



FROEHLING & ROBERTSON, INC
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
“OVER ONE HUNDRED YEARS OF SERVICE”

PROJECT SPECIFICATIONS

FOR THE REMOVAL OF ASBESTOS and LEAD-CONTAINING PAINT
GENERAL RENOVATION REQUIREMENTS

at the
Franklin Heights Development
Harrisonburg, Virginia

FOR

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Section not used.

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Section not used.

SECTION 02080
ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The GENERAL CONDITIONS (AIA DOCUMENT A201), SUPPLEMENTAL GENERAL CONDITIONS and DIVISION 1 GENERAL REQUIREMENTS, shall apply as fully as if included herein.

1.2 WORK INCLUDED

- A. The work includes the furnishing of all labor, materials, equipment, insurance and services necessary for and reasonably incidental to the completion of asbestos removal and related work.
- B. Comply with all governing regulations which the specifications supplement.
- C. Comply with DIVISION 1 GENERAL REQUIREMENTS.

1.3 REGULATIONS

- A. All work shall conform to the requirements of the U. S. Environmental Protection Agency (EPA), U. S. Department of Labor - Occupational Safety and Health Administration (OSHA) and applicable State regulations relating to asbestos.
- B. The EPA and OSHA regulations shall be posted at the job site for the duration of the work; posting shall be in a location clearly visible to employees and others in the area.

1.4 DEFINITIONS

- A. Accredited/Accreditation: When referring to a person, Contractor or laboratory, means that such person is accredited in accordance with Section 206 of Title II of the Toxic Substances Control Act (AHERA Regulations).
- B. Aerosol: A system consisting of particles, solid or liquid, suspended in air.
- C. Aggressive Sampling: High-activity level air sampling which results in all settled asbestos remaining airborne and uniformly disturbed through the use of special entrainment and mixing techniques. This makes any settled asbestos fibers accessible to the sampling filters for subsequent detection. The technique is described in 40 C.F.R. 763.90, Appendix A to Subpart E; and Guidance for Controlling ACM in Buildings, Appendix M.
- D. Air Filtration Device (AFD): Air filtration device (AFD) is part of the pressure differential system in which the air is filtered. The AFD is to be equipped with HEPA filters.
- E. Air Monitoring: The process of measuring the fiber content of a specific volume of air. NIOSH Method 7400 or TEM Method in 40 C.F.R. 763, Subpart E, Appendix A, will be used for sampling and analysis.
- F. Amended Water: Water to which a surfactant has been added.

- G. Approve: Where used in conjunction with the QP's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, "approved" will be held to limitations of QP's responsibilities and duties and does not release the Contractor from responsibilities to fulfill requirements of the Contract Documents. Approved shall also mean consent by U.S. EPA of training programs and the like.
- H. Asbestos: The asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite (amosite), anthophyllite, and actinolite-tremolite. Both the asbestiform and non-asbestiform varieties of the above minerals and any of these materials that have been chemically treated and/or altered shall be considered to be asbestos.
- I. Asbestos-Containing Material (ACM): Any material containing more than 1% by weight of asbestos of any type or mixture of types.
- J. Asbestos-Containing Waste Material: Any material which is or is suspected of being or any material contaminated with an asbestos-containing material which is to be removed from a Work Area for disposal.
- K. Authorized Visitor: Personnel authorized by the Project Officer, testing lab personnel, or a representative of any Federal, State or local regulatory agency having authority over the project are considered authorized visitors.
- L. Barrier: Any surface that seals off the Work Area to inhibit the movement of fibers.
- M. Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
- N. Ceiling Concentration: The concentration of an airborne substance that shall not be exceeded.
- O. Certified Industrial Hygienist (C.I.H.): An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.
- P. Critical Barrier: Two layers of 6 mil polyethylene sheeting on wall or three layers on floor, spray foam, or duct tape used to completely seal off the Work Area to prevent spread of fibers to surrounding areas.
- Q. Decontamination (Decon) Area: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower room and a clean room which is used for the decontamination of workers, materials and certain equipment contaminated with asbestos. This shall serve as the only entrance or exist to the Work Area.
- R. Demolition: The wrecking or taking out of any building component, system, finish or assembly of a facility together with any related handling operations.
- S. Disposal Bag: A 6 mil thick, leak-proof polyethylene bag used for transporting asbestos waste from the work area to the disposal site. Each is labeled in compliance with OSHA 1926.1101 as follows:

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

and U.S. DOT ORM-E label for Asbestos-Hazardous Material (including Asbestos Waste Manifest) and statements as required.

