## Fairfield Public Schools – Board of Education
## November 27, 2012 Meeting

1) Who is Woodard & Curran
   a. See attached profile of the firm
   b. 650 person firm with offices throughout the Northeast
   c. Recently, focusing on PCBs in building materials; have worked on assessments and remediation at over 150 buildings primarily focusing on school settings (see attached material)


2) What are PCBs and Why are they a Concern
   a. Discuss attached Q&A

3) Woodard Curran's Approach
   a. Review Osborn Hill and other previously collected data to develop a model of "like" building materials and conditions; collect new data for screening/indicators
   b. Survey other school buildings using Step (a) as a model/calibration point
   c. Develop a probability finding based on key indicator parameters as it relates to the potential presence of PCBs and potential risk
   d. Develop next steps based on findings (e.g., potential implementation of additional Interim Measures or Best Practices)

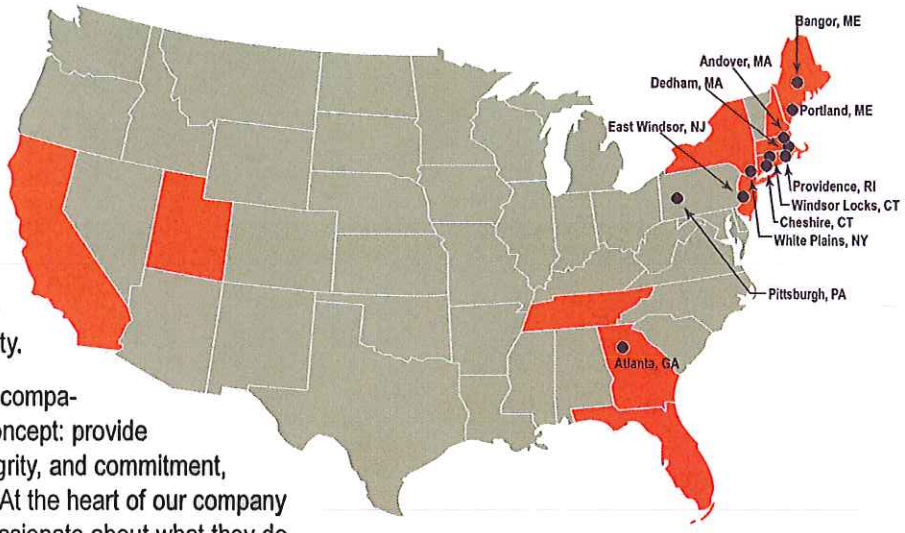
4) Questions & Answers

WOODARD &CURRAN

# PROFILE OF THE FIRM


Woodard & Curran is a 650-person, integrated engineering, science, and operations company. Privately held and steadily growing, we serve public and private clients locally and nationwide.

From our environmental roots to the range of consulting, engineering, and operations expertise we provide today, we work for a diverse clientele - including municipalities, the energy industry, food & beverage manufacturers, colleges and universities, and the real estate community.




Talented people are at the heart of our firm. Our company was founded in 1979 on a simple business concept: provide an enjoyable place to work with opportunity, integrity, and commitment, and we will attract talented people. It happened. At the heart of our company are people who are experts in their fields and passionate about what they do, showing a level of commitment and integrity that drive results for our clients. You experience this power every day in our actions, our solutions, and our promises kept.

## Commitment evident in personal approach

Our commitment is reflected in the personal attention, collaborative resources, and dedication to results that we devote to each project. We assign the right people with the right expertise to the job, and provide clients with easy accessibility to senior experts.

Our work is characterized by responsiveness, resourcefulness, and willingness to do what it takes to get the job done properly. Examples range from helping communities garner state and federal funding for wastewater treatment system improvement to managing a multi-vendor manufacturing project through a major snowstorm and getting production lines up and running. We are expert at navigating the complexities of environmental regulations and have been involved in transforming many brownfields sites into marketable properties. In defining moments like these, it is commitment that brings our clients results.

## Operating with integrity

Our integrity impacts our decision-making at all junctures of our work — from the openness of our communication to the fairness of our prices to placing your interests above our pocketbook. We hire people who share our values of honesty, respect, and fairness and who want to do the right thing. They, in turn, treat everyone — our people, our clients, regulators, and stakeholders — respectfully and honestly.

