DESIGN GUIDELINE 4.5
REGULATED AND HAZARDOUS MATERIALS

General

This section addresses the management and disposal of regulated and/ or hazardous materials that may be encountered in construction projects. University of Michigan (U-M) policies require proper management of regulated, hazardous and other construction waste to comply with local, state and federal regulations and to encourage environmental stewardship. Construction materials and waste included in this section are: asbestos containing materials (ACM), CFC & HCFC containing refrigerants, lead, mercury, PCBs, radioactive materials and miscellaneous regulated construction waste. A/Es should be aware that individual projects may encounter other materials requiring special handling that are not outlined in this section. The A/E shall work with the University Project Coordinator to identify a list of materials which are hazardous, regulated and/or require special handling and which are likely to be encountered during demolition and construction.

Related Sections

Design Guideline Technical Sections:
6.0 DG 230040 - Hydronic Systems and Specialties

U-M Master Specification:
7.0 MS 011400 - Work Restrictions
7.0 MS 028213 - Asbestos Remediation
7.0 MS 028214 - Asbestos Remediation – Floor Tile and Mastic
7.0 MS 028215 - Asbestos Remediation – Roofing Material
7.0 MS 028300 - Lead Remediation
7.0 MS 028333 - Lead Remediation – Renovation, Repair and Painting In Child-Occupied Facilities and Target Housing
7.0 MS 028110 - Regulated Construction Waste Remediation
7.0 MS 220719 - Mechanical Systems Insulation
7.0 MS 232116 - Hydronic Piping Specialties
7.0 MS 260500 - Common Work Results For Electrical

References

United States Department of Labor, Occupational Safety and Health Administration (OSHA), 29CFR Part 1926: Asbestos in Construction Standard

U-M Occupational Safety and Environmental Health (OSEH) "Asbestos Management Program."

U-M OSEH "Spill Prevention Control and Countermeasure Plan" and "Pollution Incident and Prevention Plan"
Section 2.6 "Best Management Practices for Lithium Bromide Systems."
Section 2.7 "Best Management Practices for Ethylene Glycol Systems."

U-M OSEH "Lead Management Program"

United States Department of Labor, Occupational Safety and Health Administration, 29CFR Part 1926.62 and State of Michigan Occupational Safety and Health Administration (MIOSHA) Rule 325.51991-51992: "Lead in Construction."

United States Environmental Protection Agency EPA 40 CFR 745 "Requirements for Lead-Based Paint Activities in Target Housing and Child-Occupied Facilities;" and "Requirements for Hazard Education Before Renovation of Target Housing;" and "Identification of Dangerous Levels of Lead."

Lead Abatement Act (Michigan Part 54A).

Lead Remediation Rules (MCDH Rule 325).

ASHRAE Standard 15 and Related Revisions: Safety Code for Mechanical Refrigeration.

ASHRAE Standard 34 and Related Revisions: Number Designation and Safety Classification of Refrigerants.

United States Environmental Protection Agency (US EPA) requirements of Section 808 (Prohibition of Venting and Regulation of CFC).

MI Public Act 451, Part 121: Liquid Industrial Waste.

Michigan Department of Environmental Quality (MDEQ), Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451.

Michigan Department of Environmental Quality (MDEQ), Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451).

Asbestos and Asbestos-Containing Materials (ACM):

Introduction

The current OSHA asbestos standard requires that products used in the workplace be labeled if they contain greater than 1% asbestos and are likely to result in exposures above the permissible exposure limits during reasonable foreseeable use, handling, storage, disposal, processing, or transportation. Material Safety Data Sheets may contain one of the following synonymous names:

Chemical Name: Magnesium Silicate
Mineral Names: Chrysotile, Amosite, Tremolite, Crocidolite, Anthophyllite, Actinolite
Common Names: serpentine, amphibole, fibrous grunerite

ACM in Renovation Projects

Many U-M buildings contain ACM, particularly those constructed before the early 1980's. Prior to renovation activities all buildings, ***including those built after the 1980's,*** must be surveyed for asbestos containing materials. Contact U-M OSEH well in advance of the project to coordinate a survey of building materials for asbestos. Some U-M buildings have already been surveyed for asbestos containing materials. U-M OSEH maintains an ACM database for all U-M buildings previously surveyed for asbestos. OSEH conducts additional tests where required to identify additional ACM note already identified in the database. At U-M, some ACM is labeled in the field, but in many cases, labeling is impractical. Labeling of ACM, if deemed necessary, is generally conducted by OSEH.

