

## **SECTION 02001 – ASBESTOS ABATEMENT**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK**

- A. This specification covers the abatement of exposure to asbestos hazards from building structures and components as detailed within the Scope of Work, Attachment A and as specified herein.
- B. Unless otherwise noted, references to “Contractor” means “Abatement Contractor”, for Specification Section 02001, Asbestos Abatement.
- C. All asbestos related work activities shall be performed in strict accordance with applicable EPA, OSHA, Illinois Department of Public Health and local regulations, as well as any other applicable codes and regulations that may apply.
- D. Where compliance with two or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirements, or “state of the art”, is intended and will be enforced, unless specifically detailed language written into Contract Documents clearly indicates that a less stringent standard is permitted.
- E. Personal exposure monitoring (OSHA sampling) as required by the Occupational Safety and Health Administration Asbestos Standard for the Construction Industry 29 CFR 1926.1101 shall be the responsibility of the Contractor. Any and all costs associated with sampling and analysis shall be included within the Contractor’s bid cost.

#### **1.2 WORK INCLUDED**

- A. The Scope of Work shall include the provision of all labor, equipment, materials, insurance, and permits necessary to remove and dispose of all asbestos-containing materials (ACM) indicated in the Scope of Work, Attachment A and specified herein. The Contractor, by submitting a bid for the work, represents itself as knowledgeable and expert in the performance of the work, and shall account for all expenses necessary to successfully complete the Scope of Work, whether specifically mentioned or not.
- B. The Scope of Work includes, but is not limited to the removal of friable and non-friable asbestos-containing materials listed in contract documents, including pre-cleaning work areas, moving furnishings, establishing regulated areas, isolating work areas, protecting adjacent areas, containment of regulated areas, decontamination of work areas, and packaging and disposal of regulated materials necessary to complete the Scope of Work.
- C. Existing ceiling systems, ductwork, light fixtures and diffusers and grilles which are scheduled to be re-used shall be protected from contamination. If existing components or adjacent areas are contaminated by the Contractor, the Contractor shall pay all costs associated with the clean-up and/or disposal of contaminated materials.

- D. The Contractor is responsible for restoring the work area and auxiliary areas utilized during the abatement to conditions equal to or better than original. .
- E. The work specified herein shall be performed by competent persons trained, knowledgeable and qualified in the techniques of abatement, handling and disposal of asbestos-containing and asbestos-contaminated materials, and the subsequent cleaning of contaminated areas in compliance with all applicable Federal, State, and Local regulations.
- F. Project related documents as specified herein shall be submitted to the Owner in triplicate prior to, during and at the completion of abatement activities to document compliance with project specifications and for inclusion in a final project completion report.

### 1.3 QUALITY ASSURANCE

#### A. Contractor Qualifications

- 1. The Contractor shall meet, at a minimum, the qualifications and licensure requirements of the State of Illinois Asbestos Abatement for Public and Private Schools and Commercial and Public Buildings.
- 2. Contractor qualifications will be determined from information submitted as required by contract documents. The information will be used to determine whether the Contractor has the technical qualifications, manpower, experience, equipment, training and facilities to properly and safely perform the work in accordance with the Specifications. In addition, the Owner reserves the right to request additional information as may be required to document compliance with the Specification which may include brand names of materials and equipment, serial numbers, number of HEPA units, etc. Approval will be denied where experience record in one of these areas indicates unsatisfactory performance.

#### B. Applicable Standards and Guidelines

- 1. All work under this Contract shall be done in strict accordance with applicable Federal, State and Local regulations, standards and codes governing asbestos abatement and any other environmental work or trade work done in conjunction with the abatement.
- 2. The most recent edition of any relevant regulations, standards, documents or codes shall be in effect. Where conflict among the requirements of with these specifications exists, the most stringent requirements shall be utilized.
- 3. The following regulations shall be adhered to in addition to any other applicable standards:
  - a. Illinois Department of Public Health
    - 1) Rules for Asbestos Abatement for Public and Private Schools and Commercial and Public Buildings in Illinois (77 Ill. Adm. Code 855)
  - b. Occupational Safety and Health Administration (OSHA).

- 1) Title 29 Code of Federal Regulations (CFR) Section 1926.1101 – Construction Standard for Asbestos
  - 2) Title 29 CFR Section 1910.134 General Industry Standard for Respiratory Protection
  - 3) Title 29 CFR Section 1910.20 Access to Employee Exposure and Medical Records
  - 4) Title 29 CFR Section 1910.1200 Hazard Communication
  - 5) Title 29 CFR Section 1926.62 Lead Exposure in Construction
- c. Environmental Protection Agency (EPA)
- 1) Title 40 CFR Part 61 Subparts A and M (Revised Subpart B) – National Emission Standard for Hazardous Air Pollutants (NESHAP)
  - 2) Title 40 CFR Part 763 Subpart E Asbestos Hazard Emergency Response Act (AHERA) Rules
  - 3) Title 40 CFR Part 763 Subpart E, Appendix C Asbestos Model Accreditation Plan (MAP): Interim Final Rule

