Project Specifications
for
Removal of Asbestos Containing Building Materials
Prior to Complete Building Demolition

GREEN ACRES ORPHANAGE
538 East College St
Oberlin, OH 44074

Prepared for:

THE CITY OF OBERLIN
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Prepared by

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General Requirements

1.1 All references to “Owner” in this document shall mean The City of Oberlin, Ohio.

1.2 The Contactor is responsible for security of the work areas in the facility. The contractor shall limit entry into all work areas to their personnel, the Owner, the Owner’s authorized Representatives, and governmental regulatory personnel legally entitled to inspect the project.

1.3 All Contractors’ employees shall abide by federal, state, and local laws and by the Owner’s policies while on the project.

1.4 The Contractors’ employees are restricted to those areas of the building and grounds directly included in the project.

1.5 Any communications regarding this project shall be directed to the Owner’s Representative, JP Inc..

1.6 No other contractors shall be permitted to perform work in the work areas until the asbestos abatement has been completed.

1.7 Unless otherwise specified, all references to “Contractor” shall mean the licensed asbestos abatement contractor.

1.8 The Contractor shall secure asbestos liability insurance specifically in occurrence form. The insurance carrier shall be a Best’s rated company. The minimum insurance coverage acceptable shall be $1 million each occurrence with a $1 million policy limit or limits approved by the Owner. The Contractor shall not commence work until insurance requirements have been obtained with certificates being filed with the Owner to evidence such coverage’s. An Accord form insurance certificate shall be issued to the Owner prior to commencement of the project and shall list the Owner and their representative as additional insured parties.

1.9 The prevalent airborne fiber concentration outside the work area shall not become elevated above or equal to 0.1 fibers per cubic centimeter of air (f/cc) using phase contrast microscopy (PCM). If elevated fiber concentrations are detected during the course of this Project, the Contractor shall cease work and correct their procedures and engineering controls to ensure a safe level of airborne fibers.

1.10 If the prevalent airborne fiber concentrations inside the work area exceed 1.0 f/cc for an eight-hour time weighted average (TWA_8) exposure sample, during any phase of the Project not involving Type “C” air, the Contractor shall stop work and implement response measures to reduce airborne fibers concentrations to a level less than 1.0 f/cc TWA_8 inside the work area.

1.11 All substrates, which are not specified to be abated inside the work area, may be encapsulated upon passage of the final visual inspection since this is a demolition project. The only area that will require a full enclosure will be the main boiler room.

1.12 All asbestos-containing waste requiring drums must be placed inside the containers on-site by the Contractor. Any asbestos-containing waste requiring bags shall be 6- mil polyethylene disposable bags. Complete waste disposal documentation must be submitted to the Owner’s Representative after landfill receipt.

1.13 If the contractor uses leased or rented vehicles to transport asbestos-containing waste from the job site, a signed statement from the lease/rental company must be submitted to Owner’s Representative stating the company is aware that their vehicle is being used to transport asbestos-containing waste. All carriers transporting asbestos-containing waste shall be lined with two layers of 6-mil polyethylene. All workers involved in asbestos load-out activities shall wear at minimum; half-face respirators with NIOSH approved HEPA filters and protective clothing.

1.14 The specified work shall be completed for the Owner in accordance with these specifications and accompanying details, subject to approval of the Owner's Representative. All work shall be done in a neat and workmanlike manner and shall include all material and labor unless otherwise specified, necessary to complete the project.

1.15 The Contractor shall furnish all scaffolding, machinery, transportation, tools, utensils, etc., necessary for the proper accomplishment of the project. All items shall be suitable for the use intended, and used in a safe manner, in accordance with OSHA Standard 29 CFR 1926.

1.16 The Contractor is to assume that electrical power, domestic water, restroom facilities and sanitary sewer access will be maintained on the jobsite by the Owner at no cost to the Contractor.

1.17 The contractor shall insure his work and shall hold the City of Oberlin and the Owner's Representative blameless of all damage to life or limb incurred during, or as a result of, the execution of this work under these specifications.

1.18 The Contractor shall maintain a temporary office on-site in which their authorized agent will man each workday. Copies of permits, abatement specifications, marked up to date with all revisions and required regulations shall be kept in this office.

1.19 The Contractor's employees are required to evacuate the building during fire alarms or fire emergencies.

1.20 All the Contractor's employees shall abide by federal, state, and local laws while on premises.

1.21 Lead Containing paints are assumed to be present in the wall, ceiling, and other components located at the site. The contractor has responsibility related to OSHA Hazard Communication Standard 29 CFR 1910.1200 for lead containing materials, which may be encountered during this project. Prior to disturbing any building materials coated with lead containing paint, the contactor is responsible for complying with OSHA Lead Construction Standard 29 CFR 1926.62.

1.22 The Contractor is responsible for submitting a final report to the Owner's Representative within thirty days from the time of the project completion. The contents of this final report shall contain the following:

- Original waste disposal receipts or proof of recycling
- Asbestos abatement Contractors license for the State of Ohio
- EPA and ODH Notifications (including revisions)
- Certificates of Insurance
- Daily log of project activities
- Executive summary of completed project, with a statement assuring final completion of the project
- List of personnel and current respirator fit tests, and medical clearances to wear respirators and perform the scheduled work.
- Ohio Department of Health licenses and applicable training certificates for all workers on the jobsite
- Any governmental correspondence related to the project
- Material Safety Data Sheets for each surfactant, encapsulant, or other product used on the project
- Copies of all pictures and/ or video tapes made on the project
- Copies of air sampling results for the duration of the project

END OF GENERAL REQUIREMENTS

Section 1: Technical Hazard Remediation Specifications

Part 1 – Work To Be Performed

1.1 Description of Work

This project involves the removal and proper disposal of Regulated Asbestos Containing Materials (RACM), NESHAPS Category II and NESHAPS Category I asbestos containing materials (ACM) from the Green Acres Building in preparations for its demolition. The removal work shall not necessitate the replacement of specified materials removed. The contractor is responsible for all demolition to access any ACM that may be located behind walls, in chases or otherwise concealed.

Article 2.1 and 2.2 describe the Scope of Work and Description of Work in greater detail. Estimated quantities, types, locations, of asbestos-containing materials to be removed can be found on the attached survey summary report. These quantities are estimates and are included to assist the Contractor in preparing a bid. For bidding purpose contractor is responsible for providing his own quantities. No change order requests will be considered for exposed RACM or ACM materials that were assessable during the pre-bid site visit.

1.2 Owner's Representative

The project shall be coordinated through:

JP Incorporated
630 Cobblestone Dr.
Amherst, OH 44001-1966
John Pardee, President
AHES Cert. #3201
AHPD Cert. #60060
440-984-3838 (Office)
440-984-3145 (Fax)
440-315-2735 (Cell-urgent calls/text only)
E-mail: pardeejl@yahoo.com

1.3 Substantial Completion Date

Asbestos abatement must be completed in a timely manner to meet the deadline of _____. The Contractor will submit a detailed schedule to ensure that asbestos removal is completed in time to meet this deadline.

Part 2 – General

2.1 Scope

This project involves the removal and proper disposal of Regulated Asbestos Containing Materials (RACM), NESHAPS Category II and NESHAPS Category I asbestos containing materials (ACM) specified from the Green Acres Building in preparations for its demolition.

2.2 Description of Work

2.2.1 Work Specified: The contractor shall furnish all labor, materials, employee training services, insurance, and equipment in accordance with requirements of the Specification to complete asbestos removal and decontamination of Regulated Asbestos Containing Materials (RACM), NESHAPS Category II and NESHAPS Category I asbestos containing materials (ACM) from the Green Acres Building.