Woodard & Curran serves clients locally and nationwide from offices throughout the U.S. The firm operates 11 offices in the locations noted above, as well as treatment facilities in the states that appear in orange.

## Full-service firm with multidisciplined staff

Our integrity and commitment are matched only by the depth of our expertise. Our staff are specialists in their fields, offering in-depth understanding of cutting-edge technology, astute problem-solving, multidisciplinary engineering, and expert regulatory guidance. The firm has received numerous honors and awards, and we have ranked among *Engineering News Record's* top 100 environmental firms every year since 2000.

## Services to the public sector

We have been serving cities, towns, and state governments for over 30 years. Today, we offer services beginning with studies, concept, and design on through construction and operations to address our clients' solid waste, wastewater, water, stormwater, and civil engineering needs.

These projects often incorporate hydrogeology, Geographic Information Services, and instrumentation and controls. We also offer strong capabilities in health, safety, and security, including vulnerability assessments of public water supplies, emergency planning, and environmental sustainability.

## Services to the private sector

Woodard & Curran provides a range of environmental engineering, science, and operations support to companies in the real estate, bottled water, pulp & paper, automotive, food processing, pharmaceuticals, electronics, and metals forging industries, as well as to hospitals, colleges and universities, and law firms.

While the range of clients we serve has grown, our work has always been characterized by long-term relationships. Typical projects include compliance and permitting; process and infrastructure improvements; corrective and remedial action; expert witness/litigation support; air quality; and environmental information management. Our private-sector clients also benefit from our services in health, safety, and security, and environmental sustainability.

## Operations and Management

Woodard & Curran operates nearly 50 water, wastewater, and groundwater treatment facilities across the U.S. Our O&M specialists focus on contract operations and other O&M assignments for water, wastewater, groundwater, and solid waste facilities.

We design flexible, expandable solutions that keep operations efficient, maximize existing assets, and conserve costs. Our projects have ranged from quick, hard-hitting operational and training assignments to comprehensive plant evaluations and process control improvements to full contract operations.

## Woodard & Curran's Services Offered

### Industrial engineering

- food and beverage manufacturing and source infrastructure
- electrical instrumentation, and controls
- industrial wastewater
- process engineering
- power engineering

### Civil and environmental engineering

- wastewater engineering
- civil engineering
- water supply
- solid waste management
- design-build contracting

### Environmental management consulting

- expert witness
- environmental information systems
- compliance
- health, safety, and security
- sustainability

### Corrective action and real estate services

- due diligence
- site investigation and remediation
- risk assessment
- real estate development
- environmental ecology
- civil/site engineering and permitting
- natural gas services

### Operations and management

- contract operations
- water & wastewater treatment
- water reclamation
- groundwater remediation
- training services
- health and safety

# PCBs in Building Materials

WOODARD &CURRAN

**COMMITMENT & INTEGRITY DRIVE RESULTS**

Woodard & Curran is a 650-person, integrated engineering, science, and operations company. Privately held and steadily growing, we serve public and private clients locally and nationwide. We are committed to:

- superior quality client service,
- integration of environmental controls with facility design, and
- leveraging creative, state-of-the-art designs to achieve sustainable, yet cost-effective solutions.

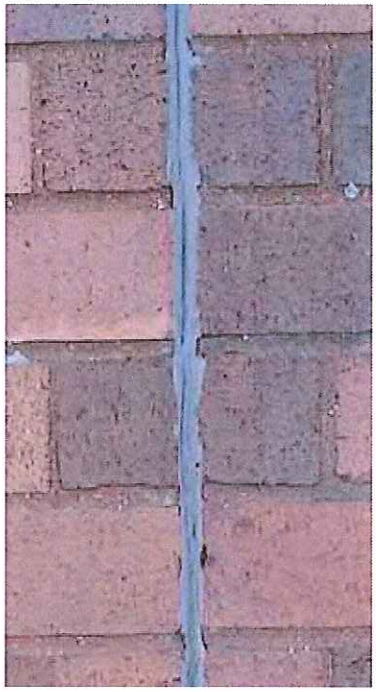
***Offices in Massachusetts, Rhode Island, Maine, Connecticut, New York, New Jersey, Georgia, and Pennsylvania***

Recent media attention and public awareness have brought polychlorinated biphenyls, or PCBs in building materials, into the spotlight, focusing on their regulatory status and potential risks to human health. PCBs were often used in the manufacture of certain building materials, such as caulking, glazings, and some industrial paints, from the 1950s through the 1970s. Many properties have buildings constructed or that were renovated during this period, and many of these buildings may be on an owner's list for scheduled repairs, renovations, or demolition. PCBs have been found in caulking at concentrations in the hundreds of thousands of parts per million, which is on the order of 10% or more of the total volume. If PCBs should be discovered once a project is underway, it could mean delays in schedule, added costs, and potentially damaging publicity.