- T. Encapsulant: A material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent release of fibers.
- U. Bridging Encapsulant: An encapsulant that forms a discrete layer on the surface of an in situ asbestos matrix.
- V. Penetrating Encapsulant: An encapsulant that is absorbed by the in situ asbestos matrix without leaving a discrete surface layer.
- W. Removal Encapsulant: A penetrating encapsulant specifically designed for removal of asbestos-containing materials rather than for in situ encapsulation.
- X. Encapsulation: Treatment of ACM with an encapsulant.
- Y. Enclosure: The construction of an air-tight, impermeable, permanent barrier around asbestos-containing material to control the release of asbestos fibers into the air.
- Z. Filter: A media component used in respirators to remove solid or liquid particles from the respired air.
- AA. Friable Asbestos Material: Material that contains more than 1.0% asbestos by Polarized Light Microscopy (PLM), and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry. This includes previously non-friable material which becomes damaged to the extent that, when dry, may be crumbled, pulverized or reduced to powder by hand pressure.
- BB. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- CC. General Supervisor: Site Superintendent, Foreman: is the Contractor's representative at the work site. This person can be the Competent Person required by OSHA, 29 C.F.R. 1926.1101.
- DD. Glovebag: A sack (typically constructed to 6 mil transparent polyethylene) with two inward projecting long sleeve gloves, which are designed to enclose an object from which an asbestos-containing material is to be removed.
- EE. HEPA Filter: A high efficiency particulate air (HEPA) filter that removes from air 99.97% or more of monodispersed dioctylphthalate (DOP) or dioctylsebacate (DOS) particles having a mean particle diameter of 0.3 microns.
- FF. HEPA Filter Vacuum Collection Equipment (or vacuum cleaner): HEPA filtered vacuum collection equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall be 99.97% efficiency for retaining fibers of 0.3 microns or larger.

- GG. Indicated: The term "Indicated" is a cross-reference for Notes or Schedules on Drawings, to other paragraphs or Schedules in the Specifications, and to similar means of recording requirements in Contract Documents.
- HH. Install: Unless defined in greater detail, "install" is used to describe operations at the project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working on dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
- II. Installer: The "installer" is defined as the entity (person or firm) engaged by the Contractor or Sub-Contractor to perform a particular trade at the work site, including installation, erection, application and similar required operations. Such entities (installers) shall be expert in operations they perform.
- JJ. Landfill Receipt: Document signed by a landfill operator acknowledging the receipt of ACM waste.
- KK. Manifest: A document detailing chain of custody for ACM waste hauled.
- LL. Negative Pressure Glovebag: A glovebag which is composed of flexible plastic that can be subjected to negative pressure without collapsing.
- MM. Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
- NN. Owner: Harrisonburg Redevelopment and Housing Authority
- OO. Permissible Exposure Limit (PEL): The Contractor shall ensure that no employee is exposed to an airborne fiber concentration of asbestos in excess of the PEL expressed as an 8-hour TWA as determined by the OSHA Reference Method of 29 C.F.R. 1926.1101 (Current PEL for asbestos is 0.1 fiber/cc.).
- PP. Personal Sampling Monitoring: Air samples taken in the breathing zone of workers as required by OSHA 29 C.F.R. 1926.1101.
- QQ. Pressure Differential: Air pressure lower than surrounding areas, caused by exhausting air from a sealed space (Work Area).
- RR. Pressure Differential System: A local exhaust system, utilizing HEPA filtration, capable of maintaining a pressure differential inside the Work Area and a constant airflow from adjacent areas into the Work Area and exhausting that filtered air outside the Work Area.
- SS. Project Manager (Contractor): The asbestos Contractor's employee responsible for the total oversight of the project.
- TT. Plasticize: Means to cover floors and walls with polyethylene sheeting as herein specified and in accordance with the temporary Enclosure Section.
- UU. Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the

breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

- VV. Provide: Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
- WW. Qualified Person (QP): A Registered Architect, Professional Engineer, or Certified Industrial Hygienist who has successfully completed training and is therefore accredited under a legitimate State Model Accreditation Plan as described in 40 CFR 763 as a Building Inspector, Management Planner, Project Monitor, and/or Asbestos Project Designer. The QP must be qualified to perform visual inspections as indicated in ASTM E 1368. The QP shall be appropriately licensed in the State of Virginia as a Project Monitor and Project Designer. For this project, Froehling & Robertson, Inc. personnel will serve as the QP.
- XX. Regulated ACM: Means friable ACM, non-friable ACM that has become friable, non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading or non-friable 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 ACM during renovation or demolition.
- YY. Regulated Area: An area where asbestos removal operations are performed which is isolated by physical boundaries to prevent entry of unauthorized persons or the spread of asbestos dust, fibers or debris. Within this area, the airborne concentration of asbestos could reasonably be expected to exceed the PEL.
- ZZ. Removal: The taking out or stripping of all ACM from a damaged area or associated area or space.
- AAA. Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.
- BBB. Short-Term Exposure Limit (STEL): A "ceiling" concentration, identified in OSHA regulations, of an airborne substance that shall not be exceeded for a duration of any 30-minute period (Current STEL for asbestos is 1.0 fiber/cc.).
- CCC. Submittal: Items which are required to be presented to the Project Officer and/or the QP for review, consideration or decision.
- DDD. Surfacing Material: Material in a building that is sprayed-on, troweled-on or otherwise applied to surfaces or structural members for acoustical, fireproofing or other purposes.
- EEE. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
- FFF. Testing Laboratory: The "testing laboratory" is an independent entity to perform specific air sampling and analysis at the work site and associated areas, to report and (if required) interpret results. Analysis shall be performed by a laboratory accredited by the American Industrial Hygiene Association (AIHA) and having demonstrated a proficient rating in AIHA's Proficiency Analytical Testing (PAT) Program. The laboratory shall be licensed by the Virginia Department of Commerce as an Asbestos Analytical Laboratory. The laboratory shall also be accredited by the National Institute of Standards and Technology (NIST) through

the National Voluntary Laboratory Accreditation Program (NVLAP) for bulk sample analysis and air sample analysis by TEM (TEM Method of 40 C.F.R. 763, Subpart E, Appendix A).