2.2.2 Removal and proper disposal of Regulated Asbestos Containing Materials (RACM), NESHAPS Category II and NESHAPS Category I asbestos containing materials (ACM) from the Green Acres Building by conventional containment methods as specified in Article 4.1.1 and 4.1.2 **NOTES:** 1) The Owner's Representative shall approve all removal methods (i.e., total containment, modified total containment, glovebag, and/or regulated work area) prior to allowing Work to begin; 2) Areas requiring total containment methods shall be completely contained and isolated from adjoining spaces (i.e., above the ceiling, pipe chases, etc.) ; 3) The Contractor shall be responsible for removing all cabinets, carpet and equipment necessary to access materials scheduled for removal. Disconnection of service lines (I.e., water, gas, electric, drain lines, etc.) shall be the responsible of the Owner.

2.2.3 Contractor Responsibilities: Piping shall not be used to support workers during the removal effort. The Contractor shall be held liable for injuries and/or damages that result from violation of these specifications. Contractor shall comply with current federal, state, and local laws and regulations. The contractor shall prepare an asbestos abatement/ site specific safety plan, which describes the methods of abatement involving this building specifically. The plan is to be submitted to the Owner or Owners Representative for review and formal approval at least seven days before commencing site preparation or asbestos removal.

2.2.4 Patent Indemnification: The contractor shall pay all license fees and royalties and assume all cost incidental to the use in the performance of Work or the incorporation of the Work of any invention, design, process, product, or device which is subject of patent rights held by others. The contractor shall indemnify and hold harmless the Owner, Owner's Representative and anyone directly or indirectly employed by them from and against all claims, damages, losses and expenses, including attorney's fees and court arbitration cost arising out of any infringement of patent rights incident to use in performance of the Work of any invention, design, process, product or device specified or not specified in the Contract Documents, and shall defend all such claims connection with any alleged infringement of such rights.

2.2.5 Furniture, etc.: The Contractor shall remove all non-contaminated furniture, movable equipment, etc. from the work areas left by the Owner prior to performing Work.

2.3 Terminology and Definitions

2.3.1 *Abatement:* Procedures to control fiber release from asbestos-containing materials, i.e., removal, encapsulation, or enclosure.

2.3.2 *Air Lock:* A system for permitting ingress or egress without permitting air movement between a contaminated area or an uncontaminated area, typically consisting of two contained doorways at least 6 feet (2meters) apart.

2.3.3 *Air Monitoring:* The process of measuring the fiber content of a specific volume of air in a stated period of time. Phase contrast microscopy in accordance with NIOSH Method No. 7400 is the prescribed method of sampling and analysis.

2.3.4 *Air Sampling Technician:* A person trained and experienced in air sampling techniques and schemes who performs air sampling.

2.3.5 *Amended Water:* Water to which surfactant has been added.

2.3.6 *American Industrial Hygiene Association:* A professional organization of Industrial Hygienists, which develops and maintains laboratory accreditation programs and industry standards.

2.3.7 *Asbestos Hazard Emergency Response Act (AHERA) :* Congressional Act which requires local education agencies to identify friable and non-friable asbestos-containing building materials (ACBM) in public and private elementary and secondary schools; submit management plans to the governor of their state; implement management plans in a timely manner; and maintain complete records of any action involving the disturbance of ACBM.

2.3.8 *Authorized Visitor:* The building owner or his representative, air sampling technician, asbestos project manager, Owner's Representative, or a representative of any regulatory or other agency having jurisdiction over the project.

2.3.9 *Barrier:* Plastic sheeting and/ or other materials used along with floors, ceilings, and walls of a structure to form an isolated Work environment that separates the contaminated work area from the uncontaminated area.

2.3.10 *Bridging Encapsulant:* A liquid designed to form a tough membrane over the surface of asbestos-containing materials.

2.3.11 *Building Owner:* The City of Oberlin

2.3.12 *Certified Industrial hygienist (C.I.H.):* A person with competence certification in Industrial Hygiene who meets the requirement of the American Board of Industrial Hygienists

2.3.13 *Clean Room:* An uncontaminated area or room that is part of the workers' decontamination enclosure system, with provisions for storage of workers' street clothes and protective equipment.

2.3.14 *Competent Person:* A Contractor's employee (typically the foreman or superintendent) by virtue of his education and experience who is capable of operating and asbestos hazard abatement project in accordance with current Federal, State, and local laws and regulations. Duties of the competent person are as defined in 29 CFR 1910.120 and 1926.1101.

2.3.15 *Contamination:* Containing or coated with asbestos

2.3.16 *Curtained Doorway:* A device to allow ingress or egress for one room to another while minimizing air movement between rooms, typically constructed by placing two overlapping sheets of plastic over an existing or temporarily formed doorway, securing the vertical edge of one sheet along one vertical side of the doorway, and securing the vertical of the other sheet along the opposite vertical side of the doorway. Two curtained doorways spaced a minimum of 6 feet (2 meters) apart from air lock.

2.3.17 *Decontamination Enclosure System:* A series of connected rooms, with curtained doorways between any two adjacent rooms, for the decontamination of workers or of

materials and equipment. A decontamination enclosure system always contains at least one air lock.

2.3.18 *Encapsulant:* A liquid material that can be applied to asbestos-containing materials or cleaned substrates following the removal of asbestos-containing materials to control the possible release of residual asbestos fibers from the material by creating a membrane over the surface.

2.3.19 *Encapsulation:* All herein specified procedures necessary to coat asbestos-containing materials with a penetrating or bridging encapsulant to control the possible release of asbestos fibers into the ambient air.

2.3.20 *Equipment Decontamination Enclosure System:* A decontamination enclosure system for materials and equipment, typically consisting of a designated area of the work area, a washroom, a holding area, and an uncontaminated area.

2.3.21 *Equipment Room:* A containment area or room that is part of the worker decontamination enclosure system, with provisions for storage of contaminated clothing and equipment.

2.3.22 *Facility Component:* Any pipe, duct, boiler, tank, fan, engines, or furnace at or in a facility, or any structural member of a facility.

2.3.23 *Fixed Object:* A piece of equipment or furniture in work area that cannot be removed the work area.

2.3.24 *Glovebag Technique:* A method with limited applications for removing small amount of asbestos-containing material from HVAC ducts, piping runs, valves, joints, elbows, and other uneven surfaces in an uncontaminated (plasticized) work area. The glovebag assembly is a manufactured or fabricated device consisting of a glovebag (typically constructed of 6-mil transparent plastic); two inward-projecting, long-sleeve, rubber gloves; one inward- projecting water wand sleeve; an internal tool pouch; and an attached , labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process. All workers who are permitted to use the glovebag technique must be highly trained, experienced, and skilled in this method.

2.3.25 *Ground Fault Circuit Interrupters:* A fast-acting circuit breaker that senses small imbalances in circuits caused by current leakage and shut off electricity in just a fraction of a second.

2.3.26 *HEPA Filter:* A high-efficiency particulate air (absolute) filter capable of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 micrometer particles or larger.

2.3.27 *HEPA Vacuum:* High- efficiency particulate air (absolute) filtered vacuuming equipment with a filter capable of collecting and retaining asbestos fibers. Filters should be 99.97 percent efficient for retaining 0.3 micrometer particle or larger.

2.3.28 *Holding Area:* A Chamber between the washroom and an uncontaminated area in the equipment decontamination enclosure system. The holding area comprises an air lock.

2.3.29 *Movable Object:* A piece of equipment or furniture in the work area that can be removed from the work area.

2.3.30 *Negative Pressure Ventilation System:* A local exhaust system capable of maintaining a detectable differential across containment barriers relative to adjacent unsealed areas.

