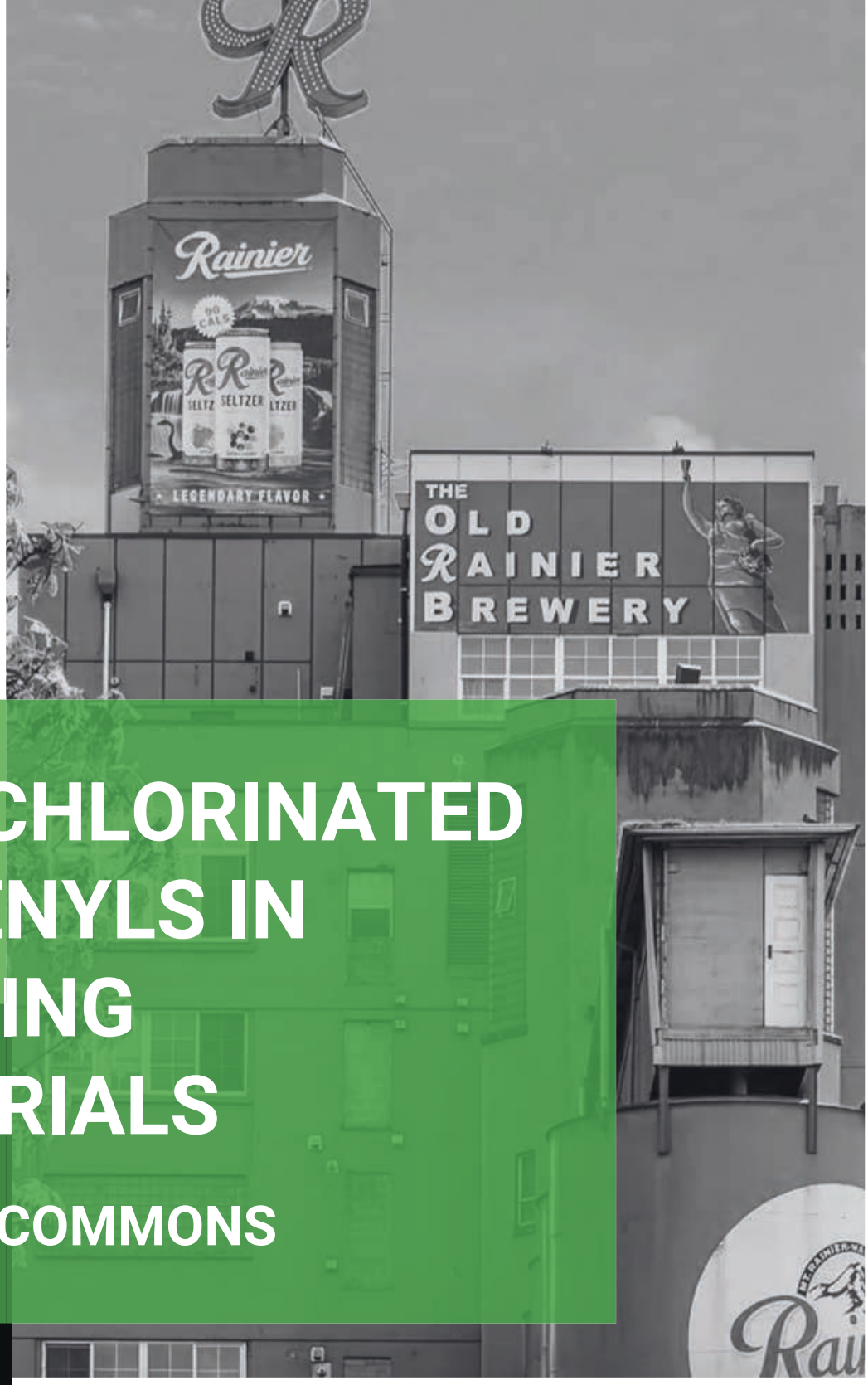


POLYCHLORINATED BIPHENYLS IN BUILDING MATERIALS

RAINIER COMMONS

SEATTLE 2030 DISTRICT | BELLEVUE 2030 DISTRICT®

02

OUR PROJECT PARTNERS

EPA

DEPARTMENT OF ECOLOGY
State of Washington

PacRim
Est.1990

Rainier Commons, also known as the “Old Rainier Brewery”