Whether you are replacing a broken window or are planning a major renovation, you should know when PCBs could be a concern and be prepared to implement a series of proactive steps in the early phases of planning a project.

PCBs were used in the production of some types of building materials for added durability and flexibility. Typical caulked joints can include exterior joints around window frames, between precast concrete panels or cast in-place slabs, joints where a vertical building face terminates at a paved ground surface, or joints between two different construction materials such as a brick wall abutting a concrete column or a metal panel.

If a building has been constructed or renovated using PCB containing caulking, PCB impacts may not be limited to the caulking itself. Through natural mechanisms such as weathering, leaching, or deterioration, PCBs may be found in the materials adjacent to the caulking, including concrete, brick, or metal surfaces. PCBs have also been known



to impact the ground surfaces surrounding a building, including soils or paved areas. At interior locations, PCBs can impact surfaces or indoor air.

The first question you are likely to ask is, "If I have PCBs at my building, should I be concerned?" The short answer is, yes. The concern is three-fold: the health and safety of building occupants and workers; potential project impacts due to required PCB abatement (schedule,

**Contact:**
**Jeffrey Hamel, Senior Vice President**
**jhamel@woodardcurran.com | 866.702.6371**

35 New England Business Center, Suite 180
Andover, MA 01810
**www.woodardcurran.com**

costs, etc.); and regulatory and enforcement implications.

If a renovation or repair project will involve the disturbance of PCB-containing caulking, consideration must be given not only to protecting the health of the personnel completing the work, but also to protecting the health of building occupants, employees, visitors, and passers-by. In addition to the human health and project impact aspect, another concern is compliance with Environmental Protection Agency (EPA) 40 CFR Part 761 and State regulations. The continued use of caulking containing PCBs at concentrations greater than or equal to 50 parts per million is prohibited by 40 CFR 761, and the unauthorized use of caulking at these concentrations is regulated by the Toxic Substances Control Act. Depending on the PCB concentration, a material can also be designated as a state hazardous waste, and certain materials such as soil can be regulated under a state remediation program. If PCB caulking and/or adjacent impacted materials are removed from a building (i.e., turned into waste), improper management or disposal of the waste could potentially result in EPA and/or state enforcement actions or other penalties.

A series of proactive steps can be taken to prepare for the possibility that a building could be subject to work that may disturb PCB-impacted materials, whether the work is scheduled in advance or is completed as an emergency repair.

**Take Stock.** Inventory your buildings and their use, compile a list of original construction dates and the dates of any renovations, and create a priority list that can be compared to future facility plans.

**Know the Regulations.** If you don't have someone on staff who is familiar with the PCB regulations, consider bringing in an expert. They can help you understand the implications of finding PCBs and how they may impact your project. They can also help you determine if and when it may be appropriate to collect samples for laboratory analysis.

**Plan Ahead.** What are your upcoming renovation or demolition plans? Are any of these buildings considered suspect for PCBs based on your assessments? If so, make other parties involved in the project planning process aware of this possibility as early as possible.

PCBs can derail even the most well-planned building repair or renovation project. If provisions are not made to properly address this issue, building owners can face unexpected delays, increased project costs, and potentially negative publicity. By taking a proactive approach, one can stay ahead of the situation and bring your projects to a successful conclusion.

## WHY SELECT WOODARD & CURRAN

Our senior staff has over 25 years of experience providing creative solutions to complicated environmental problems. The remediation of contaminated properties is a complex challenge that requires a thorough understanding of the interplay between environmental impacts, health risks, liability, and regulatory requirements. By developing site characterization and verification plans that provide only enough data to gain a solid understanding of site conditions, we maintain control of both schedule and expense.