2.3.31 *NESHAPS:* The National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61).

2.3.32 *NIOSH:* The National Institute for Occupational Safety and Health.

2.3.33 *OSHA:* Occupation Safety and Health Administration.

2.3.34 *Penetrating Encapsulant:* A liquid designed to saturate the material, thereby binding asbestos fibers to one another and to other substances in the material.

2.3.35 *Plasticize:* To cover floors, walls, etc., with plastic sheets as herein specified.

2.3.36 *Removal:* All herein specified procedures necessary to strip or clean up asbestos-containing materials from designated areas and to dispose of these materials at an acceptable disposal site.

2.3.37 *Shower Room:* A room between the clean room and the equipment room in the worker decontamination enclosure system, with hot and cold(or warm) running water and suitable arranged for complete showering during decontamination. The shower room comprises an airlock between contaminated and clean areas.

2.3.38 *Staging Area:* Either the holding area or an area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the area.

2.3.39 *Stripping:* All herein specified procedures necessary to remove asbestos-containing materials or asbestos-contaminated materials from their substrate or from any component of the facility.

2.3.40 *Substrate:* The underlying surface or material (piping, duct, boilers, tanks, chases, floors, etc.) to which asbestos containing- material has been applied.

2.3.41 *Surfactant:* A chemical wetting agent added to water to improve penetration.

2.3.42 *Thermal System Insulation:* Insulation used to prevent heat loss from pipes, boilers, tanks, breeching, heat exchangers, etc.

2.3.43 *Owner's Representative:* Individual or Company designated as the Owners' Representative; and responsible for ensuring compliance with project specifications.

2.3.44 *Washroom:* A room between the work area and the holding area in the equipment decontamination enclosure system. A washroom comprises an air lock.

2.3.45 *Wet Cleaning:* The process of eliminating asbestos contamination from the building surfaces and objects by using cloths, mops, or other cleaning tools that have been dampened with water, and then disposing of these cleaning tools as asbestos – contaminated waste.

2.3.46 *Worker Area:* Designated rooms, spaces, or areas of the project in which asbestos abatement actions are to be undertaken or which may be contaminated as a result of such abatement actions. A contained work area is one that has been sealed, plasticized, and equipped with a decontamination enclosure system. An isolated work area is a controlled- access work area that has been isolated by plastic curtains and in which the openings to the outside are sealed with plastic sheeting. An isolated work area is not an airtight containment area and is not equipped with a decontamination enclosure system.

2.3.47 *Worker Decontamination Enclosure System:* A decontamination enclosure system for workers, typically consisting of a clean room, a shower room, and an equipment room.

2.4 Applicable Reference Documents

The current issue of each document shall govern. If there is a conflict among requirements or these Specifications, the more stringent requirements shall apply.

2.4.1 Regulations- Compliance is required in strict accordance with applicable Federal, State, municipal, and local regulations.

- 2.4.1.1 Title 29, Code of Federal Regulation, Section 1910.1001, General Industry Standard for Asbestos
- 2.4.1.2 Title 29, Code of Federal Regulations, Section 1926.1101, Construction Industry Standard for Asbestos
- 2.4.1.3 Title 29, Code Regulation Section 1910.134, General Industry Standard for Respiratory Protection

2.4.1.4 Title 29, Code Regulation Section 1926.59, Construction Industry Standard for Hazard Communication
2.4.1.5 Title 29, Code Regulation Section 1910.1200, Construction Industry Standard for Hazard Communication
2.4.1.6 Title 29, Section 1910.1025, General Industry Standard for Lead
2.4.1.7 Title 29, Section 1910.1000, Occupational Safety and Health Standards
2.4.1.8 Title 29, Section 1910.120, Hazardous Waste Operations and Emergency Response
2.4.1.9 Title 29, Section 1926.404, Electrical
2.4.1.10 Title 29, Section 1926.452 (W), Scaffolding
2.4.1.11 Title 40, Code of Federal Regulations, Part 61, Subpart A
2.4.1.12 Title 40, Code of Federal Regulations, Part 763, Asbestos
2.4.1.13 Ohio Revised Code, Sections 3710.1 through 371.99 and Ohio Administrative Code, Chapter 3745-20 and 3701-34.
2.4.1.14 Title 49, Code of Federal Regulations, Hazardous Material Transportation Regulation, U.S. Department of Transportation (DOT)

2.4.2 Guidance Documents

2.4.2.1 Asbestos-containing Materials in School Buildings: A guidance Document, Part 1. Office of Toxic Substances, U.S. EPA, Washington, D.C. 1979.
2.4.2.2 Asbestos-containing Materials in School Buildings: A guidance Document, Part 2. Office of Toxic Substances, U.S. EPA, Washington, D.C. 1979.
2.4.2.3 Guidance for Controlling Friable Asbestos-Containing Materials in Buildings: Washington, D.C. Office of Pesticides and Toxic Substances, U.S. EPA 1983.
2.4.2.4 Recommended Specifications and Operating Procedures for the use of Negative Pressure Systems for Asbestos Abatement.
2.4.2.5 Guidance for Controlling Asbestos-Containing Materials in Buildings: Washington, D.C., Office of Pesticides and Toxic Substances, U.S. EPA. 1985.
2.4.2.6 Measuring Airborne Asbestos Following and Abatement Action: Washington D.C. Office of Pesticides and Toxic Substances, U.S. EPA. 1985.
2.4.2.7 Asbestos Waste Management/Guidance: Generation, Transportation, and Disposal: Washington, D.C., Office of Solid Waste, U.S. EPA. 1985.
2.4.2.8 Notification of Regulated Waste Activity. Office of Solid Waste (OS-312), Washington D.C., U.S. EPA. 1990.

2.4.3 Codes of Standards

2.4.3.1 ANSI- American National Standards Institute, ANSI Z-9.2, Fundamental Governing the Design and Operation of Local Exhaust Systems.
2.4.3.2 NEC- National Electric Code. Any Work involving electrical equipment in a facility shall be performed in strict accordance with National Electric Code.

2.5 Air Monitoring

2.5.1 General

2.5.1.1 The performance and execution of the Work shall be closely and continuously monitored by the Owner's Representative and their representatives. The surveillance shall be inside the work area and the surroundings to ensure full compliance with this Specification and all applicable regulations. Full cooperation and support shall be provided to the Owner and the Owner's

Representative and their technicians throughout the abatement process. Monitoring shall include data review from air samples collected inside the work area; personal exposure sampled collected at the breathing zone of Contractor employees conducting asbestos removal; and environmental air samples collected outside the work area. Daily inspections shall include standard operating procedures, engineering control systems, respiratory protection devices, transportation, and disposal of materials, decontamination facilities, and procedures, and any other aspects of the abatement process that may require impact the health and safety of people and quality of the environment.

2.5.1.2 The Contractor or his representative shall conduct personal exposure and excursion air monitoring of their workers throughout all phases of this Project as specified on Table II. Exposure air monitoring shall be conducted to ensure full compliance with 29 CFR 1926.1101 and to evaluate the adequacy of 1) the type of respiratory protection used by worker and 2) work practices and engineering controls.

2.5.1.3 The Contractor or his Representative is responsible for monitoring personnel working inside the work area. The person or party responsible for the collection of air samples shall be technically competent experienced and posses necessary accreditations to perform the work utilizing the prescribed procedures for collecting representative air samples.

