

PCB Caulking Work Plan
**University of Washington's
Seattle Campus**
University of Washington
Seattle, Washington

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APPENDIX A. VISUAL INSPECTION FORM

1.01 DESCRIPTION OF WORK

- A. This Work Plan provides University of Washington with the steps for the removal and disposal of Polychlorinated Biphenyls (PCB)-containing window caulking and glazing compound during routine operations and maintenance activities. The Work Plan addresses: worker training and qualifications; engineering controls; worker protection; and post removal documentation. Note: PCB-containing caulking and glazing compound may contain other regulated materials such as asbestos or heavy metals and additional procedures are required for these other regulated materials.
- B. This Work Plan seeks to minimize the potential for exposure to PCBs and contamination of areas outside the work area as a result of select removal activities. Generally, the work includes indoor or outdoor removal of deteriorated PCB-containing window caulking or glazing compound.
- C. Building occupants will be notified following standard Work Order notification procedures.
- D. This Work Plan was prepared prior to the pilot study and is subject to change based on the findings and results of the study.

1.02 QUALIFICATIONS

- A. All site personnel performing PCB-containing caulking removal shall have hazard communication training for PCBs in accordance with WAC 296-800-170 and training regarding the proper use of Personal Protective Equipment (PPE).
- B. Site personnel performing the work will also have training or certification in hazardous material abatement such as asbestos or lead abatement certification, as applicable.

1.03 RESPONSIBILITIES AND ROLES

- A. The On-Site Safety Supervisor is the Competent Person as designated by the Contractor and has the authority to immediately halt work during the exposure assessment phase if the provisions of this Work Plan are not met. The On-Site Supervisor must be qualified as the Competent Person in accordance with WAC 296-155-775.
- B. The On-Site Safety Supervisor will be 40-hour HAZWOPER certified and will have training in the EPA's recommended procedures for removal and safe handling of PCB-containing material at <http://www.epa.gov/pcbsincaulk/guide/index.htm>
- C. No one is allowed inside of the demarcated area without the approval of the On-Site Safety Supervisor. All persons entering the demarcated area are required to comply with all sections of this Work Plan.
- D. The On-Site Safety Supervisor will perform the following duties:
 - 1. Ensure all work is performed in compliance with the policies and procedures outlined in this Work Plan and applicable state and federal regulations
 - 2. Record any illness, disease, injury, pulmonary disorder, or death of any person on site
 - 3. Perform or supervise demarcated area set-up
 - 4. Enforce the requirements of the Site Specific Health and Safety Plan (HASP)
 - 5. Control entry and exit to the demarcated area
 - 6. Supervise all air monitoring
 - 7. Ensure that employees working within the demarcated area are properly wearing and using protective clothing and respirators, as required by applicable regulations and this Work Plan
 - 8. Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in this Work Plan
 - 9. Ensure that engineering controls are functioning properly
 - 10. Perform safety recordkeeping
- E. Site Workers: Site workers have/will:
 - 1. Received PCB Awareness training
 - 2. Read and follow this Work Plan
 - 3. Check all personal safety equipment to ensure it is in good working condition

4. Immediately report any accidents, illness, spills, or unsafe conditions to the Designated On-Site Safety Supervisor

1.04 GENERAL PCB WORK PROCEDURES

- A. All of the work will also be in accordance with University of Washington's policies:
 1. Fall Protection
 2. Lock-Out / Tag-Out
 3. Confined Space
 4. Respiratory Protection
 5. Personal Protective Equipment
- B. No PCB work is authorized to begin until approved on the maintenance work order.
- C. The procedures outlined in this section must be used with the Specific PCB Work Procedures prepared for each site only by authorized personnel. Authorized personnel are defined as workers who (1) have completed formal training required for the type of work, (2) are participants in their employer's medical monitoring program, (3) possess a suitable respirator for which they are currently fit-tested, and (4) are under the supervision of a Competent Person.
- D. General PCB work procedures include:
 1. Training requirements
 2. Tools, Equipment, and Supplies
 3. Work Area Preparation
 4. Personal Protection
 5. Air Monitoring
 6. Disposal

