

**BuildingName**  
**The Description of the Project**  
P00000000 0000

**SPECIFICATION DIVISION 2**

NUMBER            SECTION DESCRIPTION

**DIVISION 02 EXISTING CONDITIONS**

SECTION 028213 - ASBESTOS REMEDIATION

**END OF CONTENTS TABLE**



**DIVISION 02 EXISTING CONDITIONS**  
**SECTION 028213 - ASBESTOS REMEDIATION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes removal and disposal of asbestos-containing materials by full enclosure, glove bag, or entire structures methods as applicable. Demolition and debris removal of all asbestos-containing materials identified by provisions of this Section, or shown on drawings, or identified at the site, shall be executed under the provisions of this Section, and other applicable sections of these specifications.
- B. Extent of asbestos removal work is as follows:
  - 1. Indicated on drawings.
  - 2. Surveyed and listed in "Schedule of Items Containing Asbestos" Article in Part 3 of this Section.
  - 3. Surveyed and listed in "Schedule of Items Containing Asbestos" Article in Part 3 of this Section, as specified in related sections, and as indicated on the drawings. Proceed with Work of this Section simultaneously, and in coordination with, remaining Work of the Project.
  - 4. Marked at the site during the pre-bid inspection "walk through".
  - 5. Limited to that required to connect new plumbing work to existing piping.

**1.2 RELATED SECTIONS**

- A. Unit price items are scheduled with related units of measure in Division 01 Section "Unit Prices."
- B. Work of this Section that is affected by alternates is described in Division 01 Section "Alternates."
- C. Demolition and removal of items not containing asbestos as a component is included in Division 02 Section "Selective Demolition."
- D. Pipe re-insulation is included in Division 23 Section "Mechanical Insulation."

**1.3 DEFINITIONS**

- A. Asbestos Abatement Firm: Firm engaged to perform actual removal and disposal work, either as Contractor or subcontractor.
- B. Asbestos Containing Material: The term "asbestos containing material" is abbreviated ACM.
- C. Owner's Consultant: Firm engaged by Owner to identify and measure asbestos containing materials, or to inspect demolition operations, including monitoring of air quality.
- D. EHS: Owner's Environment, Health & Safety Department, 1239 Kipke Drive, Ann Arbor, MI 48109-1010; phone (734) 647-1143.

**1.4 SUBMITTALS**

- A. Initial Submittals: Submit the following documents to Owner's Representative at the pre-abatement meeting:
  - 1. License from the State of Michigan in accordance with Act 135 P.A. 1986 (Asbestos Abatement Contractors Licensing Act).
  - 2. Copy of notification sent to appropriate federal, state, and local agencies.
  - 3. Schedule of removal, specifying work locations, length and number of shifts, foreman's name, and crew size.
  - 4. Disposal Site Certification: Letter, signed by the Contractor, certifying that an approved asbestos-accepting type II landfill will be used for disposal. Include the facility name, address, and phone number.
  
- B. Waste Disposition Submittals: Submit to ESH signed waste shipment record stating that asbestos waste has been properly disposed. Submit the following:
  - 1. Receipts (trip tickets) from approved landfill.
  - 2. Asbestos Waste Shipment Record: As follows:
    - a. Prior to removing asbestos-containing material from the project site, provide Owner's Representative or Owner's consultant with a completed waste shipment record fully complying with Section 61.150 of the NESHAP standard, and 49 CFR Part 172.200 of the U.S. Department of Transportation, and including all required information.
    - b. Ensure that the landfill operator provides a signed copy of the waste shipment record to EHS within 35 days of the date that asbestos-containing material is removed from the project site. If waste is not transported directly from the project site to the landfill, the waste shipment record shall reflect each transfer.
    - c. The Owner will not make final payment prior to receipt of signed waste shipment record.
  
- C. Contract Closeout Submittals: Comply with the following additional requirements of Division 01 Section "Closeout Procedures":
  - 1. Asbestos Quantity Removal Report: Submit 3 copies of asbestos quantity removal report to Owner's Representative at least 4 weeks prior to Contractor's application for final payment. Include information in the following format:
    - a. Quantities of Asbestos Removed:
      - 1) Asbestos insulation removed from \_\_\_\_\_ft. of \_\_\_\_\_ inch diameter pipes.
      - 2) \_\_\_\_\_ square feet of asbestos insulation removed from ducts, chiller surfaces, equipment, etc.
      - 3) \_\_\_\_\_ square feet of asbestos-containing debris removed from project area.
      - 4) \_\_\_\_\_ square feet of asbestos-containing floor covering.
  - 2. Statement of Visual Inspection: Prior to application for final payment, submit to EHS a statement of visual inspection signed by the Contractor's competent person/supervisor. Include the following:
    - a. Name of licensed contractor conducting work.
    - b. Name, signature, and title of on-site supervisor.

