SECTION 02 84 16: POLYCHLORINATED BIPHENYL (PCB) ABATEMENT: LIGHT BALLAST REMOVAL AND DISPOSAL, MERCURY-CONTAINING LAMP REMOVAL AND DISPOSAL, AND PCB SPILL CLEANUP

PART 1 GENERAL

1.1. SCOPE

A. The contractor shall provide all labor, materials, equipment, services, permits, and insurance required to complete removal and proper disposal of PCB-containing light ballasts, PCB-contaminated light fixtures, and mercury-containing lamps, and cleanup of PCB spills.

B. Light fixtures throughout the buildings contain both PCB and NO PCB ballasts and mercury-containing fluorescent light tubes. The contractor is to inspect all light fixtures for ballast type and assume all ballasts contain PCBs if not labeled a NO PCB ballast. The methods for inspection, PCB ballast removal, and disposal and PCB cleanup are described in this Specification.

C. This section of the Specifications does not address electrical safety issues such as lockout-tagout. All provisions of OSHA 29 CFR 1910.147 and Subpart S shall be followed during the course of this project.

The scope of work includes inspection of all light fixtures throughout all floors of the buildings and removal of all items listed in the following table.

PCB- and Mercury-Containing Ballasts and Light Tubes to be Removed

Material	Quantity	Comment
PCB Light Ballasts	20 each	Found in Building ‘F’
Mercury Vapor Tube Debris	1,200 square feet	Found in Building ‘F’
Mercury Vapor Light Tubes	320 each	Throughout building Buildings ‘B’ and ‘F’
Mercury-Containing Switch	1 each	Building ‘B’

1.2. DEFINITIONS

A. Authorized Visitor: The owner or designated representative, or a representative of any regulatory or other agency having jurisdiction over the project, and having required training, medical approval, fit test, etc.

B. Controlled Area: Area that only qualified and properly protected workers or authorized visitors have access.

C. Decontamination Area (Decon): Enclosed area adjacent and connected to controlled/regulated work area consisting of an equipment room and clean room used to decontaminate workers, materials, and equipment. Where PCB removal is done in conjunction with asbestos or lead abatement, the Decon may be used for this purpose.

D. Destination Facility: A facility that treats, disposes of, or recycles universal waste. Facilities treating universal waste as allowed under 40 CFR 273.13, 273.33 or OAR 340-112-030(5) are not considered to be destination facilities. A facility, at which universal waste is only accumulated, is not a destination facility for purposes of managing universal waste.

E. Disposal: Procedures necessary to transport and deposit the PCB materials in an approved waste disposal site in compliance with EPA and other applicable regulations. Disposal Site shall be an approved landfill, incinerator or recycler for PCB-containing waste.

F. Electric Lamp: The bulb or tube portion of a lighting device specifically designed to produce radiant energy, most often in the ultraviolet (UV), visible, and infra-red (IR) regions of the electromagnetic spectrum. Examples of common electric lamps include, but are not limited to, incandescent, fluorescent, high intensity discharge, and neon lamps.

G. Environmental Consultant: Environmental consultant specializing in hazardous materials abatement—PBS Engineering and Environmental Inc. (PBS)—or any subcontractor designated by PBS.

H. Incineration: The destruction of PCBs by an EPA-approved facility. The facility must be a TSCA-permitted incinerator and a licensed Transportation Storage and Disposal Facility (TSDF). All operating permits must be current and valid.

I. SDS: Safety Data Sheet supplied by manufacturer providing information on a product listed in OSHA 29 CFR 1910.1200(g)(2).

J. Mercury Containing Lamp: An electric lamp in which mercury is purposely introduced by the manufacturer to facilitate the operation of the lamp.

K. Off-site Collection Site: A site that receives and accumulates universal waste from off site.

L. Polychlorinated Biphenyls (PCBs): A class of chlorinated hydrocarbon compounds containing a variable number of chlorine atoms. Commercially available products contain mixtures of as many as 40 to 70 PCB compounds (isomers). PCBs range from oily liquids to white, crystalline solids to hard, non-crystalline resins or waxy solids.

M. PCB Light Ballast: Any fluorescent light ballast that is not labeled “NO PCB.”

N. PCB Bulk Product Waste: For the purpose of disposal, all nonleaking fluorescent light ballasts that are not labeled "NO PCB" are to be considered PCB bulk product waste and must be disposed of in accordance with 40 CFR 761.62 (a) or (c).

O. PCB Remediation Waste: Waste that has come in contact with PCBs that have either leaked or spilled including leaking PCB light ballasts, PCB cleanup materials, painted metal light fixtures with PCB spill or leak residues, and all other building materials with PCB spill or leak residues.