#### **1.4 NOTIFICATION AND SUBMITTALS**

- A. Within ten (10) calendar days after “Notice of Award”, the Contractor shall submit the following items to the Environmental Consultant:
1. A complete list of all Sub-Contractors and foremen who are to work under this Contract;
  2. Copies of the appropriate insurance policies certifying that the Contractor is insured to perform asbestos and/or environmental abatement and has the duty to indemnify the Owner and Owner’s Representatives for such abatement.
  3. Proposed revisions to design drawings for work areas, decontamination chambers, equipment rooms, waste-outs, dumpsters, negative air exhaust points, and utility hook-ups.
  4. Supervisor’s licenses and other data sufficient to demonstrate compliance with specified requirements.
- B. At least ten (10) calendar days before the start of the Project, Contractor shall submit the following items to the Owner’s Representative:
1. A copy of the demolition/renovation/asbestos abatement notice shall be submitted to the IEPA as required by, NESHAPS, 40 CFR 61, Subparts A and M and also as required by any and all appropriate federal, state, and local agencies responsible for the enforcement of asbestos regulations.
  2. When rental equipment is to be used in abatement areas or to transport asbestos-contaminated waste, a written notification concerning intended use of the rental equipment

must be provided to the rental agency with a copy submitted to the Owner's Representative.

3. Copies of notices to police, fire, and emergency medical personnel.
- C. At least five (5) days prior to commencement of work, the Contractor shall submit the following items to the Owner's Representative:
1. Documentation that arrangements for the transport and disposal of asbestos-containing or contaminated materials and supplies have been made. The name and location of the disposal site, a copy of handling procedures, and a list of protective equipment utilized for asbestos disposal at the landfill, prepared and signed by the Landfill Owner/Operator, shall be obtained and submitted.
  2. Documentation that each worker and supervisor has the appropriate training and/or license.
  3. Documentation from a physician that all employees or agents who may be exposed to airborne asbestos in excess of background levels has been medically monitored to determine if the employee is physically capable of working while wearing the require respiratory equipment without suffering adverse health effects. Documentation that personnel have received medical monitoring as required by OSHA 29 CFR 1926.1101 shall be submitted.
  4. A list of NIOSH approvals for all respiratory protective devices utilized on site. In addition, manufacturer certification of HEPA filtration capabilities for all cartridges and filters shall be submitted.
  5. Documentation that all of the Contractor's employees and agents who must enter the work area have passed respirator fit tests and have been assigned respirators which fit. This fit testing shall be in accordance with qualitative procedures as detailed in the OSHA Standard 29 CFR 1910.1025 Appendix D Qualitative Fit Test Protocol (1985).
  6. Manufacturer's certification that HEPA vacuums, negative air pressure equipment, and other local exhaust ventilation equipment conform to ANSI Z 9.2-79.
  7. Material Safety Data Sheets (MSDS) from supplier or manufacturer for all chemicals proposed for use on the Project.
  8. Drawings for layout and construction of decontamination enclosure systems and barriers for isolation of the work area, where applicable.
- D. During abatement activities, Contractor shall submit the following items to the Owner's Representative:
1. Weekly job progress reports detailing abatement activities. Include review of progress with respect to previously established milestones and schedules, problems and action taken, injury reports, and equipment breakdown.

2. Results of personal exposure monitoring performed by the Contractor.
  3. Copies of all transport manifests, trip tickets, and disposal receipts for all asbestos waste materials removed from the Work Area during the abatement process.
  4. Copies of worksite entry logbooks with information on worker and visitor access.
  5. Logs documenting filter changes on respirators, HEPA vacuums, negative pressure ventilation units, and other engineering controls.
  6. Copies of worker documentation for all employees authorized to enter work areas.
- E. Within fifteen (15) days of completion of abatement activities, Contractor shall submit the following items to the Owner's Representative:
1. Written certification by the Contractor that all work has been completed in conformance with all applicable Federal, State, and local asbestos regulations and that all asbestos-containing and contaminated material has been removed from the site and legally transported and disposed of at an approved special waste disposal facility.
  2. Copies of all remaining transport manifests for all asbestos waste materials removed upon the completion of abatement activities as well as any project related documentation not previously submitted to the Owner's Representative.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Deliver all materials in the original packages, containers or bundles bearing the name of the manufacturer and the brand name (where applicable).
- B. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Replacement materials shall be stored outside of the Work Area until abatement is completed.
- C. All equipment and materials shall be completely clean before being brought on Site.

### **2.2 TOOLS AND EQUIPMENT**

- A. A sufficient quantity of negative pressure ventilation units equipped with HEPA filtration and operated in accordance with ANSI Z 9.2-79 (Local Exhaust Ventilation requirements) and EPA guidance document EPA 560/5-85-024 Guidance for Controlling Friable Asbestos-Containing Materials in Buildings Appendix J: Recommended Specifications and Operating Procedures For the Use of Negative Pressure Systems for Asbestos Abatement shall be utilized so as to provide one workplace air change every 15 minutes. The Contractor shall increase the air exchange rate to six times per hour if chemical solvents or removers are to be used in the Work Area.

Total required air flow shall be calculated as follows:

$$\text{Total ft}^3/\text{min} = \frac{\text{Vol. of work area}}{15 \text{ min.}}$$

Total required number of units shall be calculated as follows:

$$\text{Total Units} = \frac{\text{Total ft}^3/\text{min}}{\text{Capacity of units}}$$

- B. Respirators shall be NIOSH approved for use with asbestos, or other contaminants anticipated in the work.
- C. Contractor is fully responsible for complying with OSHA rules for other Safety equipment such as hard hats, safety harnesses, eye protection, gloves, footwear, and any other safety devices used on the Site.
- D. Airless sprayers shall have pumps capable of providing 125 pounds per square inch (psi) at the nozzle tip at a flow rate of 2 gallons per minute for spraying amended water.