- c. Name, location, and start and finish date of abatement work.
- d. Current date.
- e. Statement that the work was completed according to applicable federal, state, and local laws, and these specifications.
- f. Statement that the Asbestos Abatement Firm's field supervisor has visually inspected the work site and has found no dust, debris, or other suspect asbestos-containing materials that were part of the scope of work.

**1.5 QUALITY ASSURANCE**

- A. Pre-Qualified Asbestos Abatement Firms: Engage one of the following pre-qualified firms to perform abatement of asbestos containing materials:
  - 1. 21<sup>st</sup> Century Salvage Inc.
  - 2. Asbestos Abatement Incorporated
  - 3. BDS Environmental
  - 4. Certified Abatement Services, Inc.
  - 5. Detroit Dismantling Corporation
  - 6. Environmental Maintenance Engineers
  - 7. Environmental Specialty Services, Inc.
  - 8. Great Lakes Environmental Service, Inc.
  - 9. Homrich
  - 10. Innovative Environmental Solutions & Services DBA Paige Construction
  - 11. Michigan Mechanical Abatement, Inc.
  - 12. Midwest Environmental Inc.
  - 13. MIS Corporation-Michigan
  - 14. National Environmental Group, LLC
  - 15. Next Generation Environmental, Inc.
  - 16. Professional Thermal Systems, Inc.
  - 17. Rand Environmental Services
- B. Regulatory Requirements: Make all necessary notifications to the appropriate federal, state, and local agencies.
  - 1. The National Emission Standards for Hazardous Air Pollutants (NESHAP), Asbestos regulation 40 CFR 61, Sub-Part M requires that if at least 80 lin. meters (260 lin. ft.) of friable asbestos materials, at least 15 sq. meters (160 square feet), or 1 cu. meter (35 cu. ft.) of friable asbestos materials, or other facility components are stripped or removed while renovating a facility, all the requirements of section 61.147 apply.
  - 2. When applicable, notify the Michigan Department of Environmental Quality (MDEQ), the Michigan Department of Licensing and Regulatory Affairs (MDLARA), and appropriate state and local regulatory agencies. No work shall be conducted without notification of authorities having jurisdiction.
- C. Pre-Abatement Meeting: Approximately 2 weeks prior to scheduled start of the abatement project, the Owner's Representative will hold a pre-abatement meeting with the individuals indicated below:
  - 1. Contractor' representative.
  - 2. Asbestos Abatement Firm's representative.

3. EHS representative.
  4. Owner's consultant.
  5. Owner's Representative.
  6. Owner's building maintenance personnel.
- D. The meeting agenda will include:
1. Review of the scope of work.
  2. Removal methods to be used.
  3. Review of Contractor's initial submittals.
  4. A walk-through survey of the site, if appropriate.
- E. For small projects, the meeting may be suspended at the discretion of the Owner's Representative. If the meeting is suspended, deliver required initial submittals to the Owner's Representative's office 2 weeks prior to the start of work.

**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.1 ASBESTOS ABATEMENT, GENERAL**

- A. Conduct asbestos abatement operations in a manner that fully protects Contractor's and subcontractor's employees, the general public, and building occupants from exposure to asbestos and other safety and health hazards.
1. Asbestos abatement projects shall be directly supervised by a competent person as described in 29 CFR 1926.1101.
  2. The supervisor/competent person must complete responsibility checklists throughout all phases of the project.
- B. Protect adjacent areas, materials and surfaces from damage due to demolition operations, including but not necessarily limited to the following:
1. Water damage.
  2. Dirt, dust and debris.
  3. Abrasion.
  4. Cuts and scratches.
  5. Holes from fasteners for temporary barriers.
- C. All asbestos work shall be conducted within a regulated area that complies with the following requirements:
1. Post a sufficient number of signs required by 29 CFR 1926.1101 at the asbestos abatement area and at every work area entrance, so that tenants, Owner's personnel, and other contractor's employees have an opportunity to take protective measures before exposing themselves to asbestos. Place banners if necessary to secure open areas. Include information on signs indicating location and quantity of asbestos-containing material.
  2. Allow only authorized, properly protected personnel to enter the regulated area. Immediately report unauthorized individuals entering the work area to EHS or the Owner's consultant.