2.5.2 Asbestos Exposure Monitoring Schedule and Sampling Strategy

At a minimum, the Contractor's air monitoring schedule and sampling strategy for asbestos-related work shall be conducted as follows:

TABLE II- Asbestos Exposure Monitoring Schedule

Phase of Abatement Project	When to Sample	Type of Sample	Minimum # of Employees *	Location
Preparation – during cleaning and preparation of work area	Each day of operation	Personal	1*	Inside work area
Removal (Class I)	Each day of operation	Personal and Excursion	1*	Inside work area
Removal (Class II)	Each day of operation	Personal	1*	Inside work area
Decontamination and load-out	Each day of operation	Personal	1*	Inside work area

***NOTE:** At a minimum, one out of every four worker involved in asbestos hazard abatement activities shall be monitored during all preparation, gross removal, decontamination, and load-out phases of this project. Short-term excursion samples shall be also be collected per activity and/or at the request of the Owner's Representative and his representatives.*

2.5.3 Methods of Collection and Analysis

2.5.3.1 All air monitoring shall be conducted in accordance with 29 CFR 1926.1101 and Appendix A of the Standards. The recommended sampling period shall be 7 to 8 hours, except on abbreviated work shifts. The flow rate for the sampling pump shall be 0.5 to 2.5 liters/minute. Sampling pumps shall be checked daily by the Contractor at the beginning and end of each sample collection for proper flow-rate calibration.

2.5.3.2 All samples collected by the Contractor or his representative shall be submitted daily for analysis to a laboratory that is accredited by the American Industrial Hygiene Association and is PAT certified. Completed data sheets must be submitted to laboratory along with each day's filter samples. Sampling results for asbestos related Work will be reported to the Contractor within twenty-four hours of their collection.

2.5.3.3 The minimum number of employees and areas to monitor indicated on Table II shall not be interpreted as the total number of samples to be collected and analyzed each day. Multiple personal or area samples may have to be collected during the 7 to 8 hour work shift to accurately characterize a worker's exposure level. The number of samples collected shall depend on the degree of airborne contamination in the work area and the effectiveness of work practices and engineering controls. Overloaded filter samples will require the Contractor to cut the sample durations in half and double up on the samples collected.

2.6 Personnel Protection

2.6.1 Worker Instruction – Prior to commencement of this Project, all workers shall be instructed and shall be made knowledgeable of the requirements of this Specification.

2.6.2 Respiratory Equipment – All workers shall be provided with personally issued and marked respiratory equipment approved by NIOSH and suitable for the asbestos exposure level in each work area according to 29 CFR 1926.1101. At a minimum, all workers performing Class I asbestos abatement activities shall wear powered air-purifying respirators equipped with HEPA filter cartridges. **NOTE:** Half-face air-purifying respirators equipped with HEPA filters shall be allowed for flooring and mastic removal procedures provided the exposure monitoring results are representative of existing exposure levels and below 0.1 f/cc over the $TWA_{8.}$ Single use or reusable disposable respirators are not acceptable and shall not be used on this Project. Sufficient filter cartridges or pads for replacement shall be provided as required by the worker, applicable regulations, or as bound into this specification. If prevalent airborne fiber concentrations inside any asbestos work area exceed 1.0 f/cc over the $TWA_{8,}$ the contractor shall stop work and implement the following:

A. Use of Full-Face Type "C" air supplied respirators in positive pressure (constant flow) or pressure demand modes. All air hose connections shall be equipped with a HEPA filtered disconnect system in the event of compressor failure or the exhaustion of air in the reserve tanks. At the minimum, Type "C" air supply shall provide the following:

- A continuous sufficient supply of air
- Supplied air that meets Grade D requirements as specified by Compressed Gas Association
- An adequate volume of air to allow for escape from the work area
- Worker comfort and safety
- NIOSH approved respirators and supply hoses

Compressed air systems shall be designated to provide air volumes and pressures to accommodate respirator manufacture's specifications. Only breathing air compressors shall be used and may be either gasoline or electric powered; however, electric powered compressors are preferred. The compressor shall also be equipped with in-line air purifying sorbent beds and filters that remove moisture, odors, oils, hydrocarbons, heat, and carbon monoxide. The compressor shall be equipped with

a carbon monoxide monitor and shall be checked daily as specified by the manufacture. The carbon monoxide monitor should be equipped with a visible and audible alarm to alert the operator of a high carbon monoxide level in the air supply. The compressed air system shall also be equipped with a reserve tank or reservoir. The volume of air in the reserve tank should provide adequate escape time for employees in the work area. All Type "C" air line respiratory equipment shall be approved as an entire unit by NIOSH. This includes respirator face piece, regulator, and airline. Any alterations of the respirator or subcomponents are strictly forbidden and void any approval by NIOSH.

B. Engineering controls to reduce airborne contaminants to reduce the TWA_8 below the levels specified.

2.6.3 Protective Clothing – Per 29 CFR 1926.1101 and/or 1910.120, workers and all authorized persons on-site shall be provided with sufficient sets of protective full-body clothing. Such clothing shall consist of full-body coveralls, rubber gloves, face shields, vented goggles, and headgear. Eye protection, safety belts, steel toe safety shoes, and hard hats shall be provided as required by applicable safety regulations. Non-disposable protective clothing and footwear shall be left in the contaminated equipment room until the end of the abatement Work, at which time such items shall be properly disposed. Disposable protective clothing, headgear, and footwear shall be provided as needed and/or requested by the Owner's Representative.

2.6.4 Visitor Protection – Authorized visitors shall be provided by the Contractor with suitable respirators with new filters or cartridges and protective clothing, headgear, eye protection, safety belts, and footwear, as described in Article 2.6.3 whenever they are required to enter the work area, to a maximum of three sets per day.

2.6.5 Protection Procedures – The Contractor shall provide and prominently post the decontamination and work practices to be followed by workers in the clean/change area as described in Article 2.6.6.

2.6.6 Worker Protection Procedures - All Abatement

2.6.6.1 Each worker and authorized visitor shall, prior to entering the worker area: remove street clothes in the clean change room and don the required respiratory equipment and clean protective clothing before entering the decontamination chamber entrance to the work area; except workers that intend to re-wear contaminated protective clothing stored in the equipment room shall enter the equipment room wearing only a respirators.

2.6.6.2 Each worker and authorized visitor shall, each time he leaves the work area: remove gross contamination from clothing before leavening the work area: proceed to the equipment room and remove all clothing except respirators; still wearing the respirator, proceed naked to the showers; clean the outside of the respirator with soap and water while showering; remove the respirator; thoroughly shampoo and wash himself; if the filters require replacement, remove filters, wet them, and dispose of them in the container provided for the purpose; and wash and rinse the inside of the respirator face piece.

2.6.6.3 Following showering and drying off, each worker and authorized visitor shall proceed directly to the clean change room and dress in clean clothes at the end of each day's work, or before eating or drinking. Before reentering in the work area from the clean change room, each worker and authorized visitor shall put on a clean respirator with filters and shall dress in clean protective clothing; except worker that intend to re-wear contaminated protective clothing stored in the equipment room shall enter the equipment room wearing only respirators.

2.6.6.4 Contaminated work footwear shall be stored in the equipment room when not in use in the work area. After the asbestos and lead abatement process is completed, footwear shall be disposed of as contaminated waste or cleaned thoroughly inside and out with soap and water before being removed from the work area. Contaminated protective clothing shall be stored in the equipment room for reuse or placed in receptacles for disposal with other asbestos-contaminated materials.

2.6.6.5 Workers removing waste containers from the equipment decontamination enclosure shall enter the holding area from outside wearing a respirator and dressed in clean coveralls. Workers shall not use this system as a means to leave or enter the work area.

2.6.6.6 Worker shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of contaminated material, and until final cleanup is completed and approved.