P. Self-Implementing On-site Cleanup and Disposal Plan: A cleanup plan developed by the owner that is submitted to the EPA for approval. The plan includes documentation of spills and leaks, and describes cleanup procedures, testing, disposal, and recordkeeping.

Q. Universal Waste: Any waste that is a universal waste listed in 40 CFR 273.1 and OAR 340-113-010 and subject to the universal waste requirements of 40 CFR Part 273 and OAR 340 Division 113.

R. Waste Shipment Records: Form similar to uniform hazardous waste manifest, or an EPA approved state form.

1.3. DOCUMENTS INCORPORATED BY REFERENCE

A. The current issue of each document shall govern. Where conflict among requirements or with these Specifications exists, the most stringent requirements shall apply.

1. US Environmental Protection Agency Toxic Substance Control Act, TSCA, (Code of Federal Regulations Title 40, Part 761)
2. US Environmental Protection Agency Office of Toxic Substances Guidance Document, Summary of PCB Regulations, EPA Document Number 910-S-94-002.
3. US Department of Labor, Occupational Safety and Health Administration (OSHA)
4. RCRA, Resource Conservation and Recovery Act, 40 CFR Part 2761, Subpart D., 40 CFR 273
5. Oregon Administrative Rules: Hazardous Waste Regulations, OAR 340-100 through 340-104; Universal Waste Management Regulations, OAR 340-113

1.4. SUBMITTALS AND NOTICES

A. Contractors shall submit the following information prior to beginning work:

6. NOTIFICATION. Submit copy of any required notifications including transportation, disposal, or incineration.
7. WORK PLAN. Submit a written work plan satisfactory to the owner and environmental consultant describing the schedule for PCB abatement and mercury-containing lamp abatement, cleanup methods and work practices, worker training and worker protection. The work plan shall also include decontamination procedures and plans for a decontamination area if applicable. Also include emergency control and cleanup procedures and emergency phone number(s).
8. DISPOSAL PLAN. Submit written proof that all required permits and arrangements for transport and disposal of PCB containing or contaminated materials, supplies, and waste at a site approved by the EPA have been obtained. Submit written proof that all required arrangements for transport and disposal by recycling of mercury-containing lamps to a destination facility have been obtained.

B. Prior to making final application for payment the contractor shall submit waste shipment records completely filled out and signed by all handlers, and written proof from the designated waste disposal site that all wastes have been accepted and disposed of per EPA regulations.

C. Refer to EPA, OSHA, and other standards referenced herein for further information and regulatory requirements not included above.

1.5. TRAINING

A. All persons that perform work on fluorescent light fixtures must have a minimum of two hours of PCB and mercury awareness level training. This training shall include, but not be limited to, PCB and mercury health effects, identification of PCB spills and leaks, laws and regulations, record keeping, signage and labeling, and storage regulations.

B. All persons that perform the cleanup of PCBs and/or broken fluorescent lamp bulbs shall, in addition to the awareness training described above, have a minimum of two hours of hands-on

training that includes PCB cleanup practices, waste accumulation, decon construction, safe handling of cleaning solutions, and chemicals and waste storage container management (drums).

1.6. PERSONNEL PROTECTION

A. Personnel protective equipment for PCB ballast removal and fixture inspection.

9. Worker personal protective equipment (PPE) shall consist of PCB-resistant clothing including gloves and eye protection. Hearing, head, and fall protection as required by job site conditions.

10. Half-face mask, negative-pressure respirator with disposable chemical vapor cartridge. Protection factor: 10. Additional HEPA filter cartridges for particulates including asbestos and lead shall be available for use in areas where these materials are present.

11. Additional respiratory protection shall be as required by governing regulations.

B. Personnel protective equipment is required for mercury-containing lamp removal. Caution should be taken by the contractor to minimize lamp breakage as escaping vapors from a broken lamp may expose workers to unsafe levels of mercury. Increased personal protective equipment is not required for handling unbroken lamps. If breakage occurs, the contractor shall not attempt to clean up the resulting debris without wearing the following personal protective equipment:

12. Chemical resistant gloves and clothing (compatible with mercury) to minimize dermal contact with debris, and eye protection.

13. Chemical cartridge or canister respirator providing protection against mercury vapor and equipped with an end of service life indicator.

14. Additional respiratory protection shall be as required by governing regulations.

C. Personnel protective equipment for PCB spill cleanup.

15. Worker personal protective equipment shall consist of PCB-resistant clothing including gloves and eye protection. Hearing, head, and fall protection as required by job site conditions.

16. Half-face mask, negative-pressure respirator with disposable chemical vapor cartridge. Protection factor: 10. Additional HEPA filter cartridges for particulates including asbestos and lead shall be available for use in areas where these materials are present.

