

**SECTION 02 82 13
ASBESTOS ABATEMENT**

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PART 1 GENERAL

1. PROJECT

A.

PART 1 - GENERAL

1.1 SUMMARY OF THE WORK

1.1.1 CONTRACT DOCUMENTS AND RELATED REQUIREMENTS

Drawings, general provisions of the contract, including general and supplementary conditions and other Division 1000 specifications, shall apply to the work of this section. The contract documents show the work to be done under the contract and related requirements and conditions impacting the project. Related requirements and conditions include applicable codes and regulations, notices and permits, existing site conditions and restrictions on use of the site, coordination with other work and the phasing of the work. In the event the Asbestos Abatement Contractor discovers a conflict in the contract documents and/or requirements or codes, the conflict must be brought to the immediate attention of the Owner for resolution. Whenever there is a conflict or overlap in the requirements, the most stringent shall apply. Any actions taken by the Contractor without obtaining guidance from the Owner's Representative shall become the sole risk and responsibility of the Asbestos Abatement Contractor.

1.1.2 EXTENT OF WORK

- A. Below is a brief description of the estimated quantities of asbestos-containing materials to be abated and disposed. These quantities are for informational purposes only and are based on the best information available at the time of the specification preparation. The Asbestos Abatement Contractor shall satisfy himself as to the actual quantities to be abated. Nothing in this section may be interpreted as limiting the extent of work otherwise required by this contract and related documents.
- B. Removal of all Regulated Asbestos-Containing Materials, clean-up of debris on floors and other surfaces, and proper disposal of asbestos-containing material waste in the following approximate quantities (priority removal of items marked with asterisk):

INTERIOR A Restaurant:

Estimated 700 Square Feet (700 SF) of Black Mastic under ceramic Floor Tile
Estimated 0.5 Square Feet (0.5 SF) of Explosion-proof Light Gasket (assumed Asbestos-containing)
Estimated 20 Square Feet (20 SF) of Electrical Insulators in Panels and Switchgear (assumed Asbestos-containing)
Estimated 60 Square Feet (60 SF) of Fire Doors (assumed Asbestos-containing)

INTERIOR B Retail:

Estimated 320 Square Feet (320 SF) of 9" x 9" Floor Tile, Grey & Mastic
Estimated 20 Square Feet (20 SF) of Fire Door (assumed Asbestos-containing)
Estimated 20 Square Feet (20 SF) of Electrical Insulators in Panels and Switchgear (assumed Asbestos-containing)

INTERIOR C Retail:

Estimated 300 Square Feet (320 SF) of Drywall & Joint Compound
Estimated 1200 Square Feet (1200 SF) of Texturized Drywall & Joint Compound
Estimated 320 Square Feet (320 SF) of 9" x 9" Floor Tile, Tan Streaked & Mastic
Estimated 20 Square Feet (20 SF) of 12" x 12" Floor Tile, Tan Streaked & Black Mastic
Estimated 20 Square Feet (20 SF) of Fire Door (assumed Asbestos-containing)
Estimated 20 Square Feet (20 SF) of Electrical Insulators in Panels and Switchgear (assumed Asbestos-containing)

INTERIOR D Retail:

Estimated 120 Square Feet (120 SF) of Texturized Drywall & Joint Compound
Estimated 1420 Square Feet (1420 SF) of 1Tan Carpet Mastic over Black Mastic

Estimated 20 Square Feet (20 SF) of Fire Door (assumed Asbestos-containing)
Estimated 20 Square Feet (20 SF) of Electrical Insulators in Panels and Switchgear (assumed Asbestos-containing)

INTERIOR E Retail:

Estimated 2100 Square Feet (2100 SF) of Drywall & Joint Compound
Estimated 90 Square Feet (90 SF) of 9" x 9" Floor Tile, Beige & Black Mastic
Estimated 1450 Square Feet (1450 SF) of 12" x 12" Floor Tile , Grey Mottled & Black Mastic
Estimated 20 Square Feet (20 SF) of Fire Door (assumed Asbestos-containing)
Estimated 20 Square Feet (20 SF) of Electrical Insulators in Panels and Switchgear (assumed Asbestos-containing)

INTERIOR F Retail:

Estimated 1400 Square Feet (1400 SF) of 12" x 12" Floor Tile, Grey Plain & Black Mastic
Estimated 20 Square Feet (20 SF) of Fire Door (assumed Asbestos-containing)
Estimated 20 Square Feet (20 SF) of Electrical Insulators in Panels and Switchgear (assumed Asbestos-containing)

INTERIOR G Club:

Estimated 420 Square Feet (420 SF) of 12" x 12" Floor Tile, Aqua Mottled & Black Mastic
Estimated 4000 Square Feet (4000 SF) of 1Tan Carpet Mastic over Black Mastic
Estimated 40 Square Feet (40 SF) of Fire Door (assumed Asbestos-containing)
Estimated 30 Square Feet (30 SF) of Electrical Insulators in Panels and Switchgear (assumed Asbestos-containing)

INTERIOR H Grocery:

Estimated 4800 Square Feet (4800 SF) of 2' x 4' Ceiling Tiles, Random Holes
Estimated 180 Square Feet (180 SF) of 2' x 4' Ceiling Tiles, Long Ways Fissures
Estimated 24 Square Feet (24 SF) of 1/8" Cement Pegboard
Estimated 300 Square Feet (300 SF) of 1/8" Cement Panels
Estimated 9200 Square Feet (9200 SF) of Drywall & Joint Compound
Estimated 100 Square Feet (100 SF) of 9" x 9" Floor Tile, Beige Mottled & Black Mastic
Estimated 18000 Square Feet (18000 SF) of Black Mastic
Estimated 80 Square Feet (80 SF) of Fire Door (assumed Asbestos-containing)
Estimated 50 Square Feet (50 SF) of Electrical Insulators in Panels and Switchgear (assumed Asbestos-containing)

EXTERIOR:

Estimated 12 Square Feet (120 Linear Feet) of Window Glazing Compound
Estimated 100 Linear Feet (10 SF) of Exterior Caulk, West Entrance, H Grocery
Estimated 1000 Square Feet (1000 SF) of Nonfriable Asbestos-containing Bituminous Roofing in Poor Condition, H Grocery East Mechanical Area

- C. The following identified asbestos-containing materials will NOT be abated since they are assumed Category I Non-Friable asbestos-containing materials. These materials are NOT TO BE DISTURBED:

Estimated 5,000 Square Feet of Category I Nonfriable Bituminous Roofing Material on roofs of A Retail, C Retail and D Retail Buildings (assumed Asbestos-containing)

1.1.3 RELATED WORK

- A. Building Demolition (being bid separately)

1.1.4 TASKS

The work tasks are summarized briefly as follows:

- A. Pre-abatement activities including pre-abatement meeting(s), inspection(s), notifications, permits, submittals for approval, work-site preparations, emergency procedures arrangements, and standard operating procedures for asbestos abatement work.
- B. Abatement activities including removal of identified asbestos-containing materials from building, and disposal of ACM waste, recordkeeping, security, monitoring, and inspections.
- C. Cleaning and decontamination activities including final visual inspection, air monitoring and certification of decontamination.
- D. Demobilization from site.

1.1.5 ABATEMENT CONTRACTORS USE OF PREMISES

- A. The Abatement Contractor and Contractor's personnel shall cooperate fully with the OWNER representative and consultant to facilitate efficient use of buildings and areas within buildings. The Abatement Contractor shall perform the work in accordance with the contract specifications, drawings, and phasing plan and in compliance with all applicable regulations and requirements.
- B. The Contractor shall use the existing facilities in the building strictly within the limits indicated in contract documents as well as the approved pre-abatement work plan. Asbestos abatement drawings MUST show the limits of regulated areas; the placement of decontamination facilities; the temporary location of bagged waste ACM; the path of transport to outside the building; and the temporary waste storage area for each regulated area. Any variation from the arrangements shown on approved drawings submitted by the contractor shall be secured in writing from the OWNER representative through the pre-abatement plan of action. The following limitations of use shall apply to existing facilities shown on drawings: existing electrical power, water and sewerage may be used by Abatement Contractor.

1.2 VARIATIONS IN QUANTITY

The quantities and locations of ACM as indicated on the drawings and the extent of work included in this section are estimates that are limited by access to hidden areas of the buildings. Accordingly, minor variations (+/- 15%) in quantities of ACM within the regulated area are considered as having no impact on contract price and time requirements of this contract. Where additional work is required beyond the above variation, the contract time and price will be adjusted under provisions of the applicable clause in the contract. Additional or reduced abatement work beyond the variations will be basis for adjusting the contract price.

1.3 STOP ASBESTOS REMOVAL

If the Owner's field representative presents a written **Stop Asbestos Removal Order**, the Abatement Contractor/Personnel shall immediately stop all asbestos removal and maintain HEPA filtered air flow and adequately wet any exposed ACM. The Contractor shall not resume any asbestos removal activity until authorized to do so by the **Owner**. A stop asbestos removal order may be issued at any time the **Owner** determines abatement conditions/activities are not within specification requirements. Work stoppage will continue until conditions have been corrected to the satisfaction of the **Owner**. Standby time and costs for corrective actions will be borne by the Abatement Contractor, including the industrial hygienist consultant's time. The occurrence of any of the following events shall be reported immediately by the Abatement Contractor in writing to the **Owner** representative and shall require the Contractor to immediately stop asbestos removal activities and initiate fiber reduction activities:

- A. airborne fiber concentration >0.05 f/cc outside a regulated area;
- B. breach/break in regulated area barrier(s);
- C. loss of negative pressure in the regulated area (<0.02" of water);
- D. serious injury/death within the regulated area;
- E. fire/safety emergency within the regulated area;
- F. respiratory protection system failure, including failure of workers to properly use respiratory protection;
- G. power failure; or
- H. excessive airborne fibers (>0.5 f/cc) in the regulated area when wet methods are being used.

1.4 DEFINITIONS

1.4.1 GENERAL

Definitions and explanations here are neither complete nor exclusive of all terms used in the contract documents, but are general for the work to the extent they are not stated more explicitly in another element of the contract documents. Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated therein.

1.4.2 GLOSSARY

Abatement - Procedures to control fiber release from asbestos-containing materials, typically during removal. Includes removal, encapsulation, enclosure, demolition and renovation activities related to asbestos.

ACE - Asbestos contaminated elements.

ACM - Asbestos containing material.

Aerosol - Solid or liquid particulate suspended in air.

Adequately wet - Sufficiently mixed or penetrated with liquid to prevent the release of particulates. If visible emissions are observed coming from the ACM, then that material has not been adequately wetted.

Aggressive method - Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact ACM.

Aggressive sampling - EPA AHERA defined clearance sampling method using air moving equipment such as fans and leaf blowers to aggressively disturb and maintain in the air residual fibers after abatement.

AHERA - Asbestos Hazard Emergency Response Act. Asbestos regulations for schools issued in 1987.

AIHA - American Industrial Hygiene Association

Aircell - Pipe or duct insulation made of corrugated cardboard which contains asbestos.

Air monitoring - The process of measuring the fiber content of a known volume of air collected over a specified period of time. The NIOSH 7400 Method, Issue 2 is used to determine the fiber levels in air.

Air sample filter - The filter used to collect fibers that are then counted. The filter is made of mixed cellulose ester membrane for PCM (Phase Contrast Microscopy) and polycarbonate for TEM (Transmission Electron Microscopy)

Amended water - Water to which a surfactant (wetting agent) has been added to increase the penetrating ability of the liquid.

Asbestos - Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated or altered. Asbestos also includes PACM, as defined below.

Asbestos-containing material (ACM) - Any material containing more than one percent by weight of asbestos of any type or mixture.

Asbestos contaminated elements (ACE) - Building elements such as ceilings, walls, lights, or ductwork that are contaminated with asbestos.

Asbestos-containing waste material - Asbestos-containing material or asbestos contaminated objects requiring disposal.

Asbestos waste decontamination facility - A system consisting of drum/bag washing facilities and a temporary storage area for cleaned containers of asbestos waste. Used as the exit for waste and equipment leaving the regulated area. In an emergency, it may be used to evacuate personnel.

ASHARA - Asbestos School Hazard Abatement Re-authorization Act. This act on the regulations for implementation requires individuals conducting asbestos inspections to be AHERA trained with current certification.

Authorized person - Any person authorized by the OWNER, the Contractor, or government agency and required by work duties to be present in regulated areas.

Authorized visitor - Any person approved by the OWNER; the contractor; or any government agency having jurisdiction over the regulated area.

Barrier - Any surface that isolates the regulated area and inhibits fiber migration from the regulated area.

Containment Barrier - An airtight barrier consisting of walls, floors, and/or ceilings of sealed plastic sheeting that surrounds and seals the outer perimeter of the regulated area.

Critical Barrier - The barrier responsible for isolating the regulated area from adjacent spaces, typically constructed of plastic sheeting secured in place at openings such as doors, windows, or any other opening into the regulated area.

Primary Barrier - Barriers placed over critical barriers and exposed directly to abatement work.