2.6.6.7 Workers shall not eat, drink, or chew gum or tobacco at the Project site except in established break room or outside of the building. **Smoking shall not be permitted at any time within the facility.**

2.7 Equipment Removal Procedures

2.7.1 Cleaning – Clean external surfaces of contaminated containers and equipment thoroughly by wet mopping, or using a HEPA-filtered vacuum before moving such items onto decontamination enclosure system washroom for final cleaning and removal of uncontaminated areas. Ensure that personnel do not leave work areas through the equipment decontamination enclosure system.

2.8 Emergency Precautions

2.8.1 The Contractor shall establish (and clearly mark) emergency and fire exits from the work area. Emergency procedures shall be in written form and prominently posted in the clean change room immediately outside the worker decontamination enclosure system.

2.8.2 The Contractor shall be responsible for providing a minimum of one fire extinguisher, rated not less than 2A, for each three thousand square feet of containment areas in accordance with 29 CFR 1926.150. Travel distance from any point inside the work area to the nearest fire extinguisher shall not exceed one hundred feet.

2.8.3 OMITTED

2.8.4 Employees shall be trained in evacuation procedures in the event of work area emergencies.

2.8.5 For non-life-threatening situations, employees injured or otherwise incapacitated shall decontaminate themselves following normal procedures with assistance from fellow workers, if necessary, before exiting the work area to obtain proper medical treatment.

2.8.6 For life-threatening injury, worker decontamination shall take least priority after measures to stabilize the injured worker, remove him from the work area, and secure proper medical treatment.

2.8.7 OMITTED

2.8.8 Telephone numbers of all emergency response personnel shall be prominently posted in the clean/change room outside the worker decontamination enclosure system along with location of the nearest emergency room.

2.9 Site Security

2.9.1 The Contractor shall post warning signs at designated entrances to each work area as required by 29 CFR 1926.1101 and/.or 29 CFR 1910.1000.

2.9.2 Entry into the work area by unauthorized individuals shall be reported immediately to the Owner's Representative by the Contractor. The Contractor shall maintain a sign-in sheet for all visitors to the site.

2.9.3 Parking-There will be designated parking areas for the Contractor's vehicle(s) and equipment near the facility. The Contractor and their employees shall only use the designated areas unless otherwise authorized.

Part 3 – Materials and Equipment

3.1 Materials

3.1.1 OMITTED

3.1.1.2 OMITTED

3.1.1.3 Damaged or deteriorating materials shall not be used and shall be removed for the premises. Material that becomes contaminated with asbestos shall be disposed of in accordance with this Specification.

3.1.2 Plastic Sheeting – Plastic sheeting for all walls and stationary objects shall be a minimum of 6-mil thick. All plastic sheeting shall be sized appropriate lengths and widths to minimize the frequency of joints.

3.1.2.1 Plastic sheeting used for worker decontamination enclosure systems shall be black in color.

3.1.3 Tape – Must be capable of sealing joints of adjacent plastic sheets, capable of attaching plastic sheets to finished or unfinished surfaces of dissimilar materials, and capable of adhering under dry and wet conditions, including use of amended water.

3.1.4 Surfactant - A surfactant shall consist of 50 percent polyoxyethylene ether and 50 percent polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of 1 ounce surfactant to 5 gallons of water, or according to Manufacture's Specifications.

3.1.5 Impermeable Containers - Must be suitable for receiving and retaining any asbestos-containing and/or contaminated materials. Metal or fiber drums with tight-fitting lids are required for all asbestos-containing wastes, i.e., metal lathe, wire, metal jackets, etc. Plastic bags, 6-mil thick, are acceptable for friable asbestos, fiberglass, insulation without metal components that could tear the bags. All asbestos-containing waste shall be labeled in accordance with 29 CFR 1926.1101, 49 Part 171 and 172 and 40 CFR Part 61, Subpart A. All containers shall be both air and watertight.

3.1.6 Encapsulants – Encapsulating sealants shall be penetrating sealants and tinted to demonstrate full coverage application.

3.1.6.1 OMITTED.

3.1.6.2 The encapsulant shall not add any toxic substances and should not break down under direct flame impingement to release any toxic gases or an undue amount of smoke.

3.1.6.3 The encapsulant shall be capable of adhering to the substrate surface.

3.1.6.4 OMITTED.

3.1.6.5 The encapsulant shall have impact resistance, flexibility, and resistance to penetration in withstanding physical contact.

3.1.6.6 The encapsulant shall be water insoluble when cured.

3.1.6.7 The encapsulant shall be nontoxic and free of toxic mists/fumes during application.

3.1.6.8 OMITTED

3.1.7 Warning Labels and Signs - As required by 29 CFR 1926.1101 and/or 29 CFR 1910.1000.

3.1.8 Glovebags - Glovebags shall be made of a minimum 6-mil thick plastic and shall be seamless at the bottom as specified in 29 CFR 1926.1101.

3.1.9 Plexiglas – The Contractor shall install Plexiglas partitions in doorways or openings adjacent to an asbestos hazard abatement work area, when feasible, to enable asbestos hazard abatement activities to be observed by the Owner's Representative and/or other visitors without entering the work area. The Plexiglas partitions shall be a minimum size of 2'x 2'.

3.1.10 Other Materials - The Contractor shall provide all other materials, such as lumber, nails, and hardware that may be required to construct and dismantle the decontamination units and the barriers that isolate the work area.

3.2 Tool and Equipment

3.2.1 The Contractor shall provide suitable tools and equipment for all phases of work for this Project.

3.2.1.1 Air movement equipment- High Efficiency Particulate Air (absolute) filtration equipment in compliance with ANSI Z 9.2, Local Exhaust Ventilation. No air movement system or air equipment shall discharge asbestos fibers outside the Work area into the building.

3.2.1.2 A negative pressure differential shall be established in the work area by means of mechanical exhaust equipment (air filtration devices) in order to keep airborne fibers confined to the work area, decrease humidity, and temperature, reduce fiber levels in the work area, and achieve acceptable final air monitoring results. The mechanical equipment shall remain exhaust through a HEPA filter to the outside of the building. The equipment shall remain in operation twenty-four hours a day until decontamination of the work area and final air sampling and analysis is completed.

3.2.2 Airless Sprayer – An airless sprayer shall be used for the application of amended water and encapsulants.

3.2.3 Scaffolding and Ladders - Scaffolding and ladders shall be used as required to accomplish work specified in Part 1 and shall meet or exceed all applicable OSHA requirements and safety regulations.

3.2.4 Vacuums – All vacuums utilized to clean up asbestos-containing materials in the work area shall be equipped with HEPA filters and operated and maintained in accordance with manufactures specifications.

3.2.5 Miscellaneous Tools, and Equipment - The Contractor shall provide all other tools suitable for stripping, removal, and encapsulation of asbestos-containing materials. These tools include, but are not limited to, scrappers, wire cutters, brushes, sprayers, sponges, utility knives, flexible wire saws, shovels, and brooms.

3.2.6 Digital Pressure Differential Meter - The Contractor shall install a digital pressure differential gauge to continuously measure the pressure differential between the clean area and the works area. A pressure differential meter will be required for each separate containment.

3.2.7 Use of Owner's Tools and Equipment - No tools or equipment of the Owner shall be used by the Contractor, unless permission in writing is granted by the Owner's Representatives.