1.05 TOOLS, EQUIPMENT, AND SUPPLIES

- A. Collect and assemble all tools, equipment, and materials necessary to perform the work. Check condition and operation to see that all function properly. If maintenance tools and equipment cannot be decontaminated, they will be reserved for use on PCB projects or disposed of. Common tools and equipment required for most PCB-related work include:
- B. Maintenance Tools and Equipment
 1. utility knife or razor knife
 2. scraping tools, putty knife
 3. bristle brushes
 4. scrub pads
 5. construction barrier tape
 6. ladders, scaffolding
 7. lockout tags
 8. extension cords, adapters, and GFCIs (Note: a ground fault circuit interrupter must be used on any electrical equipment or tool where water may be in use or present in the work area)
 9. temporary work lights
- C. Personal Protective Equipment
 1. respirator: half-face, dual-cartridge with P100 filters
 2. disposable wet wipes
 3. disposable coveralls, foot wear, head wear, rubber gloves
 4. eye protection

D. Removal Equipment and Materials

1. 6-mil thick polyethylene (poly) sheeting
2. duct tape
3. spray adhesive
4. warning signs and barrier tape
5. surfactant wetting agent (for amended water)
6. disposable towels/cloths or wet wipes
7. bucket(s)
8. source/supply of fresh water
9. degreaser (such as Simple Green or LPS Orange Degreaser)
10. TSP Heavy Duty Cleanser
11. garden sprayer or hand sprayer
12. lockdown and bridging encapsulants
13. wet/dry HEPA vacuum with hose and attachments
14. disposal containers

E. Example Encapsulation Products

1. Silicone caulking
2. Bridging encapsulant
3. Foil tape

1.06 PROCEDURES FOR WORK AREA PREPARATION AND PERSONAL AND EQUIPMENT CLEAN-UP/DECONTAMINATION

A. The following checklists provide procedures for work area preparation and cleanup tasks.

1. Work Area Preparation and Protection

- a) Establish the demarcated work area using construction hazard warning tape as described.
- b) Place drop cloths in the work area where PCB-containing materials will be disturbed or impacted. Use 6-mil poly sheeting duct taped to the floor.
- c) Ensure that wash facilities or supplies (e.g. sink with soap and water or baby wipes) are available at the site for employee decontamination.
- d) Ensure that the appropriate personal protective equipment (PPE) is available.
- e) Ensure that waste containers are available, intact, and appropriately labeled.

B. Cleaning up PCB-Containing Dust and Debris

- a) Remove all drop cloths and collection material from the demarcated area taking care to contain any debris. Prevent runoff from entering drains.
- b) Use a HEPA vacuum to clean up any PCB-containing debris not contained by the drop cloths.
- c) All contaminated protective clothing should be discarded as PCB-contaminated waste.

C. Worker Protection

1. Establishing the Demarcated Work Area

- a) Demarcate the work area with red or yellow construction hazard warning tape during the exposure assessment phase of the project. The demarcated area will be established in areas where the potential for exposure to PCBs is at or above the Permissible Exposure Limit (PEL). The demarcation area will be established a minimum of ten (10) feet outside of the perimeter of tasks covered by this Work Plan. The demarcated area will be of greater size if deemed necessary by the On-Site Safety Supervisor due to specific environmental, geological, or site configuration circumstances.
- b) If at any time during the project the PEL is exceeded, signs will be posted stating:

**WARNING
PCB WORK AREA
POISON
RESPIRATORY PROTECTION REQUIRED
NO SMOKING OR EATING**

2. Access to Demarcated Area
 - a) During the work, no employee will be allowed to enter the demarcated area without complying with the provisions of Worker Protection.
 - b) While within the demarcated area all eating, drinking, smoking, chewing gum or tobacco, and applying of cosmetics is strictly prohibited.
3. Personal Protective Equipment
 - a) Until the exposure assessment determines worker exposure levels are below the 8-hour TWA PEL of 0.5 mg/m³, appropriate personal protective clothing and equipment is required. This includes, but not be limited to:
 - 1) Coveralls or similar chemically resistant full-body work clothing
 - 2) Nitrile gloves or leather gloves while using power tools
 - 3) Hard hat
 - 4) Shoes or disposable shoe coverlets
 - 5) Respiratory protection
 - b) Refer to Table 1 in this document to determine the appropriate respiratory protection for each work task. Minimum respiratory protection for manual removal will consist of a tight-fitting half-face, negative pressure respirator equipped with high efficiency particulate air (HEPA) filters. All respiratory fit testing and respiratory protection training will be performed in accordance with WAC 296-842, Respirators.