Woodard & Curran approaches each remediation project differently, customizing solutions to the needs of the client and integrating current and future site use considerations into plan development. Our experience on numerous PCB-impacted building materials projects has included site characterization, remediation plan development and monitoring, third-party review, best management practice development, contractor specification development, and project completion reporting. In each case, Woodard & Curran personnel use their experience and working relationships with EPA to guide our clients smoothly through the regulatory process where the Agency's involvement is required for project implementation.

Our overall approach to assessing and managing PCB-containing building materials at project sites is to develop a remediation plan that can be integrated into the planned renovation or demolition project, so as to minimize the incremental tasks and associated costs associated with remediation, as appropriate. We strive to implement cost-effective remedial solutions that minimize risks and maximize future use, while meeting our clients' schedule, budget, and vision.

# PCBs in Schools - Informational Handout – Fairfield Public Schools

**What are PCBs? How did they get into building materials?**

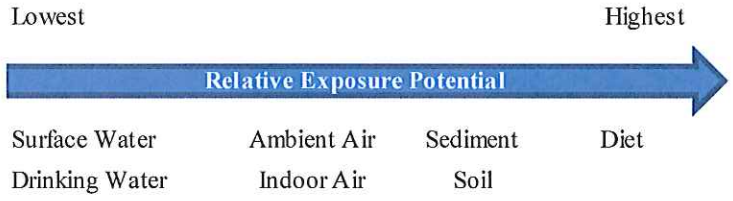
Polychlorinated biphenyls (PCBs) are manmade chemicals that were widely used in many construction materials and electrical products before 1978. PCBs were not sold as a homogenous solution of one PCB, but were rather sold as a mixture that was based upon the percent of chlorination. Aroclor 1248, 1254, and 1260 indicate the relative percentages of chlorination contained in each of these mixtures (48%, 54% and 60%, respectively). The Aroclor mixture was produced and sold by the Monsanto Chemical Company. While other chemical companies did produce some PCBs, the amounts are minor when compared to the amount Monsanto produced ***(EPA estimates over 1.5 billion pounds of PCBs were produced in the US)***.

Their widespread use and high environmental persistence has resulted in global contamination of PCBs to our soil, air, water and food. PCBs have even been found in Arctic polar ice samples. Due to concerns about their toxicity and environmental effects, PCBs were banned by Congress in 1976 and phased out of most uses by 1978. Despite this ban, PCBs can remain present in certain older building materials, such as fluorescent light ballasts, caulks, and sealants used in construction or renovation of buildings prior to 1978 *(EPA Region 1 FAQ, PCBs in Building Materials)*.

**How can I be exposed to PCBs?**

Because of their widespread use in a number of applications, PCBs have become a persistent and ubiquitous contaminant in the environment, and can be found throughout the United States in soil, air, water, plants and animals, as well as older building materials manufactured prior to 1978. Most of us have very low levels of PCBs that have accumulated in our bodies as a result of long-term exposures to PCBs in the environment. People may be exposed to PCBs by contacting soil or dust, or materials containing PCBs, by inhaling PCBs in indoor or outdoor air, and by ingesting PCBs through the diet. When you touch, inhale or ingest materials containing PCBs, the PCBs may be taken up and stored in your body.

In general, the highest PCB exposures occur through the diet, followed by contact with soil and sediment, whereas the lowest exposures occur through air and water – see chart below (EPA Chemical Summary: PCBs).




As an example, eating fish on a regular basis can contribute significantly to background exposure levels of PCBs. ***CT DPH has indicated that eating fish twice a week results in about the same PCB exposure as one would receive at the PCB indoor air levels EPA has set for schools*** (see further information on EPA indoor levels below).

**What are the Health Effects of PCB Exposure?**

Short term exposure to large amounts of PCBs can potentially cause skin conditions such as acne and rashes, as well as other conditions such as decreased liver function, neurological effects, and gastrointestinal effects. However, these types of acute toxic effects due to high levels of exposure (typically found in an industrial setting) are rare, and very unlikely to occur in a school setting.

The low levels of PCBs that are typically found in a person's body are generally not associated with adverse health effects. However, laboratory studies in animals and limited studies in humans indicate that long-term exposure to lower levels of PCBs may potentially cause health effects on the immune, reproductive, nervous and endocrine systems. PCBs have also been shown to cause cancer in animals, and are suspected to cause cancer in humans (EPA Region 1 faq; ATSDR Tox FAQs).