- D. When required, provide employees and inspectors authorized to enter the regulated area with protective work clothing consisting of disposable Dupont "Tyvek" (or equivalent) full body coveralls, head covers, boots, and other necessary safety gear, including a hard hat and eye protection.
- E. Provide respiratory protection to employees as required by current OSHA regulations including 29CFR 1910.134 and 1926.1101.
  - 1. Provide asbestos abatement workers with powered air purifying respirators (PAPR) with full facepiece and HEPA filters for adequate protection during asbestos material removal operations. Respiratory protection may be down-graded if negative exposure assessment indicates that less protection is required.
  - 2. A half-face respirator or PAPR must be worn while tearing down and setting up enclosures, while glovebagging, and during pre-cleaning and post-cleaning work.
  - 3. Do not allow respirators to be pulled away from faces while in the work area.
  - 4. Maintain an extra PAPR unit on site at all times for the duration of the abatement project.
  - 5. Provide full facepiece supplied-air respirators operated in pressure demand mode equipped with air auxiliary and pressure self-contained breathing apparatus or HEPA egress filters if required for measured fiber concentrations.
- F. Maintain at each job site and post the following documents:
  - 1. Copy of MDEQ/MDLARA notification.
  - 2. Employee respiratory protection program.
  - 3. Michigan Right-To-Know poster.
  - 4. Material Safety Data Sheet locator.
  - 5. Company standard operating procedure.
  - 6. This specification Section.
  - 7. Material Safety Data Sheets for products used on job.
  - 8. CFR 1926.1101.
  - 9. CFR, Part 61 (NESHAP).
  - 10. The foreman's or supervisor's Contractor/Supervisor Accreditation Certificate.
  - 11. State of Michigan Accreditation Certificates and Medical Approval for each worker.
- G. Use the following engineering controls and work practices for all asbestos abatement operations, regardless of measured exposure levels:
  - 1. Vacuum cleaners equipped with HEPA filters to collect all asbestos-containing dust and debris.
  - 2. Wet methods to control exposures during asbestos removal and clean-up, except where proven to be infeasible.
  - 3. Prompt clean-up and disposal of asbestos-contaminated wastes and debris in leak-proof containers.
  - 4. Establish a decontamination area, adjacent and connected to the regulated area, if the Project requires the removal of more than 25 lin. ft., or 10 sq. ft. of thermal systems insulation or surfacing ACM.
  - 5. Establish an equipment area adjacent to the regulated area if the Project requires the removal of less than 25 lin. ft. or 10 sq. ft. of thermal systems insulation or surfacing ACM.

- H. Do not use any of the following equipment or work practices during asbestos abatement operations, regardless of measured exposure levels:
1. High-speed abrasive disc saws not equipped with point-of-cut HEPA ventilation or HEPA filtered exhaust air enclosures.
  2. Blowing with compressed air to remove asbestos-containing materials.
  3. Dry sweeping, shoveling, or other dry methods to clean up asbestos-containing dust and debris.
  4. Employee rotation as a means of reducing employee exposure to asbestos.

### 3.2 ASBESTOS REMOVAL BY FULL ENCLOSURE METHOD

- A. Preparation of the Work Area: Complete the following preparation work prior to beginning asbestos removal operations:
1. Install critical barriers over each opening into the regulated area. The following requirements are in addition to, not in lieu of, other indicated surface and object protection requirements:
    - a. Seal each opening between the work area and adjacent areas with not less than 2 layers of 4-mil polyethylene sheeting. Use an expanding-polyurethane foam gun to seal areas with large numbers of pipes, conduits and beams. Openings include, but are not necessarily limited to, windows, skylights, doorways, elevator hoistway openings, corridor entrances, drains, ducts, grills, grates, and diffusers.
    - b. Seal intake and exhaust vents and duct seams within the regulated area with not less than 2 layers of 6-mil polyethylene sheeting.
  2. HVAC System Shutdown: Owner's maintenance personnel will shut down heating, cooling, and air conditioning systems when necessary. Coordinate scheduling with Owner's personnel and provide 72 hours notice to the Owner's Representative prior to planned shut-down.
  3. Protection of Surfaces and Objects: The following requirements are in addition to, not in lieu of, indicated work area sealing requirements. Cover the following surfaces and objects as follows:
    - a. Protect all surfaces beneath all removal activity. Remove moveable objects from the work area, and cover fixed objects with impermeable dropcloths or plastic sheeting with edges securely sealed with tape.
    - b. Cover open tanks with plywood or other solid material.
    - c. Provide clean, fresh air to mechanical equipment, where required to maintain proper performance of equipment.
    - d. Fully pre-clean all covered surfaces with amended water and a HEPA vacuum.
    - e. Cover walls with not less than 2 layers of 4-mil polyethylene sheeting. Construct free-standing enclosure walls of not less than 6-mil polyethylene sheeting, with supports spaced not more than 3 feet o.c.