- GGG. Time Weighted Average (TWA): The average concentration of a contaminant in air during a specific time period.
- HHH. Visible Emissions: Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed water vapor.
- III. Waste Shipment Record: Means the original shipping document, originated and signed by the waste generator (Abatement Contractor) used to track and substantiate the disposal of ACM waste as described in 40 C.F.R. Part 61.
- JJJ. Waste Generator: Means the licensed Asbestos Abatement Contractor removing ACM waste from the property.
- KKK. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils that have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of as asbestos-containing waste.
- LLL. Work Area: The area where asbestos-related work or removal operations are performed; the Work Area is defined and/or isolated to prevent the spread of asbestos dust, fibers, or debris, and entry by unauthorized personnel. The Work Area is a Regulated Area as defined by 29 C.F.R. 1926.1101.
- MMM. Work Site: The term "work site" is defined as the space available to the Contractor for performance of the work either exclusively or in conjunction with others performing other work as part of the project. The extent of project site is shown on the Drawings, and may or may not be identical with the description of land upon which the project is to be built.

ABBREVIATIONS AND NAMES:

The following acronyms or abbreviations referenced in Contract Documents are defined to mean the associated names. Both names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up-to-date as of the date of the Contract Documents:

ACM	Asbestos Containing Material
AIA	American Institute of Architects 1735 New York Avenue, N.W. Washington, D.C. 20006 (202) 626-7474
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018 (212) 354-3300
ASTM	American Society for Testing and Materials

	1916 Race Street Philadelphia, PA 19103 (215) 299-5400
CFR	Code of Federal Regulations Available from Government Printing Office Washington, D.C 20402 (Usually first published in Federal Register)
EPA	Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460 (202) 382-3949
f/cc	fibers per cubic centimeter
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology (U.S. Department of Commerce) Gaithersburg, MD 20234 (301) 921-1000
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) Government Printing Office Washington, D.C. 20402
TEM	Transmission Electron Microscopy
VA DPOR	Virginia Department of Professional and Occupational Regulation 3600 West Broad Street Richmond, Virginia 23230-4917 (804) 367-8500
UL	Underwriters Laboratories 333 Pfinningsten Road Northbrook, IL 60062

1.5 INFORMATION TO BE SUBMITTED AFTER CONTRACT IS AWARDED

A. Immediately upon award of the Contract, and before any work is commenced, Contractor shall submit for information of the Owner and Engineer the data listed below, and shall be in quantity to allow the Owner to retain two copies and the Engineer to retain one copy. The data shall show compliance with the requirements of the Contract Documents and governing regulations.

- 1) A written abatement plan.

- 2) Method and means of removal and encapsulation of asbestos-containing materials.
- 3) Containment and shrouding procedures, including any unusual conditions.
- 4) Air sampling plan.
- 5) Name of laboratory to be used in air sample analysis and copy of American Industrial Hygiene Association (AIHA) Accreditation.
- 6) Location of change and decontamination area.
- 7) Location of landfill for disposal of asbestos waste which has been approved by EPA.
- 8) Manufacturer's technical data sheets on proposed surfactant, encapsulant, mastic removers, etc.
- 9) Certificate of Insurance with notarized statement thereon that all requirements stated in paragraphs 13 (a) through 13 (d) are covered.
- 10) Copies of Asbestos Worker's License and Asbestos Supervisors License.
- 11) Notifications to all appropriate state and federal agencies and local fire and police departments.

1.6 SCOPE OF WORK

A. The Scope of Work includes, but is not necessarily limited, to the following:

- 1) The Abatement Contractor shall be responsible for removal of all asbestos-containing materials impacted by this project. These materials include various flooring materials and associated mastics, roof flashing, and pipe insulation.
- 2) The Abatement Contractor has the responsibility for determining actual quantities of materials to be removed and reviewing the scope of work. No additional contract price adjustments will be allowed due to variances between actual quantities and the estimated quantities listed herein (unless otherwise specified in this document). The Contractor should allow under their base bid for the removal of all materials as described in the survey report and/or referenced in this specification.
- 3) All mobilizations and permit notifications shall be the Abatement Contractors responsibility.
- 4) This section includes all work necessary to reduce air concentrations of asbestos to the specified level and maintain the specified asbestos control limits during the life of the contract. It also contains removal, containment, and disposal of asbestos-containing materials. The work specified in this document consists of the provision of services for the removal and disposal of asbestos-containing building materials

(ACBMs). Asbestos materials have been identified in the areas where work will be performed.

