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PCBs in Building Products

- Introduction
- Regulatory Overview
- Bulk Product Waste vs. Remediation Waste
- Demolition vs. Renovation
- Real World Application

What are PCBs?

- A polychlorinated biphenyl (PCB) is an organic chlorine compound $C_{12}H_{10-x}Cl_x$.
  - Will contain one to ten Chlorine atoms.
- Some PCBs share a structural similarity and toxic mode of action with dioxin affecting the endocrine system and the thyroid gland in particular.
- Suspected neurotoxin
- Suspected carcinogen

Why were PCBs utilized?

Many useful properties:

- Low flammability
- Fire resistant
- Chemical stability – contributes to environmental persistence
- Electrical insulating properties
- Durability
- Resistant to degradation
- Softener and plasticizer

Types of Building Materials Known to Contain PCBs

- Caulking
- Paints
- Adhesives
- Asphalt Roofing Materials
- Transformer Oil
- Fluorescent Light Ballasts
- Grout
- Insulating Coatings Mixed With Asbestos
- Plasticizer Agents
- Tar Paper

Regulations

Federal

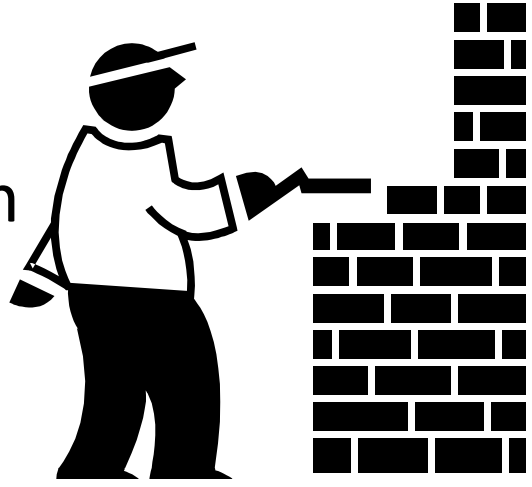
- Toxic Substances Control Act (TSCA)
- Title 40 CFR Part 761

State

- Connecticut Department of Energy and Environmental Protection (CT DEEP)

Regulatory Requirements

- No obligation to test for PCBs
- No requirement to report
- No explicit requirement to remove
- But if PCBs in building materials >50 ppm exist, owner is in violation of TSCA



PCB Nomenclature

- Not one specific compound but many different types of organochlorine compounds
- **Congener** – "any single, unique well-defined chemical compound in the PCB category".
  - 209 distinct congeners
- **Homolog** – Group of congeners defined by number of Chlorine atoms
- **Aroclor** – A trade name referring to specific mixture of congeners (1016, 1254, 1260 etc.)

Project Schedule

- Identify Scope and Goals
- Assess impacted materials
  - Additional testing may be required to determine impact to substrate(s)
- Develop remediation plan
  - Determine waste stream(s)
- Remediation
- Post remediation testing
  - May be substrate and/or air testing

How do we identify/verify PCB content?

- Building materials – EPA SW 846 Method 8082
  - With Soxhlet Extraction

Air Sampling

- Low Volume
  - Sampling - EPA Method TO-10A
  - Geared towards indoor air quality assessment
  - Analysis – EPA Method 680 (PCBs by Homologs)
- High Volume
  - Sampling - EPA Method TO-10A
  - Geared towards indoor air quality assessment
  - Analysis – EPA Method 680 (PCBs by Homologs)

Waste Streams

- Bulk Product Waste - waste derived from products manufactured to contain PCBs in a non-liquid state at 50 ppm or greater.
- Remediation Waste - waste containing PCBs as a result of a spill or release -> substrate or soil
- Significant cost difference
  - See 2012 EPA Reinterpretation

Disposal

- > 50 ppm – TSCA permitted facility
- Some facilities permitted to accept <50 ppm waste in certain quantities/concentrations
- Massachusetts - >2 ppm must go out of state
- Connecticut - >1 ppm must be removed and disposed of out of state
- May have “dual waste” i.e. PCB and Asbestos Caulking

What happens if we don't look?

