

# PCBs in the Environment

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PCBs are a relatively common contaminant that can create expensive problems. Many people have heard of PCBs but do not know what they are, nor do they understand the relative degree of risk PCBs pose. This month's article describes PCBs: what they are, how they were used, where they are found, and how they are addressed when they impact a property.

### **What are PCBs?**

Polychlorinated biphenyls (abbreviated as PCBs) are an organic chemical consisting of two biphenyl rings with chlorine molecules. How many chlorine molecules and where those molecules are located on the chlorine ring dictates its exact chemical nature and specific name. There are 209 possible chemical configurations of PCB, and each configuration is slightly different from the next. PCBs are insoluble in water but are highly soluble in solvents, oils, and fats. They adhere tenaciously to soil particles.

PCBs are incredibly stable, even when exposed to high amounts of heat for prolonged periods of time; and therein lies the key quality that made them so widely used. One of their common uses (before their manufacture was banned in 1979) was in electrical transformers found on telephone poles, in electrical substations, and on the premises of factories and facilities. Transformers either “step-up” or “step-down” voltage during electricity's transmission—a process that creates a lot of heat. This heat is absorbed by the PCB fluid and dissipated. PCBs were also used to cool fluorescent light ballasts, and they were blended into metal cutting fluids and heat transfer fluids.

Unfortunately today, PCBs are commonly found in the environment. If I told you all the places PCBs have been discovered, you'd say, “How the heck did they get there?” (My personal “favorite” bizarre example of PCB disbursement is that game fish inhabiting remote lakes in the Canadian wilderness test positive for PCBs.) Consequently, environmental consultants routinely test for an array of chemicals (including PCBs) when investigating sites with unknown site histories. And as might be expected PCBs occasionally appear, turning what had been considered an innocuous site into one with unexpectedly expensive investigative and remedial requirements.

### **What if PCBs are found in an old factory or building?**

Building interiors impacted with PCBs have to be remediated. Thankfully, most of the serious and expensive problems were identified and remediated decades ago. Infamous examples abound in New Jersey: the former Singer Sewing Machine factory in Elizabeth, the former

Alcoa factory in Edgewater, the former General Electric factory in Newark, and others. These facilities were rife with PCB issues that required removal of concrete and sometimes cleaning surfaces to wash away the old oily film contaminated with PCB residue.

Perhaps most infamously, improper disposal of PCB-contaminated materials from General Electric into the Hudson River led to the river's designation by the federal Environmental Protection Agency (EPA) as our country's largest and most expensive Superfund site. Sediment on the bottom of a vast area of the Hudson River is impacted with PCB residue... After more than 30 years of investigation and legal wrangling, this PCB problem is finally being remediated.

### **What if PCBs are found in soil or groundwater?**

Let's first address ground water. As stated above, because PCBs are insoluble in water it is almost impossible that water can be contaminated with PCBs. So if someone tells you that groundwater is impacted with PCBs you should be suspicious. If someone analyzes an unfiltered groundwater sample that contains sediment or even clay particles, PCBs could be detected because they might be adhering to the soil particles. But unless there is some other situation that would chemically promote the solubility of the PCBs, assume that your groundwater is not impacted.

PCB impacts in soil are more common than you might suspect. And because PCB adheres to soil so very well, once soil is impacted the PCBs rarely leach away. The PCBs stay put unless the mass of soil is moved via an excavator, erosion or some other means. Almost always, the only financially viable remedial solution is to excavate and dispose of the impacted soil.

Because PCBs are regulated under the Toxic Substances Control Act (TSCA), most PCB projects come under the regulatory authority of the EPA. It is not unusual, however, to have PCB remedial projects that are governed by the EPA and once completed, require additional compliance steps under one or more state environmental regulations. In short, PCB remediation must be executed carefully both from scientific and regulatory perspectives.

### **A word about PCBs in fish.**

In aquatic environments, PCBs that adhere to solids are ingested by zooplankton and bioaccumulate up the food chain. As I noted before, PCBs are soluble in fat. Thus PCBs tend to accumulate in fat, not flesh. In most fish the fat is gray and subcutaneous, making it easy to see and remove. I make it a habit when eating fish to peel away the fat, thereby avoiding the ingestion of minute levels of PCBs. Does it make a difference in one's overall health? I honestly don't know, but every little bit of PCB avoidance certainly helps.

### **The price to remediate PCBs.**

There is no way to generalize about remedial price estimates because the scopes of work can be so vastly different from site to site. So I will leave you with a few general thoughts. Disposing of PCB-impacted soil is far more expensive than simply disposing of petroleum hydrocarbon impacted soil. When PCBs impact a building, depending upon the size of the building, the costs can run into the multi-millions of dollars. Having said that, I believe that most such buildings

have been addressed already. However, I always urge people who are buying a piece of property to perform adequate due diligence to identify the potential for impacts.

So many of the topics about which I write are complicated. This article is brief and by necessity only skims the surface. Please call me at 732-469-8888 if you want additional information on this or any other topic.

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