Table 1. Summary of Personal Protective Equipment by Task

| TASK | PERSONAL PROTECTIVE EQUIPMENT | MINIMUM RESPIRATOR |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------|
| Using tools to manually remove PCB-containing caulking or glazing compound. | Coveralls, eye protection, nitrile gloves, shoes or shoe covers | Tight-fitting half-face air-purifying respirator with HEPA filters. |
| Cleanup of PCB-containing dust and debris | Coveralls, eye protection, nitrile gloves, shoes or shoe covers | Tight-fitting half-face air-purifying respirator with HEPA filters. |
| Using tools to mechanically remove PCB-containing caulking or glazing compound. | Coveralls, eye protection, nitrile gloves, shoes or shoe covers | Tight-fitting full-face air-purifying respirator with HEPA filters. |

4. Decontamination
 - a) All contaminated protective clothing will be discarded as regulated waste. Workers will be required to wash their hands and face before leaving the work area and eating, drinking, smoking, or applying cosmetics.

1.07 REMOVAL METHODS

- A. The removal methods for PCB-containing window caulking or glazing compound include the use of manual and mechanical methods. Manual methods include the use of tools and equipment that limit the generation of dust. Such tools include utility knife, hammer and chisel, ripping chisel, and putty knife. Mechanical methods include the use of tools and equipment that generate dust and may also cause the PCB material to heat up and volatilize PCBs. If using utility knife, chisels, or other non-mechanical device and the caulking does not readily reduce to powder or dust, a containment is not required. If using mechanical methods such as disk grinding (or the condition of the material is very poor), a containment or tools equipped with HEPA filters is required.
1. Each window configuration may require modifications to the work area preparation procedures (e.g., area to be covered with poly). The work area preparation should protect adjacent surfaces from contamination during the removal and should be documented in the daily inspection report.
- B. The following procedures detail the steps for removal and encapsulation of PCB containing window caulking or glazing compound
1. Manual Removal Outdoors
 2. Manual Removal Indoors
 3. Mechanical Removal Outdoors
 4. Mechanical Removal Indoors
- C. Manual Removal of PCB-containing Window Caulking or Glazing Compound - Outdoors
1. These procedures will be followed when re-glazing or re-caulking windows with PCB-containing caulking or glazing compound. These procedures assume the work will be done with manual methods using tools such as utility knife, hammer and chisel, ripping chisel, putty knife, or other non-mechanical method.
 - a) Seal the interior of the window with two layers of 6-mil poly.
 - b) Place 6-mil plastic sheeting in the area of work. Extend the plastic ten feet in all directions if possible. Secure the poly to the building with duct tape or masonry tape.
 - c) Place all tools and equipment into the work area.
 - d) Demarcate the area with caution/warning tape.
 - e) Install a visual barrier using poly.
 - f) Don PPE including disposable suits, respiratory protection, and gloves.
 - g) Remove metal strips if present.
 - h) Adequately wet caulking or glazing compound.
 - i) HEPA vacuum the exposed areas.
 - j) Use a utility knife (or other manual tool) to cut material out of the joint or from the window pane.
 - k) Remove accessible residual caulking or glazing compound with stiff brush or scrub pad as appropriate.
 - l) Put all debris into disposal container.
 - m) HEPA vacuum and wet wipe areas where caulking or glazing compound was removed.
 - n) Perform detailed cleaning listed in Item G below.
 - o) Conduct a visual inspection of the work area to document that surfaces are free from dust and debris. The visual inspection shall be in general accordance with ASTM Standard for Visual Inspections ASTM 1368-11. The visual inspection will be conducted by the contractor performing the work and the Owner's Representative and will be documented on the form at the end of this work plan.
 - p) Apply a bridging encapsulant to the exposure edges of remaining non-source material. Caution should be used to prevent the encapsulant from getting onto the glass or adjacent materials. Bridging encapsulant will be allowed to dry prior to installation of new caulking or glazing compound by UW Shops.
 - q) Use wet cloths and HEPA vacuum to clean all equipment drop sheet and tools used.