Secondary Barrier - Any additional sheeting used to isolate and provide protection from debris during abatement work.

Breathing zone - The hemisphere forward of the shoulders with a radius of about 150 - 225 mm (6 - 9 inches) from the worker's nose.

Bridging encapsulant - An encapsulant that forms a layer on the surface of the ACM.

Building/facility owner - The legal entity, including a lessee, which exercises control over management and recordkeeping functions relating to a building and/or facility in which asbestos activities take place.

Bulk testing - The collection and analysis of suspect asbestos containing materials.

Certified Industrial Hygienist (CIH) - One certified and maintaining certification in the practice of industrial hygiene by the American Board of Industrial Hygiene.

Class I asbestos work - Activities involving the removal of Thermal System Insulation (TSI) and surfacing ACM and Presumed Asbestos Containing Material (PACM).

Class II asbestos work - Activities involving the removal of ACM that is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic.

Class III asbestos work - Repair and maintenance operations where ACM, including TSI and surfacing ACM and PACM, may be disturbed.

Class IV asbestos work - Maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste, and debris resulting from Class I, II, and III activities.

Clean room/Changing room - An uncontaminated room having facilities for the storage of employee's street clothing and uncontaminated materials and equipment.

Clearance sample - The final air sample taken after all asbestos work has been done and visually inspected. Performed by the **Owner's** certified industrial hygiene consultant (CIH).

Closely resemble - The major workplace conditions that have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person - In addition to the definition in 29 CFR 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work, one who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

Count - Refers to the fiber concentration or the average number of fibers greater than five microns in length per cubic centimeter of air.

Decontamination area/unit - An enclosed area adjacent to and connected to the regulated area and consisting of an equipment room, shower room, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition - The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Disposal bag - Typically 6-mil thick siftproof, dustproof, leak-tight container used to package and transport asbestos waste from regulated areas to the approved landfill. Each bag/container must be labeled/marked in accordance with EPA, OSHA and DOT requirements.

Disturbance - Activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount that can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or disposal bag which shall not exceed 60 inches in length or width.

Drum - A rigid, impermeable container made of cardboard fiber, plastic, or metal which can be sealed in order to be siftproof, dustproof, and leak-tight.

Employee exposure - The exposure to airborne asbestos that would occur if the employee were not wearing respiratory protection equipment.

Encapsulant - A material that surrounds or embeds asbestos fibers in an adhesive matrix and prevents the release of fibers.

Encapsulation - Treating ACM with an encapsulant.

Enclosure - The construction of an airtight, impermeable, permanent barrier around ACM to control the release of asbestos fibers from the material and also eliminate access to the material.

Equipment decontamination facility (EDF) - The area in which equipment is decontaminated before removal from the regulated area.

Equipment room - A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fiber - A fibrous form of asbestos, 5 microns or longer, with a length to width ratio of at least 3 to 1.

Fibers per cubic centimeter (f/cc) - the concentration of asbestos fibers greater than 5 microns in length in a cubic centimeter of air.

Filter - Media used in respirators, vacuums, or other machines to remove particulates from air.

Firestopping - Material used to close the open parts of a structure in order to prevent a fire from spreading.

Friable asbestos containing material - Any material containing more than 1 percent asbestos as determined using the method specified in appendix A, Subpart F, 40 CFR 763, section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Glovebag - Not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which materials and tools may be handled.

High efficiency particulate air (HEPA) filter - A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 microns or greater in diameter.

HEPA vacuum - Vacuum collection equipment equipped with a HEPA filter system capable of collecting and retaining asbestos fibers.

Homogeneous area - An area of surfacing, thermal system insulation or miscellaneous ACM that is uniform in color, texture and date of application.

HVAC - Heating, Ventilation and Air Conditioning

Industrial hygienist - A professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards. Meets definition requirements of the American Industrial Hygiene Association (AIHA).

Industrial hygienist technician - A person working under the direction of a CIH who has special training, experience, certifications and licenses required for the industrial hygiene work assigned.

Intact - The ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

Lockdown - Applying encapsulant, after a final visual inspection, on all abated surfaces at the conclusion of ACM removal prior to removal of critical barriers.

National Emission Standards for Hazardous Air Pollutants (NESHAPs) - EPA's rule to control emissions of asbestos to the environment.

Negative initial exposure assessment - A demonstration by the employer which complies with the criteria in 29 CFR 1926.1101 (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PELs.

Negative pressure - Air pressure that is lower than the surrounding area, created by exhausting air from a sealed regulated area through HEPA equipped filtration units. OSHA requires maintaining -0.02" water gauge inside the negative pressure enclosure.

Negative pressure respirator - A respirator in which the air pressure inside the facepiece is negative during inhalation relative to the air outside the respirator.

Non-friable ACM - Material that contains more than 1 percent asbestos but cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Organic vapor cartridge - The type of cartridge used on air purifying respirators for organic vapor exposures.

Outside air - The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open dock.

Owner/operator - Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

Penetrating encapsulant - Encapsulant that is absorbed into the ACM matrix without leaving a surface layer.

Personal sampling/monitoring - Representative air samples obtained in the breathing zone of the person using a cassette and battery operated pump to determine asbestos exposure.

Permissible exposure limit (PEL) - The level of exposure OSHA allows for an 8-hour time weighted average. For asbestos fibers, the PEL is 0.1 fibers per cc.

Polarized light microscopy (PLM) - Light microscopy using dispersion staining techniques and refractive indices to identify and quantify the type(s) of asbestos present in a bulk sample.

Polyethylene sheeting - Strong plastic barrier material 4 to 6-mils thick, semi-transparent, sometimes flame retardant in compliance with NFPA 241.

Positive/negative fit check - A method of verifying the fit of a respirator by closing off the filters and breathing in or closing off the exhalation valve and breathing out while detecting leakage of the respirator.

Presumed ACM (PACM) - Thermal system insulation, surfacing, and flooring material installed in buildings prior to 1981. If the building owner has actual knowledge, or should have known through the exercise of due diligence that other materials are ACM, they too must be treated as PACM. The designation of PACM may be rebutted pursuant to 29 CFR 1926.1101.

Project designer - A person who has successfully completed the training and licensing requirements for an asbestos abatement project designer as required by 40 CFR 763 Appendix C, Part I; (B)(5).

Protection factor - A value assigned by OSHA/NIOSH to indicate the assigned protection a respirator should provide if worn properly. The number indicates the reduction of exposure level from outside to inside the respirator.

Qualitative fit test (QLFT) - A fit test using a challenge material that can be sensed by the wearer if leakage in the respirator occurs.

Quantitative fit test (QNFT) - A fit test using a challenge material that is quantified outside and inside the respirator thus allowing the determination of the actual fit factor.

Regulated area - An area established by the employer to demarcate where Class I, II, III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed the PEL.

Regulated ACM (RACM) - Friable ACM; Category I nonfriable ACM that has become friable; Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or; Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operation.

Removal - All operations where ACM, PACM and/or RACM is taken out or stripped from structures or substrates, including demolition operations.

Renovation - Altering a facility or one or more facility components in any way, including the stripping or removal of asbestos from a facility component that does not involve demolition activity.

Repair - Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

Shower room - The portion of the PDF where personnel shower before leaving the regulated area. Also used for bag/drum decontamination in the EDF.

Standard operating procedures (SOPs) - Asbestos work procedures required to be submitted by the contractor before work begins.

Supplied air respirator (SAR) - A respirator that utilizes an air supply separate from the air in the regulated area.

Surfacing ACM - A material containing more than 1 percent asbestos that is sprayed, troweled on or otherwise applied to surfaces for acoustical, fireproofing and other purposes.

Surfactant - A chemical added to water to decrease water's surface tension thus making it more penetrating into ACM.

Thermal system ACM - A material containing more than 1 percent asbestos applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

Transmission electron microscopy (TEM) - A microscopy method that can identify and count asbestos fibers.

Owner Representative - The Owner official responsible for on-going project work.

Visible emissions - Any emissions, which are visually detectable without the aid of instruments, coming from ACM/PACM/RACM or ACM waste material.

Waste generator - Any owner or operator whose act or process produces asbestos-containing waste material.

Waste shipment record - The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

Wet cleaning - The process of thoroughly eliminating, by wet methods, any asbestos contamination from surfaces or objects.

1.4.3 REFERENCED STANDARDS ORGANIZATIONS

The following acronyms or abbreviations as referenced in contract/specification documents are defined to mean the associated names. Names and addresses may be subject to change.

- A. AIHA American Industrial Hygiene Association
2700 Prosperity Avenue, Suite 250
Fairfax, VA 22031
703-849-8888
- B. ANSI American National Standards Institute
1430 Broadway
New York, NY 10018
212-354-3300
- C. ASTM American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103
215-299-5400
- D. CFR Code of Federal Regulations
Government Printing Office
Washington, DC 20420
- E. CGA Compressed Gas Association
1235 Jefferson Davis Highway
Arlington, VA 22202
703-979-0900
- F. CS Commercial Standard of the National Institute of Standards and Technology(NIST)
U. S. Department of Commerce
Government Printing Office
Washington, DC 20420
- G. EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460
202-382-3949
- H. MIL-STD Military Standards/Standardization Division
Office of the Assistant Secretary of Defense
Washington, DC 20420
- I. MSHA Mine Safety and Health Administration
Respiratory Protection Division
Ballston Tower #3
Department of Labor
Arlington, VA 22203
703-235-1452
- J. NIST National Institute for Standards and Technology
U. S. Department of Commerce

Gaithersburg, MD 20234
301-921-1000

- K. NEC National Electrical Code
- L. NEMA National Electrical Manufacturer's Association
2101 L Street, N.W.
Washington, DC 20037
- M. NFPA National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
800-344-3555
- N. NIOSH National Institutes for Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, OH 45226
513-533-8236
- O. OSHA Occupational Safety and Health Administration
U.S. Department of Labor
Government Printing Office
Washington, DC 20402
- P. UL Underwriters Laboratory
333 Pfingsten Rd.
Northbrook, IL 60062
312-272-8800

1.5 APPLICABLE CODES AND REGULATIONS

1.5.1 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS

- A. All work under this contract shall be done in strict accordance with all applicable Federal, State, and local regulations, standards and codes governing asbestos abatement, and any other trade work done in conjunction with the abatement. All applicable codes, regulations and standards are adopted into this specification and will have the same force and effect as this specification.
- B. The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with this specification exists, the most stringent requirement(s) shall be utilized.
- C. Copies of all standards, regulations, codes and other applicable documents, including this specification and those listed in Section 1.5 shall be available at the worksite in the clean change area of the worker decontamination system.

1.5.2 CONTRACTOR RESPONSIBILITY

The asbestos abatement contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to any and all aspects of the abatement project. The contractor is responsible for providing and maintaining training, accreditations, medical exams, medical records, personal protective equipment as required by applicable Federal, State and Local regulations. The contractor shall hold the **Owner**, Owner's Representatives, and consultants harmless for any failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of himself, his employees, or his subcontractors. The contractor will incur all costs for personal air monitoring, including all sampling/analytical costs to assure compliance with OSHA/EPA/State requirements.

1.5.3 FEDERAL REQUIREMENTS

Federal requirements that govern some aspect of asbestos abatement include, but are not limited to, the following regulations.

- A. Occupational Safety and Health Administration (**OSHA**)
 - 1. Title 29 CFR 1926.1101 - Construction Standard for Asbestos
 - 2. Title 29 CFR 1910.132 - Personal Protective Equipment
 - 3. Title 29 CFR 1910.134 - Respiratory Protection

4. Title 29 CFR 1926 - Construction Industry Standards
5. Title 29 CFR 1910.20 - Access to Employee Exposure and Medical Records
6. Title 29 CFR 1910.1200 - Hazard Communication
7. Title 29 CFR 1910.151 - Medical and First Aid
- B. Environmental Protection Agency (**EPA**)
 1. 40 CFR 61 Subpart A and M (Revised Subpart B) - National Emission Standard for Hazardous Air Pollutants - Asbestos.
 2. 40 CFR 763.80 - Asbestos Hazard Emergency Response Act (AHERA)
- C. Department of Transportation (**DOT**)
Title 49 CFR 100 - 185 - Transportation

1.5.4 STATE REQUIREMENTS

State requirements that apply to the asbestos abatement work, disposal, clearance, etc., include, but are not limited to, the following:

- A. Ohio Environmental Protection Agency (OEPA)
 1. Ohio Asbestos Emission Control Rules (OAC 3745-20, 22)

1.5.5 LOCAL REQUIREMENTS

If local requirements are more stringent than federal or state standards, the local standards are to be followed. The Regional Air Pollution Control Agency, Dayton, Ohio is the local enforcement agency.