17. Additional respiratory protection shall be as required by governing regulations.

1.7. SAFETY

A. With regard to the work of this contract, the safety of the contractor's employees, the owner's employees, and the public is the sole responsibility of the contractor.

1.8. LIABILITY

A. The contractor is an independent contractor and not an employee of the owner or the environmental consultant. The owner and the environmental consultant shall have no liability to the contractor or any third persons for the contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the owner or the environmental consultant to discover a violation by the contractor of any of the provisions of these Specifications, or to require the contractor to

fully perform and follow any of them, such failure shall not constitute a waiver of any of the requirements of these Specifications, which shall remain fully binding upon the contractor.

1.9. QUALITY ASSURANCE

A. The environmental consultant shall perform periodic inspections to observe work, handling, and packaging procedures.

B. The environmental consultant shall notify the contractor in writing to stop work if the environmental consultant determines that work practices are in violation of the Specifications or is endangering workers and occupants of the building. The contractor shall continue work when conditions and actions are corrected and when written authorization is received from the environmental consultant.

1.10. LIMITS

A. The contractor shall limit PCB levels as follows:

18. Airborne concentrations below 1 microgram per cubic meter ($\mu g/m^3$) or pre-abatement background levels, where available.

19. Final, post cleanup concentrations of PCBs on nonporous surfaces and intact painted metal surfaces shall not exceed 10 µg/100 microgram per square centimeter (cm^2) on building surfaces as measured using the standard wipe test.

B. The contractor shall limit mercury levels as follows:

20. Airborne concentration below 0.05 milligram per cubic meter (mg/m^3) or pre-abatement background levels, where available.

PART 2 PRODUCTS

2.1. THE FOLLOWING APPLIES TO PCB ABATEMENT

A. Plastic Sheet: Plastic sheeting shall be flame retardant polyethylene material. It shall not dissolve on contact with PCB compounds or any chemicals used by the contractor for abatement/decontamination. The minimum thickness shall be 6 mil.

B. Storage Containers: Storage containers shall be suitable to receive and retain any PCB containing or contaminated materials until disposal or incineration at an approved site, and shall comply with container specifications set forth in 49 CFR 178.80, 178.82, 178.102 or 178.116. Containers shall be labeled with waterproof print and permanent adhesive in accordance with OAR, OSHA, DOT and EPA regulations.

C. Warning labels on all disposal containers/drums shall include the following information:

DANGER
CONTAINS POLYCHLORINATED BIPHENYLS
CANCER HAZARD

D. Warning Signs: Unless other signage or security access is provided, warning signs shall be provided and displayed at each regulated area to warn of the presence of PCBs. If PCB

containing wastes are to be stored on site, all provisions of 40 CFR 761.65 shall be followed. These rules include, but are not limited to, establishing a designated and secure storage area and proper signage and documentation.

2.2. THE FOLLOWING APPLIES TO MERCURY-CONTAINING LAMP ABATEMENT

A. Storage Containers: A container for lamps must be closed, structurally sound, compatible with the contents of the lamp, and lack evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions.

B. Labeling/marking for mercury-containing lamps. In addition to the requirements in 40 CFR 273.14 and 40 CFR 273.34, universal waste mercury containing lamps (i.e., each lamp) or a container in which the lamps are contained must be labeled or marked clearly with any one of the following phrases:

UNIVERSAL WASTE: MERCURY-CONTAINING LAMP(S), or
WASTE MERCURY CONTAINING LAMP(S), or
USED MERCURY CONTAINING LAMP(S).

PART 3 EXECUTION

3.1. WORK AREA PREPARATION

A. Where the work area containment requirements are determined by abatement of other hazardous materials, the contractor may not need to provide any additional isolation procedures.

B. PCB Cleanup: Where no other hazardous materials abatement is performed in conjunction with the PCB cleanup, prepare the work area as follows:

1. The contractor shall isolate the work area from unauthorized, untrained, unqualified, and unprotected persons. At minimum, warning signage indicating the presence of PCBs and danger tape shall be used. Whenever possible, doors should be closed to further reduce unauthorized access.
2. An approved disposable floor covering (i.e., plastic sheeting) shall be kept beneath the work and in areas of dismantling, consolidation, or packaging.
3. An approved worker decontamination area.

C. Mercury-Containing Lamp Abatement: If no lamps are broken, then no special precautions are necessary other than items listed below:

4. Provide mercury cleanup equipment to immediately transfer any material recovered from a spill or leak to a container that meets the requirements of 40 CFR 262.34.
5. Ensure that the area is well-ventilated and monitored in the event of breakage, to ensure compliance with applicable OSHA exposure levels for mercury.