- r) Remove the interior poly and inspect for any dust or debris. HEPA vacuum and wet wipe the window frame, window sill, and window well.
- s) Removed material will be disposed of by Environmental Programs.

D. Manual Removal of PCB-containing Window Caulking or Glazing Compound - Indoors

1. These procedures will be followed when removing PCB-containing caulking or glazing compound indoors. These procedures assume the work will be done with manual methods using tools such as utility knife, hammer and chisel, ripping chisel, putty knife, or other non-mechanical method.
 - a) Shut down or seal HVAC systems in the work area.
 - b) Place 6-mil plastic sheeting in the area of work. See site specific poly requirements later in the document. Secure the poly to the building with duct tape or masonry tape. Use tape that will not damage the remaining surfaces. This may require multiple types of tape.
 - c) Place all tools and equipment into the work area.
 - d) Demarcate the area with caution/warning tape.
 - e) Don PPE including disposable suits, respiratory protection, and gloves.
 - f) Remove metal strips if present.
 - g) Adequately wet caulking or glazing compound.
 - h) HEPA vacuum the exposed areas.
 - i) Use a utility knife (or other manual tool) to cut material out of the joint or from the window pane.
 - j) Remove accessible residual caulking or glazing compound with stiff brush or scrub pad as appropriate.
 - k) Put all debris into disposal container.
 - l) HEPA vacuum and wet wipe areas where caulking or glazing compound was removed.
 - m) Perform detailed cleaning listed in Item G below.
 - n) Conduct a visual inspection of the work area to document that surfaces are free from dust and debris. The visual inspection shall be in general accordance with ASTM Standard for Visual Inspections ASTM 1368-11. The visual inspection will be conducted by the contractor performing the work and the Owner's Representative and will be documented on the form at the end of the work plan.
 - o) If appropriate, apply a bridging encapsulant to the exposure edges of remaining non-source material. Caution should be used to prevent the encapsulant from getting onto the glass or adjacent materials. Bridging encapsulant will be allowed to dry prior to installation of new caulking or glazing compound by UW Shops.
 - p) Use wet cloths and HEPA vacuum to clean all equipment drop sheet and tools used.
 - q) Removed material will be disposed of by Environmental Programs as PCB-contaminated waste.

E. Mechanical Removal of PCB-containing Window Caulking or Glazing Compound - Outdoors

1. These procedures will be followed when removing PCB-containing caulking or glazing compound with mechanical tools outdoors. These procedures assume the work will be done with mechanical methods using tools such as oscillating saws, needle guns, or wire bristle grinding wheel. When using mechanical methods such as disk grinding, a containment or tools equipped with HEPA filters is required.
 - a) Seal the interior of the window with two layers of 6-mil poly.
 - b) Place 6-mil plastic sheeting in the area of work. Extend the plastic ten feet in all directions if possible. Secure the poly to the building with duct tape or masonry tape.
 - c) Install a two-chamber mini-enclosure around the window.
 - d) Place a small negative air machine equipped with HEPA filtration or HEPA vacuum to achieve negative pressure.
 - e) Place all tools and equipment into the work area.
 - f) Demarcate the area with caution/warning tape.
 - g) Don PPE including disposable suits, respiratory protection, and gloves.
 - h) Adequately wet caulking or glazing compound.