1.5.6 STANDARDS

- A. Standards that govern asbestos abatement activities include, but are not limited to, the following:
 1. American National Standards Institute (ANSI) Z9.2-79 - Fundamentals Governing the Design and Operation of Local Exhaust Systems Z88.2 - Practices for Respiratory Protection.
 2. Underwriters Laboratories (UL) 586-90 - UL Standard for Safety of HEPA Filter Units, 7th Edition.
- B. Standards that govern encapsulation work include, but are not limited to the following:
 1. American Society for Testing and Materials (ASTM)
- C. Standards governing testing laboratories:
 1. Air sampling - AIHA Laboratory Accreditation Program Accredited
 2. Bulk sampling - NIST NVLAP Accredited
- D. Standards that govern the fire and safety concerns in abatement work include, but are not limited to, the following:
 1. National Fire Protection Association (NFPA) 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.
 2. NFPA 701 - Standard Methods for Fire Tests for Flame Resistant Textiles and Film.
 2. NFPA 101 - Life Safety Code

1.5.7 EPA GUIDANCE DOCUMENTS

- A. EPA guidance documents that discuss asbestos abatement work activities are listed below. These documents are made part of this section by reference. EPA publications can be ordered from (800) 424-9065.
- B. Guidance for Controlling ACM in Buildings (Purple Book) EPA 560/5-85-024
- C. Asbestos Waste Management Guidance EPA 530-SW-85-007
- D. A Guide to Respiratory Protection for the Asbestos Abatement Industry EPA-560-OPTS-86-001
- E. Guide to Managing Asbestos in Place (Green Book) TS 799 20T July 1990

1.5.8 NOTICES

- A. State and Local agencies: Send written notification to the Ohio Department of Health and the City of Toledo, Division of Environmental Services, as required by state regulations. Update as required.
- B. Inform emergency response organizations that would respond to calls, including the local police and fire departments prior to beginning any work on ACM in writing.

- C. Copies of notifications shall be submitted to the Owner for the facility's records in the same time frame notification is given to EPA, State, and Local authorities. Copies of all available notifications shall be submitted with the contractor's Pre-Work Submittals.

1.5.9 PERMITS/LICENSES

- A. The contractor shall apply for and have all required permits and licenses to perform asbestos abatement work as required by Federal, State, and Local regulations.

1.5.10 POSTING AND FILING OF REGULATIONS

- A. Maintain two (2) copies of applicable federal, state, and local regulations. Maintain one copy near each regulated area where workers will have daily access to the regulations and keep another copy in the contractor's office.

1.5.11 OWNER RESPONSIBILITIES

Prior to commencement of work:

- A. Notify occupants adjacent to regulated areas of project dates and requirements for relocation, if needed. Arrangements must be made prior to starting work for relocation of desks, files, equipment and personal possessions to avoid unauthorized access into the regulated area. **Note: Notification of adjacent personnel is required by OSHA in 29 CFR 1926.1101 (k) to prevent unnecessary or unauthorized access to the regulated area.**
- D. Make available to the Abatement Contractor results of background air sampling; including location of samples, person who collected the samples, equipment utilized and method of analysis. During abatement, make available to the Abatement Contractor, results of bulk material analysis and air sampling data collected during the course of the abatement. This information shall not release the Contractor from any responsibility for OSHA compliance.

1.5.12 SITE SECURITY

- A. Regulated area access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Abatement Contractor's employees, employees of Subcontractors, Owner employees and representatives, State and local inspectors, designated industrial hygiene consultant personnel, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be posted in the clean room of the decontamination unit.
- B. Entry into the regulated area by unauthorized individuals shall be reported immediately to the Competent Person by anyone observing the entry.
- C. A logbook shall be maintained in the clean room of the decontamination unit. Anyone who enters the regulated area must record his or her name, affiliation, time in, and time out for each entry.
- D. Access to the regulated area shall be through a single decontamination unit. All other access (doors, windows, hallways, etc.) shall be sealed or locked to prevent entry to or exit from the regulated area. The only exceptions for this requirement are the waste load-out area that shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits. Emergency exits shall not be locked from the inside, however, they shall be sealed with polyethylene sheeting and taped until needed, and they should also be labeled as Emergency Exits.
- E. Where asbestos removal will be performed only by glovebag removal methods and space limitations preclude the use of an attached decontamination unit, the contractor may be authorized to construct a remote decontamination unit, with standard operating procedures to permit the workers to use the remote decontamination unit in accordance with OSHA requirements.
- F. The Abatement Contractor's Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel. Security shall be provided at the entrance to the regulated area to assure that all entrants are logged in/out and that only authorized personnel are allowed entrance.

- G. The Abatement Contractor will have the Owner's assistance in notifying adjacent personnel of the presence, location and quantity of ACM in the regulated area and enforcement of restricted access by the Owner's employees.
- H. Each regulated area shall be locked during non-working hours.

1.5.13 EMERGENCY ACTION PLAN AND ARRANGEMENTS

- A. An Emergency Action Plan shall be developed by the Abatement Contractor prior to commencing abatement activities and shall be agreed to by the Abatement Contractor and the Owner. The Plan shall meet the requirements of 29 CFR 1910.38 (a);(b).
- B. Emergency procedures shall be in written form and prominently posted in the clean room and equipment room of the decontamination unit. Everyone, prior to entering the regulated area, must read and sign these procedures to acknowledge understanding of the regulated area layout, location of emergency exits and emergency procedures.
- C. Emergency planning shall include written notification of police, fire, and emergency medical personnel of planned abatement activities; work schedule and layout of regulated area, particularly barriers that may affect response capabilities.
- D. Emergency planning shall include consideration of fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, confined spaces, and heat stress illness. Written procedures for response to emergency situations shall be developed and employee training in procedures shall be provided.
- E. Employees shall be trained in regulated area/site evacuation procedures in the event of workplace emergencies.
 - 1. For non life-threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.
 - 2. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove them from the regulated area, and secure proper medical treatment.
- F. Telephone numbers of all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.
- G. The Abatement Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3 minutes of a life-threatening injury/illness. Bloodborne Pathogen training shall also be verified for those personnel required to provide first aid/CPR.
- H. The Emergency Action Plan shall provide for a contingency plan in the event that an incident occurs that may require the modification of the standard operating procedures during abatement. Such incidents include, but are not limited to, fire; accident; power failure; negative pressure failure; and supplied air system failure. The Abatement Contractor shall detail procedures to be followed in the event of an incident assuring that work is stopped and wetting is continued until correction of the problem.

1.5.14 PRE-CONSTRUCTION MEETING

Prior to commencing the work, the Abatement Contractor shall meet with the Owner, Architect and Certified Industrial Hygienist Consultant to present and review, as appropriate, the items following this paragraph. The Abatement Contractor's Competent Person(s) who will be on-site and the CIH Consultant's on-site representative shall also participate in the pre-construction meeting. The pre-construction meeting is to discuss and determine procedures to be used during the project. At this meeting, the Abatement Contractor shall provide three copies of the Pre-Work Submittals, or an electronic copy of the submittals. No work shall be performed until the submittals are reviewed and approved in writing by the CIH.

1.6 SUBMITTALS

1.6.1 PRE-WORK SUBMITTALS

Submit to the Owner three (3) copies of Pre-Work Submittals or one (1) electronic copy of the Pre-Work Submittals 10 days prior to the proposed start of work for review and approval. Meeting this requirement is a prerequisite for the pre-construction meeting for this project. No

work shall be performed on site until the submittals have been reviewed and approved in writing by the CIH and Owner. Pre-Work Submittals must provide the following documentation:

- A. Proof of Contractor licensing.
- B. Proof the Competent Person is trained and accredited and approved for working in Ohio. Verification of the experience of the Competent Person shall also be presented.
- C. A list of all workers who will participate in the project, including experience and verification of training and accreditation.
- D. A list of and verification of training for all personnel who have current first-aid/CPR training. A minimum of one person per shift must have adequate training.
- E. Current medical written opinions for all personnel working on-site meeting the requirements of 29 CFR 1926.1101 (m).
- F. Current fit-tests for all personnel wearing respirators on-site meeting the requirements of 29 CFR 1926.1101 (h) and 29 CFR 1910.134.
- G. A copy of the Abatement Contractor's Standard Operating Procedures for Asbestos Abatement. In these procedures, the following information must be detailed, specific for this project.
 - 1. Regulated area preparation procedures;
 - 2. Notification requirements procedure of Contractor;
 - 3. Decontamination area set-up/layout and decontamination procedures for employees, using project drawings;
 - 4. Abatement methods/procedures and equipment to be used;
 - 5. Personal protective equipment to be used;
 - 6. Route of waste removal and location of waste transportation vehicle or dumpster.
 - 7. Proposed additional heating supply for building.
- H. Design and layout of each regulated area showing the number, size and location of negative air machines.
- I. Procedures for handling, packaging and disposal of asbestos waste.
- J. Emergency Action Plan and Contingency Procedures.
- K. Submit a detailed work schedule for the entire project reflecting contract documents and the phasing/schedule. The detailed work plan shall identify the workday from NTP to completion of the project, the activities planned for each day, the number of workers and supervisors on site each day, and work hours for each day. **Sufficient numbers of employees shall be scheduled to complete all of the identified asbestos abatement in less than twenty (20) EIGHT-HOUR CONSECUTIVE WEEK DAYS ON SITE. (NOTE: No work will be scheduled on weekends or Federal holidays.) THE ABATEMENT CONTRACTOR WILL REIMBURSE COSTS FOR THE MONITORING OF ADDITIONAL HOURS NEEDED TO COMPLETE THE PROJECT TO THE OWNER. (NOTE: ADDITIONAL INSPECTION AND TESTING BASED ON FAILURE TO ACHIEVE FINAL CLEARANCE CRITERIA WILL ALSO BE DONE AT THE EXPENSE OF THE ABATEMENT CONTRACTOR.)**
- L. Submit a staff organization chart showing all personnel who will be working on the project and their capacity/function.
- M. Provide a copy of the "Certificate of Worker's Acknowledgment" and the "Affidavit of Medical Surveillance and Respiratory Protection" for each person.
- N. Submit the specifics of the materials and equipment to be used for this project with brand names, model numbers, performance characteristics, pictures/diagrams, and number available for the following:
 - 1. Supplied air system, if used, negative air machines, HEPA vacuums, air monitoring pumps, calibration devices, pressure differential monitoring device.
 - 2. Wastewater filtration system, shower system, containment barriers.
 - 3. Encapsulants, surfactants, hand held sprayers, airless sprayers, and glovebags.
 - 4. Personal protective equipment, including respirators, protective clothing, hardhats, safety glasses, etc.
 - 5. Fire safety equipment, such as fire extinguishers, to be used in the regulated area. (NOTE: Fire alarm system and fire sprinkler system is still operational in the Building. Please be sure that an adequate number of fire extinguishers are present on site during the project.)
 - 6. Safety Data Sheets for each material containing hazardous ingredients to be used on the project.
- O. Submit the name, location, and phone number of the approved landfill; proof/verification the landfill is approved for ACM disposal; the landfill's requirements for ACM waste; the type of

- vehicle to be used for transportation; and name, address, and phone number of transportation subcontractor, if used.
- P. Submit required notifications and arrangements made with regulatory agencies having regulatory jurisdiction and the specific contingency/emergency arrangements made with local health, fire, ambulance, hospital authorities and any other notifications/arrangements.
 - Q. Submit the name, location and verification of the AIHA-accredited laboratory to be used for analysis of air and/or bulk samples.
 - R. Submit references for verification as follows. Make sure that all references are current and verifiable by providing current phone numbers and documentation.
 - 1. Asbestos Abatement Company: Project experience within the past 3 years; listing projects first most similar to this project: Project Name; Type of Abatement; Duration; Cost; Reference Name/Phone Number; Final Clearance; Completion Date
 - 2. List of project(s) halted by owner, A/E, IH, regulatory agency in the last 3 years: Project Name; Reason; Date; Reference Name/Number; Resolution
 - 3. List asbestos regulatory citations, penalties, damages paid and legal actions taken against the company in the last 3 years. Provide copies and all information needed for verification.
 - S. Submit copies of insurance policy, including exclusions to the coverage provided and the fact that asbestos abatement activities are covered by the policy.
 - T. When rental equipment is to be used in regulated areas or used to transport asbestos waste, the contractor shall inform the rental agency in writing of the intended use and assure complete decontamination of the rental equipment before return to the rental agency. A copy of the notification letter shall be submitted. If rental equipment will not be used on the project, submit a statement to that effect.
 - U. Encapsulant Requirements:
 - 1. Submit, before the start of work, the manufacturer's technical data for all types of encapsulants to be used on the project. Provide application instructions also.

1.6.2 SUBMITTALS DURING ABATEMENT

- A. The Competent Person shall maintain and submit all daily logs at the regulated area documenting the dates and times of the following: purpose, attendees and summary of meetings; all personnel entering/exiting the regulated area; document and discuss the resolution of unusual events such as barrier breeching, equipment failures, emergencies, and any cause for stopping work; representative air monitoring and results/TWAs/ELs. Submit the daily logs on a weekly basis to **OWNER's** representative.
- B. The CIH shall document and maintain the following during abatement and submit on a weekly basis to the **OWNER's** representative.
 - 1. Inspection and approval of the regulated area preparation prior to start of work and daily during work.
 - 2. Removal of any polyethylene barriers.
 - 3. Visual inspection/testing by the CIH prior to application of lockdown encapsulation.
 - 4. Packaging and removal of ACM waste from regulated area, including copies of Waste Shipment Records/landfill receipts to the **OWNER's** representative as generated.