- 5) All asbestos abatement work will be performed by competent, licensed (by the Virginia Department of Professional and Occupational Regulation) persons trained, qualified, and knowledgeable in the techniques of abatement, handling, and disposal of ACBMs and materials contaminated by asbestos, in accordance with pertinent local, state, and federal regulations.

143 Reservoir Street

- 6) The Abatement Contractor shall remove all flashing materials (approximately 50 linear feet) located on the roof. These materials shall be removed intact without containment.
- 7) The Abatement Contractor shall remove all (approximately 100 linear feet) asbestos-containing pipe insulation located in the basement. This material may be removed by "candy stripping" both the pipe and insulation together. Glovebags shall be utilized to remove insulation at the cut locations. The Abatement Contractor shall place drop cloths in the areas to be abated to collect any debris. The Contractor shall also clean and decontaminate the collection areas.

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- 8) The Abatement Contractor shall remove all floor tiles and mastics (approximately 28,000 square feet of asbestos-containing 9 inch and 12 inch floor tile in various colors and all associated black mastics) located throughout the development in each building. The Abatement Contractor shall remove these materials within negative pressure containment with a minimum pressure differential of 0.02" water column. The Abatement Contractor shall be responsible for removal of all floor tile and mastic under partition walls, fixtures, cabinets, and other furnishings and obstructions. It should be noted that several layers of floor tile exists including layers of floor tile located under plywood sub-flooring on the second floor of the buildings.
- 9) The Abatement Contractor shall submit unit cost estimates for the following items:
 - a) Removal of floor tile and mastic within negative pressure containment, per square foot.
 - b) Removal of asbestos containing flashing materials per linear foot.
 - c) Removal of asbestos containing pipe insulation using glovebags, per linear foot.

1.7 NOTES FOR DEMOLITION

- A. The Abatement Contractor shall coordinate with the Mechanical, Electrical, Plumbing, and General Contractors to ensure that all appropriate systems that

will be impacted by demolition have been properly decommissioned prior to the start of any work.

- B. The Abatement Contractor shall coordinate with the General Contractor selected for this project to verify that the structure will support the planned activities and comply with local building codes and OSHA requirements.

1.8 QUALITY CONTROLS

- A. The asbestos removal Contractor's superintendent shall be on the job each day during removal and he shall be knowledgeable, experienced and competent in this type of work.
- B. The asbestos removal Contractor shall be responsible for any damage to the building and its contents resulting from leakage or spillage of water.
- C. Authorities of the Commonwealth of Virginia shall be notified of the starting date of the asbestos removal project by the asbestos removal Contractor.
- D. The Owner reserves the right to halt the project work until hazardous or potentially hazardous conditions are corrected.
- E. The Owner reserves the right to independently perform such analysis and tests at any time as he deems necessary to ensure and protect safety of the project.

1.9 WORKER PROTECTION - ASBESTOS REMOVAL PROCEDURES & EQUIPMENT

- A. Comply with all EPA and OSHA Regulations, and follow EPA workplace guidelines.
- B. Provide and maintain negative air systems for all work areas, for the duration of asbestos removal work.
- C. Submit certificates signed by each employee indicating that the employee has received Virginia DPOR-approved training and is currently licensed in the Commonwealth of Virginia in the proper handling of materials that contain asbestos.
- D. All workers shall be instructed in and be knowledgeable of the following:
 - 1) The hazards of asbestos exposure.
 - 2) Use of respirators and protective clothing.
 - 3) Use of personal air monitoring equipment.
 - 4) Use of decontamination facilities and designated showers.
- E. Respiratory Equipment and Air Sampling Requirements
 - 1) Provide workers with respiratory equipment in accordance with OSHA 1910.134, as suitable for the asbestos exposure in the work area.
 - 2) Provide sufficient filters for replacement of disposable type filters.

- F. Provide a copy of written respirator program on the job site at all times.
- G. Personnel breathing zone samples shall be made by the asbestos removal Contractor on a daily basis for determination of both 8-hour time weighted average (TWA) and ceiling concentrations of employee exposures.
- H. The sampling schedule shall be posted outside of the containment area showing sample frequency, duration of the sample, and pump flow rates.
- I. Results of all samples shall be posted within 24 hours of sampling outside of the containment area, and maintained there until the job has been concluded. This data shall include both the results of individual samples and the results of 8-hour TWA determinations. Posted results should include a synopsis of work activities of which the results are representative.