## 2.3 MATERIALS

- A. Contractor shall ensure that encapsulants and sealants used as primers, basecoats, or covering existing materials are compatible with the respective existing or reinstallation materials and their manufacturers' warranties.
- B. Polyethylene sheeting for all applications shall be 6 mil nominal thickness for floors and drop cloths, and 4 mil polyethylene sheeting for walls. Polyethylene sheeting utilized for worker decontamination enclosures shall be opaque white or black in color.
- C. Tape shall be 2" or 3" duct tape or other waterproof tape suitable for joining poly seams and attaching polyethylene sheeting to surfaces.
- D. Spray adhesives shall be non-flammable and free of methylene chloride solvents.
- E. Disposal bags shall be 6 mil nominal thickness, pre-printed with labels as required by applicable EPA and OSHA requirements with the owners name, date of the project, and shall include the following information:

**DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD**

- F. Brushes utilized for removing loose asbestos-containing material shall have nylon or fiber bristles.

- G. Disposable suits, hoods, and foot coverings shall be TYVEK or similar.
- H. Solvents shall be compatible with any primers, mastics, adhesives, paints, coatings, or other surfacing materials to be installed following their use.
- I. A sufficient supply of disposable mops, rags and sponges for work area decontamination shall be present at all times.

### **PART 3 - EXECUTION**

#### **3.1 WORK AREA ISOLATION AND PREPARATION**

##### **A. Work Area Isolation**

1. The Contractor shall establish a regulated work area in accordance with 29 CFR 1910.1001(e)(1) and (2).
2. Where lockable doors are not present, contaminated work area shall be separated from uncontaminated / occupied areas of the building by poly sheeting.
3. In areas where glove bag removal or patch and repair will be performed outside of a negative pressure containment, a barrier shall be constructed around the work area, and asbestos warning signs shall be posted.
4. Access to the work area shall be limited to the authorized personnel.

##### **B. Work Area Preparation**

1. Post caution signs meeting the specifications of OSHA 29 CFR 1926.1101 (k) (6) at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a sufficient distance from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs need to be posted following construction of workplace enclosure barriers.
2. Shut down and lock out electric power to all work areas. Provide temporary power and lighting. Insure safe installation (including ground fault circuit interrupters) at the source for temporary power sources and equipment in compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems. All costs for electricity shall be paid for by the Owner.
3. Shut down and lock out all heating, ventilating, and air conditioning (HVAC) components that are in, supply or pass through the work area. Appropriate equipment and control measures shall be utilized to prevent contamination of building spaces during this operation.

4. Seal all intake and exhaust vents in the work area with tape and 6-mil polyethylene. Also seal any seams in the system components that pass through the work area. Remove all HVAC system filters and place in labeled 6-mil polyethylene bags for staging and eventual disposal as asbestos contaminated waste.
5. The Contractor shall provide sanitary facilities for abatement personnel outside of the enclosed work area, and maintain them in a clean and sanitary condition throughout the project.
6. The Owner will provide cold water for construction purposes. The Contractor may connect to the Owner's existing system.
7. Seal off all windows, doorways, elevator openings, corridor entrances, drains, ducts, grilles, grates, diffusers, and any other openings between the work area and uncontaminated areas outside of the work area with minimum 6-mil polyethylene sheeting and tape.
8. For non-floor tile abatement areas, cover floors and walls of negative pressure enclosures with polyethylene sheeting as follows:
  - a. Cover the floors with one layer of 6-mil polyethylene sheeting extending a minimum of 12 inches up the sidewalls.
  - b. Cover walls with one layer of 4-mil polyethylene sheeting extending a minimum of twelve (12) inches beyond the wall/floor joint.
  - c. Plastic shall be sized to minimize seams. Seams shall be staggered and separated by a distance of at least 6 feet.
  - d. Wall sheeting shall be secured adequately to prevent it from falling away from the walls as a result of negative pressure or abatement activities.
  - e. Ceilings shall be covered utilizing the same procedure for walls for all removal other than ceiling tile removal.
  - f. For floor tile abatement areas, the procedures noted above shall be apply with the exception that floor sheeting may be omitted.
9. Negative pressure shall be established within full containment enclosures at  $-0.02''$  H<sub>2</sub>O.
10. Maintain emergency and fire exits from the Work Areas or establish alternative exits acceptable to the local fire department and applicable codes.

C. Worker Decontamination Enclosure Systems

1. Worker decontamination enclosure systems shall be provided at all locations where workers will enter or exit the Work Area.
2. Worker decontamination enclosure systems constructed at the work site shall utilize 6-mil opaque black or white polyethylene sheeting or other acceptable materials for privacy.