03

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

04

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

06

The Site

Rainier Commons: 3100 Airport Way S, Seattle, WA 98134

Building Size

24 buildings on a 4.6 acre lot

Building Type

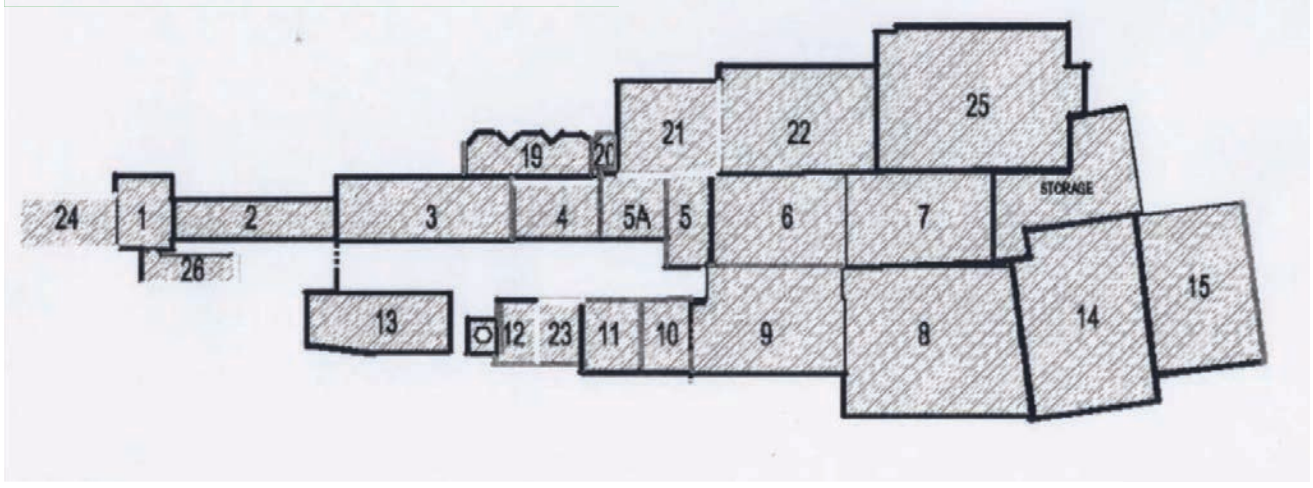
Mixed-use development containing housing and commercial businesses of various types, some which servive customers on-site

Construction Timeframe

Varying years throughout the mid-twentieth century

Contracted Remediation Specialist

NVL Labs



THE PROJECT

07

PCB Discovery

In 2004, Seattle Public Utilities (SPU) conducted routine sediment sampling in a catch basin of Rainier Commons, where they discovered the presence of PCBs. From their subsequent investigation, SPU identified Rainier Commons as the source of the PCB contamination in the catch basin. Following initial identification, the building's exterior paint was identified as the primary source of contamination.

PCB Sampling

In total 86 samples were collected from the various buildings that constitute Rainier Commons over the course of testing. Initial site sampling found 17.5 ppm PCBs in the sediment. Samples from on-site catch basins showed 17 to 23 ppm. A trench on site contained 2,200 ppm and exterior paint contained 213,000 ppm. Concentrations of PCBs are heterogeneous and for a large, multi-building site like Rainier Commons it's hard to know where the highest level of contamination is. When it becomes apparent that PCBs are abundant the issue should be treated as widespread.

Timeline

The first sample was collected in 2004, followed by the cleaning of the catch basin and drainage system in 2008. The EPA collected indoor samples from June to September 2010. The EPA approved a general work plan in December 2013 and the first phase was completed in 2014. Exterior paint has been removed from Building 13, the west side of Building 10 and 11, and the south side of Building 15. PCB-containing waste was collected in drums and disposed of pursuant to the applicable EPA regulations.

Negative enclosure containment set-up: interior poly and tape to seal abatement work area

08

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

Abatement Activities

The EPA outlines that abatement activities should be prioritized based on four drivers: (1) PCB Concentrations and Condition, (2) Accessibility, (3) Occupancy, and (4) Interim Measures. Because of the multi-entity composition of Rainier Commons, abatement activities were organized according to which occupants could be relocated in a timely manner, rather than where the highest level of contamination was concentrated—a relatively unknowable variable due to the site's size.

Rainier Commons utilized abrasive blasting on contaminated paint as well as hand removal as part of its abatement process. This required a negative pressure containment area to prevent the spread of contamination during removal activities. Due to the unexpected porosity of walls and the presence of cracks, sheeting was also put up indoors opposite exterior blasting activity to prevent the ingress of PCBs.

Visit https://www.epa.gov/pcbs/steps-safe-pcb-abatement-activities *for the EPA's Steps to Safe PCB Abatement Activities*

09

PROJECT OUTCOMES

MAJOR PROJECT OUTCOMES TO DATE include a reduction in PCB contamination within the SPU catch basin and the original site

PCB removal at the Rainier Commons site is ongoing as of 2025 under the continued oversight of NVL Labs. The site completed abatement activities outlined under Phase I and II.a of their certified clean-up plan and Phase III of this project was approved in 2021.

Lessons Learned

- Efficacy of abatement method can vary across site due to inhomogeneity in PCBs concentration and characterization. Contractors can expect variation in effort.
- More could be communicated to building owners and contractors around the scale and driver of PCBs remediation, as well as their obligations and liabilities.
- Creation of a certification and official training program would help promote standard best practices for PCBs remediation.
- Contractors should assume that walls are porous and take measures to protect indoor spaces from the spread of contamination.
- Communicating risks to tenants and negotiating timeline and nature of abatement activities could help avoid legal issues.

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. These 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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