Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition

Managing PCBs–Containing Building Materials during Demolition

Bay Area Stormwater Management Agencies Association

August 2018
3. **PCBS BUILDING MATERIAL EVALUATION PROTOCOL**

This section presents the evaluation protocol for identifying building materials in structures constructed or remodeled between the years 1950 and 1980\(^\text{10}\) that may contain a significant mass of PCBs. Once identified as containing PCBs at concentrations exceeding 50 ppm, these materials should be properly managed prior to building demolition, to ensure PCBs are not discharged to the municipal storm drain system.

This protocol is not intended to address all PCBs-containing materials that may disturbed during building demolition. Additional sampling is likely to be required to comply with EPA and Cal/OSHA regulations pertaining to the management, removal and disposal of PCBs-containing materials.

For this program, it is assumed that organizations and staff qualified to sample, test, remediate, and dispose of PCBs at the building site will coordinate processes for other hazardous building materials at the building site, to ensure proper sampling, testing, remediation, and disposal or all statutorily-required hazardous materials handling.

### 3.1 Priority Building Materials to be Tested

A prioritized list of PCBs-containing materials is provided in Appendix A. Building materials were evaluated based upon the following criteria:

- **Source Material** – Does the building material contain PCBs through the original product manufacturing process or was the building material contaminated (impregnated) with PCBs from an adjacent building material that already contained PCBs? For the evaluation, building materials originally manufactured with PCBs at or above 50 mg/kg were prioritized.

- **Concentration** – Building materials were evaluated based on readily available existing data regarding ranges of PCBs concentrations identified in the materials.

- **Prevalence** – A prevalence factor was assigned based upon best professional judgement of the prevalence of occurrence of the PCBs-containing materials in buildings, which ranged from highly prevalent to low prevalence.

- **Ease of Removal** – Building materials were evaluated based on their attachment to the building, which ranged from “very easily removed” to “difficult to remove,” under the assumption that higher ease of removal results in higher feasibility and lower costs for removing a material before demolition.

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\(^{10}\) Single-family residential and wood frame structures are exempt.
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- **Flaking/Crumbling** – Building materials were evaluated based on their tendency to flake or crumble during disturbance or demolition, which could lead to a higher likelihood of entering stormwater as a result of building demolition.

- **PCBs Removed by Other Waste Program** – This factor addresses materials that are removed from buildings because of other waste management programs (e.g., Universal Waste Rule). Fluorescent light ballasts\(^\text{11}\), polyurethane foam furniture, and Askarel fluid used in transformers, all of which may contain PCBs, are typically managed during pre-demolition activities under current regulations and programs that require removal of universal waste and outdated transformers. For this program it is assumed that those materials will be evaluated and managed under those existing programs.

Material prioritization was conducted by assigning a score on a scale of 1 to 5 (low to high) for each criterion. The final score for each material type was calculated as the average of the scores assigned to the six criteria. The materials given the highest scores through the prioritization analysis are shown below, along with their typical locations in a building. For this evaluation, thermal insulation and fiberglass insulation were grouped together as they tend to be co-located and are typically managed together. The materials listed below (along with typical locations where they are found) are the materials that should be sampled using the protocols described in Section 3.2.

1. Caulks and Sealants:
   a. Around windows or window frames;
   b. Around door frames; and
   c. Expansion joints between concrete sections (e.g., floor segments).

2. Thermal/Fiberglass Insulation and Other Insulating Materials:
   a. Around HVAC systems,
   b. Around heaters,
   c. Around boilers,
   d. Around heated transfer piping, and
   e. Inside walls or crawls spaces.

3. Adhesive/Mastic:
   a. Below carpet and floor tiles;

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\(^{11}\) Fluorescent light ballasts that contain PCBs are not required to be managed under the Universal Waste Rule Program but are recommended by the EPA to be identified in a pre-demolition survey of a structure and to be managed with the removal of other required wastes in the abatement process.
b. On, under, or between roofing materials and flashing.

4. Rubber Window Seals/Gaskets:
   a. Around windows or window frames.

Examples of the prioritized PCBs-containing building materials and what they may look like in a building planned for demolition are provided in Appendix B.

3.2 PCBs Sampling Procedures

Many building materials may contain PCBs. The building owner is responsible for identifying and handling all hazardous materials in accordance with all applicable laws, including all materials with 50 ppm or more PCBs. For purposes of obtaining a demolition permit, the City requires a building owner to sample the limited number of materials shown below:

1. Caulks and Sealants:
   a. Around windows or window frames;
   b. Around door frames; and
   c. Expansion joints between concrete sections (e.g., floor segments).