1.10 AIR MONITORING

- A. Provide air monitoring in the work areas throughout all asbestos stripping, removal and cleaning operations to ensure that the workers are adequately protected at all times. All personal air monitoring for OSHA compliance shall be the responsibility of the Contractor.
- B. Samples for air monitoring shall be collected by a competent person in accordance with methods prescribed in Chapter X of the Federal OSHA Industrial Hygiene Field Operations Manual or by equivalent procedures.
- C. Air monitoring shall be in compliance with 1910.1001 (f) of the OSHA standards.
- D. Air samples must be analyzed by NIOSH method 7400 by a laboratory accredited by AIHA.
- E. Air monitoring (protection of the Contractor's employees) shall be provided throughout the removal and cleaning operations. Air monitoring shall be conducted and evaluated by a testing laboratory employed by the asbestos removal Contractor to ensure that the Contractor is complying with applicable EPA and OSHA regulations.
- F. Environmental samples outside of containment and clearance sampling shall be performed by the QP (Froehling & Robertson, Inc.).
- G. Area samples shall be collected outside the containment in areas of highest risk of contamination.
- H. Samples shall be made on a daily basis outside the containment.
- I. All analytical results shall be presented as signed "Certificates of Analysis". Form shall state:

Date and time sampling began.
Flow rate of samples.
Sampling time elapsed.
Concentration of fibers.
Site/individual sampled.
Signature of Analyst.

- J. Two copies of analytical results shall be delivered in writing to the job site within 24 hours of sample collection (excluding non-working days).
- K. Sampling schedules for area samples shall be posted outside the containment area showing sampling frequency, sample duration, and pump flow rates.
- L. Results of area samples made outside the containment shall be posted within 24 hours and maintained in the area showing the fiber concentrations. Posted results should include a synopsis of the days activities of which the samples are representative.
- M. The Owner shall be informed immediately of any area samples outside the containment with results in excess of 0.1 fibers/cc.
- N. Copies of the results of all samples made in areas where Owner's employees are or may be exposed shall be given to the Owner to assure maintenance of records in compliance with OSHA standard 1910.1001 (i) (1).
- O. Operations shall be discontinued immediately at any time visible emissions are observed emanating from the containment.

PART 2 - PRODUCTS

2.1 PRODUCTS AND EQUIPMENT

- A. Protective plastic (polyethylene) sheeting of minimum 6 mil thickness and size to provide protection to all equipment, floors, walls, piping, ductwork, and all other exposed areas, with minimum frequency of joints.
- B. Seal tape shall be glass fiber or other type capable of sealing joints of adequate sheets of plastic for the attachment of plastic sheeting to finished or unfinished surfaces of dissimilar materials under either dry or wet conditions, including use of amended water.
- C. Disposal Containers: Bags and drums to be used for disposal of asbestos waste shall be suitable to receive and retain any asbestos-containing or contaminated materials until disposal at an EPA approved and certified waste disposal site. Bags shall be 6 mil thickness.
- D. Warning Labels: As required by OSHA Regulation 29 CFR 1910.1001 (g) (2).
- E. Surfactant (wetting agent for amended water): Acceptable surfactant.
- F. Encapsulant: Acceptable encapsulant

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Isolate the work areas for the duration of the work by completely sealing off all openings and fixtures in the work area with plastic sheeting taped and glued securely.
- B. For full containment - Cover all critical barriers with two layers of 6 mil plastic sheeting. Cover wall and floor surfaces with one layer (overlapping at any

- seams) of 6 mil plastic sheeting. Seal poly with tape and glue securely. Floor coverings shall extend up the wall 4 feet from the floor.
- C. For Floor Tile / Mastic Removal Only - Cover all critical barriers with two layers of 6 mil plastic sheeting sealed with tape and glue securely. Install poly splash guards on the walls extending up the wall 4 feet from the floor.
 - D. For Roof removal - Seal all roof top penetrations, except plumbing vents, prior to asbestos roofing work. Isolate the work areas for the duration of the work by completely sealing off all openings and fixtures in the work area with plastic sheeting taped and glued securely.
 - E. For window unit / caulking removal - Place drop cloths in the areas to be abated to collect any debris. The Contractor shall also clean and decontaminate the collection areas.
 - F. Contractor shall provide the Outside Clean Room, Shower Room, and Equipment Room prior to start of work within building work areas. Personnel lockers in the Clean Room and facilities for disposal of contaminated clothing in the Equipment Room shall be provided. Egress openings shall consist of two sheets of plastic taped across the opening head and down opposite jambs, one leaf shall be taped on one side of the jamb, the other on the opposite jamb.
 - G. Containment partitions separating a contaminated area from a clean area shall be constructed of wood studs and two sheets of minimum 6 mil polyethylene plastic. The inner plastic barrier shall face the contaminated area, the outer barrier, the clean area.
 - H. Maintain enclosures in tidy conditions. 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 and end of each work period. Use smoke methods to test effectiveness of barriers.
 - I. Each unit of asbestos filtration systems shall consist of a blower filter system, equipped with HEPA inline filtration which, as a minimum, continuously traps asbestos fibers of all sizes to 0.3 microns at 99.97% efficiency. Each unit shall be equipped with the following minimum controls:
 - 1) A warning light and audible alarm to indicate reduced air flow due to dirty filters.
 - 2) Automatic shut down, with warning light, to ensure against continued operation of units in event of clogged or damaged filters.
 - J. The asbestos filtration system shall be in operation during all removal operations, until final clearance air samples are received. An adequate number of filtration units shall be used to assure maintenance of pressure differential of 0.02" water column. In addition, filtration units shall be sized to provide a minimum of four air changes per hour in the containment area. Provide instrumentation to document pressure differential.
 - K. Post the EPA and OSHA regulations or any applicable state and local government regulations at the job site in locations clearly visible to employees and others. Attention is directed to all requirements of the Contract Documents concerning precautionary procedures mandated thereby and by OSHA and EPA

for the protection of personnel, the public, and the environment from exposure to or possible contamination by asbestos fibers.