In general, U-M strives to remove ACM, as opportunities present themselves. At a minimum, projects that require some abatement are responsible for minimum required abatement. In some cases abatement may be expanded to address all ACM of a certain type in a certain area. Coordinate ACM abatement scope with U-M Project Coordinator and OSEH.

In many cases asbestos abatement projects are designed and conducted by the University, and the University contracts separately for asbestos abatement. Therefore the A/E involved with the design of a renovation project may not be required to include asbestos abatement specifications in the Bid Documents. However, A/Es must make the University Project Coordinator aware if they suspect that asbestos may be encountered due to project activity. In addition, the A/E should advise the Contractor on the construction documents that asbestos may be present in the area or adjacent areas of the renovation project, and to conduct their work accordingly.

Refer to U-M Master Specification Section 15240 regarding reinsulation of abated mechanical insulation.

ACM in New Construction

U-M does not permit the use of new ACM in construction projects. A/Es should be aware that asbestos-containing products may still be legally manufactured, imported and sold in the United States, although very limited quantities are probably produced. Legal products include but are not limited to floor tile, floor tile adhesive, sealants, plaster, and roofing materials. Because of the possibility of encountering ACM, prohibitory language should be added to specification sections covering materials which might contain asbestos.

In the event that a particular performance requirement is identified that can only be satisfied by the use of ACM, the A/E should contact OSEH through the University Project Coordinator and submit a written request for authorization. Approval for new ACM usage must be obtained prior to specification and installation. If approval is received, proper documentation will be coordinated with OSEH.

CFC & HCFC-Containing Refrigerants:

The University requires that all work related to refrigerant contained in chillers, cooling coils, air conditioners, and similar equipment, including related piping, be handled in strict accordance with the referenced standards. A/Es should advise contractors of these requirements. In addition, the University has tracking procedures in place for CFC and HCFC refrigerants. When new refrigeration equipment is installed, when old refrigeration equipment is removed, or when refrigerant is disposed of, include language in the Contract Documents directing the Contractor to inform the Owner's Plant Operations Air Conditioning Shop. Refer to U-M Master Specification Section 01140. Copies of the required form are available at:
http://www.plant.bf.umich.edu/utilities/operations-engineering/CFC_Form.pdf

Recovered refrigerant shall be handled through the U-M Plant Operations Air Conditioning Shop. Direct the Contractor to contact the Plant Operations Air Conditioning Shop to properly handle the recovered refrigerant. In most cases, U-M A/C Shop will remove refrigerant for reclamation.

Ethylene Glycol

Ethylene glycol systems are used on campus in some heating, ventilation and air-conditioning systems. Ethylene glycol is regulated by the State of Michigan as a Liquid Industrial Waste. Consequently, the Contractor's disposal methods are subject to the oversight of U-M OSEH. Where mechanical devices or systems containing ethylene glycol are indicated to be demolished, direct the Contractor to legally dispose of ethylene glycol. The Contractor shall contact U-M OSEH Environmental and Hazardous Materials Management Program (734-763-4568) in the event of an accidental spill of ethylene glycol.

Refer to U-M Design Guideline Technical Section 15515 and U-M Master Specification 15515 for design and installation requirements for glycol systems.

Lithium Bromide

Lithium bromide is used on campus in most absorption chillers. Lithium bromide within these systems is contained within the machinery and does not circulate throughout the building. Where absorption chillers are indicated to be demolished, contact the U-M Plant Operations Air Conditioning Shop to determine whether the recovered lithium bromide can be used in other machinery.