Part 4: Execution

4.1 Sequence of Execution

4.1.1 Work Area Sequence- The sequence of execution for each work area involving asbestos abatement activities utilizing conventional total containment methods shall occur in the following order:

4.1.1.1 Due to the presence of mold, the entire building will need to be fogged with a commercial grade biocide followed by being fogged with a lockdown encapsulant to minimize airborne mold spores. Air filtration devices need to be installed and activated to change the air for both asbestos fiber and airborne mold spore minimization.
4.1.1.2 Prepare work area per Article 4.2
4.1.1.3 Strip and remove asbestos-containing Class I materials first, then Class II materials second in specified areas per Article 4.3.
4.1.1.4 Remove and discard asbestos-containing waste generated from abatement activities per Article 4.4.
4.1.1.5 Decontaminate and clean work area per Articles 4.5 and 4.6.
4.1.1.6 Encapsulate building surfaces with an approved sealant as specified per Article 4.7
4.1.1.7 Establish final clearance criteria for each work area per Article 4.8

4.1.2 Work area Sequence- The sequence of execution for each work area involving asbestos abatement activities utilizing glovebag methods shall occur in the following order:

4.1.2.1 Prepared the work area per Article 4.2. If it is determined by the on-site Owner's Representative that a contiguous decontamination unit is not feasible, a centrally located decontamination unit shall be required in the areas where glovebag and/or cut wrap methods are used. The on-site Owner's Representative shall determine the number of decontamination stations.
4.1.2.2 Install glovebags on asbestos-containing material according to the manufactures instruction and this Specification.
4.1.2.3 Perform wrap and cut procedures per the requirements of this specifications.
4.1.2.4 Strip and remove asbestos-containing materials in the specified areas per Article 4.3.
4.1.2.5 Removal and discard asbestos-containing waste generated from the abatement activities per Article 4.4. Removal and disposal of all asbestos-containing materials shall be performed concurrently with stripping.
4.1.2.6 Establish Clearance criteria as specified per Article 4.8.

4.1.3 Work Area Sequence- The sequence of execution for the removal of the asbestos-containing materials by modified containment methods shall occur in the following order:

4.1.3.1 Prepare all work area per Article 4.2.
4.1.3.2 Strip and remove asbestos-containing materials in designated are per Article 4.3.3 and 4.3.4.

4.1.3.3 Remove and discard asbestos-containing waste generated from abatement activities per Article 4.4. Removal and disposal of asbestos-containing materials shall be performed concurrently with the stripping.
4.1.3.4 Decontamination and clean work area per Articles 4.5 and 4.6.
4.1.3.5 Encapsulate building surfaces with an approved sealant per Article 4.7.
4.1.3.6 Establish final clearance criteria for each work area per Article 4.8.

4.2 Work Area Preparation

4.2.1 OMMITED
4.2.2 Shut down and lockout electric power to all work areas where applicable. Provide temporary power and lighting, as specified in applicable electrical code requirements. As a minimum, one (1) 200 watt halogen light per every 500 square feet shall be provided in common work space areas and one (1) 200 watt halogen light per every 200 square feet for crawl space and pipe tunnel work areas. Provide temporary lighting and ground –fault interrupt circuits as a power source for electrical equipment. A certified electrician shall perform all modifications to the building's electrical system.
4.2.3 Shut down and isolate heating, cooling, and ventilation air systems such as, but not limited to, fans, air handlers, and unit ventilators to prevent contamination of the units and fiber dispersal to other areas of the facility. Seal all electrical components and equipment tightly to prevent moisture or water damage. Ventilation duct vents within the work area shall be sealed with tape and 6-mil plastic sheeting.
4.2.4 Removal Of movable objects from the work area, except where movable furniture is laden with contamination.
4.2.5 Install HEPA-filtered air movement devices into the work area and vent exhaust ducts through openings to the outside of the building. Seal openings around exhaust ducts. Exhaust from negative air movement equipment shall not be allowed to be released within the buildings. All HEPA filtered air movement equipment shall be maintained per Article 4.2.3.
4.2.6 Introduce scaffolding, ladders, and other large equipment into the work area and install the worker decontamination enclosure system per Article 4.2.2. Once the decontamination enclosure system is in place, it shall be used as specified for the entrance an exit of all personnel and equipment.
4.2.7 Seal off all openings (including but limited to corridors, doorways, windows, skylights, ducts, grilles, diffuser, and any other penetration of the work area) with 6-mil plastic sheeting sealed with tape. Doorways and corridors that will not be used for passage during the work must be sealed with barriers per Article 4.2.2.3.
4.2.8 Pre-clean contaminated movable objects within the work area using HEPA-filtered vacuums and wet cleaning methods. Remove the decontaminated furniture for the work area and store in an uncontaminated part of the building.
4.2.9 Pre-clean fixed objects within the proposed work area using HEPA-filtered vacuums and/or wet cleaning methods as appropriate, and enclose with 4-mil (minimum) plastic sheeting sealed with tape.
4.2.10 Remove, wet wipe and/or HEPA vacuum ceiling mounted objects (such as lights, speakers, and other items not previously sealed off) that interfere with asbestos-abatement activities. Any item remaining in the work area shall be enclosed with 6-mil plastic sheeting sealed with tape.
4.2.11 For total containment work areas cover all floors with plastic sheeting sealed with tape. Use a minimum of two layers of 6-mil plastic on wood and tiled floors, and one layer of 6-mil on concrete floors or dirt floors. Cover floors with plastic extending at least twelve

inches up on all walls. Cover all walls with 4-mil plastic sheeting overlap floor sheeting by at least twenty-four inches.

4.2.12 Decontamination Enclosure System

4.2.12.1 General- Build suitable framing and/or use existing rooms connected with framed-in tunnels, if necessary, and line with plastic sealed with tape at all lap joints for all enclosures and decontamination enclosure systems rooms. Either existing rooms outside of the work area or specially framed and sealed temporary areas shall be used for decontamination enclosure system. Convenience and proximity to the work area shall be the determining factors, In all cases, access between contaminated and uncontaminated rooms or areas shall be through and airlock, as described in Section 2.3.

4.2.12.2 Worker Decontamination Enclosure System – Per 29 CFR 1926.1101, construct a worker decontamination enclosure system contiguous to indoor work areas and central to outdoor work areas that consists of six totally enclosed chambers as follows:

- An equipment room with curtained doorways: one to the work area and one to the shower room
- A three (3) foot airlock chamber
- A shower room with two curtained doorways; one to the equipment room and one to the clean room. One shower shall be provided for every ten (10) workers or fraction thereof as required by 29 CFR 1910.141 (d) (3). To ensure against potential leakage, a metal pan with minimum three-inch li0p shall be installed underneath each shower facility. Ensure soap is available at all times in the shower room. The shower waste water shall be drained, collected, and filtered through a system with a least 5 to 10 micron particle size collection capability. All expended filters shall be discarded as contaminated waste. Filtered water may be discharged to sanitary or storm sewer drain.
- A three (3) foot airlock chamber
- A clean room with one curtained doorway into the shower and one entrance or exit to uncontaminated areas of the building. The clean room shall have sufficient space for storage of workers' street clothes, towels, and other uncontaminated items.
- A three (3) foot air lock chamber
- Use black plastic for the walls and curtains of the workers decontamination enclosure system to ensure the privacy of the workers.

4.2.12.3 Equipment Decontamination Enclosure System- The purpose of this area is to provide a means of decontamination drums, scaffolding, materials containers, vacuum, and spray equipment, and other tools and equipment for which the worker decontamination enclosure system contiguous to the work area that consists of two totally enclosed chambers as follows:

- A washroom, constituting an airlock, with a curtained doorway to a designated area of the work area and a curtained doorway to the holding area. This area shall be the same as the equipment room in the worker decontamination enclosure system. The washroom wastewater shall be drained, collected, and filtered through system with at least 5 to 10 micron particle size collection capability. All expended filters shall be discarded as

contaminated waste. Filtered water may be discharged to sanitary or storm sewer drain.

- A holding area, constituting an airlock, with curtained doorway to an uncontaminated area. This area shall be the same area as the shower room in the worker decontamination system.