- i) Use mechanical tools to cut material out of the joint or from the window pane.
- j) Remove accessible residual caulking or glazing compound.
- k) Put all debris into disposal container.
- l) HEPA vacuum and wet wipe areas where caulking or glazing compound was removed.
- m) Perform detailed cleaning listed in Item G below.
- n) Conduct a visual inspection of the work area to document that surfaces are free from dust and debris. The visual inspection shall be in general accordance with ASTM Standard for Visual Inspections ASTM 1368-11. The visual inspection will be conducted by the contractor performing the work and the Owner's Representative and will be documented on the form at the end of this work plan.
- o) Apply a bridging encapsulant to the exposure edges of remaining non-source material. Caution should be used to prevent the encapsulant from getting onto the glass or adjacent materials. Bridging encapsulant will be allowed to dry prior to installation of new caulking or glazing compound by UW Shops.
- p) Air sampling or wipe sampling will not be performed for outdoor work.
- q) Use wet cloths and HEPA vacuum to clean all equipment drop sheet and tools used.
- r) Remove the interior poly and inspect for any dust or debris. HEPA vacuum and wet wipe the window frame, window sill, and window well.
- s) Removed material will be disposed of by Environmental Programs as PCB-contaminated waste.

F. Mechanical Removal of PCB-containing Window Caulking or Glazing Compound - Indoors

1. These procedures will be followed when removing PCB-containing caulking or glazing compound with mechanical tools indoors. These procedures assume the work will be done with mechanical methods using tools such as oscillating saws, needle guns, or wire bristle grinding wheel. When using mechanical methods such as disk grinding, a containment or tools equipped with HEPA filters will be used.
 - a) Seal the exterior of the window with two layers of 6-mil poly.
 - b) Place 6-mil plastic sheeting in the area of work. Extend the plastic six feet in all directions, if feasible. Secure the poly to the building with duct tape or masonry tape. Use tape that will not damage the remaining surfaces this may require multiple types of tape.
 - c) Install a two-chamber mini-enclosure around the window.
 - d) Place a small negative air machine equipped with HEPA filtration or HEPA vacuum to achieve negative pressure.
 - e) Place all tools and equipment into the work area.
 - f) Demarcate the area with caution/warning tape.
 - g) Don PPE including disposable suits, respiratory protection, and gloves.
 - h) Adequately wet caulking or glazing compound.
 - i) Use mechanical tools to cut material out of the joint or from the window pane.
 - j) Remove accessible residual caulking or glazing compound.
 - k) Put all debris into disposal container.
 - l) HEPA vacuum and wet wipe areas where caulking or glazing compound was removed.
 - m) Perform detailed cleaning listed in Item G below.
 - n) Conduct a visual inspection of the work area to document that surfaces are free from dust and debris. The visual inspection shall be in general accordance with ASTM Standard for Visual Inspections ASTM 1368-11. The visual inspection will be conducted by the contractor performing the work and the Owner's Representative and will be documented on the form at the end of this work plan.
 - o) Apply a bridging encapsulant to the exposure edges of remaining non-source material. Caution should be used to prevent the encapsulant from getting onto the glass or adjacent materials. Bridging encapsulant will be allowed to dry prior to installation of new caulking or glazing compound by UW Shops.
 - p) Air sampling or wipe sampling may be performed for indoor work. Refer to 1.08 for sampling procedures.

- q) Use wet cloths and HEPA vacuum to clean all equipment drop sheet and tools used.
- r) Removed material will be disposed of by Environmental Programs as PCB-contaminated waste.

G. Final Clean-up

1. These procedures will be used following the removal of PCB-containing caulking or glazing compounds using all methods listed above.
2. After the removal of material, HEPA vacuum all surfaces (vertical and horizontal) where the material was removed and five feet around. Pay close attention to the window wells and sills.
3. After HEPA vacuuming, wipe the window surfaces with a clean cloth using a soap and water solution (TSP may be used). Be very methodical about the cloth, folding it often to get a clean surface. Also, change the cloth often to prevent cross-contamination. There should be a bucket of soap and water and a separate rinse water bucket.
4. Completion of the wet wiping will be achieved when a clean rag can be wiped over the surfaces and no visible dust or dirt is apparent on the cloth. Once this is achieved, a wipe down will be performed using a spray-bottle with an acceptable degreaser (such as Simple Green) and clean cloth. Final wipe down using TSP or other heavy duty cleanser.