3. The worker decontamination enclosure system shall be constructed with three (3) chambers including, at a minimum, a clean room, shower room, and an equipment room, each separated from each other by a curtained doorway.
4. Entry to and exit from decontamination enclosure system chambers shall be through curtained doorways consisting of three sheets of overlapping polyethylene sheeting. All sheets will be secured at the top. The first and third sheets will be secured at the side opposite the side from which the middle sheet is secured. All sheets shall have weights attached to the bottom to insure that they straight and maintain a seal over the doorway when not in use.
5. The clean room shall be sized to adequately accommodate the work crew. Benches and clothes hooks shall be provided. Shelves for storing respirators shall also be provided in this area. Clean work clothes (if required under disposables), clean disposable clothing, replacement filters for respirators, towels, and other necessary items shall be provided in adequate supply at the clean room. A location for postings shall also be provided in this area. Whenever possible, a lockable door shall be used to permit access to the clean room from outside the work area. Lighting, heat, and electricity shall be provided as necessary. This space shall not be used for office space, or for storage of other than specifically designated tools, equipment or materials.
6. Shower facilities shall be provided which comply with 29 CFR 1910.141 (d)(3). The shower room shall contain one or more showers as necessary to adequately accommodate workers. Each shower head shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to insure against leakage of any kind. An adequate supply of soap, shampoo, and towels shall be supplied by the Contractor and available at all times. Shower water shall be drained, collected, and filtered through a system with at least 0.5-1.0 micron particle size capability. (Note: a system containing a series of several filters with progressively smaller pore sizes is recommended to avoid rapid clogging of filtration system by large particles).
7. The equipment room shall be used for storage of equipment and tools at the end of a shift after they have been decontaminated using a HEPA filtered vacuum and/or wet cleaning techniques as appropriate. Replacement filters (in sealed containers until used) for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during abatement may also be stored here. A drum lined with a labeled 6-mil polyethylene bag for collection of disposable clothing shall be located in this room. Contaminated footwear (e.g. rubber boots, other reusable footwear) shall be stored in this area for reuse the following workday.

#### D. Remote Decontamination

1. Remote Decontamination may be utilized for patch and repair activities, removal of thermal system insulation utilizing mini-containment glovebag enclosures, or abatement methods that will not result in the disturbance of friable material. Remote Decontamination enclosures shall comply with 29 CFR 1910.141(d)(3). The following procedures shall be utilized with a remote decontamination system:

- a. Workers shall don respiratory protection and two pairs of protective coveralls prior to entering the contained removal area.
- b. Upon completion of removal and cleaning, the worker shall HEPA vacuum the outer suit, enter the airlock, remove the outer suit and dispose of it as asbestos-contaminated waste.
- c. Still wearing the inner suit and respiratory protection, the worker shall either proceed to another containment, don a second suite and enter, or proceed to the remote decontamination enclosure system.
- d. The remote decontamination enclosure system shall be wet cleaned after the completion of abatement and have a 12 hour settling period prior to the collection of air samples.

#### E. Waste Container Pass-Out

1. Wherever possible, the waste container pass-out airlock shall be located where there is direct access from the work area to the outside of the building.
2. This airlock system shall consist of a container staging area and another airlock with access to outside the work area.
3. The waste container pass-out airlock shall be constructed in similar fashion to the worker decontamination enclosure system using similar materials and airlock and doorway designs.
4. This waste-container pass out and associated airlock system shall not be used to enter or exit the work area.
5. Bag-out shall be on a daily basis. All bagged waste shall be double bagged and sealed with duct tape "goose neck" ties or double wrapped and sealed with duct tape. The waste transporters will hand carry or use only the contractor's plastic gurnies for bagged or wrapped waste. The gurneys will not be overloaded, so as not to expose the polyethylene bags to punctures and/or tears. NOTE: a current fit Test Certificate will be required for users of half-mask respirators.

#### F. Emergency Exits

1. Emergency exits shall be established and clearly marked with duct tape arrows or other effective designations to permit easy location from anywhere within the Work Area. They shall be secured to prevent access from uncontaminated areas and still permit emergency exiting. These exits shall be properly sealed with polyethylene sheeting which can be cut to permit egress if needed. These exits may be the worker decontamination enclosure, the waste pass-out airlock and/or other alternative exits satisfactory to fire officials.

#### G. Maintenance of Workplace Barriers and Decontamination Enclosure Systems

1. All polyethylene barriers inside the work area, in the worker decontamination enclosure system, in the waste container pass-out airlock, and at partitions constructed to isolate the work area from occupied areas shall be inspected at least twice daily: prior to the start of each day's abatement activities, and subsequent to the finish of each day's abatement activities. Documentation of these inspections and observations shall be kept in the daily project log.
2. Damage and defects in the enclosure system are to be repaired immediately upon discovery.
3. Use smoke tubes to test the effectiveness of the barrier system when directed by the Owner or Owner's Representative.
4. At any time during the abatement activities after the barriers have been erected, if visible material is observed outside of the work area or if damage occurs to barriers, work shall immediately stop, repairs shall be made to the barriers, and debris/residue shall be cleaned up using appropriate HEPA vacuuming and wet cleaning procedures.
5. If air samples collected outside of the work area during abatement activities indicate airborne fiber concentrations greater than 0.01 f/cc or pre-measured background levels (whichever is lower), work shall immediately stop for inspection and repair of barriers. Cleanup of surfaces outside of the work area using HEPA vacuum and wet cleaning techniques may be necessary.
6. Install and initiate operation of negative pressure ventilation equipment as needed to provide a minimum of 4 work area volumes of air exchange per hour. Openings made in the enclosure system to accommodate these units shall be made airtight with tape and/or caulking as needed. The discharge of negative air exhaust ventilation must be to the outside of the building and shall not be exhausted into occupied areas. If more than one unit is installed, they should be turned on one at a time checking the integrity of wall barriers for secure attachment and need for additional reinforcement. Insure that adequate power supply is available to satisfy the requirements of the ventilating units.
7. A negative air pressure differential of at least - 0.02 inches of water column, relative to outside ambient air pressure, shall be maintained at all times throughout the contained areas.
8. Instrumentation for measuring pressure differential shall be provided by the Contractor in accordance with OSHA Regulations 29 CFR 1926.1101.