- L. In addition to requirements for asbestos protection, comply with all other applicable requirements of 29 CFR 1910 and 1926.
- M. Provide hard hats, eye protection, and foot protection in those areas where such protective measures are required by OSHA regulations.
- N. Workers shall always wear a respirator properly fitted on the face while in the work area. Instruct and train workers to use respirators properly in accordance with the requirements of the American National Standards Practices for Respiratory Protection (ANSI Z88.2-1969). Ensure that workers wear the appropriate respirator at all times while in the work area. Each employee shall be tested for respirator fit in accordance with the cited ANSI standard.
- O. Workers shall wear disposable full body coveralls and disposable head and foot coverings in the work area. If non-disposable footwear such as protective shoes are required and disposal foot coverings are not suitable, the non-disposable protective footwear shall be left in the work area at all times until disposal at job completion, then disposed of as asbestos contaminated waste.
- P. The Contractor shall establish decontamination procedures for each work area. All persons without exception shall pass through these decontamination areas for any purpose. Procedures shall, as a minimum, consist of the following:
 - 1) Outside Clean room Area: In this room, the worker or individual shall remove normal street clothing and replace with clean work clothing, including disposable coveralls, respiratory protective equipment, and all other protective gear. No asbestos contaminated items shall enter this room with the exception of reusable respirators which are to be placed in a bin or other suitable receptacle approved by the Contractor's technical representative. Provide suitable lockers or other secure storage areas for the employee's clothing.
 - 2) Showers: A shower room or similar facility shall be provided for transit by cleanly dressed workers entering the work area from the outside clean room, or by workers headed for the showers after undressing in the contaminated equipment room or area. Except in cases of emergency, no person shall leave a contaminated area without first having taken a shower. Propose methods by which the personal hygiene of workers or other persons involved can be monitored. Water from the showers shall be passed through 5 micron water filters and then piped into the building floor drain or collected and disposed of by the Contractor. Provide water for the showers. Cold water supply from existing system may be tapped by use of garden hoses, clamps and control valves. The taps and extensions shall be provided by the Contractor. The change facility shall be equipped with adequate water heating capacity to provide for hot water showers. The decontamination facility shall be equipped with a thermostatically controlled heating system for the clean room and equipment room.
 - 3) Equipment Room: Provide an area in which work equipment, footwear and contaminated work clothing can be placed in suitable receptacles for

reuse or disposal prior to entry into the shower room and thence to the outside clean room.

- 4) Decontamination Procedures: Submit to the Owner, a protection program to ensure that workers and others follow an established decontamination sequence utilizing the aforementioned facilities. They shall ensure that gross contamination and debris is removed from protective clothing and equipment prior to egress from the work area. Respiratory protective equipment shall be removed last, during shower, to prevent inhalation of fibers during removal of contaminated clothing. The Contractor shall provide a plan for receipt, inspection, cleaning and storage of respiratory protective equipment in such a manner as to avoid contamination of clean areas.

3.2 METHOD OF REMOVAL FOR ENCLOSED WORK AREAS

- A. A low pressure fine spray of amended water shall be applied to reduce fiber release preceding removal. The asbestos shall be saturated sufficiently to retard emission of airborne fibers. If the asbestos is thick and detaches in chunks having dry bottoms, amended water shall be sprayed over the material as it is loosened and removed.
- B. Following removal of asbestos-containing material, all plastic sheeting, tape, cleaning material, clothing and all other disposal materials or items used in the work area shall be packed into sealable plastic bags (6 mil minimum), sealed and placed into a locked dumpster for transport. The containers or dumpster shall be labeled as prescribed by OSHA Specifications 29 CFR 1910.1001 (g).
- C. All containers shall be cleaned and thoroughly decontaminated before leaving the work area by being passed through the shower, or through the airlock and container cleaning assembly, as follows:
 - 1) Containers shall first be gross-cleaned by vacuuming and then damp-wiped, before being placed into shower container or cleaning airlock.
 - 2) If a container being transferred from the work area via a shower has dried, it shall be wet-wiped again before being transferred past the shower.
- D. Transport the sealed container or enclosed dumpster to an EPA approved and certified waste disposal site. The Contractor shall provide the Owner with a signed certificate listing the quantity of materials delivered to the disposal site, a description of the location of the site, and a statement attesting to the fact that the site is an EPA and State approved disposal location. The signatures of the asbestos removal Contractor, transporter, and site operator must appear on the certificate. The Contractor shall ensure that the operator leaves damaged bags in the delivery containers and that the entire contaminated container is buried, however, sealed plastic bags may be dumped from the containers into the burial site and uncontaminated containers may be reused. The Contractor shall certify that any reused containers have not contained damaged or broken bags of asbestos or other asbestos-contaminated material.
- E. Disposal of all asbestos waste shall be at a prearranged disposal site in accordance with regulations of the Virginia Department of Environmental Quality-Waste Division and OSHA Regulation 29 C.F.R. 1910.1001.