If it is determined that the lithium bromide cannot be used in other machinery and it is to be disposed of, it is subject to regulation by the State of Michigan as a Liquid Industrial Waste. Direct the Contractor to coordinate removal activities with UM OSEH's tracking program and to legally dispose of lithium bromide. The Contractor must contact U-M OSEH Environmental and Hazardous Materials Management Program (734-763-4568) in the event of an accidental spill of lithium bromide.

Lead

Lead may be a component of building materials in many campus buildings. Materials likely to contain lead include latex and oil based paints (especially paints manufactured before 1978), radiation shielding materials, plumbing joints, solder, pipe wrap, flashing and other materials used as soundproofing. Construction activities that may result in lead exposure include sanding, scraping, cutting, grinding, welding and demolition. The University Project Coordinator will arrange to have a lead survey completed early in the design process, through U-M OSEH.

Procedures for working with lead-based paint (LBP) and other lead-containing material (LCM) depend on the type of work being completed and the type of building in which the work is occurring. Of particular concern are construction projects that create lead disturbances in child-occupied facilities (child care centers and family housing). For projects in or affecting child-occupied facilities, A/Es should work with the University Project Coordinator and OSEH early in the design process to develop custom specifications addressing specific project conditions and additional state and federal regulations.

For other University buildings, Master Specification Section 13285 outlines the University policy and procedures that have been developed in conjunction with OSEH to meet all applicable local, state and federal regulations for non-child occupied facilities.

Use of LCM in New Construction

The University discourages the use of new LCM in construction projects. In the event that a particular performance requirement is identified that can only be satisfied by the use of LCM, the A/E should contact OSEH through the University Project Coordinator and submit a written request for authorization. If approval is received, proper documentation will be coordinated with OSEH.

Lubricant or Other Oils

Introduction and Policy

Oils are regulated by the State of Michigan as a Liquid Industrial Waste. Consequently, the Contractor's disposal methods are subject to the oversight of UM OSEH. Where mechanical devices that contain lubricant or other oils are indicated to be demolished, direct the Contractor to legally dispose of the oils. The Contractor must contact UM OSEH Environmental and Hazardous Materials Management Program (734-763-4568) in the event of an accidental spill.

Mercury

Mercury-containing articles and equipment likely to be encountered during construction include but are not limited to controls, thermometers, thermostats, switches, manometers and gauges. Fluorescent laps also contain mercury. See paragraph below regarding lamp recycling.

Mercury-containing articles and equipment are considered regulated construction waste and must be disposed of through the OSEH Environmental and Hazardous Materials Management Program. OSEH will package, pickup and dispose of properly staged Regulated Waste at no cost to the Contractor.

A/Es should direct the Contractor to handle mercury-containing articles and equipment with extreme care to prevent the release of elemental mercury. Mercury-containing articles and equipment must be properly packaged with adequate cushioning in only OSEH-provided containers. In the case of an accidental spill of elemental mercury, the affected area must be immediately evacuated, closed to traffic and OSEH or DPS contacted for clean-up.

PCBs

Bulk Product Waste

PCB (Polychlorinated Biphenyl) bulk product waste refers to waste derived from manufactured products containing PCBs in a non-liquid state. This includes applied dried paints, varnishes, waxes, or other similar coatings or sealants. The University Project Coordinator will arrange to have a PCB survey completed by UM OSEH early in the design process.

A/Es shall direct Contractors to dispose of PCB-containing waste in coordination with OSEH. There are no specific requirements for containerizing or segregating PCB bulk product waste, if the concentration of PCB's is less than 50 parts per million (ppm). It can be disposed with other construction debris in a municipal or non-municipal non-hazardous waste landfill licensed by the State of Michigan, Department of Environmental Quality. If the concentration of PCBs in the waste is greater than 50 ppm, it must be collected by UM OSEH for disposal. Coordination is required, since OSEH must notify the landfill, 15 days in advance, of the type of waste to be disposed. A PCB concentration less than 50 ppm does not require notification.