2. Thermal/Fiberglass Insulation and Other Insulating Materials:
   a. Around HVAC systems,
   b. Around heaters,
   c. Around boilers,
   d. Around heated transfer piping, and
   e. Inside walls or crawl spaces.

3. Adhesive/Mastic:
   a. Below carpet and floor tiles;
   b. On, under, or between roofing materials and flashing.

4. Rubber Window Seals/Gaskets:
   a. Around windows or window frames.

It should be noted that some materials that are being evaluated for PCBs in this protocol may also be associated with asbestos, lead, or other hazardous substances. Since this protocol follows pre-established asbestos management program guidelines and procedures, the sampling frequency, types of building materials, and surveying techniques overlap with the PCBs survey protocol. If a
material has been determined to contain asbestos, lead or other hazardous substances and will be abated under an associated waste program, that material need not be sampled for PCBs under this program.

3.2.1 Sampling Equipment

Building materials that are planned to be collected for laboratory analysis should be placed in laboratory-supplied glass jars with Teflon-sealed lids. Samples should be collected with either factory-sealed or decontaminated equipment that will be used to remove a representative building material sample (i.e., scissors, tweezers, pliers, spoons, or putty knife).

For sampling equipment (i.e., scissors, tweezers, pliers, spoons, putty knife, etc.) that will be decontaminated, the following three bucket wash procedure should be performed, which is in general accordance with standard decontamination procedures defined in SESDPROC-205-R3 (EPA, 2015):

- In the first bucket, mix a residue free cleaning detergent (e.g., Alconox®), with distilled water to generate the recommended detergent concentration specified in the product directions;
- Fill the second bucket with distilled water;
- Fill the third bucket with distilled water;
- Clean the equipment in the first bucket with the cleaning detergent, then rinse in the second and then the third bucket. If the second bucket becomes slightly discolored during the rinse, change the contents of the second bucket with distilled water. Change the third bucket, if any dirt or material is observed in the water, since the third bucket needs to stay clean as it is the final rinse; and
- At the end of cleaning, let the equipment air dry in a clean area before use in sample collection. The rinse water should then be drummed and sampled for disposal. The planned disposal facility should be contacted to determine the required sample analysis for the rinse water characterization and profiling and that the disposal procedures comply with state and federal regulations.

If disposable sampling tools are used, the above decontamination procedures do not apply.

3.2.2 Sample Collection Frequency

For the four prioritized building materials, the following collection techniques and frequency should be followed.

Caulking

Three different types of caulking should be evaluated:
1. Window caulking;
2. Door frame caulking; and
3. Floor and expansion joint caulking.

For each type of caulking material identified, the following number of samples should be collected:

- Collect at least one sample from each homogenous area that contains less than 50 linear feet of caulking;
- Collect at least three samples from each homogenous area that contains between 50 and 250 linear feet of caulking;
- Collect at least five samples from each homogenous area that contains between 250 and 1,000 linear feet of caulking;
- Collect at least seven samples from each homogenous area that contains between 1,000 and 2,500 linear feet of caulking; and
- Collect at least nine samples from each homogenous area that contains greater than 2,500 linear feet of caulking.

If homogenous caulking material is found throughout the building, samples should be spatially distributed so as to not collect the required number of samples from one area. In addition, the width or cross-sectional area of the caulking bead is not relevant for determining the linear footage to be sampled. It is also recommended that the sampler performing the evaluation inspect the entire building prior to sample collection to insure proper distribution is performed.

**Thermal/Fiberglass Insulation**

For thermal/fiberglass insulation:

- Collect at least one bulk sample from each homogeneous area.

**Adhesive/Mastic**

For each type of adhesive/mastic material identified, the following number of samples should be collected:

- Collect at least three samples from each homogenous area less than 1,000 square feet;
- Collect at least five samples from each homogenous area between 1,000 and 5,000 square feet; and
- Collect at least seven samples from each homogenous area greater than 5,000 square feet.

If homogenous adhesive/mastic material is found throughout the building, samples should be spatially distributed so as to not collect the required number of samples from one area. It is
recommended that the sampler performing the evaluation inspect the entire building prior to sample collection to insure proper distribution is performed.

**Rubber Window Seals/Gaskets**

For rubber window seals/gaskets identified, the following number of samples should be collected:

- Collect at least one sample from each homogenous area that contains less than 50 linear feet of caulking (of any width or cross-sectional area of bead);
- Collect at least three samples from each homogenous area that contains between 50 and 250 linear feet of caulking;
- Collect at least five samples from each homogenous area that contains between 250 and 1,000 linear feet of caulking;
- Collect at least seven samples from each homogenous area that contains between 1,000 and 2,500 linear feet of caulking; and
- Collect at least nine samples from each homogenous area that contains greater than 2,500 linear feet of caulking.