3.3 METHOD OF REMOVAL FOR GLOVEBAGS

- A. The glovebag method may be appropriate for removing certain sections of pipe insulation. Negative pressure enclosures are not required if glovebags are installed according to manufacturer's recommendations.
- B. Remove wetted asbestos material within the sealed glovebag in small sections. Glovebags are to be single use only.
- C. Personal air monitoring of the glovebag worker shall be performed and air monitoring results shall not exceed 0.1 F/CC.
- D. In areas where the pipe and insulation are to be removed, the glovebag method may be used to remove sections of pipe insulation to allow for cutting of the pipe. The remaining intact asbestos insulation may be wrapped in 6 mil polyethylene to allow for removal and disposal of pipe and insulation together.

3.4 DECONTAMINATION OF WORK AREA

- A. Replace pre-filter and the intermediate filter in the Air Filtration Device. Clean all surfaces of the Work Area, including the outside surface of critical barrier sheeting, tools, scaffolding and/or staging, by HEPA-filtered vacuuming, then damp cleaning and mopping. Do not dry-dust or dry-sweep. Continue cleaning until there is no visible dust, debris or residue on polyethylene sheeting and other surfaces.
- B. Perform a complete visual inspection of all Work Area surfaces and contents. If any debris or residue is found, repeat the first cleaning and continue decontamination procedure from that point.
- C. Allow sufficient time for the Work Area to completely dry while operating HEPA filtered fan units. Maintain operation of negative pressure differential system in operation during the drying period.
- D. The QP shall conduct a visual inspection of the Work Area when the abatement and decontamination is complete and when the Contractor's supervisor requests such inspection.
- E. After the visual inspection, an approved lock down encapsulant shall be applied to all the surfaces in the Work Area. The encapsulant used shall not impede re-insulation. After sufficient drying time, determined by the QP, the final clearance can take place.
- F. Additional cleaning required after the first final cleaning will be performed at the expense of the contractor. Additional hours required by the QP will also be an expense paid for by the Contractor, as well as necessary repeat final air clearance analyses.
- G. After final air samples are found to meet clearance criteria, remove critical barriers and completely dismantle and remove Decontamination Area.
- H. Seal HEPA filtered AFDs with 6 mil polyethylene sheeting and duct tape to form a tight seal at intake and before unit is moved from the Work Area.

3.5 FINAL INSPECTION AND TESTING.

- A. After cleaning and decontamination of the workspace has been conducted, and if a high degree of cleanliness has been achieved, notify the QP that the workspace is ready for inspection and final testing. The QP will visually inspect each Work Area where such activity was conducted to determine whether the clean-up has been properly completed and to detect any visible asbestos dust or contamination. The QP shall conduct a visual inspection of the Work Area when the abatement and decontamination is complete and when the Contractor's supervisor requests such inspection. The visual inspection will be conducted in compliance with ASTM E 1368-90, Standard Practice for Visual Inspection of Asbestos Abatement Projects.
- B. If the visual inspection does not reveal any dust or other signs of contamination, the final air monitoring will take place except for roofing and window removal.
- C. Aggressive final air clearance testing shall be conducted by the QP in the Work Area in accordance with EPA 40 C.F.R. Part 763.90(i), (2, i) and Appendix A.
- D. Phase contrast microscopy analysis will be performed in accordance with NIOSH Method 7400. Final test results shall show contamination levels not to exceed 0.01 f/cc when using phase contrast microscopy. Air samples shall have a minimum volume of 1,200 liters per sample but may vary depending on size of Work Area and other variables.

-- End of Section --

**SECTION 02081
LEAD-CONTAINING PAINT GENERAL RENOVATION REQUIREMENTS**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2 (1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems

ANSI Z88.2 (1992) Respiratory Protection

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1926.21 Safety Training and Education

29 CFR 1926.33 Access to Employee Exposure and Medical Records

29 CFR 1926.55 Gases, Vapors, Fumes, Dusts, and Mists

29 CFR 1926.59 Hazard Communication

29 CFR 1926.62 Lead Exposure in Construction

29 CFR 1926.65 Hazardous Waste Operations and Emergency Response

29 CFR 1926.103 Respiratory Protection

40 CFR 260 Hazardous Waste Management Systems: General

40 CFR 261 Identification and Listing of Hazardous Waste

40 CFR 262 Generators of Hazardous Waste

40 CFR 263 Transporters of Hazardous Waste

40 CFR 264 Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

40 CFR 265 Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

40 CFR 268 Land Disposal Restrictions

40 CFR 745 Lead; Requirements for Lead-Based Paint Activities

49 CFR 172 Hazardous Materials, Tables, and Hazardous Materials
Communications Regulations

49 CFR 178 Shipping Container Specification

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

HUD Guidelines (1995) Guidelines for the Evaluation and Control of Lead
Based Paint Hazards in Housing

UNDERWRITERS LABORATORIES INC. (UL)

UL 586 (1996) High-Efficiency, Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8 hour period in an occupational/industrial environment.

