POLYCHLORINATED BIPHENYLS (PCBS) IN BUILDING MATERIALS

PRITCHARD LIBRARY

SEATTLE 2030 DISTRICT | BELLEVUE 2030 DISTRICT®

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OUR PROJECT PARTNERS

EPA

DEPARTMENT OF ECOLOGY
State of Washington

PacRim
Est.1990

Abatement of asphaltic expansion joints beneath carpeting and between columns

ABOUT OUR PROJECT

From 2021 through 2022, the Washington State Department of Ecology ("Ecology" hereafter) developed resources to characterize and abate sources of polychlorinated biphenyls (PCBs) within building materials. The Seattle and Bellevue 2030 Districts were awarded a grant through the Stormwater Strategic Initiative Lead to launch an outreach and education campaign targeting property owners about the risks of PCBs in building materials and Ecology's tools for identification and abatement. This case study illustrates the removal of PCBs and showcases Ecology's strong guidance for reducing the impacts of PCBs in our built environmental and natural ecosystems.

THE 101 ON PCBS

Origin & Legacy

Polychlorinated biphenyls (PCBs) are a class of 209 synthetic chemical compounds. They're commonly known by their trade name: Aroclor. PCBs were manufactured to improve flexibility, adhesion, and durability—among other purposes—and were used in a variety of common building materials. While the manufacture of PCBs was banned in 1979 by the Toxic Substances Control Act (TSCA), the use of PCB-containing materials was not prohibited. Thus, PCBs can still be found in buildings built or renovated between 1950 - 1979. Contractors continued using PCB-containing materials throughout the decade following TSCA regulations and the ban of PCBs. This means buildings constructed or renovated between 1980 and 1989 are also at risk of containing PCBs, although the risk is lower. The legal limit that triggers abatement is 50 parts per million (ppm).

Chemical Characteristics

PCB-containing building materials can pose health risks when they contaminate stormwater, soils, sediments, and indoor air. They're persistent, bioaccumulative, and toxic chemicals. Being a bioaccumulative chemical means they build up over time in people and animals through consistent exposure, becoming more concentrated in organisms at the top of the food chain such as orcas. PCBs impact salmon populations, Southern Resident Killer Whales, and sediments and organisms in WA rivers, lakes, and estuaries. These chemical compounds also take a long time to break down and thus remain in the environment and living organisms for their entire lifespan.

Materials Potentially Containing Non-Liquid PCBs: Paint, varnishes, lacquers, non-conducting, electrical cables, rubber/felt gaskets, coal-tar enamel coatings/rust, inhibitor coatings, insulation material, adhesives/tapes, caulk/grout, rubber isolation mounts, foundation mounts, pipe hangers, plastic applications, galbestos siding, mastics, acoustic ceiling/ floor tiles, joint material, asphalt roofing/tar paper, synthetic resins/floor varnish, and sprayed-on fireproofing

Materials Potentially Containing Liquid PCBs: Electrical equipment, fluorescent light ballasts, hydraulic equipment, heat transfer equipment, extrusion fluids, oil-filled electrical cable

Toxicity

PCBs have toxic effects on the immune, reproductive, nervous, and endocrine systems in people and other organisms. PCBs cause cancer in animals and are likely to cause cancer in humans. Even low concentrations of PCBs in water can impact aquatic life and human health. They're considered to be one of the most significant toxic chemicals in the Puget Sound.

Exposure Pathways

There are numerous routes to and sources of exposure. Diet is the primary exposure route for humans. This may look like consuming seafood contaminated by PCBs that entered the Puget Sound via stormwater runoff. These chemical compounds can be disturbed and spread during numerous scenarios. For example, this can happen during workplace repairs and maintenance on items containing PCBs, improper removal, contact with old appliances, or electrical equipment accidents.

When PCBs are present in exterior building materials, natural processes like the weather or human actions may cause PCBs to enter the environment. PCB contamination can happen as a result of weather, building maintenance, construction debris, disturbance of PCB-containing materials, and stormwater runoff. It's important to be conscious of these pathways to prevent them.

BUILDING PROFILE

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The Site

Joel M. Pritchard Library at the Washington State Capitol Building and Campus

415 15th Ave SW, Olympia, WA 98501

Contracted Remediation Specialist

Pacific Rim Environmental

Building Type

Public Library — State of Washington Public Works

Construction Timeframe

1957 — 1958

Building Size

77,000 sq ft

THE CASE STUDY 07

PCB Discovery

As part of a capital improvement project, the Pritchard building's plans included flooring demolition in the basement. Triggered by the major renovations, the project team conducted an occupied Regulated Building Materials Survey (RBMS). The initial test identified PCBs in the asphaltic expansion joints found beneath the carpeting between columns. The joints were located largely under interior walls and flooring products. The project team did not have access to the building drawing, which may have aided the investigation during the RBMS.