4.2.12.4 Separation of Work Areas- The Contractor shall use air and watertight barriers to separate the parts of the facility required to remain free of contamination from the parts of the facility that shall undergo asbestos hazard abatement work. The barriers shall be constructed as follows:

- Building suitable wood or metal frame.
- Cover the inside and outside of the frame with plywood and/or 6mil plastic sheeting sealed with tape as specified.
- Where applicable, Plexiglas partitions shall be install to enable asbestos hazard abatement activities to be observed in room adjacent to the work area.

4.2.12.5 Maintenance of Enclosure Systems:

- Ensure that barriers and plastic linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
- Visually inspect enclosures at the beginning, during and following each work shift.
- Use smoke methods to determine the effectiveness of barriers when directed by the Owner and/or the Owners Representative.

4.2.12.6 Abatement work shall not commence until:

- Arrangements have been made approval granted for disposal of asbestos waste at an acceptable site.
- Work areas and decontamination enclosure systems and parts of the building required to remain uncontaminated are effectively segregated. The on-site Owner's Representative shall inspect that work area enclosure system to ensure that it is both air and watertight. Any deficiencies noted by the Owner's Representative shall be corrected.
- Tools, equipment, and material waste are on hand.

4.2.13 Air Filtration System

4.2.13.1 A pressure differential between the outside and inside work area shall be maintained at all times while abatement activity is in progress. The Contractor shall not allow any airflow out of the work area except through HEPA filtered air filtration devices.

4.2.13.2 A pressure differential in the work area is required as outlined in 29 CFR 1926.1101, Appendix F. At a minimum, the air filtration devices shall provide for a complete air change every 15 minutes.

4.2.13.2.1 The following formula shall be used for estimating the number of air filtration devices:

$$\text{Number of units needed} = \frac{\text{ft.}^2 \text{ of work area x height of ceiling in ft.}}{\text{15 minutes x cfm capacity of units}}$$

4.2.13.3 The pressure differential shall be maintained so that the movement of tools, equipment, employees, and waste containers through the decontamination enclosure systems do not result in air flow out of the work area.

4.2.13.4 Air circulation throughout the work area shall be maintained by the air filtration devices to reduce dead air spaces and provide appropriate ventilations inside the work area. The contractor shall install a pressure differential meter as described in Article 3.2.6. The meter must show a measurable pressure differential between the work area adjacent areas at a minimum of 0.02 inches of water column. If the Contractor cannot maintain and adequate pressure differential inside the work area all Work shall be stopped until the problem is corrected.

4.2.13.5 OMITTED

4.2.13.6 OMITTED

4.3 Work Area Removal and Decontamination Procedures

4.3.1 Thermal Systems Insulation (TSI) – After the work area has been prepared per Section 4.2, spray asbestos-containing TSI with a fine mist of amended water. Allow time for the amended water to saturate the materials. Remove the materials in manageable quantities and control descent to the floor. Remove all visible residues from the remaining system utilizing a stiff wire brush or green pad.

Glovebag removal methods may be utilized including cut and wrap method within the full containment method outlined above. Methods must be fulfilled regulatory requirement as outlined by OSHA 29 CFR 1926.11.1, EPA and the Ohio Department of Health.

4.3.2 Acoustical or Hard Ceiling Plaster on Metal Lathe Wood Lathe or Drywall- OMMITED

4.3.3 Floor Tile Removal- After work preparation has been completed as per Section 4.2, the floor tile shall be thoroughly wetted with amended water. After floor tile has been adequately wetted, the edge of a prying tool will be placed under a corner of a tile to release it from the floor. The tiles will be removed as intact as possible. The removed tiles will be placed into appropriate disposal containers and disposed of as ACM.

4.3.4 Floor Tile Mastic Removal- After work are preparation has been completed as per Section 4.2, a commercial mastic remover will be applied to the mastic. The mastic remover will be given the appropriate time to permit it to begin to loosen the mastic. After the mastic is loosened, the Contractor will use a stiff bristled broom or buffer with a scrubbing pad to agitate the mastic remover. After the mastic remover has dissolved the mastic the Contractor will use HEPA filtered vacuum, mops, absorbent material or other means to extract the mastic remover from the floor. The floor tile mastic will be placed into appropriate disposal containers and disposed of as ACM.

4.3.5 Sheet flooring - After work preparation has been completed as per Section 4.2, the sheet flooring wear layer shall be sliced thoroughly to allow wetting agent to penetrate and then shall be wetted with amended water. After sheet flooring has been adequately wetted, use of sharp edged flooring removal tools shall be utilized to remove the wear layer and the bulk of the sheet flooring backing. The residual backing and adhesive shall be removed using a powered skiving tool down to clean concrete. The removed flooring, backing and adhesive will be placed into appropriate disposal containers and disposed of as ACM.

4.3.6 Light insulators- After work area preparation has been completed per Section 4.2, lightly mist exposed surfaces of each light insulator with amended water to reduce the potential

exposure hazards. Caution is to be exercised due to the electrical hazard potential of introducing water to an electrical device. Once the initial application of amended water has been applied to the insulator, remove by hand with an insulated protective glove and disposed of as ACM waste. Clean substrates as necessary to remove all visible debris.

4.3.7 Vibration isolators- After work area preparation has been completed per Section 4.2, adequately mist exposed surfaces with amended water to reduce the potential exposure hazards. Once the initial application of amended water has been applied to the vibration isolators, the Contractor will disassemble the ductwork to effectively remove all ACM insulating materials from the duct. All isolating materials shall be removed to eliminate all visible debris.

4.3.8 Boilers - After work area preparation has been completed per Section 4.2, disassemble each boiler and adequately wet exposed asbestos insulation panels with amended water to reduce the potential exposure hazards. Once the initial application of amended water has been applied to the boilers, the Contractor will remove the boiler insulation and place directly into an asbestos disposal bag. All surfaces in contact with the boiler insulation shall be wet wiped, brushed and/or HEPA vacuumed to eliminate all visible debris.

4.3.9 Asbestos containing fire doors- All identified asbestos containing fire doors shall be removed from their hinges and placed in a lined roll off waste container and disposed of as ACM waste.

4.4 Removal and Disposal of Contaminated Waste

4.4.1 Fill disposal containers to a level that workers can handle safely and with ease.

4.4.1.1 As disposal containers are filled, seal and move them to the staging areas for decontamination.

4.4.1.2 In conventional total containment asbestos removal practices, clean external surfaces of containers thoroughly by wet sponging in the designated area that is part of the equipment decontamination enclosure system. Move containers to the washroom, wet-clean each container thoroughly, and move them to the holding areas pending removal to uncontaminated areas. Place decontaminated, sealed plastic bags containing asbestos material into a second clean bag; twist the bag opening tightly, bend the twisted end downward, and seal with tape. Move all disposal containers to the holding area and await disposal at an approval landfill. If glovebag techniques are used, place the glovebag into a clean bag; twist the bag opening tightly, bend the twisted end downward, seal with tape, and then move it to the holding area. Place caution labels on containers in accordance with 29 CFR 1926.1101. Identification labels shall also be placed on the outside bag in accordance with 40 CFR Part 61, Subpart M. Ensure that containers are removed from the holding area by workers, dressed in clean coveralls, who have entered from uncontaminated areas. Ensure that workers do not enter from uncontaminated areas into the washroom of the work area; ensure that contaminated worker do not exit the work are through the equipment decontamination enclosure system.

4.4.1.3 To prevent exceeding available storage capacity on-site as the work progresses, remove sealed and labeled containers of asbestos waste and dispose of such containers at an authorized disposal site in accordance with requirements of disposal authority and these specifications. Submit

documentation regarding disposal to the Owner and/or Owner's Representative upon landfill receipt.