If homogenous rubber window seals/gaskets are found throughout the building, samples should be spatially distributed so as to not collect the required number of samples from one area. It is also recommended that the sampler performing the evaluation inspect the entire building prior to sample collection to insure proper distribution is performed.

### 3.2.3 Sample Analysis and Preservation

Samples collected to evaluate building materials for PCBs should be analyzed for Aroclors by EPA Method 8082/8082A\textsuperscript{12} by an accredited analytical laboratory. The minimum reporting limit should be 50 micrograms per kilogram (µg/kg) and the laboratory should be contacted before sampling to confirm minimum material volume required to meet the reporting limit objectives. A sample reporting limit of 50 µg/kg is well below the target management level of 50 mg/kg.

Samples should immediately be chilled in an ice cooler and then kept at 4 degrees Celsius (39.2 degrees Fahrenheit) or colder during storage and transportation to the laboratory. Proper chain-of-custody\textsuperscript{13} procedures should be followed from the time the samples are collected until they are delivered to the laboratory for analysis. Holding times for EPA Method 8082/8082A are sample extraction within 14 days of sample collection and analysis of the extract within 40 days of

\textsuperscript{12} Provision C.12.f. requires that Permittees develop and implement or cause to be developed and implemented an effective protocol for managing materials with PCBs concentrations of 50 ppm. EPA Method 8082/8082A is an acceptable method to quantify PCBs. Analysis of PCBs congeners is not required to meet the permit requirement.

\textsuperscript{13} Chain-of-custody is the procedure to document, label, store, and transfer samples to personnel and laboratories. For a detailed list of procedures, refer to the Sample and Evidence Management, Operating Procedure (SESDPROC-005-R2), January 29, 2013.
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extraction. However, PCBs are very stable in a variety of matrices and holding times may be extended to as long as one year. Once extracted, analysis of the extract should take place within 40 days.

3.2.4 Quality Assurance and Quality Control

For this program, general quality assurance and quality control (QA/QC) procedures will be utilized. The following checklist should be used by the contractor performing the evaluation:

- QA/QC Checklist:
  - Proper specified sampling equipment was used (pre-cleaned or other, stainless steel);
  - Proper decontamination procedures were followed;
  - Sampling collection spatial frequency was met;
  - A National Environmental Laboratory Accreditation Program (NELAP) laboratory was utilized;
  - Samples were received by the laboratory within proper temperature range;
  - Samples were extracted and analyzed within the method holding time for EPA Method 8082/8082A; and
  - Sample reporting limit met data quality objectives.

3.3 Reporting and Notifications

The following considerations are applicable to reporting and notification:

- Assessment results must be submitted to the applicable Permitting Authority by the project applicant;
- Applicants that determine PCBs exist in priority building materials must follow applicable federal and state laws. This may include reporting to USEPA, the San Francisco Bay Regional Water Quality Control Board, and the California Department of Toxic Substances Control (DTSC). These agencies may require additional sampling and abatement of PCBs.
- Depending on the approach for sampling and removing building materials containing PCBs, applicants may need to notify or seek advance approval from USEPA before building demolition. Even in circumstances where advance notification to or approval from USEPA is not required before the demolition activity, the disposal of PCBs waste is regulated under TSCA.
- The disposal of PCBs waste is subject to California Code of Regulations (CCR) Title 22, Section Division 4.5, Chapter 12, Standards Applicable to Hazardous Waste Generators.
• Building owners and employers need to consider worker and public safety during work involving hazardous materials and wastes including PCBs.

For further information, applicants should refer to the *PCBs in Priority Building Materials Screening Assessment Applicant Package*, BASMAA, July 2018.
4. REFERENCES

Guidelines for Asbestos Sampling:
- https://www.epa.gov/asbestos/asbestos-laws-and-regulations

Guidelines for Lead-Based Paint Evaluations:
- Environmental Protection Agency (EPA) - Created the Renovation, Repair, and Painting (RRP) Rule which requires training and certification for anyone working for compensation in pre-1978 residential structures, day care centers, and schools where known or assumed lead-based paint is impacted. The EPA website with complete information on this regulation is https://www.epa.gov/lead/renovation-repair-and-painting-program.
- California Department of Public Health (CDPH) - Created "Title 17" which includes lead testing and abatement provisions in residential and public structures in California. Several important definitions are contained in Title 17 including Abatement, Clearance Inspection, Containment, Lead-Based Paint.
- Lead Contaminated Dust and Soil, Lead Hazard, and Lead Hazard Evaluation. Title 17 establishes that lead testing be performed using XRF equipment or by paint chip sample analysis in California. Lead test kits are not accepted. It also establishes testing in California be performed by a State certified lead inspector/assessor if the testing is related to a project involving compensation.
- Department of Housing and Urban Development (HUD) - Created the HUD Guidelines which contain protocols for lead testing and abatement.