1.6.3 SUBMITTALS AT COMPLETION OF ABATEMENT

The contractor shall submit three copies of the project report consisting of the approved contractor submittals, daily log book, documentation of events, personnel certifications and affidavits, personal air monitoring results, pressure monitoring records, and completed original Waste Shipment Records signed by the landfill's agent. The project report shall be submitted within 30 days of the completion of the project. Each copy of the report shall be provided in a 3-inch thick 3-hole binder and shall include a certificate of completion, to be signed and dated by the CIH, in accordance with Attachment #1. The CIH will add surveillance and air monitoring records to the project report and forward the abatement documentation report to the owner after completion of the project.

1.7 MONITORING, INSPECTION AND TESTING

1.7.1 GENERAL

- A. Perform throughout abatement work monitoring, inspection and testing inside and around the regulated area in accordance with the OSHA requirements and these specifications. The contractor shall periodically inspect and monitor conditions inside the regulated area to ensure compliance with these specifications. In addition, the contractor shall personally manage air sample collection, analysis, and evaluation for personnel, regulated area, and adjacent area samples to satisfy OSHA requirements. Additional inspection and testing requirements are also indicated in other parts of this specification.
- B. The **OWNER** will employ an independent Certified Industrial Hygienist (CIH) consultant and/or use its own IH to perform various services on behalf of the **OWNER**. The CIH will perform the necessary monitoring, inspection, testing, and other support services to ensure that **OWNER** representatives, employees, and visitors will not be adversely affected by the abatement work, and that the abatement work proceeds in accordance with these specifications, that the abated areas or abated buildings have been successfully decontaminated. The work of the CIH consultant in no way relieves the Abatement Contractor from their responsibility to perform the work in accordance with contract/specification requirements, to perform continuous inspection, monitoring and testing for the safety of their employees, and to perform other such services as specified. The cost of the CIH and consultant services will be borne by the **OWNER** except for any repeat of final inspection and testing that may be required due to unsatisfactory initial results, and additional work days or hours above the number specified in Paragraph 1.6.1.K of the specifications. Any repeated final inspections and/or testing and additional consultant service time, if required, will be paid for by the Abatement Contractor.
- B. If the airborne fiber concentration determined by the CIH during abatement work, either inside or outside the regulated area, utilizing the NIOSH 7400 air monitoring method, exceeds the specified stop work limits, the Abatement Contractor shall stop work. The Abatement Contractor may request confirmation of the results by analysis of the samples by TEM. Request must be in writing and submitted to the **OWNER's** representative. Cost for the confirmation of results will be borne by the Abatement Contractor for both the collection and analysis of samples and for the time delay that may/does result for this confirmation. Confirmation sampling and analysis will be the responsibility of the Contractor with review and approval of the CIH. An agreement between the Contractor and the CIH shall be reached on the exact details of the confirmation effort, in writing, including such things as the number of samples, location, collection, quality control on-site, analytical laboratory, interpretation of results and any follow-up actions. This written agreement shall be co-signed by the Contractor and CIH and delivered to the **OWNER's** representative.

1.7.2 SCOPE OF SERVICES OF THE CIH CONSULTANT

- A. The purpose of the work of the CIH is to: Assure quality; resolve problems; and prevent the spread of contamination beyond the regulated area. In addition, their work includes performing the final inspection and testing to determine whether the regulated area or building has been adequately decontaminated. All air clearance monitoring is to be done utilizing PCM or TEM after approval from the **OWNER's** representative. The CIH will perform the following tasks:
 - 1. Task 1: Establish background levels before abatement begins by collecting background samples. Retain samples for possible TEM reanalysis.
 - 2. Task 2: Perform air monitoring, inspection, and testing outside the regulated area during actual abatement work to detect any faults in the regulated area isolation and any adverse impact on the surroundings from regulated area activities.
 - 3. Task 3: Perform unannounced visits to spot check overall compliance of work with contract/specifications. These visits may include any inspection, monitoring, and testing inside and outside the regulated area and all aspects of the operation except personnel monitoring.
 - 4. Task 4: Provide support to the **OWNER** representative such as evaluation of submittals from the Abatement Contractor, resolution of unforeseen developments, etc.
 - 5. Task 5: Perform final inspection and testing of a decontaminated regulated area or building at the conclusion of the abatement and clean-up work to certify compliance with the **OWNER** requirements.
 - 6. Task 6: Issue certificate of decontamination for each regulated area and project report.

- B. All data, inspection results and testing results generated by the CIH will be available to the Abatement Contractor for information and consideration. The Abatement Contractor shall cooperate with and support the CIH for efficient and smooth performance of their work.
- C. The monitoring and inspection results of the CIH will be used by the **OWNER** to issue any stop removal orders to the Abatement Contractor during abatement work and to accept or reject a regulated area or building as decontaminated.

1.7.3 MONITORING, INSPECTION AND TESTING BY ABATEMENT CONTRACTOR

The Contractor is responsible for managing all personal air monitoring, inspections, and testing required by these specifications, as well as any and all regulatory requirements adopted by these specifications. The contractor is responsible for the continuous monitoring of all subsystems and procedures that could affect the health and safety of the Abatement Contractor's personnel. Safety and health conditions and the provision of those conditions inside the regulated area for all persons entering the regulated area is the exclusive responsibility of the Abatement Contractor/Competent Person. The person performing the personnel and area air monitoring inside the regulated area shall be certified as an Asbestos Hazard Abatement Specialist, an Asbestos Hazard Evaluation Specialist, or an Asbestos Air Monitoring Technician who shall be trained and shall have specialized field experience in air sampling and analysis. The analytical laboratory used by the Abatement Contractor to analyze the samples shall be AIHA-accredited for industrial hygiene analyses. A daily log documenting all OSHA requirements for air monitoring for asbestos in 29 CFR 1926.1101(f), (g) and Appendix A shall be made available to the **OWNER** representative and the CIH. The log will contain, at a minimum, information on personnel or area sampled, other persons represented by the sample, the date of sample collection, start and stop times for sampling, sample volume, flow rate, and fibers/cc. The contractor shall take and analyze samples for each representative job being done in the regulated area, i.e., removal, wetting, clean-up, and load-out. No fewer than two personal samples and two excursion samples per shift shall be collected. Air sampling results must be available on site within 24 hours of collection for review by the CIH. In addition to the continuous monitoring required, the contractor will perform visual inspection at the final stages of abatement for each regulated area.

1.8 STANDARD OPERATING PROCEDURES

The Asbestos Abatement Contractor shall have established Standard Operating Procedures (SOPs) in printed form and loose leaf folder consisting of simplified text, diagrams, sketches, and pictures that establish and explain clearly the ways and procedures to be followed during all phases of the work by the contractor's personnel. The SOPs must be modified as needed to address specific requirements of the project. The SOPs shall be submitted for review and approval prior to the start of any abatement work. The minimum topics and areas to be covered by the SOPs are:

- A. Minimum Personnel Qualifications
- B. Contingency Plans and Arrangements
- C. Security and Safety Procedures
- D. Respiratory Protection/Personal Protective Equipment Program and Training
- E. Medical Surveillance Program and Recordkeeping
- F. Regulated Area Requirements - Containment Barriers/Isolation of Regulated Area
- G. Decontamination Facilities and Entry/Exit Procedures (PDF and EDF)
- H. Negative Pressure Systems Requirements
- I. Monitoring, Inspections, and Testing
- J. Removal Procedures for ACM and ACE
- K. Removal of Contaminated Soil (if applicable)
- L. Encapsulation Procedures for ACM
- M. Disposal of ACM and ACE
- N. Regulated Area Decontamination/Clean-up
- O. Regulated Area Visual and Air Clearance
- P. Project Completion/Closeout

PART 2 - PRODUCTS, MATERIALS AND EQUIPMENT

2.1 MATERIALS AND EQUIPMENT

2.1.1 GENERAL REQUIREMENTS (ALL ABATEMENT PROJECTS)

Prior to the start of work, the abatement contractor shall provide and maintain a sufficient quantity of materials and equipment to assure continuous and efficient work throughout the duration of the project. Work shall not start unless the following items have been delivered to the site.

- A. All materials shall be delivered in their original package, container or bundle 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. Flammable materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated/work area until abatement is completed.
- C. The Competent Person shall inspect each package for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the worksite and disposed of properly.
- D. The Abatement Contractor shall not block or hinder use of buildings by OWNER representatives, and visitors to the **OWNER** in partially occupied buildings by placing materials/equipment in any unauthorized place.
- E. Fire-resistant polyethylene sheeting for walls in the regulated area shall be a minimum of 4-mil thick. For floors and all other uses, sheeting of at least 6-mil thickness shall be used in widths selected to minimize the frequency of joints.
- F. The method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the **OWNER** and selected to minimize damage to equipment and surfaces. Method of attachment may include any combination of moisture resistant duct tape or other waterproof tape, furring strips, spray glue, staples, nails, screws, lumber and plywood for enclosures or other effective procedures capable of sealing polyethylene to dissimilar finished or unfinished surfaces under both wet and dry conditions **(including the use of amended water)**.
- G. Polyethylene sheeting utilized for personnel decontamination facility shall be opaque white or black in color, 6-mil polyethylene sheeting.
- H. Installation and plumbing hardware, showers, hoses, drain pans, sump pumps and wastewater filtration system shall be provided.
- I. An adequate number of negative pressure units capable of providing a minimum of 4 actual air changes per hour in the regulated area while maintaining -0.02" water column plus one reserve unit available to replace any malfunctioning unit without delay shall be provided.
- J. An adequate number of HEPA vacuums, air sampling pumps and loaded filter cassettes, supplied air system, if used, providing Grade D breathing air with respirators and air lines sufficient for personnel, and pressure differential monitors with recording capability shall be provided.
- K. An adequate number of scrapers, sprayers, nylon brushes, brooms, disposable mops, rags, sponges, staple guns, shovels, ladders and scaffolding of suitable height and length as well as meeting OSHA requirements, fall protection devices, water hose to reach all areas in the regulated area, airless spray equipment, and any other tools, materials or equipment required to conduct the abatement project. All electrically operated hand tools, equipment, electric cords shall be equipped with ground-fault circuit protection.
- L. Special protection for objects in the regulated area shall be detailed (e.g., plywood over carpeting to prevent damage from scaffolds and falling material).
- M. Impermeable 6-mil disposal bags for asbestos waste shall be pre-printed with labels and markings as required by OSHA, EPA and DOT regulations.
- N. The **OWNER** shall be provided with a copy of the SDS as required for all hazardous chemicals under OSHA 29 CFR 1910.1200 - Hazard Communication. Methylene chloride shall not be used with any spray adhesive or other product. Appropriate encapsulant(s) shall be provided.
- O. DANGER signs, as many and as required by OSHA 29 CFR 1926.1101(k)(7) shall be provided and placed by the Competent Person. All other posters and notices required by Federal and State regulations shall be posted in the Clean Room.
- P. Adequate respirators, disposable protective clothing, hard hats, goggles, gloves and footwear for the project and number of personnel/shifts shall be provided. All personal protective equipment issued must be based on a hazard assessment conducted under 29 CFR 1910.132(d).

- Q. Sufficient number of recording continuous pressure differential monitors to ensure that at least one monitor is in operation for each negative-pressure enclosure.
- R. Smoke tubes needed to document airflow at negative-pressure enclosures, to perform leak testing of glovebags, or to perform qualitative respirator fit-testing for employees.
- S. Sufficient number of clean fans and electric leaf blowers to be used for final clearance testing in each regulated area.

2.2 RESPIRATORY PROTECTION

2.2.1 GENERAL - RESPIRATORY PROTECTION PROGRAM

The Abatement Contractor shall develop and implement a Respiratory Protection Program (RPP) which is in compliance with OSHA requirements found at 29 CFR 1926.1101 and 29 CFR 1910.132;134. All respirators used must be NIOSH approved for asbestos abatement activities. The written respiratory protection shall, at a minimum, contain the basic requirements found at 29 CFR 1910.134 - Respiratory Protection Program. A copy of the Respiratory Protection Program must be available in the clean room of the decontamination unit for reference by employees or authorized visitors.

2.2.2 RESPIRATORY PROTECTION PROGRAM COORDINATOR

The Respiratory Protection Program Coordinator (RPPC) must be identified by name or title.

2.2.3 SELECTION AND USE OF RESPIRATORS

The procedure for the selection and use of respirators must be submitted to the **OWNER** as part of the Abatement Contractor's qualification. The procedure must be written clearly enough for workers to understand.

2.2.4 MINIMUM RESPIRATORY PROTECTION

Minimum respiratory protection shall be a half-face air-purifying respirator with HEPA (P100) filters when airborne fiber levels are maintained consistently at or below 0.5 f/cc. More protective levels of respiratory protection may be provided or required, depending on fiber levels. Respirator selection shall meet the requirements of 29 CFR 1926.1101 (h); Table 1, except as indicated in this paragraph. Abatement personnel must have a respirator for their exclusive use.