**How are PCBs in School Buildings Assessed?**

The EPA has set "Public Health Levels for PCBs in Indoor School Air." These levels are designed to be conservative (health-protective) concentrations for adults and children that keep total PCB exposures (from school and background sources in soil, air and diet) below a level at which adverse health effects are unlikely to occur.

These screening levels are expressed in units of nanograms of PCBs per cubic meter of air ($ng/m^3$) [see sidebar for discussion on nanograms]. The levels for different ages and school types are presented in the table below. These public health levels assume a continuous exposure during the course of the school day, and therefore are most appropriate for comparison to air testing results in classrooms where students spend most of their time.

A nanogram is a very small amount, equivalent to a billionth of one gram. One $ng/m^3$ is the equivalent of one billionth of one gram of a substance (in this case, PCBs) in 1,000 liters of air. A more tangible way to visualize this amount is as one-tenth of a teaspoon of salt in enough water to fill more than two olympic-sized swimming pools.

An exceedance of these screening levels does not mean that adverse effects will necessarily occur, but that further evaluation should be undertaken at the school. For example, these levels were set based upon the most sensitive health effects seen with PCB exposures in animal studies or human exposures. EPA then divided the lowest levels that caused those effects by a safety factor of 300 to set a safe level for schools.

As seen on the chart provided on Page 4, the potential risk for an elementary school student at the EPA air level of 300 ng/m3 is well under 1 in 1,000,000.

**EPA-Recommended Max Concentrations of PCBs in School Air**

| | Age | Maximum Concentrations of PCBs in School Air ($ng/m^3$) |
|---|---|---|
| Pre-School to Kindergarten | 1-<2 yr | 70 |
| | 2-<3 yr | 70 |
| | 3-<6 yr | 100 |
| Elementary School | 6-<12 yr | 300 |
| Middle School | 12-<15 yr | 450 |
| High School | 15-<19 yr | 600 |
| Adult | 19+ yr | 450 |

As an alternative to use of the default EPA screening levels, schools may consider use of a site-specific "risk-based" approach to evaluate PCB exposure. The risk-based approach considers factors that are unique to their individual school, such as room uses, age group exposures, time spent in various classrooms, etc. The site-specific risk-based approach provides more useful information on actual exposures at a school, relative to a target risk goal, and allows for better-informed risk management decisions than does use of single default screening level.