D. Broken Mercury-Containing Lamp Cleanup: In the event that a lamp is broken, the following work area preparation steps shall be taken:

6. Secure the impacted area with barricades such as hazard tape, danger signs, etc.
7. Notify workers in affected area and notify owner and/or owner's environmental consultant.

3.2. REMOVAL OF MERCURY-CONTAINING LAMPS

A. The contractor shall isolate work area and perform work at times and in a manner that will not result in the release or discharge of mercury vapor or the exposure to employees or other building occupants.

B. The contractor shall carefully handle lamps and shall not break, drop, throw, or otherwise damage them.

C. Should lamp breakage occur, the contractor shall determine if resulting released material is hazardous waste and if so, the contractor shall manage it as a hazardous waste.

D. Lamps shall be transferred directly into a container, such as a lamp box, that is suitable for shipping to the disposal or recycling facility. Filled containers shall be handled and stored in a manner that protects lamps from breakage.

3.3. INSPECTION OF FLUORESCENT LIGHT FIXTURES

A. The contractor shall isolate work area and perform work at times and in a manner that will not result in the release or discharge of PCBs or the exposure to employees or other building occupants.

B. The contractor shall disassemble fluorescent light fixtures to the extent that the ballast and surrounding fixture surfaces can be visually inspected. If there is visual evidence or suspicion of a PCB leak or spill, the contractor shall secure the immediate area with barricades such as hazard tape, danger signs, etc., shall notify workers in the area, and shall notify the owner and/or the owner's environmental consultant.

3.4. REMOVAL OF NONLEAKING PCB LIGHT BALLASTS

A. The contractor shall isolate the work area and perform work at times and in a manner that will not result in the release or discharge of PCBs or the exposure to employees or other building occupants.

B. The contractor shall carefully handle light ballasts and shall not break, drop, throw, or otherwise damage the ballasts.

C. The contractor shall remove nonleaking ballasts from fixtures and place them directly into an awaiting container (55-gallon drum typical) that will be used to transport the ballasts to an approved disposal site. Ballasts should be stacked in the drum in an orderly fashion to maximize the capacity of the drum and to minimize the potential for damage to the ballasts. The container shall be labeled per 40 CFR 761.65. While filling the drum with ballasts, the void between ballasts shall be filled with a suitable absorbent material (kitty litter typical).

D. Filled containers shall be handled and stored in a manner that protects lamps from breakage.

E. Areas used for temporary storage of PCB ballasts shall be secured and demarcated as per 40 CFR 761.65.

3.5. CLEANUP OF PCB SPILLS FROM NONPOROUS AND PAINTED METAL SURFACES

A. The contractor shall isolate the work area and perform work at times and in a manner that will not result in the release or discharge of PCBs or mercury vapor or the exposure to employees or other building occupants.

B. The contractor shall record the location of all leaking PCB ballasts and all visible or suspected PCB leaks and spills on floor plans that clearly indicate the location of light fixtures, leaking and nonleaking ballasts, the room number, the direction north, and a list of all surfaces and materials that appear to have been impacted by the PCB leaks and spills and a description of the area that was impacted. If PCBs appear to have spilled or leaked onto a porous surface, the owner and/or the owner's environmental consultant shall be immediately notified.

C. PCBs on nonporous surfaces and intact painted metal surfaces shall be cleaned up to a concentration of 10 micrograms per 100 square centimeters (10 µg/100cm^2). Generation of liquid wastes during the cleanup of PCBs is not allowed.

D. When PCB cleanup is complete, the owner's environmental consultant will collect wipe samples from cleaned surfaces to verify if cleanup is complete. Samples will be collected from every surface that is cleaned. If sample analysis indicates PCB concentrations in excess of 10 µg/100cm^2, the contractor will reclean the fixture at no expense to the owner and shall pay lab fees associated with retesting the recleaned surface (assume $100 per sample).

E. All waste materials generated during the cleaning of PCBs shall be placed directly into an awaiting container (55-gallon drum typical) that will be used to transport the wastes to an approved disposal site. The container shall be labeled per 40 CFR 761.65.

F. Filled containers shall be handled and stored in a manner that prevents leakage and possible exposure to PCBs.

G. Areas used for the temporary storage of PCB cleanup related wastes shall be secured and demarcated as per 40 CFR 761.65.

3.6. DISPOSAL

A. The contractor shall determine current waste handling, transportation, and disposal regulations for each waste stream generated. The contractor must comply with these regulations and US Department of Transportation and EPA requirements.

B. Unless permitted by the owner, the contractor shall remove containers from the site within ten calendar days after collection for disposal or incineration at a site operated in accordance with the provisions of 40 CFR 761 (PCB waste) and OAR 340-113 and 40 CFR 273 (mercury-containing lamps handled as a universal waste). The disposal site shall be notified in advance of delivery to ensure immediate disposal.

END OF SECTION