PCB Sampling

While desirable, the project team was unable to complete destructive sampling while the building was occupied due to the presence of public workers. The project team collected more than 25 samples from the expansion joints and cores in the concrete. The team conducted additional sampling to determine whether PCBs migrated into the substrate. Upon sampling the soil beneath the slab on grade, PCBs were detected. The initial sample collected from an expansion joint of 20 lineal feet contained more than 2 parts per million (ppm).

Legal label to be compliant with disposal


Drum and sampling with label

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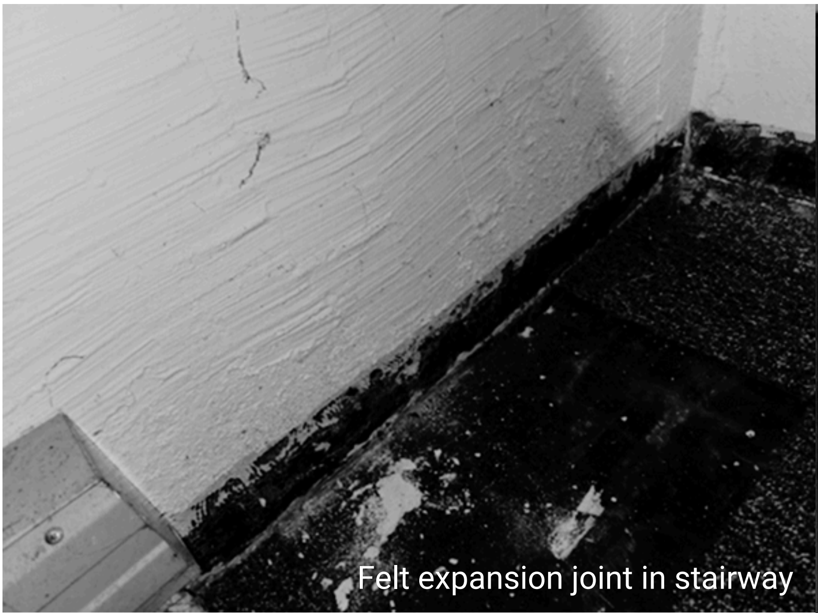
DISCOVERY & TESTING → PROJECT PRE-DESIGN & DESIGN → EPA PLAN APPROVAL → PCB MATERIAL DISPOSAL → FINAL REPORTING

Timeline

Interrupting the 2-year long improvement project, abatement activities took 4 weeks with an average crew size of 10-15 workers. The removal was scheduled for 6-8 weeks, including the interior soft demolition.

Abatement

Preventing the spread of contamination required soft demolition via manual methods. Approximately 2,200 LF of expansion joint was removed by saw cutting.



Felt expansion joint in stairway

Debris sampling of barreled saw cutting slurry

PROJECT OUTCOMES

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Following the 6-week removal period, the work site was free of PCBs. Pacific Rim Environmental performed PCB air monitoring and oversight. As scheduled, the slabs were removed and the site was ready to resume renovation. Slurry was placed into 55-gallon steel drums and disposed of. The team sampled a third of the drums for waste determination.

The EPA Region 10 PCB Coordinator was notified of the removal work. They determined that the PCB bulk product waste could be disposed of in accordance with 40 CFR 761.62 without notifying EPA.

The building now complies with PCBs and other regulated building materials, and the capital improvement project continues.

Project significantly enhanced future **OCCUPANT HEALTH** with the removal of all PCBs.

STORMWATER POLLUTION CONTROL improved.

LEARN MORE ABOUT THE 2030 DISTRICTS

The Bellevue and Seattle 2030 Districts work to create a high-performance building districts in the Puget Sound region, aiming to dramatically reduce environmental impacts while fostering economic growth. These organizations work with property owners, managers, developers, and stakeholders to reduce energy use, water consumption, and transportation emissions by 50% by the year 2030. This collaborative effort focuses on driving sustainability in urban development through public-private partnerships and expanding crucial networks. We are the only 2030 Districts with a stormwater pollution reduction program, which was piloted in 2016. This case study showcases this program's goal to reduce negative environmental impacts and pollution in our stormwater.

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