- f. Cover floors with not less than 2 layers of 6-mil polyethylene sheeting. Avoid seams where possible. If seams are necessary, overlap not less than 12 inches and tape joints. Extend sheeting 12 inches up the side walls leaving no seams at the wall and floor joint. Immediately repair punctures and leaks, and clean up seepage.
- 4. Cleaning: Do not use cleaning methods that raise dust, such as sweeping or using vacuum cleaners not equipped with HEPA filters. Do not disturb asbestos materials during pre-cleaning phases.
  - a. Treat water removed from the enclosure as asbestos contaminated waste. Fully seal floor drains.
- 5. Deactivate or install ground-fault circuit interrupters on each electrical circuit within the enclosure.
- 6. Construct a three-chambered decontamination facility that is adjacent to and connected to the regulated area, and that consists of a dirty room, a shower room, and a clean room in series. Construct decontamination facilities that are exposed to weather of lumber and exterior grade plywood. Secure the facility when not in use.
  - 1) Supply the equipment room with properly labeled, impermeable bags and containers for the containment and disposal of contaminated protective equipment.
  - 2) Construct showers that comply with the requirements of 29 CFR 1910.141 (d) (3), with the shower room adjacent to both the equipment room and the clean room. Filter water waste and shower water through a 5 micron filter, or remove water from site as asbestos waste.
  - 3) Equip the clean room with a locker or appropriate storage container for each employee.
- 7. Employee Decontamination Facilities: Comply with the following requirements:
  - a. Access the work area only through an approved decontamination system. Lock or block other entrances. Seal emergency exits (for use during a fire or accident) with polyethylene sheeting and tape.
  - b. Seal the waste pass-out, except during the removal of asbestos waste from the enclosure.
  - c. Entrance To The Regulated Area: Employees shall enter the decontamination area through the clean room, remove and store clothing, and put on protective clothing and respiratory protection before passing through to the equipment room.
  - d. Exit From The Regulated Area: Employees shall exit the regulated area by removing gross contamination and debris from their protective clothing. The clothing shall be removed and disposed of in the equipment room into labeled impermeable bags or containers. Employees shall then shower and enter the clean room before changing into street clothes.
- 8. Local Exhaust Ventilation: Maintain portable air filtration units with a HEPA filter in use during asbestos abatement operations requiring enclosures. Units shall conform to OSHA Standard 1926.1101, Appendix F, and shall be designed in accordance with 40 CFR 61, Subpart M, Section 61.153.

- a. Exhaust directly to building exterior. Provide a backup portable air filtration unit at each removal enclosure. Startup ventilation units prior to initiating asbestos removal operations and run until the Owner's consultant has approved their shut-down after cleaning, sampling, visual inspection, and tear-down.
  - b. Direct air movement within the enclosure away from the employees' work area and toward the air filtration device.
  - c. Provide not less than 4 air changes per hour within the enclosure.
  - d. Within the enclosure, through the period of its use, maintain a pressure differential of not less than minus 0.02 water gage with respect to ambient conditions outside the enclosure.
9. Visually inspect the enclosure for breeches and smoke-test for leaks before work begins, and before the start of each work shift. Make all modifications to the enclosure prior to starting removal work.
- B. Asbestos Removal Operations: Comply with the following requirements for asbestos removal operations:
1. Immediately preceding asbestos removal, apply a fine mist of amended water (water and wetting agent) to the asbestos materials and the surrounding area. Keep surrounding areas wet by spraying periodically with amended water. Maintain a high humidity environment to assist in fiber settling.
  2. Remove asbestos material using two-person teams, on staging platforms, if necessary.
  3. Remove the wet asbestos material as intact sections or components. Carefully lower the material to the floor or place directly into container. Never drop or throw asbestos material on the floor.
  4. At working heights between 15 and 50 feet above the floor, place removed asbestos materials in containers at the elevated levels and lower to floor, or place onto inclined chutes or scaffolding for subsequent collection and placement into containers. Clean all debris at the completion of each workday.
  5. Once the asbestos material is at ground level, pack in labeled 6-mil polyethylene bags, wet and, if appropriate, hold in drums prior to starting the next section.
  6. Use 2 sealed and labeled 6-mil thick bags for storage and transportation of asbestos waste. Standing water shall be in each bag
  7. Wrap large components removed intact in two layers of 6-mil polyethylene sheeting, label, and secure with tape for transport to the landfill. Comply with all wetting requirements.
  8. Treat wires, hangers, steel bands, nails, screws, metal lath, tin sheeting, and similar sharp objects removed with asbestos material as asbestos waste. Place in drums for disposal.
  9. Label containerized asbestos waste in accordance with OSHA, EPA, and Department of Transportation regulations, as follows:
    - a. Label each container with OSHA label that contains the following information:

**DANGER**  
**CONTAINS ASBESTOS FIBERS**

**MAY CAUSE CANCER  
CAUSES DAMAGE TO LUNGS  
DO NOT BREATHE DUST  
AVOID CREATING DUST**

- b. Label each container with Owner's and Asbestos Abatement Firm's names and addresses as required by NESHAP. Owner's address is EHS, 1239 Kipke Drive, Ann Arbor, MI 48109-1010.
  - c. Label each container with Class 9 Label required by DOT and identify waste as "RQ, Asbestos NA 2212."
  - 10. Prepare a complete and accurate NESHAP Waste Shipment Record (special manifest). Assure all information required by the U.S. Department of Transportation regulation is included. Under "special handling instructions" provide the required DOT identification information: RQ Asbestos 9,NA 2212, PG III.
    - a. Do not remove waste from site until Owner's Representative has signed and verified the shipment record.
  - 11. Remove containerized asbestos waste daily from site, or store on site in a locked or secured location until ready for final disposal. Obtain approval of Owner's Representative and EHS representative of the location of disposal containers. Outdoor waste containers shall be fully enclosed and locked. Mark vehicles used to transport waste during the loading and unloading of asbestos waste with a visible sign, as required by NESHAP.
  - 12. Each container shall have excess water evident, or the asbestos waste shall be mixed in a slurry.
- C. Post-Removal Operation Requirements: After completion of asbestos removal and clean-up operations, comply with the following requirements:
- 1. The Asbestos Abatement Firm representative, in presence of Owner's consultant, shall inspect the entire work area for asbestos. Include decontamination unit, all plastic sheeting, seals over doorways, windows, and all other openings.
    - a. If any suspect asbestos is found, repeat final cleaning operation, until the visual inspection is satisfactory to the Owner's consultant and the asbestos removal firm. Asbestos not scheduled to be removed as part of the project is exempt.
  - 2. Encapsulate all walls, floors, ceilings, other exposed surfaces, and decontamination facilities after completing the work area inspection.
    - a. Remove the inner polyethylene barrier that is not integral to maintaining negative pressure in the enclosure at this time, and post-abatement air samples will be collected by Owner's consultant. Immediately clean any asbestos-containing materials observed behind these secondary barriers.
  - 3. When post-abatement fiber levels are greater than either 0.01 fiber/cc or background level, repeat cleanup operation until the area is below either 0.01 fibers/cc or background level.
  - 4. When the post-abatement samples are in compliance, and the Owner's consultant or EHS has completed the visual inspection, the enclosure shall be removed.

- a. Turn off HEPA filter exhaust units only after all barriers have been removed.
- b. A final visual inspection will be conducted by the Owner's consultant or EHS representative before the Contractor is released from the removal site. The final inspection will include tape, polyethylene sheet, debris, and equipment.

**3.3 REMOVAL BY NEGATIVE PRESSURE GLOVE BAG SYSTEMS**

- A. Equipment and Materials: Use the following equipment and materials for each glovebag procedure:
  - 1. Glovebags fabricated of 6-mil thick plastic without seams at the bottom.
  - 2. HEPA vacuum system attached to the glovebag and run continuously during operation.
  - 3. Protective suits and respirators.
  - 4. Plastic sheeting.
  - 5. Wetting agent.
  - 6. Encapsulant.
- B. Procedures: Comply with the following glovebag method requirements:
  - 1. Wrap loose and friable material adjacent to the removal area in 2 layers of 6-mil thick plastic, or otherwise render intact.
  - 2. Place plastic sheeting on the floor and equipment beneath each glovebag.
  - 3. Wet-wipe or HEPA vacuum dust and dirt from insulation to be removed.
  - 4. Install glovebags to completely cover the circumference of pipe or other structure where work is to be done.
  - 5. Smoke-test glovebags for leaks. Seal leaks prior to use.
  - 6. Insert and seal equipment that penetrates the bag (spray wands, vacuum nozzles) before insulation is disturbed.
  - 7. Wet the insulation to be removed before, during, and after the removal.
  - 8. Provide only bags capable of withstanding constant wetting and evacuation through a HEPA filtered device.
  - 9. During the performance of glovebag operations removing thermal systems, insulation, or surfacing materials, employ not less than 2 persons, working simultaneously, for each task.
  - 10. Wipe insulation residue from the pipe prior to application of an encapsulant.
  - 11. Spray the pipe and glovebag with an encapsulant before the bag is removed from the pipe.
  - 12. Seal exposed insulation ends with a heavy grade mastic.
  - 13. Follow glovebag manufacturer's instructions.
  - 14. Comply with requirements for asbestos waste disposal indicated in "Removal by Full Enclosure Method" of this Section.
- C. Unacceptable Conditions and Procedures and Conditions: In general, do not use the glovebag method in conditions that prevent safe completion of the removal process. The following procedures are not allowed during glovebag removal:
  - 1. Removing severely damaged insulation.
  - 2. Overloading glovebag.
  - 3. Sliding or moving insulation or glovebag along pipe.
  - 4. Squeezing bags to remove air.