#### H. Commencement of Work

1. Commencement of work shall not occur until :
  - a. Enclosure systems have been constructed and tested.
  - b. Negative pressure ventilation systems are functioning adequately.
  - c. All pre-abatement submittals, notifications, postings and permits have been provided and are satisfactory to the Owner.

- d. All equipment for abatement, clean-up, and disposal is on hand.
- e. All worker training certification is completed.
- f. All containments have been inspected and approved by the Owner's Representative.

### **3.2 WORK AREA ENTRY AND EXIT**

#### **A. Personnel Entry and Exit**

- 1. All workers and authorized personnel shall enter the work area through the worker decontamination enclosure system, where applicable.
- 2. All personnel entering or leaving the work area must sign the access log located in the clean room.
- 3. Before entering the work area, all personnel shall read and be familiar with all posted regulations, personnel protection requirements (including work area entry and exit procedures) and emergency procedures. A sign-off sheet shall be used to acknowledge that these have been reviewed and understood by all personnel prior to entry.
- 4. All personnel shall first proceed to the clean room, remove all street clothes and don appropriate respiratory protection and launderable and/or disposable coveralls, as well as head and foot coverings. Hard hats, gloves, etc. shall also be utilized if conditions so indicate. Clean respirators and protective clothing shall be provided and utilized by each person for each separate entry into the work area.
- 5. Personnel wearing designated protective equipment shall proceed from the clean room through the shower and equipment rooms to the main work area.
- 6. Before leaving the work area, all personnel shall remove gross contamination from the outside of respirators and protective clothing by brushing and/or wet wiping procedures. (Small HEPA vacuums with brush may be utilized for this purpose, however, larger machines may tear the suits). Each person shall clean the bottoms of their protective footwear in the walkoff pan just prior to entering the equipment room.
- 7. Personnel shall proceed to equipment room where they remove all protective equipment except respirators. Deposit disposable (and launderable) clothing into appropriately labeled containers for disposal (and laundering).
- 8. Reusable, contaminated footwear shall be stored in the equipment room when not in use in the work area. Upon completion of abatement, the footwear shall be disposed of as asbestos contaminated waste. (Rubber boots may be decontaminated at the completion of the abatement for reuse).
- 9. Prior to removing the respirator, personnel will proceed to the shower room, and wash exposed face areas as well as the respirator under running water. The respirator is then removed, and a shampoo and shower is taken to remove any residual asbestos contamination. Various types of respirators will require slight modification of these procedures. A

type C respirator with HEPA disconnect protection may be disconnected in the equipment room and worn into the shower. A powered air-purifying respirator face piece will have to be disconnected from the filter/power pack assembly which is not waterproof, upon entering the shower. A dual cartridge respirator may be worn into the shower. Cartridges must be replaced for each new entry into the work area.

10. After showering and drying off, proceed to the clean room and don clean disposable [and/or launderable] clothing if there will be later re-entry of the work area or street clothes if it is the end of the work shift.
11. These procedures shall be posted in the clean room and equipment room.

#### B. Equipment and Waste Container Pass-out

1. Asbestos contaminated waste that has been containerized shall be transported out of the work area through the waste container pass-out airlock.
2. Waste pass-out procedures shall utilize two teams of workers, an "inside" team and an "outside" team.
3. The inside team wearing appropriate protective clothing and respirators for inside the work, area shall clean the outside, including bottoms, of properly labeled containers (bags, drums, or wrapped components) using HEPA vacuums and wet wiping techniques and transport them into the waste container pass-out airlock. No worker from the inside team shall further exit the work area through this airlock.
4. The outside team, donning protective clothing and appropriately assigned respirators, shall enter the airlock from outside the work area, enclose the drums (bags, drums, or wrapped components) in clean, labeled, 6-mil polyethylene bags and remove them from the airlock to the outside. No worker from the outside team shall further enter the work area through this airlock.
5. If the equipment decontamination enclosure system does not terminate to the exterior of the building, the following procedures shall be followed:
  - a. Waste and equipment shall be placed in a cart lined with a minimum of one layer of six mil plastic sheeting. The cart shall not be overloaded, which may cause tipping. The top of the cart shall be covered with a minimum of one layer of six mil plastic sheeting. The plastic sheeting shall be secured.
  - b. The loaded cart shall be carefully taken to and unloaded in the enclosed waste storage unit.
6. The exits from this airlock shall be secured to prevent unauthorized entry.
7. Bag-out shall be on a daily basis. All bagged waste shall be double bagged and sealed with duct tape "goose neck" ties.

### 3.3 TRAINING AND PERSONAL PROTECTION

#### A. Training

1. Prior to commencement of abatement activities, all personnel who will be required to enter the work area or handle containerized asbestos containing materials must have received adequate training in accordance with Part 4 of this document.
2. Special on-site training on equipment and procedures unique to this job site shall be performed as required by the Contractor.
3. Training in emergency response and evacuation procedures shall be provided.