EPA Method 8082A – Polychlorinated Biphenyls (PCBs) by Gas Chromatography


SESDPROC-005-R2, Sample and Evidence Management, Operating Procedure, January 29, 2013
APPENDIX B

Priority Building Materials

Photographic Log
## Appendix B

### Priority Building Materials to be Tested for PCBs

| Photograph 1 | ![Image of brick wall with damaged caulking]
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Window Caulking:</strong></td>
<td><strong>Damaged caulking around a window.</strong></td>
</tr>
</tbody>
</table>

| Photograph 2 | ![Image of concrete wall with worn caulking]
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Window Caulking:</strong></td>
<td><strong>Worn and potentially friable caulking around a window.</strong></td>
</tr>
</tbody>
</table>
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### Priority Building Materials to be Tested for PCBs

<table>
<thead>
<tr>
<th>Photograph 3</th>
<th>Door Frame Caulking:</th>
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<tbody>
<tr>
<td></td>
<td>Damaged, friable caulking on an interior door frame.</td>
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</table>

<table>
<thead>
<tr>
<th>Photograph 4</th>
<th>Floor and Expansion Joint Caulking:</th>
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<tbody>
<tr>
<td></td>
<td>Joint compound between flooring segments.</td>
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</table>
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Priority Building Materials to be Tested for PCBs

<table>
<thead>
<tr>
<th>Photograph 5</th>
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</thead>
<tbody>
<tr>
<td>Thermal Insulation: Foam insulation material in an attic.</td>
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<table>
<thead>
<tr>
<th>Photograph 6</th>
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<tbody>
<tr>
<td>Thermal Insulation: Damaged floor foam insulation.</td>
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<td>Photograph 7</td>
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<tr>
<td>--------------</td>
</tr>
<tr>
<td><strong>Thermal Insulation:</strong></td>
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<tr>
<td>Damaged pipe foam insulation.</td>
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</tbody>
</table>

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<tr>
<th>Photograph 8</th>
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</thead>
<tbody>
<tr>
<td><strong>Thermal Insulation:</strong></td>
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<tr>
<td>Exposed/damaged pipe insulation.</td>
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</table>
# Appendix B

## Priority Building Materials to be Tested for PCBs

<table>
<thead>
<tr>
<th>Photograph 9</th>
<th><img src="image1.png" alt="Image" /></th>
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<tbody>
<tr>
<td>Thermal Insulation:</td>
<td>Damaged pipe insulation.</td>
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<table>
<thead>
<tr>
<th>Photograph 10</th>
<th><img src="image2.png" alt="Image" /></th>
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</thead>
<tbody>
<tr>
<td>Thermal Insulation:</td>
<td>Exposed pipe insulation.</td>
</tr>
</tbody>
</table>
### Appendix B

#### Priority Building Materials to be Tested for PCBs

<table>
<thead>
<tr>
<th>Photograph 11</th>
<th><img src="image1.png" alt="Image" /></th>
</tr>
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<tbody>
<tr>
<td><strong>Adhesive / Mastic:</strong></td>
<td>Friable adhesive on a cement surface.</td>
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</table>

<table>
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<tr>
<th>Photograph 12</th>
<th><img src="image2.png" alt="Image" /></th>
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<tbody>
<tr>
<td><strong>Adhesive / Mastic:</strong></td>
<td>Adhesive beneath a carpet.</td>
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<tr>
<td>Photograph 13</td>
<td>Adhesive / Mastic: Adhesive remnants on flooring.</td>
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<tr>
<td>Photograph 14</td>
<td>Adhesive / Mastic: Exposed adhesive on roofing.</td>
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<td>Photograph 15</td>
<td>Photograph 16</td>
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<tr>
<td><strong>Rubber Window Seal/Gasket:</strong></td>
<td><strong>Rubber Window Seal/Gasket:</strong></td>
</tr>
<tr>
<td>Grey rubber window seal/gasket in a wood type frame.</td>
<td>Off white rubber window seal/gasket in an aluminum type frame.</td>
</tr>
</tbody>
</table>