc.gov/site/doh/health/health-topics/polychlorinated-biphenyl-pcb.page

http://www1.nyc.gov/assets/doh/downloads/pdf/epi/pcb.pdf

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PCBs in Caulk and Disposal Guidance

http://www.p12.nysed.gov/facplan/HealthSafety/PCBinCaulkProtocol-070615.html

PCBs in Ballasts

http://www1.nyc.gov/assets/doh/downloads/pdf/PCBsInBallasts.pdf

## North Carolina

General Information

http://epi.publichealth.nc.gov/oee/docs/PCBsFactSheet.pdf

http://epi.publichealth.nc.gov/oee/hace/docs/Falls_Res_2012_Fish_PCB_RA.pdf

http://epi.publichealth.nc.gov/oee/a_z/pcbs.html

## North Dakota

General information, PCBs in Ballast, PCBs in Caulk

http://www.ndhealth.gov/wm/polychlorinatedbiphenyls.htm

Disposal Guidance

http://www.ndhealth.gov/wm/publications/managementofpcbwastes.pdf

## Ohio

Disposal Guidance

http://epa.ohio.gov/portals/34/document/guidance/gd_032.pdf

http://ohioepa.custhelp.com/app/answers/detail/a_id/977/~/managing-non-household-fluorescent-lamps-and-ballasts

## Oklahoma

General Information, Disposal Guidance

http://www.deq.state.ok.us/lpdnew/hw/hazwaste.html#pcbs

## Oregon

General Information

https://public.health.oregon.gov/HealthyEnvironments/HealthyNeighborhoods/ToxicSubstances/Pages/Polychlorinated-biphenyls.aspx

https://public.health.oregon.gov/HealthyEnvironments/HealthyNeighborhoods/ToxicSubstances/Pages/pcbs.aspx

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Reporting Guidance, Disposal Guidance

https://www.oregon.gov/energy/CONS/Pages/school/pcbs/PCBRemove.aspx

PCBs in Ballast

https://www.oregon.gov/energy/CONS/BUS/light/Pages/PCBs.aspx

PCBs in Caulk

http://www.deq.state.or.us/lq/cu/nwr/PortlandHarbor/docs/SourcePCBs.pdf

## Rhode Island

Disposal Guidance, PCBs in Ballast

http://www.dem.ri.gov/pubs/regs/regs/waste/hwregs14.pdf

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## South Carolina

General Information

http://www.dnr.sc.gov/lakehartwell/LakeHartwellFinal32006.pdf

Disposal Guidance

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## South Dakota

General Information

http://denr.sd.gov/des/wm/wmp/pcb.aspx https://denr.sd.gov/des/wm/hw/documents/SD%20PCB%20Services%20062315.pdf

## Tennessee

General Information, Testing Guidance, Disposal Guidance, PCBs in Ballast, PCBs in Caulk

http://www.tn.gov/environment/article/sw-polychlorinated-biphenyls-program

http://www.tn.gov/environment/topic/sw-toxic-substances-program

## Texas

General Information

https://www.tceq.texas.gov/assets/public/comm_exec/pubs/archive/rg094.pdf

http://fortworthtexas.gov/water/lake-worth/fish-advisory-faq/

Disposal Guidance

https://www.tceq.texas.gov/permitting/waste_permits/msw_permits/msw_specialwaste.html

https://www.tceq.texas.gov/assistance/waste/waste-matrix/matrixq42.html

## Utah

General Information

http://www.fishadvisories.utah.gov/contaminants/pcbs.htm

http://www.fishadvisories.utah.gov/docs/2007/PCBs_FAQ_ATSDR.pdf

## Vermont

General Information, PCBs in Ballast, PCBs in Caulk

http://healthvermont.gov/documents/PCB_factsheet.pdf

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Testing Guidance

http://psb.vermont.gov/sites/psb/files/248j/2015/Exhibit%20MK-7.pdf

## Virginia

General Information

http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/PCBTMD_Ls.aspx

PCBs in Caulk

http://www.doe.virginia.gov/administrators/superintendents_memos/2009/283-09.shtml

## Washington

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http://www.ecy.wa.gov/programs/hwtr/RTT/pbt/pcb.html

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Disposal Guidance, PCBs in Ballast

http://www.ecy.wa.gov/programs/hwtr/demodebris/pages2/pcbsummary.html

## Wisconsin

General Information

https://www.dhs.wisconsin.gov/chemical/pcb.htm

https://www.dhs.wisconsin.gov/environmental/pcb-fish.htm

Disposal Guidance

https://www.dhs.wisconsin.gov/radiation/bulbs.htm

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