4.4.1.4 After the waste containers are decontaminated, the Contractor may make arrangements for a hauler or tuck driver from the waste disposal site to transport the asbestos waste and contaminated material to the disposal site. Transportation of all materials form each work area shall be in accordance with all applicable DOT and EPA regulations.

4.4.1.5 All asbestos-containing waste inside the work area shall be removed and items decontaminated before any cleanup work is started and before the isolation, structures are dismantled.

4.4.1.6 The contractor shall dispose of all asbestos waste material in an EPA approved landfill. Appropriate notifications and provisions shall be made with each agency having jurisdiction over asbestos waste disposal.

4.4.1.7 The Contractor shall be responsible for determining current waste handling and disposal regulatory requirements and must comply with these regulations.

4.4.1.8 The Contractor shall ensure that all employees handling and discarding regulated waste shall wear approved respiratory protection and protective clothing in accordance with these Specifications.

4.4.1.9 In certain instances, plastic bags or fiber and metal drums may not be adequate or suitable to handle certain asbestos-containing materials. As an alternative, the Contractor may remove asbestos-containing material that is bulky or cumbersome in two layers of 6-mil plastic sheeting sealed tightly at all joints with tape and/or spray adhesive. The waste shall be properly labeled in accordance with current OSHA, DOT, and NESHAP requirements before transportation to the approved disposal site. All metal and wood waste shall be deposited and disposed of in air and watertight drums. The drums shall be properly labeled before transportation to the appointed disposal site.

4.5 Cleanup and Decontamination of the Work Area

4.5.1 Asbestos Cleanup- Remove visible accumulations of asbestos material and debris. Wet-clean all surfaces within the work area.

4.5.1.1 Remove plastic sheets from walls and floors only. The windows, doors, HVAC vents, and other equipment and penetrations shall remain sealed, and any HEPA air filtration and decontamination enclosure systems shall remain in service.

4.5.1.2 Clean all surfaces in the work area and any other contaminated areas with water and/or with HEPA –filtered vacuum equipment . After completion of the cleaning operation, visually inspect the entire work area to ensure that it is free of visible asbestos debris.

4.5.1.3 Sealed containers and all equipment used in the work area shall be included in the cleanup and shall be removed from the work areas, via the equipment decontamination enclosure system, at an appropriate time in the cleaning sequence.

4.5.1.4 If the owner and/or Asbestos Owner's Representative find visible accumulation of asbestos debris in the work area after cleaning, the Contractor shall repeat the wet cleaning, at his expense, until the work area is in compliance.

4.5.1.5 When a final inspection and air monitoring determine that the area is free of accumulated visible asbestos debris and airborne fibers, the decontamination enclosure system shall be removed, all areas shall be thoroughly wet-cleaned

and materials from the equipment room and shower shall be disposed of as contaminated waste. The Owner and/or Owner's Representative to ensure that no dust or debris remains on surfaces as a result of dismantling operations shall carry out a final check.

4.5.1.6 To prevent exceeding available storage capacity on-site as the work progresses, sealed and labeled containers of contaminated waste shall be removed and disposed of as contaminated waste (see Article 4.4).

4.6 Determining Asbestos Abatement Completion

4.6.1 Visual Inspection

4.6.1.1 The Owner's representative shall visually inspect the abatement areas for completion in conjunction with the contractor.

4.6.1.2 The Owner's Representative shall conduct a thorough first visual inspection of each work area after the Contractor has indicated that all asbestos-containing materials have been completely removed. The first inspection shall be conducted before the plastic sheets have been cleaned with damp mops and cloths, but all gross debris has been cleaned up and prior to the spray application of sealant to exposed surfaces.

4.6.1.3 Items to be checked during the first visual inspection include, but are not limited to, the following:

- The adequacy of the removal of asbestos-containing material and/or other contaminants from substrates.
- The presences of adhering material or accumulated material on exposed surfaces.
- Only after the work area has passed the first visual shall the Contractor be permitted to apply the sealant materials.

4.6.1.4 After the work has passed the first visual inspection; the Contractor shall apply an approved sealant to exposed surfaces per Section 4.7 and clean all surfaces in the work area and any other contaminated areas with water and/or with HEPA-filtered vacuum equipment.

4.6.1.5 The Owner's Representative shall conduct a second visual inspection of the work area following application of the sealant. Items to be checked during the second visual inspection shall include, but are not limited to the following:

- Cleanliness of the work area and decontamination areas: accumulations of loose dust and debris on plastic sheets covering surfaces and floors.
- Complete coverage of the exposed surfaces by the sealant.
- The Owner's Representative shall, at their discretion, use an electric leaf blower during the inspection to dislodge or discover any hidden debris that should have been removed. It is strongly recommended that the Contractor perform this procedure himself before notifying the Owner's Representative that the area is clean and ready for inspection. If visible dust or debris is discovered during the inspection, the Contractor shall wet-clean the entire work area again until the Owner and Owner's Representative is satisfied that all visible dust and debris has been removed.

- If any accumulation of dust and debris is observed, the Contractor shall be required to wet-clean and/or HEPA vacuum the work area again and pass another visual inspection.

4.6.1.6 After the work area has passed the second visual inspection, the Contractor shall remove the plastic sheets form the floors and walls. The windows, doors, and HVAC vents shall remain sealed. All HEAP-filtered air filtration and decontamination enclosure system shall remain in service.

4.6.1.7 The Owner's representative may conduct a third visual inspection of the work area to ensure that the walls, floors, and all exposed surfaces are dust free following the final cleaning procedure. After the work area has passed the third visual inspection, the Owner's Representative may perform final air monitoring described in Article 4.8. Only after the work area has met the final air testing criteria shall the Contractor be permitted to proceed to the next phase of work.

4.7 Sealant Application for Lockdown:

4.7.1 In all areas from where asbestos-containing materials were removed, an approved sealant shall be used to lock down any residual airborne asbestos fibers to the substrate in prevention of subsequent dispersion or re-suspension.

4.7.2 The sealant shall be applied to walls, floors, ceilings, plastic sheeting, and any other exposed surface in the work areas.

4.7.3 The sealant shall be applied with low pressure airless sprayer equipment.

4.7.4 The sealant shall be used and applied in strict accordance to manufacture's Specifications.

4.7.5 The Contractor shall apply a thin, visible, contiguous film of sealant to all areas specified. Additional applications shall be required if the first applications does not adequately cover the substrates or lockdown the residual airborne asbestos fibers.

4.8 Final Air monitoring

4.8.1 Final air tests may be performed to determine and document air quality upon completion of asbestos hazard abatement activities. The Owner's Representative may perform the final air tests after the work area has passed the final visual inspection. The samples shall be collected using High-volume electric sampling pumps calibrated to a maximum flow rate of 10 liters/minute. Final clearance samples shall be collected and analyzed by phase contrast microscopy (PCM).

4.8.1.1 Regulated work area final clearance concentrations by PCM – Final air samples may be collected from several locations within the work area and in adjacent equipment and worker decontamination areas. At least three (3) inside area samples may be collected and analyzed by PCM using NIOSH Methods No. 7400 Revision 'A' rules. The total airborne fiber concentration for each sample location collected inside the work area must be less than 0.01 f/cc. If not, the Contractor shall re-clean the work area with HEPA-filtered vacuum equipment, damp cloths, and mops. Additional sets of air samples for the entire work area may be collected and analyzed by the Owner's Representative at the Contractors expense until final fiber concentrations are achieved. If the levels in the work area still exceed acceptable levels the Contractor shall be required to re-clean and pay for the additional air monitoring.