1.2.2 Area Sampling

Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations but is not collected in the breathing zone of personnel.

1.2.3 Competent Person (CP)

As used in this section, refers to a person employed by the Contractor who is trained in the recognition and control of lead hazards in accordance with current federal, State, and local regulations.

1.2.4 Contaminated Room

Room for removal of contaminated personal protective equipment (PPE).

1.2.5 Decontamination Shower Facility

That facility that encompasses a clean clothing storage room, and a contaminated clothing storage and disposal rooms, with a shower facility in between.

1.2.6 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead to which an employee is exposed, averaged over an 8 hour workday as indicated in 29 CFR 1926.62.

1.2.7 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron or larger size particles.

1.2.8 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps.

1.2.9 Lead-Based Paint (LBP)

Paint or other surface coating that contains lead in excess of 1.0 milligram per centimeter squared or 0.5 percent by weight.

1.2.10 Lead-Based Paint Hazard (LBP Hazard)

Any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, lead-based paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects.

1.2.11 Lead-Containing Paint (LCP)

Lead-based paint or other similar surface coating containing lead or lead compound in excess of 0.06 percent by weight of the total nonvolatile content of the paint.

1.2.12 Lead Control Area

An enclosed area or structure, constructed as a temporary containment equipped with HEPA filtered local exhaust, which prevents the spread of lead dust, paint chips, or debris existing as a condition of lead-based paint removal operations. The lead control area is also isolated by physical boundaries to prevent unauthorized entry of personnel.

1.2.13 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8 hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than eight hours in a workday, the PEL shall be determined by the following formula:

$$\text{PEL (micrograms/cubic meter of air)} = 400/\text{No. hrs worked per day}$$

1.2.14 Personal Sampling

Sampling of airborne lead concentrations within the breathing zone of an employee to determine the 8 hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employees' work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and centered at the nose or mouth of an employee.

1.2.15 Physical Boundary

Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area but inside boundary."

1.3 LEAD HAZARD AWARENESS

1.3.1 Lead-Based Paint

Due to the age of the building, Lead-Based Paint (LBP) may be encountered during renovation / demolition activities. Based upon the scope of the work, abatement (i.e., removal of LBP prior to demolition) is not required for this project. However, ALL Contractors shall complete all renovation / demolition work in accordance with the requirements found in 29 CFR 1926.62. Submit documentation of compliance with this standard to The Owner prior to start-up of work, including an air monitoring plan, dust control measures, etc. All compliance sampling and other control measures for potential lead dust shall be addressed within exposure control and monitoring plan prepared by the Contractor. All compliance sampling shall be performed by individuals working under the direction of the Contractor's Competent Person. Following completion of work, submit all monitoring documentation to the Contracting Officer. The Owner may elect to do independent sampling.

1.4 PERSONNEL PROTECTION

1.4.1 Equipment

The Contractor shall provide adequate personal protective equipment (PPE) to any employees working on lead coated surfaces if there is a potential for generation of airborne lead dust or fume (e.g., through grinding, cutting, sanding, etc.) above the Permissible Exposure Limit (29 CFR 1926.62). Note: The standard does not reference a specific level of lead in paint at which a hazard exists. Rather, OSHA defines airborne concentrations, and references specific types of work practices and operations from which a lead hazard may be generated (29 CFR 1926.62, paragraph d).

1.4.2 Exposure Monitoring

The Contractor should make allowances in the bid price for the cost of environmental and personnel monitoring, along with costs for provision of all other related services, monitoring, and/or equipment needed to comply with requirements found within 29 CFR 1926.62. The Contractor shall be required to conduct personnel air monitoring to establish personal exposure levels. This monitoring information will be used by the Contractor to determine the levels of personnel protection and environmental controls (if necessary) required to be used by the Contractor for this contract. Monitoring shall be performed under the direction of the Competent Person. The costs for PPE, monitoring, decontamination facilities, etc. shall be borne by the Contractor. The Contractor shall also be required to conduct air monitoring during the course of the project to document airborne lead levels.

1.5 WASTE COLLECTION AND DISPOSAL

It is expected that waste debris generated by this project may contain lead coated surfaces. The Contractor shall assume that all debris may be disposed of as non-hazardous waste. The Owner or their representative shall perform testing services to determine proper disposal, in accordance with EPA hazardous waste disposal requirements found in 40 CFR 260 - 264. The Contractor shall be responsible for disposal of all materials generated at the site. The Contractor is responsible for notifying all other parties who may receive this waste that it may have lead-coated surfaces.

PART 2 PRODUCTS

Section not used.

PART 3 EXECUTION

Section not used.

-- End Of Section --