2.2.5 MEDICAL WRITTEN OPINION

No employee shall be allowed to wear a respirator unless a physician has determined they are capable of doing so and has issued a current written opinion for that person.

2.2.6 RESPIRATOR FIT TEST

All personnel wearing respirators shall have a current qualitative/ quantitative fit test which was conducted in accordance with 29 CFR 1910.134 (f) and Appendix A. Fit tests shall also be performed for PAPRs which have been put into a fan failure mode, if used for work on the project.

2.2.7 RESPIRATOR FIT CHECK

The Competent Person shall assure that the positive/negative fit check is done each time the respirator is donned by an employee. Head coverings must cover respirator head straps. Any situation that prevents an effective facepiece-to-face seal as evidenced by facial hair under the sealing surfaces of the respirator, or failure of a fit check shall preclude that person from wearing a respirator until resolution of the problem.

2.2.8 MAINTENANCE AND CARE OF RESPIRATORS

The Respiratory Protection Program Coordinator shall submit evidence and documentation showing compliance with 29 CFR 1910.134 (h) Maintenance and care of respirators.

2.2.9 SUPPLIED-AIR SYSTEMS

If a supplied-air system is used, the system shall meet all requirements of 29 CFR 1910.134 and the ANSI/Compressed Gas Association (CGA) Commodity Specification for Air current requirements for Type 1 - Grade D breathing air. Low-pressure systems may not be used on asbestos abatement projects. Supplied-Air respirator use shall be in accordance with EPA/NIOSH publication EPA-560-OPTS-86-001 "A Guide to Respiratory Protection for the Asbestos Abatement Industry".

2.3 PROTECTIVE CLOTHING

Provide boots, booties, hard hats, goggles, gloves, clothing, respirators and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). Provide all personnel entering the regulated area with disposable full body coveralls, disposable head covering, and 18 inch boots or coverings. The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Provide gloves for hand protection.

2.4 NEGATIVE PRESSURE FILTRATION SYSTEM

The Abatement Contractor shall provide enough HEPA negative air machines to completely exchange the regulated area air volume 4 actual times per hour. The Competent Person shall determine the number of units needed for each regulated area by dividing the cubic feet in the regulated area by 15 and then dividing that result by the actual cubic feet per minute (cfm) for each unit to determine the number of units needed to effect 4 air changes per hour. Provide a standby unit in the event of machine failure and/or emergency in an adjacent area.

2.4.1 NEGATIVE AIR MACHINES (HEPA UNITS)

- A. Negative Air Machine Cabinet: The cabinet shall be constructed of steel or other durable material capable of withstanding potential damage from rough handling and transportation. The width of the cabinet shall be less than 30" in order to fit in standard doorways. The cabinet must be factory sealed to prevent asbestos fibers from being released during use, transport, or maintenance. Any access to and replacement of filters shall be from the inlet end. The unit must be on casters or wheels.
- B. Negative Air Machine Fan: The rating capacity of the fan must describe the air moving capacity under actual operating conditions. Manufacturers typically use "free-air" (no resistance) conditions when rating fans. The fan must be a centrifugal type fan.
- C. Negative Air Machine Final Filter: The final filter shall be a HEPA filter. The filter media must be completely sealed on all edges within a structurally rigid frame. The filter shall align with a continuous flexible gasket material in the negative air machine housing to form an air tight seal. Each HEPA filter shall be individually tested and certified by the manufacturer to have an efficiency of not less than 99.97% when challenged with 0.3 µm dioctylphthalate (DOP) particles. Testing shall have been done in accordance with Military Standard MIL-STD-282 and Army Instruction Manual 136-300-175A. Each filter must bear a UL586 label to indicate ability to perform under specified conditions. Each filter shall be marked with the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
- D. Negative Air Machine Pre-filters: The pre-filters, which protect the final HEPA filter by removing larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. A first stage pre-filter shall be a low efficiency type for particles 10 µm or larger. A second stage pre-filter shall have a medium efficiency effective for particles down to 5 µm or larger. Pre-filters shall be installed either on or in the intake grid of the unit and held in place with a special housing or clamps.
- E. Negative Air Machine Instrumentation: Each unit must be equipped with a gauge to measure the pressure drop across the filters and to indicate when filters have become loaded and need to be changed. A table indicating the cfm for various pressure readings on the gauge shall be affixed near the gauge for reference or the reading shall indicate at what point the filters shall be changed, noting cfm delivery at that point. The unit must have an elapsed time meter to show total hours of operation.

- F. Negative Air Machine Safety and Warning Devices: An electrical/ mechanical lockout must be provide to prevent the fan from being operated without a HEPA filter. Units must be equipped with an automatic shutdown device to stop the fan in the event of a rupture in the HEPA filter or blockage in the discharge of the fan. Warning lights are required to indicate normal operation; too high a pressure drop across filters; or too low of a pressure drop across filters.
- T. Negative Air Machine Electrical: All electrical components shall be approved by the National Electrical Manufacturer's Association (NEMA) and Underwriter's Laboratories (UL). Each unit must be provided with overload protection and the motor, fan, fan housing, and cabinet must be grounded.

2.5 PRESSURE DIFFERENTIAL

The fully operational negative air system within the regulated area shall continuously maintain a pressure differential of -0.02" water column. Before any disturbance of any asbestos material, this shall be demonstrated to the **OWNER** by use of a pressure differential meter/manometer supplied by the Abatement Contractor as required by OSHA 29 CFR 1926.1101(g)(5)(i). The Competent Person shall be responsible for providing and maintaining the negative pressure and air changes as required by OSHA and this specification.

2.5.1 MONITORING

The pressure differential shall be continuously monitored and recorded between the regulated area and the area outside the regulated area with a monitoring device that incorporates a strip chart recorder. The strip chart recorder shall become part of the project log and shall indicate at least -0.02" water column for the duration of the project. A copy of the signed and dated strip chart shall be submitted to the CIH on a weekly basis.

2.6 ENCAPSULANTS

2.6.1 TYPES OF ENCAPSULANTS

- A. The following four types of encapsulants must comply with performance requirements as stated in paragraph 2.6.2:
 - 1. Removal encapsulant - used as a wetting agent to remove ACM.
 - 2. Bridging encapsulant - provides a tough, durable coating on ACM.
 - 3. Penetrating encapsulant - penetrates/encapsulates ACM at least 13 mm (1/2").
 - 4. Lockdown encapsulant - seals microscopic fibers on surfaces after ACM removal.

2.6.2 PERFORMANCE REQUIREMENTS

Encapsulants shall meet the latest requirements of EPA; shall not contain toxic or hazardous substances; or solvents; and shall comply with the following performance requirements:

- A. General Requirements for all Encapsulants:
 - 1. ASTM E84: Flame spread of 25; smoke emission of 50.
 - 2. University of Pittsburgh Protocol: Combustion Toxicity; zero mortality.
 - 3. ASTM C732: Accelerated Aging Test; Life Expectancy - 20 years.
 - 4. ASTM E96: Permeability - minimum of 0.4 perms.
- B. Bridging/Penetrating Encapsulants:
 - 1. ASTM E736: Cohesion/Adhesion Test - 24 kPa (50 lbs/ft²).
 - 2. ASTM E119: Fire Resistance - 3 hours (Classified by UL for use on fibrous/cementitious fireproofing).
 - 3. ASTM D2794: Gardner Impact Test; Impact Resistance - minimum 11.5 kg-mm (43 in/lb).
 - 4. ASTM D522: Mandrel Bend Test; Flexibility - no rupture or cracking.
- C. Lockdown Encapsulants:
 - 1. ASTM E119: Fire resistance - 3 hours (tested with fireproofing over encapsulant applied directly to steel member).
 - 2. ASTM E736: Bond Strength - 48 kPa (100 lbs/ft²) (test compatibility with cementitious and fibrous fireproofing).

- D. In certain situations, encapsulants may have to be applied to hot pipes/equipment. The encapsulant must be able to withstand high temperatures without cracking or off-gassing any noxious vapors during application.

PART 3 - EXECUTION

3.1 PRE-ABATEMENT ACTIVITIES

3.1.1 PRE-ABATEMENT MEETING

The **OWNER** representative, upon receipt, review, and substantial approval of all pre-abatement submittals and verification by the CIH that all materials and equipment required for the project are on the site, will arrange for a pre-abatement meeting between the abatement contractor, the Competent Person(s), the **OWNER** representative(s), and the CIH. The purpose of the meeting is to discuss any aspect of the submittals needing clarification or amplification and to discuss any aspect of the project execution and the sequence of the operation. The abatement contractor shall be prepared to provide any supplemental information/documentation to the **OWNER's** representative regarding any submittals, documentation, materials or equipment. Upon satisfactory resolution of any outstanding issues, the **OWNER's** representative will issue a written order to proceed to the abatement contractor. No abatement work of any kind described in the following provisions shall be initiated prior to the **OWNER** written order to proceed.

3.1.2 PRE-ABATEMENT INSPECTIONS AND PREPARATIONS

Before any work begins on the construction of the regulated area, the abatement contractor will:

- A. Conduct a space-by-space inspection with an authorized **OWNER** representative and prepare a written inventory of all existing damage in those spaces where asbestos abatement will occur. Still or video photography may be used to supplement the written damage inventory. Document will be signed and certified as accurate by both parties.
- B. The abatement contractor must be aware of the potential failure to identify asbestos in the inaccessible areas of the building. Make sure these areas are looked at/reviewed on the project: Lay-in ceilings concealing ACM; ACM behind walls/windows from previous renovations; inside chases/walls; transite piping/ductwork/sheets; behind radiators; roofing materials; below window sills; water/sewer lines; electrical conduit coverings; flooring/mastic covered by carpeting or walls; exterior insulated wall panels.
- C. Ensure that all furniture, machinery, equipment, curtains, drapes, blinds, and other movable objects that the abatement contractor is required to remove from the regulated area have been cleaned and removed or properly protected from contamination.
- D. Shut down and seal with a minimum of 2 layers of 6-mil polyethylene sheeting all HVAC systems serving the regulated area. The regulated area environment shall be completely isolated from any other air in the building. The **OWNER's** representative will monitor the shut down process.
- E. Shut down and lock out in accordance with 29 CFR 1910.147 all electrical circuits which pose a potential hazard. Electrical arrangements will be tailored to the particular regulated area and the systems involved. All electrical circuits affected will be turned off at the circuit box outside the regulated area, not just the wall switch. The goal is to eliminate the potential for electrical shock that is a major threat to life in the regulated area due to water use and possible energized circuits. Electrical lines used to power equipment in the regulated area shall conform to all electrical safety standards and shall be isolated by the use of a ground fault circuit interrupter (GFCI). All GFCIs shall be tested prior to use. The **OWNER's** representative will monitor the electrical shutdown.

3.1.3 PRE-ABATEMENT CONSTRUCTION AND OPERATIONS

- A. Perform all preparatory work for each regulated area in accordance with the approved work schedule and with this specification.
- B. Upon completion of all preparatory work, the CIH will inspect the work and systems and will notify the **OWNER's** representative when the work is completed in accordance with this specification. The **OWNER's** representative may inspect the regulated area and the systems with the CIH and may require that the contractor repair or complete the installation of the engineering controls as needed. Upon satisfactory inspection, the abatement contractor's employees must perform all major aspects of the approved SOPs, especially worker protection, respiratory

systems, contingency plans, decontamination procedures, and monitoring to demonstrate satisfactory operation. The operational systems for respiratory protection and the negative pressure system shall be demonstrated for proper performance.

- C. Upon satisfactory inspection of the installation of and operation of systems, the CIH will notify the abatement contractor to proceed with the asbestos abatement work in accordance with this specification.