Liquid Waste (Older Electromagnetic Ballasts)

Older electromagnetic ballasts may contain liquid PCBs. A/Es shall advise the Contractor that the University requires recycling of all fluorescent lighting ballasts, along with tubular fluorescent, compact fluorescent and HID lamps as a part of the OSEH's Environmental Stewardship program. Master specification section 16010, "Basic Electrical Requirements" outlines proper packaging and pick-up requirements for fluorescent lamps and ballasts. Leaking electromagnetic ballasts shall be packaged separately from intact ballasts to avoid contamination. Contractor shall coordinate proper handling, packaging and decontamination of surrounding materials with OSEH for all leaking ballasts. Electronic ballasts do not contain PCB's and are to be packaged separately from electromagnetic ballasts.

Radioactive Materials

Common construction waste that may contain low levels of radioactivity includes but is not limited to smoke detectors and self luminescent exit signs.

Construction waste containing any level of radioactivity must be disposed of through the OSEH Environmental and Hazardous Materials Management Program. OSEH will package, pickup and dispose of properly staged Regulated Waste at no cost to the Contractor. A/Es should advise Contractors to handle and package self luminescent exit signs with extreme care. They contain fragile glass tubes filled with a radioactive gas, and care must be taken not to break the glass during demolition and recycling. Collect the frame of the exit sign as it may contain sign specific information. For radioactive smoke detectors, collect both the top and the bottom of the unit.

There are research laboratories on campus that use radioactive materials. When a lab that uses radioactive materials relocates or discontinues radioactive research, the lab will undergo a strict decommissioning process in coordination with OSEH Radiation Safety Services. If an A/E suspects that the radioactive materials may have been present in an area which will undergo renovation, immediately notify the University Project Coordinator, who will contact OSEH in order to schedule decommissioning. This process will be completed before a construction project is undertaken.

Regulated Construction Waste

The term "Regulated Waste" refers to building equipment or materials that will be demolished as part of a renovation or construction project, but cannot be disposed of as typical construction and demolition debris. Materials include but are not limited to the following:

- Batteries, including but not limited to lead-, nickel- and or mercury-containing batteries from exit signs, smoke detectors and backup power sources.
- Containers of paint and paint related materials, cleaners, pesticides, compressed gas cylinders and portable fuel cans.
- Fire extinguishers.

OSEH will package, pickup and dispose of properly staged Regulated Waste at no cost to the Contractor, provided that the waste has actually been removed from UM buildings. A/Es should instruct the Contractor to Contact OSEH Environmental and Hazardous Materials Management Program (734-763-4568) to schedule a pickup immediately after regulated waste has been staged. Incidental Regulated Waste that is not removed from UM buildings must be properly disposed of by the Contractor.

Suspect Contaminated Soil, Groundwater, or Unknown Material

During work activities, if suspect contaminated soil, groundwater, or other unknown material is encountered, the suspect material must be characterized to determine if special handling, or disposal protocol is required. Suspect contaminated soil may exhibit chemical or unusual odors, staining, unusual coloring, and/or contain man-made debris. Suspect contaminated groundwater may exhibit chemical or unusual odors, unusual coloring, and/or sheen.

A/Es shall direct the Contractor that if suspect contaminated soil, groundwater, or other unknown material is encountered, they shall immediately cease all excavation, dewatering, transport, or disturbance of the suspect material, and they shall contact the U-M Project Manager and U-M OSEH (763-6973) immediately. Direct the Contractor not to resume activities until given direction by the U-M Project Manager.

Bulk Chemical Storage (tanks and drums)

Secondary containment is required for all chemical or oil bulk storage (drums or tanks) according to the MDEQ, Michigan Part 5 Rules and the Ann Arbor Sanitary Sewer Ordinance.

Some options for secondary containment include building a berm (curb), using double wall tanks or using spill pallets. The University considers it preferable to construct a permanent berm rather than using spill pallets.

The secondary containment must have the capacity to hold the volume of the largest container or 10% of the combined containers, whichever is larger. If the room has no floor drains, and if the required volume can be completely contained without escaping through cracks in the floor and pipe penetration, over thresholds, etc., then the room itself may be considered sufficient secondary containment. If the room is considered the secondary containment ensure there is a lip at the door so no liquids can exit the room in the event of a leak. Consider use of leak detection and alarm for the secondary containment, depending on hazard posed, and on likelihood that a leak will be observed within in reason period of time.