5. Placing glovebags on pipes or other surfaces that exceed 150 deg. F.
6. Using a glovebag more than once.

### **3.4 REMOVAL BY ENTIRE STRUCTURES METHOD**

- A. The removal of entire structures without disturbing the asbestos is encouraged. An example is removal of asbestos covered pipe fittings by cutting out the entire pipe section scheduled for demolition.
  1. Obtain Owner's Representative's approval of removal by entire structures method prior to starting the project.
- B. Required Procedures: Comply with the following requirements applicable to removal of entire structures:
  1. Properly wet all asbestos materials before starting procedure. Ensure that material stays adequately wet throughout the entire procedure by continuing application of water as needed.
  2. Properly and fully wrap and label the structure before it is moved or cut out.
  3. Provide the equipment necessary for asbestos debris cleaning on site during the procedure.
  4. Comply with requirements for asbestos waste disposal indicated in "Removal by Enclosure Full Method" Article of this Section.

### **3.5 FIELD QUALITY CONTROL**

- A. Pre-Notification of EHS Representative: To permit adequate time to schedule air monitoring, notify the EHS representative not less than 10 calendar days prior to planned start of all removal operations.
- B. Air Monitoring: Except for roofing removal work Owner will retain a professional independent industrial hygiene consultant to collect air samples and oversee the project to insure that compliance with applicable codes, regulations, and ordinances, including 29 CFR 1926.1101, NESHAP, and P.A. 135. The consultant will collect background, contiguous, work area, personal, and post-abatement air samples. EHS will provide one copy of the report to the Contractor.
  1. If contiguous sampling indicates airborne fiber concentrations above 0.01 fibers/cc or background level, work will be stopped unless otherwise approved by EHS. Work may resume when the source of contamination has been corrected and the contamination has been cleaned to the satisfaction of the EHS.
  2. Glovebag, entire structures, and full enclosure clearance sampling will be by the aggressive PCM method when feasible. Enclosures must be fully dry before sampling.
  3. Roofing removal Contractors may provide their own air monitoring in compliance with roofing removal requirements of this Section.
- C. Inspection: If during the project, EHS representative or Owner's consultant determines that work practices either violate applicable rules and regulations or endanger employees, the Contractor's on-site representative shall stop operations immediately and take corrective action. Cooperate fully with EHS representative and Owner's consultant.