#### B. Respiratory Protection

1. All respiratory protection shall be provided to workers and maintained in accordance with the contractor's written respiratory protection program, which includes all items in OSHA 29 CFR 1910.134 (b) (1-11). This program shall be posted outside of the clean room of the worker decontamination enclosure system.
2. Workers shall be provided with individually identified (marked with waterproof designations) respirators.
3. Contractors shall use available historical data to perform an initial exposure assessment prior to the initiation of abatement activities. The minimum level of respiratory protection allowed during abatement activities shall be Powered Air Purifying Respirators unless and until air sampling and laboratory data support the use half-mask air purifying respirators which will then be the minimum allowable respiratory protection for the removal and cleanup phases of this project.

#### C. Fit Testing

1. Workers must perform positive and negative pressure fit tests each time a respirator is put on, whenever the respirator design so permits. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.
2. Workers shall be given a qualitative fit test in accordance with procedures detailed in the OSHA Standard (29 CFR 1926.1101, Appendix C, Qualitative Fit Test Protocols) for all respirators to be used on this abatement project. An appropriately administered quantitative fit test may be substituted for the qualitative fit test. NOTE: All respirators used on this project must have the capacity to function safely in the negative pressure mode, so as to insure a level of respiratory protection, in the event of battery pack, AC power, or compressor failures.
3. Documentation of adequate respiratory fit testing must be provided to the Owner's Representative.

4. Additional respirators (minimum of 2 of each type) and training on their donning and use must be available at the work site for authorized visitors who may be required to enter the work area.

D. Protective Clothing

1. Disposable clothing including head, foot, and full body protection shall be provided in sufficient quantities and sizes for all workers and authorized visitors.
2. Hard hats, protective eyewear, gloves, rubber boots, and/or other footwear shall be provided as required for workers and authorized visitors. Safety shoes may be required for some activities.
3. Non-disposable footwear and/or clothing shall remain in the work area and shall be disposed of as contaminated material at the end of the project.

### 3.4 ABATEMENT PROCEDURES

A. Gross Removal Within Full Containment

1. Clean and isolate the work area as specified herein.
2. Wet all asbestos containing material with an amended water solution using equipment capable of providing a fine spray mist, in order to reduce airborne fiber concentrations when the material is disturbed. Saturate the material to the substrate, however, do not allow excessive water to accumulate in the work area. Keep all removed material wet enough to prevent fiber release until it can be containerized for disposal. It is important to maintain humidity in the work area (by misting or spraying) to assist in fiber settling and reduce airborne concentrations. Wetting procedures are not equally effective on all types of asbestos-containing materials, but shall nonetheless be used in all cases.
3. Saturated asbestos containing material shall be removed in manageable sections. Removed material shall be containerized before moving to a new location for continuance of work. Surrounding areas shall be periodically sprayed and maintained in a wet condition until visible material is cleaned up.
4. Material removed from the building structure or components shall not be dropped or thrown to the floor. Material is to be removed as intact sections or components whenever possible and carefully lowered to the floor. When this cannot be done, materials will be transported by a constructed dust-tight shoot to containers on the floor, or the material may be containerized at elevated levels (e.g. on scaffolds) and carefully lowered to the ground by mechanical means.
5. Containers (6-mil polyethylene bags or drums) shall be sealed when full. Bags shall not be overfilled. They shall be securely sealed to prevent accidental opening and leakage by tying the tops of the bags in an overhand knot or by taping in gooseneck fashion. Do not seal the bags with wire or cord. Bags shall be decontaminated on exterior surfaces by

HEPA vacuuming and wet cleaning before being placed in clean drums or bags in the waste decontamination pass-out enclosure.

6. Large components removed intact may be wrapped in two layers of 6-mil polyethylene sheeting secured with tape for transport to the landfill.
7. Asbestos-containing waste with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) will tear polyethylene bags or sheeting, and thus must be placed in drums and/or burlap bags for disposal.
8. After completion of all stripping work, surfaces from asbestos containing material have been removed shall be wet-brushed and sponged or cleaned by some equivalent method to remove all visible residue.
9. Clean-up shall proceed in accordance with Section 3.7
10. After the work area has been rendered free of visible residues, a thin coat of satisfactory encapsulating agent shall be applied to all surfaces in the work area including structural members, building components, and plastic sheeting on walls, floors, and covering non-removable items, to seal in non-visible residue.

#### B. Glovebag Removal within Mini-Containment Enclosures

1. All glovebag removal activities shall be performed within tented mini-containment enclosures. Glove bag procedures for the removal and repair of pipe insulation shall be conducted using commercially available glove bags of 6-mil clear polyethylene or equivalent, appropriately sized for the project.
2. Prior to performing glove bag removal procedures, the work area shall be isolated to restrict access to work areas by non abatement personnel. Warning signs shall be posted at the entrances to the restricted area in order to avoid any accidental entry into the work area.
3. Upon isolation of the work area, a mini-containment shall be erected consisting of one layer of 6-mil polyethylene sheeting over floors, ceilings and walls. Negative pressure to the Work Area shall be provided using HEPA filtration.
4. Decontamination facilities shall be constructed consisting of at least a clean room, shower room and equipment room within a reasonable proximity to the Work Area as approved by the Owner's Representative.
5. Glovebag removal procedures shall be done by a minimum of two licensed asbestos workers trained in mini-containment procedures and equipped with respiratory protection and two disposable coveralls.
6. All necessary tools shall be brought into the mini-containment Work Area before the glove bag removal procedure begins.