3.2 REGULATED AREA PREPARATIONS

- A. Post OSHA DANGER signs meeting the specifications of OSHA 29 CFR 1926.1101 at any location and approaches to the regulated area where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the regulated area to permit any personnel to read the sign and take the necessary measures to avoid exposure. Additional signs will be posted following construction of the regulated area enclosure.
- B. Shut down and lock out electric power to the regulated area. Provide temporary power and lighting. Electricity shall be provided by the **OWNER** for use by the abatement contractor during the project.
- C. Shut down and lock out heating, cooling, and air conditioning system (HVAC) components that are in, supply or pass through the regulated area. Seal all intake and exhaust vents in the regulated area with duct tape and 2 layers of 6-mil polyethylene sheeting. Also, seal any ducts or system components that pass through the regulated area. Remove all contaminated HVAC system filters and place in labeled 6-mil polyethylene disposal bags for staging and eventual disposal as asbestos waste.
- D. The Contractor shall provide sanitary facilities for abatement personnel and maintain them in a clean and sanitary condition throughout the abatement project. Where restroom facilities in the building are not located within a negative-pressure enclosure and accessible, they can be used by the Contractor provided that they are cleaned on a daily basis during operations on site.
- E. The abatement contractor will provide potable water for abatement purposes. The Contractor may connect to the existing **OWNER** system at his risk. The water service shall be supplied with backflow prevention.
- F. Pre-clean all movable objects within the regulated area using a HEPA filtered vacuum and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the regulated area and carefully stored in an uncontaminated location. Drapes, clothing, upholstered furniture and other fabric items should be disposed of as asbestos contaminated waste. Cleaning these asbestos contaminated items utilizing HEPA vacuum techniques and off-premises steam cleaning is very difficult and cannot guarantee decontamination. Since adequate cleaning of contaminated fabrics is difficult, the **OWNER** will determine whether this option is an appropriate one. Carpeting will be removed and discarded prior to abatement if in the regulated area.
- G. Pre-clean all fixed objects in the regulated area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery behind grills or gratings where access may be difficult but contamination may be significant. Also, pay particular attention to wall, floor and ceiling penetration behind fixed items. After precleaning, enclose fixed objects with 2 layers of 6-mil polyethylene sheeting and seal securely in place with duct tape. Objects (e.g., electronic communication equipment, sprinklers, alarm systems, and electronic cables) that must remain in the regulated area and functioning should be protected using a combination of 2 layers of 6-mil polyethylene sheeting with filtered vents if needed.
- H. Pre-clean all surfaces in the regulated area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb asbestos-containing materials during this pre-cleaning phase.

3.3 CONTAINMENT BARRIERS AND COVERINGS FOR THE REGULATED AREA

3.3.1 GENERAL

Seal off the perimeter of the regulated area to completely isolate the abatement project and to contain all airborne asbestos contamination created by the abatement activities. Should the

adjacent area past the regulated area become contaminated due to improper work activities, the abatement contractor shall suspend work inside the regulated area, continue wetting, and clean the adjacent areas in accordance with procedures described in these specifications. **Any and all costs associated with the adjacent area cleanup shall be borne by the Abatement Contractor.**

3.3.2 PREPARATION PRIOR TO SEALING OFF

Place all tools, scaffolding, materials and equipment needed for working in the regulated area prior to erecting any plastic sheeting. Remove all uncontaminated removable furniture, equipment and/or supplies from the regulated area before commencing work, or completely cover with two layers of 6-mil polyethylene sheeting and secure with duct tape. Lock out and tag out or seal any HVAC systems in the regulated area.

3.3.3 CONTROLLING ACCESS TO THE REGULATED AREA

Access to the regulated area shall be permitted only through the PDF. All other means of access shall be closed off by proper sealing and DANGER signs posted on the clean side of the regulated area where it is adjacent to any occupiable area. If the area adjacent to the regulated area is accessible to the public, construct a solid barrier on the public side of the sheeting for protection and isolation of the project. The barrier shall be constructed with nominal 2" x 4" (50mm x 100mm) wood or metal studs 16" (400mm) on centers, securely anchored to prevent movement and covered with a minimum of 1/2" (12.5mm) plywood. Danger signs must be posted as per OSHA. Any alternate method must be submitted for **OWNER** written approval.

3.3.4 CRITICAL BARRIERS

The regulated area must be completely separated from the adjacent areas, and the outside by at least 1 layer of 6-mil polyethylene sheeting and duct tape/spray adhesive or nonporous physical barriers. Individually seal all supply and exhaust ventilation openings, lighting fixtures, clocks, doorways, windows, convectors, speakers, and other openings into the regulated area with 2 layers of 6-mil polyethylene sheeting, and taped securely in place with duct tape/spray adhesive. Critical barriers must remain in place until all work and clearances have been completed. Light fixtures shall not be operational during abatement. Contractor shall provide auxiliary lighting. If needed, provide plywood squares 6" x 6" x 3/8" (150mm x 150mm x 18mm) held in place with one 6d smooth masonry/galvanized nail driven through the center of the plywood square and duct tape on the polyethylene sheeting so as to clamp the polyethylene sheeting to the wall/surface. Locate plywood squares at each end, corner, and 4' (1200mm) maximum on centers. Use care with hot/warm surfaces.

3.3.5 PRIMARY BARRIERS

Clean all furniture, equipment, etc., prior to being moved as specified above. Clean all surfaces in the regulated area using the HEPA vacuum and/or wet wiping prior to installing any polyethylene sheeting.

- A. Floors: Cover the floor of the regulated area with at least two layers of 6-mil polyethylene sheeting, turning up the walls at least 12" (300mm). The polyethylene sheeting must form a right angle at the floor-wall juncture so there is no radius that can be stepped on, possibly causing detachment of the polyethylene sheeting. Spray glue and duct tape must both be used for floor seams. Floor seams must overlap a minimum of 6 feet (1800mm) or be at right angles to each other. The top sheet of polyethylene sheeting must be able to be removed independently of the bottom layer. A third loose layer of 6-mil polyethylene sheeting shall be used in the area of removal and periodically picked up to reduce contamination of the underlying layers.
- B. Walls: All walls in the regulated area, including critical barriers, shall be covered with 2 layers of 4 mil polyethylene sheeting, mechanically supported and sealed with duct tape and/or spray glue. Tape all joints, including the floor-wall joint, with duct tape/spray glue. All wall joints must overlap at least 6 feet (1800mm).
- C. If stairs and ramps are covered with 6-mil polyethylene sheeting, two layers must be used. Provide 19 mm (3/4") exterior grade plywood treads held in place with duct tape/glue on the plastic. Do not cover rungs or rails with any isolation materials.

- D. Primary barriers may not be required for glovebag removal areas. Critical barriers are required.

3.3.6 SECONDARY BARRIERS

Not used.

3.3.7 EXTENSION OF THE REGULATED AREA

If the regulated area critical barrier is breached in any manner that could allow the passage of asbestos fibers or debris, the Competent Person shall immediately stop work, continue wetting, and proceed to extend the regulated area to enclose the affected area as per procedures described in this specification. If the affected area cannot be enclosed, decontamination measures and cleanup shall start immediately. All personnel shall be isolated from the affected area until decontamination/cleanup is completed as verified by visual inspection and air monitoring. Air monitoring at completion must indicate clearance or background levels.

3.3.8 FIRESTOPPING

Not used.

3.4 INSTALLING NEGATIVE PRESSURE SYSTEM

The contractor shall install the negative pressure ventilation system after the completion of the barrier system. Negative pressure ventilation systems may not be required for glovebag removal areas.

3.4.1 SUPPLEMENTAL MAKE-UP AIR INLETS

Provide inlets as needed for proper air flow in the regulated area, in a location approved by the **CIH**, by making openings in the plastic sheeting to allow outside air to flow into the regulated area. Auxiliary makeup air inlets must be located as far from the negative air machines as possible, off the floor near the ceiling, and away from the barriers that separate the regulated area from the occupied clean areas. Cover the inlets with coarse filter media and install weighted flaps that will seal in the event of failure of the negative pressure system. The flap must be sprayed with adhesive to assure sealing if it closes.

3.4.2 TESTING THE SYSTEM

The negative pressure system must be tested before any ACM is disturbed in any way. After the regulated area has been completely prepared, the decontamination units set up, and the negative air machines installed, start the units up one at a time. Demonstrate and document the operation and testing of the negative pressure system to the **CIH** using smoke tubes and a negative pressure gauge. Testing must also be done at the start of each work shift.

3.4.3 DEMONSTRATION OF THE NEGATIVE AIR PRESSURE SYSTEM

The demonstration of the operation of the negative pressure system to the **CIH** shall include, but not be limited to, the following:

- A. Plastic barriers and sheeting move lightly in toward the regulated area.
- B. Curtains of the decontamination units move in toward regulated area.
- C. There is a noticeable movement of air through the decontamination units. Use the smoke tube to demonstrate air movement from the clean room to the shower room to the equipment to the regulated area.
- D. Use smoke tubes to demonstrate negative air pressure system is moving air across all areas in which work is to be done. Use a differential pressure gauge to indicate a negative pressure of at least 5.0 Pa (-0.02") across every barrier separating the regulated area from the rest of the building. Modify the system as necessary to meet the above requirements.

3.4.4 USE OF SYSTEM DURING ABATEMENT OPERATIONS

- A. Start units before beginning any disturbance of ACM occurs. After work begins, the units shall run continuously, maintaining 4 actual air changes per hour at a negative pressure differential of 5.0

- Pa (-0.02") water column, for the duration of the work until a final visual clearance and final air clearance has been completed.
- B. The negative air machines shall not be shut down for the duration of the project unless authorized by the **OWNER**, in writing.
 - C. Abatement work shall begin at a location farthest from the units and proceed towards them. If an electric failure occurs, the Competent Person shall stop all abatement work and immediately begin wetting all exposed asbestos materials for the duration of the power outage. Abatement work shall not resume until power is restored and all units necessary are operating properly again.
 - D. The negative air machines shall continue to run after all work is completed and until a final visual clearance and a final air clearance has been completed for that regulated area.

3.4.5 DISMANTLING THE SYSTEM

After completion of the final visual and final air clearance has been obtained, the units may be shut down. The units will be **completely decontaminated**, all pre-filters removed and disposed of as asbestos waste, and the unit inlet and outlet sealed with 2 layers of 6-mil polyethylene sheeting.

3.5 SPECIAL REMOVAL PROCEDURES

3.5.1 GENERAL GLOVEBAG REMOVAL PROCEDURE

Not used.

3.5.2 NEGATIVE PRESSURE GLOVEBAG PROCEDURE

Not used.

3.5.3 CONTAMINATED SOIL REMOVAL PROCEDURE

Not used.

3.6 DECONTAMINATION FACILITIES

3.6.1 DESCRIPTION

Provide each work area with separate personnel (PDF) and equipment decontamination facilities (EDF). Ensure that the PDF are the only means of ingress and egress to the regulated area and that all equipment, bagged waste, and other material exit the regulated area only through the EDF. See drawings for layout of each work area and OSHA 29 CFR 1926.1101, Appendix F.

3.6.2 GENERAL REQUIREMENTS

All personnel entering or exiting a regulated area shall follow the requirements at 29 CFR 1926.1101 (j)(1) and these specifications. All equipment and materials must exit the regulated area through the EDF and be decontaminated in accordance with these specifications. Walls and ceilings of the PDF and EDF must be constructed of a minimum of 2 layers of 6-mil opaque polyethylene sheeting and be securely attached to existing building components and/or an adequate temporary framework. A minimum of 2 layers of 6-mil polyethylene sheeting shall also be used to cover the floor under the EDF and PDF units. Construct doors so that they overlap and secure to adjacent surfaces. Weight sheets with layers of duct tape so that they close quickly after release. Put arrows on sheets so they show direction of travel and overlap. If the building adjacent area is occupied, construct a solid barrier on the occupied side(s) to protect the sheeting.

3.6.3 TEMPORARY FACILITIES TO THE PDF AND EDF

The Competent Person shall provide temporary water service connections to the EDF and PDF. Backflow prevention must be provided at the point of connection to the **OWNER** system. Water supply must be of adequate pressure and meet requirements of 29 CFR 1910.141(d)(3). Provide adequate temporary electric power with ground fault protection and overhead wiring in the EDF and PDF. Provide a sub-panel for all temporary power in the clean room. Provide adequate lighting to provide a minimum of 50 foot-candles in the EDF and PDF. Provide temporary heat to

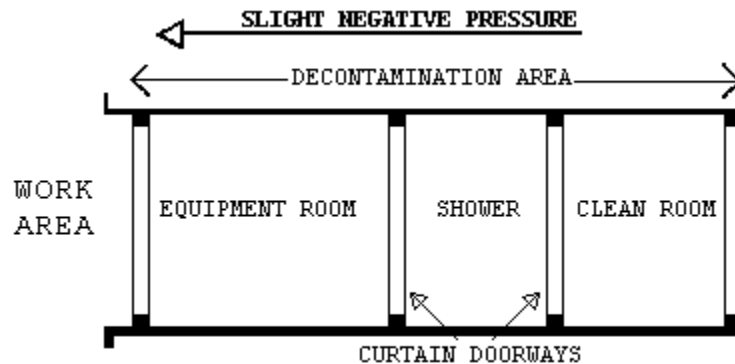
maintain 70°F throughout the PDF and EDF except the shower of the PDF shall be maintained at 75°F.

3.6.4 PERSONNEL DECONTAMINATION FACILITY (PDF)

The Competent Person shall provide a PDF consisting of shower room that is contiguous to a clean room and equipment room. The PDF must be sized to accommodate the number of personnel scheduled for the project. The shower room, located in the center of the PDF, shall be fitted with as many portable showers as necessary to insure all employees can complete the entire decontamination procedure within 15 minutes. The PDF shall be constructed of opaque polyethylene sheeting for privacy. The PDF shall be constructed to eliminate any parallel routes of egress without showering.