### 3.6 REMOVAL OF NON-FRIABLE ASBESTOS-CONTAINING MATERIALS

- A. Removal of Non-Friable Materials, General: For each type of non-friable asbestos-containing material indicated, comply with the following requirements:
1. Comply with requirements of Article 3.1 of this Section.
  2. Conduct non-friable material removal operations to prevent the material from becoming friable during the removal and disposal process. No visible emissions are permitted. If the material does not remain substantially intact, comply with the requirements for friable asbestos removal specified in Articles 3.2 of this Section (except roofing removal).
  3. Place impermeable dropcloths on surfaces beneath removal activity.
  4. Do not conduct asbestos removal unless the Owner's Consultant is present at the site and EHS has been notified. For roofing removal projects, notify EHS prior to start of work.
  5. Labeling Containerized Waste: Comply with the requirements of Article 3.2, paragraphs B.9.a. through c. of this Section.
- B. Removal of Resilient Flooring Materials:
1. Prior to removal, critical barriers shall be placed over openings to the regulated area. During removal, air in the regulated area shall be filtered through the use of air filtration device(s).
  2. Removal of floor tile with an infrared heat machine eliminates the critical barrier and negative pressure requirements.
  3. Prior to removal, clean floors of dirt and debris with vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (brush tools are not permitted). Control odors and fumes with engineering controls.
  4. Sanding the floor or related backing is not permitted.
  5. Mechanical chipping of vinyl floor tile is prohibited, except when performed in a negative pressure enclosure.
  6. Thoroughly wet vinyl floor tile with amended water. Use a slip scraper or equivalent to loosen the floor tile from the floor. Remove the floor tile in an intact state. Keep the floor tile wet throughout the removal and cleanup.
    - a. Removal of floor tile using an infrared heat machine eliminates the wetting requirement.
  7. Remove vinyl sheet flooring by cutting while wetting the snip-point. Wet sheet flooring during delamination. Rip-up of resilient flooring material is not permitted.
  8. Clean resilient flooring of all debris using a HEPA vacuum, wet sweeping, mopping or equivalent and allow time to dry. Dry sweeping is prohibited.
  9. Place the resilient flooring material and debris in an asbestos disposal bag. Seal the bag and place it in a properly labeled drum or polypun bag. Comply with the disposal and labeling requirements of this Section.
- C. Asbestos Mastic Removal:
1. Clean the floor of all debris using a HEPA vacuum, wet sweeping, mopping or equivalent.

2. Remove as much mastic as possible using an EHS approved solvent. Control odors and fumes with engineering controls.
3. Perform scraping of residual adhesive and backing using wet methods.
4. After all debris is removed, thoroughly mop the floor and allow time to dry.
5. If shot blasting is used to remove mastic, comply with requirements for friable asbestos removal specified in Article 3.2 of this Section.
6. Properly dispose of all asbestos and solvent waste according to all applicable regulations, and comply with the disposal and labeling requirements of this Section.

D. Asbestos-Containing Siding, Transite Panels, and Laboratory Counter Tops: Remove non-friable asbestos-containing siding, shingles, transite panels, and laboratory counter tops using the following technique:

1. Cutting, abrading, or breaking material is not permitted.
2. Wet material with amended water prior to removal.
3. Carefully disassemble material such a manner as to prevent breakage.
4. Wrap and seal material in two layers 6-mil thick polyethylene, asbestos disposal bags, or equivalent. Seal bags or packages and properly label them with appropriate asbestos warning signs as indicated in "Removal of Non-Friable Materials, General" Article of this Section.
5. Immediately lower to the ground unwrapped or unbagged materials via covered, dust-tight chute, crane, or hoist; or place in an impervious waste bag or wrap in plastic sheet and lower to the ground no later than the end of the work shift.
6. Clean the floor of all debris using a HEPA vacuum, wet sweeping, mopping or equivalent and allow time to dry.
7. Dispose of asbestos waste in accordance requirements of this Section.

E. Non-Friable Asbestos-Containing Roofing Materials: Non-friable asbestos-containing roofing materials may be removed in a non-friable state. This specification does not apply to removal of intact cements, coatings, or mastics. Obtain EHS review and approval of planned removal operations prior to beginning. Remove non-friable asbestos-containing roofing materials in using the following technique:

1. Each employee who is likely to disturb or handle asbestos material shall have completed an 8-hour training class, and the project shall be supervised by a competent person who has completed the appropriate contractor/supervisor course.
2. Isolate roof level heating and ventilation air intake sources within the regulated area and others that will be affected; or arrange for shut-down the affected ventilation system during removal operations. Acceptable isolation techniques include the following:
  - a. Use 20-foot or larger buffer zones.
  - b. Installation of HEPA filters over the air intakes.
  - c. Erection of horizontal or vertical extensions that relocate the opening of the intake outside or above the regulated area.