**What does "acceptable risk" and "cancer risk" mean?**

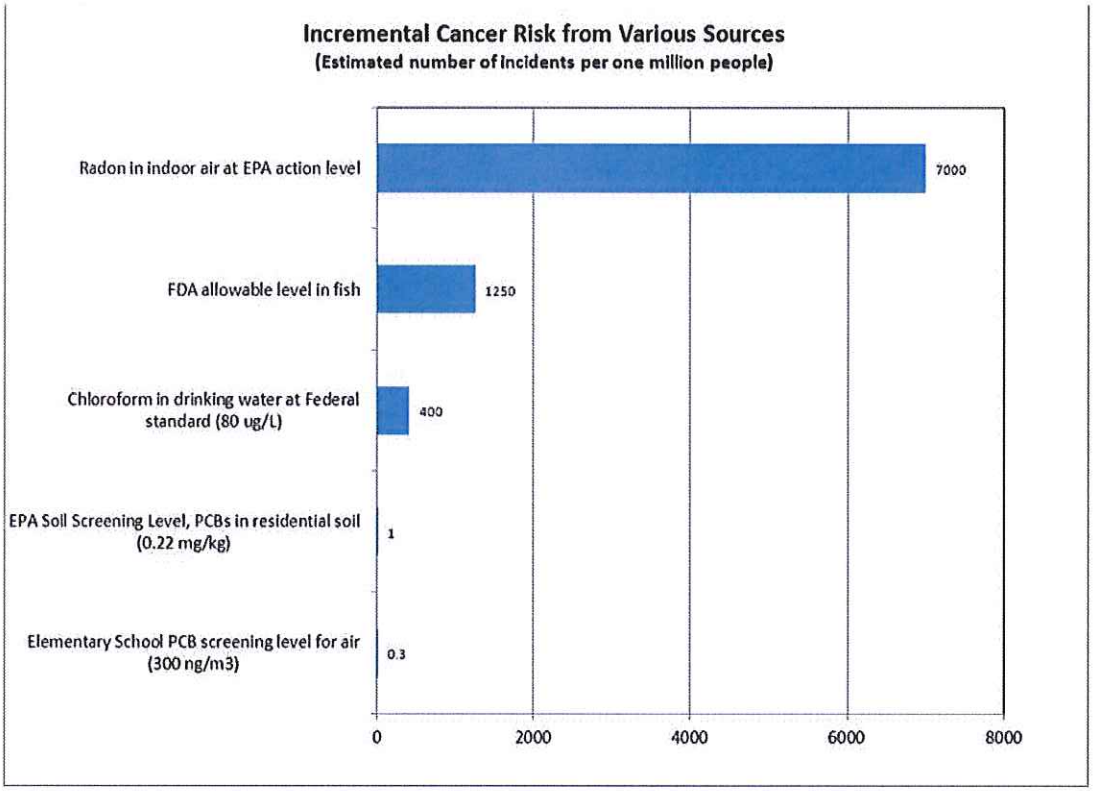
"Acceptable health risk" is a term of art used by risk assessors and regulators, who recognize that "zero risk" may be an impossible goal. We all take risks every day, in virtually all the activities in which we engage. We are all familiar with the concept of "acceptable" risk because this guides the decisions we make in our lives. Environmental regulations (for example, the "Superfund" rule) define an acceptable cancer risk as a level of risk set so low that is considered "de minimis", meaning that a lifetime exposure to a substance increases a person's chance of developing cancer by a very small fraction. For non-cancer health effects, risk is set at a level at or below conservative health-based reference levels.

The CT DPH discussed this "risk" concept using the highest levels of PCBs measured in indoor air of the classrooms and gym at the Osborn Hill School, and an exposure duration of 30 years for teachers and 6 years for students. The resulting estimated theoretical lifetime cancer risk for students and teachers is low. The highest risk comes from exposure in the gym because that is the room where indoor air PCB levels were highest. Long term exposure (30 years) to air in the gym has an estimated cancer risk of about 2 in 100,000. This means that if 100,000 people were exposed for 30 years to the highest PCB air level measured in the gym, every day throughout the school year, there would be an estimated 2 additional cancers resulting from that exposure over the course of a lifetime. Estimated cancer risks are much lower for students and teachers spending time in other parts of the school where air PCB levels were lower.

It is also important to understand background cancer rates. ***According to the American Cancer Society, half of all men and one-third of all women in the US will develop cancer during their lifetime.*** This means that the estimated 2 additional cancers in 100,000 exposed persons at Osborn Hill School would be in addition to the 33,000 to 50,000 background cancers that would be expected without any PCB exposure from the school. The high background cancer rate makes it impossible to determine if an individual cancer is related to a specific PCB exposure. Also, cancer is not a single disease with each cancer having its own set of risk factors. PCBs do not cause all types of cancer and have only been associated with a few forms of cancer, most notably liver cancer.

**What is the relative risk from PCB exposure compared to everyday risks?**

It is not simple to show a comparison of risks from PCBs in indoor air to risks from other facets of life, because of the many differences in compounds, toxic effects, levels of exposure and numerous other factors. However, to provide some perspective on the health risk (in this case, cancer potential) from PCBs in indoor air, the following chart shows a comparison of relative cancer risk from other types of contaminants typically encountered on a daily basis.




The risk from PCBs in indoor air exposures at the EPA screening level for elementary schools is very small relative to that from some other typical exposures, such as common contaminants in drinking water and radon in indoor air of a residence.

**What are the best near-term actions (i.e., best management practices) to reduce potential PCB exposures in buildings?**

Where schools or other buildings were built or renovated between 1950 and 1978, EPA recommends the following best practices to minimize potential exposure:

- Improve ventilation and add exhaust fans
- Clean frequently to reduce dust and residue inside buildings
- Use a wet or damp cloth or mop to clean surfaces
- Use vacuums with high efficiency particulate air filters
- Do not sweep with dry brooms; minimize the use of dusters near areas with caulk
- Wash hands with soap and water often, particularly before eating