1. **Clean Room:** The clean room must be physically and visually separated from the rest of the building to protect the privacy of personnel changing clothes. The clean room shall be constructed of at least 2 layers of 6-mil polyethylene sheeting to provide an air tight room. Provide a minimum of 2 - 900 mm (3 foot) wide flapped doorways. One doorway shall be the entry from outside the PDF and the second doorway shall be to the shower room of the PDF. The floor of the clean room shall be maintained in a clean, dry condition. Shower overflow shall not be allowed into the clean room. All surfaces in the clean room shall be disinfected twice after each shift change. An adequate supply of disposable towels and disposable protective clothing. Provide 1 storage locker per person. A portable fire extinguisher, Type ABC, shall be provided in accordance with OSHA and NFPA Standard 10. All persons entering the regulated area shall remove all street clothing in the clean room and dress in disposable protective clothing and respiratory protection. Any person entering the clean room does so either from the outside with street clothing on or is coming from the shower room completely naked and thoroughly washed. Females required to enter the regulated area shall be ensured of their privacy throughout the entry/exit process by posting guards at both entry points to the PDF so no male can enter or exit the PDF during her stay in the PDF.
2. **Shower Room:** The Competent Person shall assure that the shower room is a completely water tight compartment to be used for the movement of all personnel from the clean room to the equipment room and for the showering of all personnel going from the regulated area to the clean room. Each shower shall be constructed so water runs down the walls of the shower and into a drip pan. Install a freely draining smooth floor on top of the shower pan. The shower room shall be separated from the rest of the building and from the clean room and equipment room using air tight walls made from at least 2 layers of 6-mil polyethylene sheeting. The shower shall be equipped with a shower head and controls, hot and cold water, drainage, soap dish and continuous supply of soap, and shall be maintained in a sanitary condition throughout its use. The controls shall be arranged so an individual can shower without assistance. Provide a flexible hose shower head, hose bibs and all other items shown on Shower Schematic. Wastewater will be pumped to a drain after being filtered through a minimum of a 100 micron sock in the shower drain; a 20 micron filter; and a final 5 micron filter. Filters will be changed a minimum of daily or more often as needed. Filter changes must be done in the shower to prevent loss of contaminated water. Hose down all shower surfaces after each shift and clean any debris from the shower pan. Residue is to be disposed of as asbestos waste.
3. **Equipment Room:** The Competent Person shall provide an equipment room that shall be an air tight compartment for the storage of work equipment, reusable footwear and for use as a change station for personnel exiting the regulated area. The equipment room shall be separated from the regulated area by a minimum 3 foot wide door made of three layers of 6-mil polyethylene sheeting. The equipment room shall be separated from the regulated area, the shower room and the rest of the building by airtight walls and ceiling constructed of a minimum of 2 layers of 6-mil polyethylene sheeting. If the airborne level of asbestos in the regulated area is expected to exceed 0.5 f/cc, add an intermediate cleaning space between the equipment room and the regulated area. Damp wipe all surfaces of the equipment room after each shift change. Provide an additional loose layer of 6-mil polyethylene sheeting per shift change and remove this layer after each shift. Provide a temporary electrical sub-panel in this room to accommodate any power tools and equipment used in the regulated area.

4. The PDF shall look like as follows: Clean room at the entrance followed by a shower room followed by an equipment room leading to the regulated area. Each doorway in the PDF is minimum of double flaps of 6-mil polyethylene sheeting.



3.6.5 REGULATED AREA ENTRY PROCEDURE

Worker protection shall meet the most stringent requirement. The Competent Person shall ensure that each time workers enter the regulated area, they remove ALL street clothes in the clean room of the decontamination unit and put on new disposable coveralls, head coverings, a clean respirator, and then proceed through the shower room to the equipment room where they put on non-disposable required personal protective equipment.

3.6.6 DECONTAMINATION PROCEDURE

The Competent Person shall require all personnel to adhere to following decontamination procedures whenever they leave the regulated area.

- A. When exiting the regulated area, remove disposable coveralls, and ALL other clothes, disposable head coverings, and foot coverings or boots in the equipment room.
- B. Still wearing the respirator and completely naked, proceed to the shower. Showering is MANDATORY. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:
 1. Thoroughly wet body including hair and face without wetting filters. If using a PAPR hold blower above head to keep filters dry.
 2. With respirator still in place, thoroughly decontaminate body, hair, respirator face piece, and all other parts of the respirator except the blower and battery pack on a PAPR. Pay particular attention to cleaning the area between the face and respirator facepiece and under the respirator straps.
 3. Take a deep breath, hold it and/or exhale slowly, completely wetting hair, face, and respirator. While still holding breath, remove the respirator and hold it away from the face before starting to breathe.
- C. Dispose of wetted filters from respirator. Carefully decontaminate the facepiece of the respirator inside and out. If using a PAPR, shut down using the following sequence: a) first cap inlets to filters; b) turn blower off to keep debris collected on the inlet side of the filter from dislodging and contaminating the outside of the unit; c) thoroughly decontaminate blower and hoses; d) carefully decontaminate battery pack with a wet rag being cautious of getting water in the battery pack thus preventing destruction. **(Note: THIS PROCEDURE IS NOT A SUBSTITUTE FOR RESPIRATOR CLEANING!).**
- D. Shower and wash body completely with soap and water. Rinse thoroughly.
- E. Rinse shower room walls and floor to drain prior to exiting.
- F. Proceed from shower to clean room; dry off and change into street clothes or into new disposable work clothing.

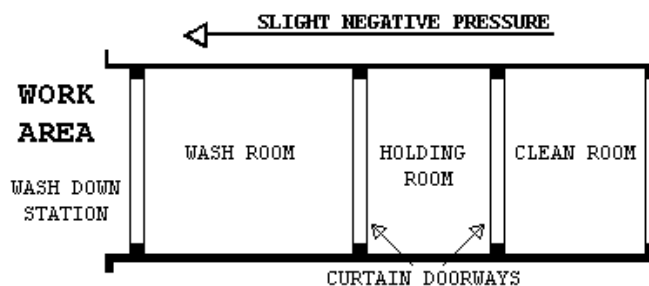
3.6.7 REGULATED AREA REQUIREMENTS

The Competent Person shall meet all requirements of 29 CFR 1926.1101 (o) and assure that all requirements for regulated areas at 29 CFR 1926.1101 (e) are met. All personnel in the regulated area shall not be allowed to eat, drink, smoke, chew tobacco or gum, apply cosmetics, or in any way interfere with the fit of their respirator.

3.6.8 EQUIPMENT DECONTAMINATION FACILITY (EDF)

The Competent Person shall provide an EDF consisting of a washroom, holding room, and clean room for removal of equipment and material from the regulated area. Personnel shall not enter or exit the EDF except in the event of an emergency. Clean debris and residue in the EDF daily. All surfaces in the EDF shall be wiped/hosed down after each shift and all debris shall be cleaned from the shower pan. The EDF shall consist of the following:

1. Wash Down Station: Provide an enclosed shower unit in the regulated area just outside the Wash Room as an equipment bag and container cleaning station.
2. Wash Room: Provide a wash room for cleaning of bagged or containerized asbestos containing waste materials passed from the regulated area. Construct the washroom using 50 x 100 mm (2" x 4") wood framing and 2 layers of 6-mil polyethylene sheeting. Locate the washroom so that packaged materials, after being wiped clean, can be passed to the Holding Room. Doorways in the washroom shall be constructed of two layers of 6-mil polyethylene sheeting.
3. Holding Room: Provide a holding room as a drop location for bagged materials passed from the washroom. Construct the holding room using 50 x 100 mm (2" x 4") wood framing and 2 layers of 6-mil polyethylene sheeting. The holding room shall be located so that bagged material cannot be passed from the washroom to the clean room unless it goes through the holding room. Doorways in the holding room shall be constructed of two layers of 6-mil polyethylene sheeting.
4. Clean Room: Provide a clean room to isolate the holding room from the building exterior. Construct the clean room using 2 x 4 wood framing and 2 layers of 6-mil polyethylene sheeting. The clean room shall be located so as to provide access to the holding room from the building exterior. Doorways to the clean room shall be constructed of two layers of 6-mil polyethylene sheeting. When a negative pressure differential system is used, a rigid enclosure separation between the EDF clean room and the adjacent areas shall be provided.
5. The EDF shall be provided as follows: Washroom leading to a Holding Room followed by a Clean Room leading to the outside. See diagram.



3.6.9 EQUIPMENT DECONTAMINATION PROCEDURES

At washdown station in the regulated area, thoroughly wet clean contaminated equipment and/or sealed polyethylene bags and pass into Wash Room after visual inspection. When passing anything into the Wash Room, close all doorways of the EDF, other than the doorway between the washdown station and the washroom. Keep all outside personnel clear of the EDF. Once inside the Wash Room, wet clean the equipment and/or bags. After cleaning and inspection, pass items into the Holding Room. Close all doorways except the doorway between the Holding Room and the Clean Room. Workers from the Clean Room/Exterior shall enter the Holding Room and remove the

decontaminated/cleaned equipment/bags for removal and disposal. These personnel shall wear full protective clothing and appropriate respirators. At no time shall personnel from the clean side be allowed to enter the washroom.

3.7 REMOVAL OF ACM AND ACE

3.7.1 WETTING MATERIALS

- A. Use amended water for the wetting of ACM prior to removal. The Competent Person shall assure the wetting of ACM meets the definition of "adequately wet" in the EPA NESHAPs regulation for the duration of the project. A removal encapsulant may be used instead of amended water with written approval of the **OWNER's** representative.
- B. Amended Water: Provide water to which a surfactant has been added shall be used to wet the ACM and reduce the potential for fiber release during disturbance of ACM. The mixture must be equal to or greater than the wetting provided by water amended by a surfactant consisting one ounce of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with 5 gallons (19L) of water.
- B. Removal Encapsulant: Provide a penetrating encapsulant designed specifically for the removal of ACM. The material must, when used, result in adequate wetting of the ACM and retard fiber release during disturbance equal to or greater than the amended water described above in B.

3.7.2 SECONDARY BARRIER AND WALKWAYS

- A. Install as a drop cloth a 6-mil polyethylene sheet at the beginning of each work shift where removal is to be done during that shift. Completely cover any walls within 10 feet (3M) of the area where work is to be done. Secure the secondary barrier with duct tape to prevent debris from getting behind it. Remove the secondary barrier at the end of the shift or as work in the area is completed. Keep residue on the secondary barrier wetted. When removing, fold inward to prevent spillage and place in a disposal bag.
- B. Install walkways using 6-mil black polyethylene sheeting between the regulated area and the decontamination facilities (PDF and EDF) to protect the primary layers from contamination and damage. Install the walkways at the beginning of each shift and remove at the end of each shift.

3.7.3 WET REMOVAL OF ACM OTHER THAN AMOSITE

- A. Adequately and thoroughly wet the ACM to be removed prior to removal to reduce/prevent fiber release to the air. Adequate time must be allowed for the amended water to saturate the ACM. Abatement personnel must not disturb dry ACM. Use a fine spray of amended water or removal encapsulant. Saturate the material sufficiently to wet to the substrate without causing excessive dripping. The material must be sprayed repeatedly/continuously during the removal process in order to maintain adequately wet conditions. Removal encapsulants must be applied in accordance with the manufacturer's written instructions. Perforate or carefully separate, using wet methods, an outer covering that is painted or jacketed in order to allow penetration and wetting of the material. Where necessary, carefully remove covering while wetting to minimize fiber release. **(Note: In no event shall dry removal occur except with written authorization in the case of electrical hazards or a greater safety issue is possible!)**
- B. If ACM does not wet well with amended water due to coating or jacketing, remove as follows:
 - 1. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.
 - 2. Remove saturated ACM in small sections. Do not allow material to dry out. As material is removed, bag material while still wet into disposal bags. Twist tightly the bag neck, bend over (gooseneck) and seal with a minimum of three tight wraps of duct tape. Clean/decontaminate the outside of any residue and move to washdown station adjacent to EDF.

3.7.4 WET REMOVAL OF AMOSITE

Not used.

3.8 LOCKDOWN ENCAPSULATION

Lockdown encapsulation is an integral part of the ACM removal. At the conclusion of ACM removal and before removal of the primary barriers, all surfaces shall be encapsulated with a bridging encapsulant. Poly sheeting may be used in lieu of encapsulation for soil removal areas.

3.8.2 ENCAPSULATION OF SCRATCH COAT PLASTER OR PIPING

Not used.

3.8.3 SEALING EXPOSED EDGES

Exposed edges of asbestos-containing materials shall be covered with plastic sheeting and/or duct tape or encapsulated to prevent fiber release.

3.9 DISPOSAL OF ACM AND ACE WASTE MATERIALS

3.9.1 GENERAL

Dispose of waste ACM/ACE and debris that is packaged in accordance with these specifications, OSHA, EPA and DOT. The landfill requirements for packaging must also be met. Disposal shall be done at the approved landfill. Disposal of non-friable ACM/ACE shall be done in accordance with applicable regulations.