- d. Covering the intake with plastic sheeting or other appropriate barrier.
  3. Personal protective equipment (PPE), including disposable coveralls and NIOSH approved appropriate high efficiency particulate absolute (HEPA) respirators, shall be worn by personnel if the asbestos containing material is not removed in an intact state.
  4. Remove roofing material in an intact state.
  5. Use wet methods to remove materials that are not intact, or that are rendered not intact during removal, except where wet methods will create a safety hazard or are otherwise not feasible.
  6. Continuously apply a water mist to the blade of power cutting tools, unless a competent person determines that misting will substantially decrease worker safety.
  7. When removing roofing felts, collect the dust generated by power roof cutters with a HEPA-filtered dust collector; or immediately vacuum using a HEPA-filtered vacuum along the cut line. For smooth surfaces only, gently sweep wet dust generated from cutting operations, and carefully and completely wipe up the still-wet dust and debris.
  8. For removal and repair operations of intact roofing less than 25 sq. ft. in area, the use of wet methods or HEPA vacuuming is not required, provided manual methods do not render the material non-intact and no visible dust is created.
  9. Do not drop or throw to the ground asbestos-containing roofing material that has been removed. As soon as practicable, but not later than the end of the work shift, lower debris to ground either by passing or carrying by hand, or by lowering to the ground in a covered, dust-tight chute, crane or hoist.
    - a. While on the roof, keep non-intact asbestos-containing materials wet; or seal in impermeable waste bags, or wrap in plastic sheeting.
    - b. While on the roof, intact asbestos-containing material is not required to be kept wet, bagged, or wrapped.
  10. Upon being lowered to the ground, transfer unwrapped material to a closed receptacle in manner that precludes the dispersion of dust. Dispose of the material in an asbestos-accepting Type II landfill. Notify the landfill that the roofing material contains asbestos and provide waste shipment records to EHS within 35 days.
  11. For removal of intact pipeline asphaltic wrap or roof flashings that contain asbestos, engage a competent person to examine the material and determine whether the material is intact and likely to remain intact during removal. Remove the material using manual methods. Sanding, grinding, or other abrading operations are not permitted. Do not throw or drop materials to the ground. Lower the material in a covered, dust-tight chute, crane, or hoist. Remove debris from the roof at the end of the work shift.
- F. Non-Friable Asbestos Containing Exterior Sealant, Caulk, Putty and Window Glazing: Remove exterior non-friable asbestos-containing sealants, caulk, putty and window glazing using the following technique:
1. Any existing loose material shall be HEPA vacuumed prior to removal.



2. The material shall be thoroughly wetted prior to and during its removal.
3. The material should be removed as intact as possible. Manual methods such as scraping or raking shall be used, unless power tools are used that are equipped with HEPA ventilation. If power tools are used comply with Article 3.2 (Asbestos Removal by Full Enclosure Method) of this Section.
4. Asbestos containing materials removed, shall be immediately bagged or wrapped and kept wetted until transferred to a closed receptacle.
5. The removal of windows and other whole building components without disturbing the asbestos is encouraged. An example of this would be removing a window with asbestos containing glazing or caulk by cutting out the entire window scheduled for demolition. Comply with Article 3.4 (Removal by Entire Structures Method) of this Section when removing entire building components containing asbestos.
6. If the material becomes friable during the abatement process, comply with the requirements for friable asbestos removal specified in Article 3.2 (Asbestos Removal by Full Enclosure Method) of this Section.
7. Dispose of all asbestos containing materials, including those removed by the entire structures method, per the requirements of this Section.

### **3.7 SCHEDULE OF ITEMS CONTAINING ASBESTOS**

- A. Bidding Requirements: Comply with the following requirements related to bidding:
  1. Survey quantities provided are approximate. Bidders are required to field investigate as necessary and assume all responsibility to verify the work required and quantities involved for complete asbestos abatement.
  2. The building is open for field inspection by all bidders during the bidding period.
  3. A "pre-bid orientation meeting" will be conducted to familiarize prospective bidders with site conditions and provide for verification of marked and scheduled quantities, as applicable.
- B. The following items have been surveyed and determined to have asbestos as a component:
  1. Roofing felts and base flashing.
  2. Roofing underlayment.
  3. Spray applied insulation.
  4. Blown-in insulation.
  5. Fire proofing materials.
  6. Fire doors.
  7. Drywall and drywall taping compounds.
  8. Acoustic and decorative plaster.
  9. Vinyl asbestos floor tile.
  10. Composition sheet flooring.
  11. Shaft wall construction.
  12. Flooring adhesives.
  13. Textured paints and coatings.
  14. Laboratory countertops, sinks and shelves.

15. Cabinet liners and bottoms.
16. Laboratory fume hood interior.
17. Vinyl wall coverings.
18. Cement pipes.
19. Boiler insulation.
20. Piping insulation.
21. Duct insulation.
22. Flexible fabric ductwork connections.
23. Cement composition board ducts.
24. Electrical panel partitions.
25. Electrical wiring insulation and electrical cloth.
  - a. Assignment of Responsibility: Removal of wire covered with non-friable, asbestos-containing, insulation shall be performed by the electrical (sub)contractor. Electrical (sub)contractor shall accumulate wire in containers furnished by the asbestos abatement contractor. The asbestos abatement (sub)contractor shall seal and dispose of containers as asbestos waste.
26. Underground electric ductbank insulation.

**END OF SECTION 028213**