7. Glovebags shall be sized to adequately fit the diameter of pipe insulation to be removed. Do not attempt to use a glove bag on piping hotter than 150 degrees F.
8. Glovebag removal procedures shall be performed as follows:
  - a. Place all the tools and material necessary to remove and seal the covering in the tool pouch or in the bottom of the bag.
  - b. Attach the glove bag around the pipe and seal the ends of the glove bag securely to the pipe utilizing duct tape to create an airtight seal. The integrity of the seals shall be tested by smoke testing prior to the initiation of removal.
  - c. Make a small hole in the center of the bag just below the pipe (6 inches) and insert the water sprayer. Seal this hole airtight with tape. The subject pipe insulation shall be misted with amended water prior to and during removal activities.
  - d. Use tools to cut existing wires, bands, or metal jacketing. Care must be taken when removing these to avoid ruptures of the bag from the sharp edges. The material removed should be gently placed on the bottom of the bag to avoid rips and tears.
  - e. Cut the ends of the insulation and slit lengthwise to remove insulation from the associated pipe.
  - f. Spray unprotected pipe with amended water and use tools to fully remove any residual dust and debris from pipe surfaces.
  - g. Seal exposed ends of insulation with bridging encapsulant or duct tape.
  - h. Spray tools and amended water to clean and place tools within the one of the rubber gloves.
  - i. Turn the glove inside out and twist and twist and seal end of glove from the inner portion with duct tape. Sever the center of the duct tape to create two separate bags.
  - j. Remove the water wand and replace it with the HEPA vacuum. Seal the hole and collapse the bag with the vacuum. This will create negative pressure in the bag and help reduce tears and leaks.
  - k. Twist the glove bag several times and seal the connection with duct tape.
  - l. Place a 6-mil polyethylene disposal bag under the glove bag, remove the tape, and place the sealed glovebag into the disposal bag.
9. Upon completion of removal activities, workers shall proceed into the airlock, remove the outer suit, and place the suit within the polyethylene disposal bag. The worker shall then proceed to the decontamination unit and shall follow routine decontamination procedures.

### **3.5 CLEAN UP PROCEDURES**

#### **A. Clean-up Procedures Shall Include the Following**

1. Remove and containerize all visible accumulations of asbestos containing material and asbestos contaminated debris utilizing rubber dust pans and rubber squeegees to move material around. Do not use metal shovels to pick up or move accumulated waste. Special care shall be taken to minimize damage to floor sheeting.
2. Wet clean all surfaces in the work area using rags, mops, and sponges as appropriate. To pick up excess water and gross wet debris, use a HEPA wet-dry vacuum.

3. The negative pressure ventilation units shall remain in continuous operation. Decontamination enclosure systems shall remain in place and be utilized.
4. After cleaning the work area, wait until all the surfaces become dry to allow fibers to settle and HEPA vacuum and wet clean all objects and surfaces in the work area again.
5. Remove all containerized waste from the area and waste container pass-out airlock.
6. Decontaminate all tools and equipment and remove at the appropriate time in the cleaning sequence.
7. Inspect the work area for visible residue. If any accumulation of residue is observed, it will be assumed to be asbestos and the settling period/cleaning cycle repeated.
8. Following the completion of required cleaning cycles and authorization by the Owner's Representative, encapsulate each work area where asbestos has been removed.
9. The work areas shall be cleaned until the Owner and/or the Owner's Representative has determined that the results of his visual inspection are satisfactory. Clearance air testing will be passed when laboratory results indicate airborne fiber concentrations of less than or equal to 0.01 fibers per cubic centimeter (using phase contrast microscopy) at all sampling locations. Sampling protocols shall conform to that presented in 77 Ill. Adm. Code 855. Additional cleaning cycles shall be provided, as necessary, at no cost to the Building Owner/Management until these criteria have been met.
10. Following the satisfactory completion of clearance air monitoring, the remaining barriers may be removed and properly disposed of. A final visual inspection by the Owner's Representative shall insure that no contamination remains in the work area. Unsatisfactory conditions may require additional cleaning and air monitoring which shall both be performed by the Contractor at no additional to the Owner.
11. All HEPA filtration units shall remain in operation until the containment has successfully achieved final clearance air monitoring.

### **3.6 AIR MONITORING AND ANALYSIS**

#### **A. General**

1. The Contractor will be responsible for monitoring the workers exposure to asbestos fibers as required by law. All monitoring for that purpose will comply with the requirements of the most recent standards promulgated to cover the activity. Monitoring results will be provided on a daily basis to the Owner or the Owner's Representative.
2. The Contractor shall ensure that no employee is exposed to an airborne fiber concentration in excess of 1.0 fiber per cubic centimeter (f/cc) of air as averaged over a sampling period

of thirty (30) minutes or is exposed to concentrations that exceeds 0.1 f/cc when factoring in the protection factor of the provided respiratory protection.

3. Wherever possible, the Owner will conduct air sampling prior to the abatement to establish the background concentration of airborne fibers.
4. Wherever possible, Owner will conduct area monitoring during all phases of abatement process. Owner reserves the right to stop/cease abatement activities when the ambient air concentration of asbestos fibers outside the work area exceeds 0.01 f/cc or the background air quality until control measures are instituted to reduce the fiber concentrations to the background air quality or to 0.01 f/cc or less and until any contaminated area is cleaned using HEPA vacuum cleaner and/or wet cleaning methods.