- If they are not identified and improperly disposed, this will lead to a Toxic Substance Control Act (TSCA) violation.
- If identified and still in-use, depending on the concentration present PCBs must be remediated. PCBs in building material (above 50 ppm) is a "prohibited use"
- Health and safety
  - Actual health risks uncertain
  - Public outcry and perception can drive projects
  - Worker protection

What happens if we don't look?

- Typical renovation/demolition can increase PCB exposures
- Must appropriately dispose of PCB materials mid project
- Dramatic increase in demolition disposal costs
- Change Orders
- Long lead time and impact to schedule may exceed 6 months
  - Seasonal disposal considerations

Different strokes for different folks (Demolition vs. Renovation)

- Weston & Sampson typically recommends the use of one of two procedures for PCBs in building materials:
- Procedure #1 Favored for demolition
  - Test and determine PCB concentrations and then develop a plan for remediation/disposal; or
- Procedure #2 Favored for renovation
  - Assume PCBs are present and manage building material wastes generated as bulk product waste.

Renovation (Procedure #2)

1) May cause increased costs for disposal as PCB Bulk Product Wastes when they may just be clean debris.
   - Clean debris disposal - $60 to $80/ton
   - PCB Bulk Product Wastes are $125 to $150/ton
   - 500 T = additional $32,500 to $35,000 in disposal costs

2) Advantage lies in providing a fixed scope of work for a renovation project and a fixed cost and schedule.
   A. Testing may result in increased costs:
      - Removal of materials outside of the intended work scope area
      - Removal of additional materials within the work area including an unknown amount of building substrate removal.
      - Both can lead to scope change, change orders and project delays.

EXAMPLE 1: Typical PCB Window Caulk Abatement

- PCB caulking at window frames
- Performance-based removal
- Sampled brick at 6-inch offset to verify no PCB impact
- Cut-out/removed brick and window for disposal as Bulk Product Waste
- Sampling and remediation added **$500,000** to the project.

EXAMPLE 2: PCB Paint Abatement

- Former School Building in Maine that was converted to housing
- PCBs were included in original 2010 Phase I ESA and Assessed during Initial Phase II ESA
- PCBs found in paint over 50 ppm in basement and first floor
- Sampling and remediation added +/-$400,000 to the project, but these costs were anticipated.

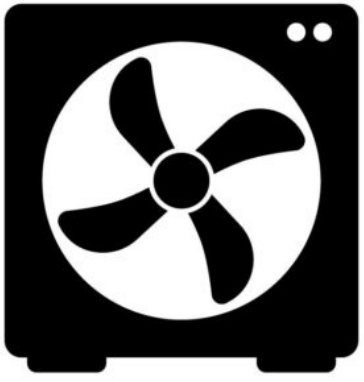
Example #3
"The Best of Both Worlds"

- Long-term residential facility
- Project began as energy efficiency upgrade
- PCBs and ACM found in window caulk
- Substrate testing produced unexpected results
  - PCBs subsequently found in wall paint
- Remediation performed
  - Abatement, cleaning, painting, cleaning
  - Follow-up testing failure
- Follow-up testing failure

Example #3
What do we do now?!?!?!?!?

Example #3

- Reclean facility with abatement contractors vs general trades
- Perform air exchanges
- Retest air
  - Eventually passed



Example #3
So what happened and what should we do?

- Assumed volatilization
  - BUT, percentages of homologs in air did not match with the parent Aroclors identified in bulk sampling
- Determined that any cleaning activities were causing spike in air test results
- Perform cleaning and then air exchanges over days/weeks

Conclusions

- Assess for PCBs in properties that have buildings constructed or renovated between 1920 and 1979 and where demolition/renovation is planned.
- Understand the issue before you buy it!!
- Consider alternate sources not just the materials impacted by work scope
- Assessment is cheap – remediation is $$$

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