3.9.2 PROCEDURES

- A. Asbestos waste shall be packaged and moved through the EDF into a covered transport container in accordance with NESHAPs packaging requirements. Waste shall be double-bagged prior to disposal. Wetted waste can be very heavy. Bags shall not be overfilled. Bags shall be securely sealed to prevent accidental opening and/or leakage. The top shall be tightly twisted and goosenecked prior to tightly sealing with at least three wraps of duct tape. Ensure that unauthorized persons do not have access to the waste material once it is outside the regulated area. All transport containers must be kept fully enclosed and locked at all times when not in use. NESHAP signs must be on containers during loading and unloading. Material shall not be stored or transported in open vehicles. If drums are used for packaging, the drums shall be labeled properly and shall not be re-used.
- B. Waste Load Out: Waste load out shall be done in accordance with the procedures in EDF Decontamination Procedures. Bags shall be decontaminated on exterior surfaces by wet cleaning and/or HEPA vacuuming before being placed in the second bag. All waste shipments shall be manifested by EPA requirements.
- C. Strapping, tin sheeting, jacketing, metal mesh, etc., which might tear polyethylene bags shall be wrapped securely in burlap before packaging and, if needed, use a polyethylene lined fiber drum as the second container, prior to disposal.

3.10 PROJECT DECONTAMINATION

3.10.1 GENERAL

- A. The entire work related to project decontamination shall be performed under the close supervision and monitoring of the CIH.
- B. If the asbestos abatement work is in an area that was contaminated prior to the start of abatement, the decontamination will be a four step procedure; two cleanings of the primary barrier polyethylene sheeting prior to its removal and two cleanings of the space surfaces after the primary barrier removal.
- C. If the asbestos abatement work is in an area which was uncontaminated prior to the start of abatement, the decontamination will be a two step procedure; two cleanings of the primary barrier polyethylene sheeting prior to its removal, thus preventing contamination of the building when the regulated area critical barriers are removed.
- D. Glovebag removal areas shall be cleaned one time to permit aggressive final air sampling.

3.10.2 REGULATED AREA CLEARANCE

Air testing and other requirements that must be met before release of the Abatement Contractor and re-occupancy of the regulated area space are specified in Final Testing Procedures.

3.10.3 WORK DESCRIPTION

Decontamination includes the cleaning and clearance of the air in the regulated area and the decontamination and removal of the enclosures/facilities installed prior to the abatement work including primary/critical barriers, PDF and EDF facilities, and negative pressure systems.

3.10.4 PRE-DECONTAMINATION CONDITIONS

- A. Before decontamination starts, all ACM and ACE from the regulated area shall be removed, all waste collected and removed, and the secondary barrier of polyethylene sheeting removed and disposed of along with any gross debris generated by the work.
- B. At the start of decontamination, the following shall be in place:
 - 1. Primary barriers consisting of one layer of 6-mil polyethylene sheeting on the walls.
 - 2. Critical barriers consisting of at least one layer of 6-mil polyethylene sheeting which is the sole barrier between the regulated area and the rest of the building or outside.
 - 3. Critical barrier polyethylene sheeting over lighting fixtures, clocks, HVAC openings, doorways, windows, convectors, speakers and other openings in the regulated area.
 - 4. Decontamination facilities for personnel and equipment in operating condition and the negative pressure system in operation.

3.10.5 CLEANING

Clean all surfaces of the regulated area including items of remaining polyethylene sheeting, tools, scaffolding, ladders, staging by wet methods and/or HEPA vacuuming. Do not use dry dusting/sweeping methods. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible residue from abated surfaces or polyethylene sheeting or other surfaces. Remove all coarse and medium filters in the air filtration devices and dispose of as ACM waste in accordance with these specifications, and replace with new filters. The negative pressure system shall remain in operation during this time. If determined by the CONTRACTOR or CIH, additional cleaning(s) may be needed.

If the visual inspection is acceptable, all primary noncritical barriers shall be removed, leaving only the critical barriers to separate the work area from the non-work areas. Additional cleaning shall be performed as needed.

3.10.6 PRE-CLEARANCE INSPECTION AND TESTING

The contractor and CIH will perform a thorough and detailed visual inspection after the first cleaning to determine whether there is any visible residue in the regulated area.

3.10.7 LOCKDOWN ENCAPSULATION OF ABATED SURFACES

With the express permission of the CIH, perform lockdown encapsulation of all surfaces from which asbestos was abated in accordance with the procedures in this specification. Negative pressure shall be maintained in the regulated areas during the lockdown.

3.11 FINAL VISUAL INSPECTION AND AIR CLEARANCE TESTING

3.11.1 GENERAL

Notify the **OWNER** representative in advance for the performance of the final visual inspection and testing. The final testing will be performed by the CIH starting no sooner than four hours after the completion of the lockdown encapsulation.

3.11.2 FINAL VISUAL INSPECTION

Final visual inspection will include the entire regulated area, the PDF, all remaining critical barrier polyethylene sheeting, seals over HVAC openings, doorways, windows, and any other openings. If

any debris, residue, dust or any other suspect material is detected, the final cleaning shall be repeated at no cost to the **OWNER**. Dust/material samples may be collected and analyzed at the abatement contractors expense and no cost to the **OWNER** at the discretion of the CIH to confirm visual findings. When the regulated area is visually clean the final testing can be done.

3.11.3 FINAL AIR CLEARANCE TESTING

- A. After an acceptable final visual inspection by the CIH and the **OWNER** Representative, the Abatement Contractor will be permitted to perform lockdown encapsulation of the work area. After a settling period of at least four hours, the CIH will perform the final testing. Air samples will be collected and analyzed in accordance with ODOH regulations. If the clearance criteria are not met, the Abatement Contractor shall repeat the final cleaning and continue decontamination procedures. **(NOTE: Additional inspection and testing will be done at the expense of the Abatement Contractor.)**
- B. If the results of the final testing are acceptable, remove the critical barriers and shut down the negative pressure system as detailed in Abatement Closeout. Any small quantities of residue material found upon removal of the polyethylene sheeting shall be removed with a HEPA vacuum and localized isolation. If significant quantities are found as determined by the CIH, then the entire affected area shall be isolated and recleaned as specified in the final cleaning.
- C. If release criteria are met, proceed to perform the abatement closeout and to issue the required documentation and certificate of completion in accordance with these specifications.

3.11.4 FINAL AIR CLEARANCE PROCEDURES

- A. Contractor's Release Criteria: Work in a regulated area is complete when the regulated area is visually clean and dry, and airborne fiber levels comply with Ohio Department of Health clearance criteria by PCM and/or TEM.
- B. Air Monitoring and Final Clearance Sampling: To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, the CIH will secure samples and analyze them according to the following procedures:
 - 1. Fibers Counted: "Fibers" referred to in this section shall be "fibers" counted using the PCM method or "structures" counted using the TEM method.
 - 2. Aggressive Sampling: All final air testing samples within negative pressure enclosures shall be collected using aggressive sampling techniques.

3.11.5 LABORATORY TESTING OF FINAL AIR SAMPLES

Samples shall be sent by the CIH to an AIHA-accredited laboratory for initial PCM analysis with reanalysis at an AIHA-accredited laboratory by TEM if needed. Verbal/faxed PCM results from the laboratory shall be available within 24 hours after sampling. A complete record of all Final Air results shall be furnished to the **OWNER's** representative and the Abatement Contractor.

3.12 ABATEMENT CLOSEOUT AND CERTIFICATE OF COMPLIANCE

3.12.1 COMPLETION OF ABATEMENT WORK

After thorough decontamination, seal negative air machines with 2 layers of 6-mil polyethylene sheeting and duct tape to form a tight seal at the intake/outlet ends before removal from the regulated area. Complete asbestos abatement work upon meeting the regulated area clearance criteria and fulfilling the following:

- A. Remove all equipment, materials, and debris from the project area.
- B. Package and dispose of all asbestos waste as required.
- C. Repair or replace all damaged interior finishes required to be maintained during the abatement work, and replace stored carpeting if removed prior to start of abatement.
- D. Fulfill other project closeout requirements as specified elsewhere in this specification including final submittals.

3.12.2 CERTIFICATE OF COMPLETION BY CONTRACTOR

The Contractor shall complete and sign the "Certificate of Completion" in accordance with Attachment 1 at the completion of the abatement and decontamination of the regulated area.

3.12.3 WORK SHIFTS

All work shall be done during the following weekday hours: 7:00 am to 4:00 pm Monday to Friday. No work shall be scheduled by the Contractor on weekend days or Federal holidays. Any change in the work schedule must be proposed in writing prior to the changed schedule, and approved in writing by the **OWNER** Representative and CIH.

3.12.4 RE-INSULATION

Not used.

3.13.1 ATTACHMENT #1

CERTIFICATE OF COMPLETION

DATE:

PROJECT NAME: Wilmington Heights Nuisance Abatement

ADDRESS: 4614 - 4650 Wilmington Pike, Kettering, Ohio

1. I certify that I have personally inspected, monitored and supervised the abatement work which took place from / / 2026 to
 / /2026.
2. That throughout the work all applicable requirements/regulations and the **OWNER's** specifications were met.
3. That any person who entered the regulated area was protected with the appropriate personal protective equipment and respirator and that they followed the proper entry and exit procedures and the proper operating procedures for the duration of the work.
4. That all employees of the Abatement Contractor engaged in this work were trained in respiratory protection, were experienced with abatement work, had proper medical surveillance documentation, were fit-tested for their respirator, and were not exposed at any time during the work to asbestos without the benefit of appropriate respiratory protection.
5. That I performed and supervised all inspection and testing specified and required by applicable regulations and **OWNER** specifications.
6. That the negative pressure system was installed, operated and maintained in order to provide a minimum of 4 actual air changes per hour with a continuous -0.02" of water column pressure.

Signature/Date:

Contractor Name and Address:

Approved by CIH:

3.13.2 ATTACHMENT #2

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

DATE:

PROJECT NAME: Wilmington Heights Nuisance Abatement

ADDRESS: 4614 - 4650 Wilmington Pike, Kettering, Ohio

ABATEMENT CONTRACTOR'S NAME:

WORKING WITH ASBESTOS CAN BE HAZARDOUS TO YOUR HEALTH. INHALING ASBESTOS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCERS. IF YOU SMOKE AND INHALE ASBESTOS FIBERS YOUR CHANCES OF DEVELOPING LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with the owner for the above project requires that: You must be supplied with the proper personal protective equipment including an adequate respirator and be trained in its use. You must be trained in safe and healthy work practices and in the use of the equipment found at an asbestos abatement project. You must receive/have a current medical examination for working with asbestos. These things shall be provided at no cost to you. By signing this certificate you are indicating to the owner that your employer has met these obligations.

RESPIRATORY PROTECTION: I have been trained in the proper use of respirators and have been informed of the type of respirator to be used on the above indicated project. I have a copy of the written Respiratory Protection Program issued by my employer. I have been provided for my exclusive use, at no cost, with a respirator to be used on the above indicated project.

TRAINING COURSE: I have been trained by a third party, State/EPA accredited trainer in the requirements for an AHERA/OSHA Asbestos Abatement Worker training course, 32 hours minimum duration. I currently have a valid State accreditation certificate. The topics covered in the course include, as a minimum, the following:

- Physical Characteristics and Background Information on Asbestos
- Potential Health Effects Related to Exposure to Asbestos
- Employee Personal Protective Equipment
- Establishment of a Respiratory Protection Program
- State of the Art Work Practices
- Personal Hygiene
- Additional Safety Hazards
- Medical Monitoring
- Air Monitoring
- Relevant Federal, State and Local Regulatory Requirements, Procedures, and Standards
- Asbestos Waste Disposal

MEDICAL EXAMINATION: I have had a medical examination within the past 12 months that was paid for by my employer. This examination included: Health history, occupational history, pulmonary function test, and may have included a chest x-ray evaluation. The physician issued a positive written opinion after the examination.

Signature:

Printed Name:

Social Security Number:

Witness:

3.13.3 ATTACHMENT #3

**AFFIDAVIT OF MEDICAL SURVEILLANCE, RESPIRATORY PROTECTION AND
TRAINING/ACCREDITATION**

PROJECT NAME: Wilmington Heights Nuisance Abatement

ADDRESS: 4614 - 4650 Wilmington Pike, Kettering, Ohio

ABATEMENT CONTRACTOR'S NAME AND ADDRESS:

1. I verify that the following individual

Name: Social Security Number:

who is proposed to be employed in asbestos abatement work associated with the above project by the named Abatement Contractor, is included in a medical surveillance program in accordance with 29 CFR 1926.1101(m), and that complete records of the medical surveillance program as required by 29 CFR 1926.1101(m)(n) and 29 CFR 1910.20 are kept at the offices of the Abatement Contractor at the following address.

Address:

2. I verify that this individual has been trained, fit-tested and instructed in the use of all appropriate respiratory protection systems and that the person is capable of working in safe and healthy manner as expected and required in the expected work environment of this project.
3. I verify that this individual has been trained as required by 29 CFR 1926.1101(k). This individual has also obtained a valid State accreditation certificate. Documentation will be kept on-site.

Signature of Contractor:

Date:

Printed Name of Contractor:

E N D

END OF SECTION ## ####