#### B. Clearance Air Sampling

1. Following completion of clean-up operations, the Contractor shall notify the Owner and/or the Owner's Representative that the work area is ready for clearance air sampling.
2. The air sampling will be conducted using sampling pumps calibrated at a flow rate of at least 6 and not more than 12 liters per minute using collection media and procedures in accordance with 77 Ill. Adm. Code 855 final air clearance sampling and analysis methods.
3. The number of samples that are required and approximate locations where they shall be taken should be established by the Owner's Representative in conjunction with the Air Sampling Technician before abatement activity begins.
4. Aggressive sampling shall be performed with sufficient portable 20" fans circulating air in the work area to simulate actual use conditions. Negative pressure ventilation units will not suffice for this purpose, but will continue to operate during clearance air sampling.
5. Clearance air samples shall be analyzed by Phase Contrast Microscopy (PCM), samples at all inside abatement locations shall not exceed 0.01 f/cc.
6. Areas exceeding this level shall be re-cleaned by the Contractor at no additional cost to the Owner and retested until satisfactory levels are obtained.

### 3.7 DISPOSAL PROCEDURES

#### A. Waste Disposal

1. Temporary storage on-facility shall be secured and shall be free of debris and lined with 6-mil polyethylene sheeting to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first and extend up the side walls. Wall sheeting shall be overlapped and taped into place.
2. Temporary storage on-site shall be provided by the Owner.

3. Waste volume in the temporary storage shall be reported daily to the Owner.
4. Waste materials shall be removed from the Work Area on a daily basis. All bagged waste shall be double bagged and sealed with duct tape "goose neck" ties. Transporters will use only the contractor's plastic gurneys for bagged waste. The gurneys will not be overloaded, so as not to expose the polyethylene bags to punctures and/or tears. At all times, all transporters of asbestos debris must have a half-mask negative air respirator with HEPA cartridge filters within concealed reach (eg. tied-off on the gurnies in opaque bags) at all times. NOTE: a current Fit Test Certificate will be required for users of half-mask respirators.
5. Any debris or residue observed on containers or surfaces outside of the work area resulting from clean-up disposal activities shall be cleaned up immediately using HEPA filtered vacuum equipment and/or wet methods as appropriate.
6. Disposal must occur at an authorized site in accordance with the regulatory requirements of NESHAPS and applicable State and Local guidelines and regulations.
7. All dump receipts, trip tickets, transportation manifests or other documentation of disposal shall be delivered to the Owner for his records. A recommended recordkeeping format utilizes a chain-of-custody form which includes the names and addresses of the Generator (Owner), Contractor, pick-up site, and disposal site, the estimated quantity of asbestos waste, and the type of containers used. The form should be signed by the Generator, the Contractor, and the Disposal Site Operator, as the material changes hands. If a separate hauler is employed, his name, address, telephone number, and signature should also appear on the form.

B. Transportation to the Landfill

1. Once drums, bags, and wrapped components have been removed from the work area, they shall be loaded into an enclosed truck and locked for transport to the landfill.
2. When moving containers, utilize hand trucks, carts, and proper lifting techniques to avoid back injuries. Trucks with lift gates are helpful for raising drums during truck loading.
3. The enclosed cargo area of the truck shall be free of debris and lined with 6-mil polyethylene sheeting to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first and extend up the side walls. Wall sheeting shall be overlapped and taped into place.
4. Drums shall be placed on level surfaces in the cargo area and packed tightly together to prevent shifting and tipping. Large structural components shall be secured to prevent shifting and bags placed on top. Do not throw containers into truck cargo area.

5. Any debris or residue observed on containers or surfaces outside of the work area resulting from clean-up disposal activities shall be cleaned up immediately using HEPA filtered vacuum equipment and/or wet methods as appropriate.
6. If dumpsters are used for asbestos waste disposal or enclosed cargo area of a truck, they shall have metal doors or metal tops that can be closed and locked to prevent vandalism or other disturbances of bagged asbestos debris. Dumpsters and vehicles shall be locked at all times except when under the direct supervision of Contractor personnel during waste loading materials.

### **3.8 REESTABLISHMENT OF THE WORK AREA**

#### **A. Work Area Reestablishment**

1. Reestablishment of the work area shall only occur following the completion of cleanup procedures and after clearance air testing has been performed and documented to the satisfaction of the Owner.
2. Polyethylene barriers shall be removed from walls and floors at this time, maintaining decontamination enclosure systems and barriers over doors, windows, etc.
3. The Contractor and Owner shall visually inspect the work area for any remaining visible residue. Evidence of contamination will necessitate additional cleaning requirements.
4. Additional air monitoring shall be performed if additional clean-up is necessary.
5. Following satisfactory clearance of the work area, remaining polyethylene barriers may be removed and disposed as asbestos contaminated waste.
6. At the discretion of the Contractor, mandatory requirements for personal protective equipment may be waived following the removal of all barriers.
7. Reestablish HVAC, mechanical and electrical systems in proper working order.
8. At the completion of work activities, a final walkthrough punchlist shall be performed by the Owner's Representative in conjunction with the Owner and the Contractor. All items identified in the final walkthrough punchlist shall be completed to the satisfaction of the Owner prior to full demobilization from the site. The Owner reserves the right to withhold final payment for services rendered until final punchlist items have been successfully completed by the Contractor.