1.08 POST REMOVAL SAMPLING – MECHANICAL METHODS

- A. For work being performed using mechanical methods or conditions not represented by the Pilot Study, air or wipe sampling may be performed. Since mechanical methods may generate dust, air or wipe sampling may be performed. Sampling may be performed following the completion of the removal and encapsulation. The UW may choose to conduct post-removal sampling and will use the following factors to decide if sampling and what type of sampling is going to be performed:
 1. Levels of PCBs in the removed material
 2. Condition of the material
 3. Nature of occupancy (e.g., child occupied, food service)
 4. Potential for contact
- B. After successful visual inspection and encapsulation, post removal sampling may be performed. It is important to allow for the encapsulation to adequately dry prior to sampling.
- C. Based on the size and nature of the work (typically one to two window repairs), one pre-removal and one-post removal air sample will be collected following mechanical removal of PCB material. The air sampling will be performed following removal and installation of the new caulking but prior to re-occupancy.
- D. Based on the size and nature of the work (typically one to two window repairs), one pre-removal and one-post removal wipe sample will be collected from each window following mechanical removal of PCB material. The wipe sampling will be performed on non-porous surface such as the window sill. Pre and post removal samples will be collected from the same locations. Sample locations will be temporarily marker with blue masking tape.
- E. Acceptable post removal air monitoring results will be less than pre-removal levels or use EPA school criteria. Acceptable post removal wipe sampling will be 10 micrograms/100cm² or pre-removal levels.

1.09 WASTE MANAGEMENT

- A. PCB waste will be removed and containerized according to the work plan. Full drums will be managed by Environmental Programs for disposal by the Owner.

1.10 RECORDKEEPING

- A. The documentation for each removal will include the following:
 1. Daily Inspection Report (DIR) which includes who performed the work, engineering controls used, and removal procedures, visual inspection and clearance form,
 2. Shipping papers and disposal records
 3. any post-removal wipe or air sampling
- B. Records will be maintained by the UW Regulated Materials Management Office and UW EH&S.

Appendix A Visual Inspection Form

CERTIFICATE OF COMPLETION

CONTRACTOR CERTIFICATION OF VISUAL INSPECTION

In accordance with the Work Plan, the Contractor's supervisor/competent person hereby certifies that he/she has visually inspected the work area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris, or loose residue.

Circle the one of the following and provide comments:

Residual PCB-containing material remains in the work area:

Comment:

No residual PCB-containing material remains in the work area:

Identity of Work Area: _____

by: (Signature of Supervisor/Competent Person) _____ Date _____

(Print Name/Title) _____ Certificate # _____ Expiration Date _____

OWNER'S CERTIFICATION OF VISUAL INSPECTION

In accordance with the Work Plan, the Owner hereby certify that they have visually inspected the work area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and have found no dust, debris, or loose residue.

Identity of Work Area: _____

by: (Signature) _____ Date _____ Pass / Fail (see punchlist)

(Print Name/Title) _____ Certificate # & Expiration Date _____

ADDITIONAL CLEARANCE INFORMATION

Refer to Work Order for additional clearance requirements for the Work.

If air monitoring is performed, complete the following:

The Owner or Contractor (circle one) hereby certifies that he/she has conducted air clearance sampling in accordance with EPA methods and this sampling is valid to the best of his/her knowledge and belief. Chain of custody and final laboratory results must be attached.

Identity of Work Area _____ Air Sample Identification #: _____

Flow Rate: _____ Volume _____

Air Sampling Results: _____ Analyzed By: _____ Time Sample Taken: _____

If wipe sampling is performed, complete the following:

The Owner or Contractor (circle one) hereby certifies that he/she has conducted wipe sampling in accordance with EPA Methods and this sampling is valid to the best of his/her knowledge and belief. Chain of custody and final laboratory results must be attached.

Identity of Work Area _____ Sample Identification #: _____

Wipe Result: _____

Analyzed By: _____ Time Sample Taken: _____

OWNER APPROVAL FOR RE-OCCUPANCY

by: (Signature) _____ Date _____