

SECTION 02 82 13

ASBESTOS ABATEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contracts, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.02 SCOPE OF WORK

- A. The scope of work for this project covers the supplying of all labor, tools, materials, equipment, services and appurtenances to accomplish the work below. The work shall be performed to the complete satisfaction of St. Vincent College in accordance with the current EPA and OSHA regulations, Department of Labor & Industry and Department of Environmental Protection regulations, and any other applicable codes and regulations. *Abatement of asbestos material called for in the bridges and Center Common Building have already been completed under the Demolition and Site Utility Relocation Contract and is not part of this project. (ADD#1)*

- B. Work under this project includes but is not limited to removal and disposal of the following asbestos-containing materials: **Quantities and locations are for informational purposes only and are based on the best information available at the time of the specification preparation. No warranty or representation is being made as to the accuracy of these quantities/locations. The Contractor shall satisfy himself as to the actual quantities to be abated. It will be the Contractors responsibility to refer to the engineering demolition drawings to assist in determining quantities/locations. Nothing in this section may be interpreted as limiting the extent of work otherwise required by this contract and related documents. It will be the responsibility of the Contractor for the means and methods that may be required to access and remove all of these materials. This may include but is not limited to the removal of plaster walls/ceilings, concrete walls/ceilings, etc... The plaster material will be treated as non ACM unless interior piping is damaged and any plaster coming in direct contact with the damaged insulation will then be considered contaminated.**

PHYSICS BUILDING

Hot/Cold Water Line Fittings – This material is found throughout the building. Two Hundred and Twelve (212) fittings were observed.

Roof Drains – This material is located in the Mechanical Room and Room 206. Eight (8) fittings were observed.

Insulation on Electrical Heaters – These Units are found in the 1st and 2nd Floor Stairwell. Two (2) units are present.

BIOLOGY BUILDING

Hot/Cold Water Line Fittings – This material is found possibly throughout the building. One Hundred and Twenty Seven (127) fittings were observed.

Roof Drains – This material is located in the Mechanical Room and Room 204. Five (5) fittings were observed.

Insulation on Electrical Heaters – These Units are found in the 1st and 2nd Floor Stairwell. Two (2) units are present.

CHEMISTRY BUILDING

Hot/Cold Water Line Fittings – This material is found possibly throughout the building. One Hundred and Sixty Eight (168) fittings were observed.

Roof Drains – This material is located in the Mechanical Room and Room 205. Six (6) fittings were observed.

Insulation on Electrical Heaters – These Units are found in the 1st and 2nd Floor Stairwell. Two (2) units are present.

Vent Hoods – Twenty-Six (26) hoods were found in the following locations: Rooms C204, C206, C207, C108, C104, and C103.

C. The abatement contractor is responsible for confirming quantities of all ACM to be abated and to note any unusual site conditions that may affect the performance of the work.

1. The Abatement Contractor is responsible for coordinating his work activities with other trades.
2. The Abatement Contractor shall perform work according to a schedule or phasing plan established by the General Contractor.
3. The Abatement Contractor shall coordinate the locations of waste dumpsters and/or temporary storage of materials with the General Contractor and Owner.

1.03 TASKS: BRIEF SUMMARY OF WORK

- A. Pre-abatement Activities including pre-abatement meeting, inspection, notifications, permits, submittal approvals, preparations, emergency arrangements and standard operating procedures.
- B. Abatement Activities including removal, encapsulation and disposal of contaminated waste, Record- keeping, security and inspection and monitoring.
- C. Cleaning and Decontaminating Activities including final inspection and testing and certification of contamination.

1.04 CONTRACTOR'S USE OF PREMISES

Cooperate fully with the Building Owner and other trades to minimize conflicts and to facilitate the Owner's safe and smooth usage of building. Perform the work in accordance with specifications, and all applicable regulations.

1.05 STOP ASBESTOS REMOVAL

If the Building Owner or the Owner's Representative presents a written stop asbestos removal order immediately stop all asbestos removal and initiate fiber reduction activities. Do not resume asbestos removal until authorized in writing by the Owner. A stop asbestos removal order will be issued at any time the Owner determines abatement conditions are not within specifications requirements. Stoppage will continue until conditions have been corrected. Standby time and cost required for corrective action is at contractor's expense. The occurrence of the following events shall be reported in writing to the Owner's Representative and shall require the contractor to automatically stop asbestos removal and initiate fiber reduction activities.

- A. Excessive airborne fibers outside containment area (0.01 f/cc or greater).
- B. Break in containment barriers.

- C. Loss of negative air pressure (At or below 0.01 inches of water).
- D. Serious injury within the containment area.
- E. Fire and safety emergency.
- F. Respiratory protection system failure.
- G. Power failure.
- H. Excessive airborne fibers inside containment area (0.5 f/cc or greater when wet methods are employed).

1.06 DEFINITIONS

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

Abatement: A general term used to refer to the various processes used to control asbestos materials in buildings. Three alternative methods for ACM and/or ACE abatement are removal, encapsulation and enclosure.

ACS: Asbestos contaminated soil.

Aerosol: Solid or liquid, particles, suspended in air.

Aggressive Sampling: EPA defined clearance sampling method using air-moving equipment such as fans and leaf blowers to stir the air.

Air Cell: Type of pipe or duct insulation comprised of corrugated cardboard which frequently contains asbestos combined with cellulose or refractory binders.

Air Monitoring: The process of collecting and analyzing air samples to determine the number of fibers present per cubic centimeter of air. This overall monitoring procedure is also called Air Testing, or Testing.

Air Sample Collection Filter: Membrane filter used to collect fibers/particulates that are counted and/or analyzed. Membrane is usually made of mixed cellulose material for PCM, (phase contrast microscopy) and polycarbonate or mixed cellulose for TEM (transmission electron microscopy).

Amended Water: Water to which a surfactant has been added.

Asbestos: The general name for a group of fibrous mineral forms including but not limited to chrysotile, amosite, crocidolite, anthophyllite, actinolite and tremolite.

Asbestos Waste Decontamination Facility: Airlock system consisting of drum/bag washing facilities and temporary storage area for cleaned containers. Used as exit for waste and equipment leaving the abatement area. May be used in an emergency to evacuate personnel.

Asbestos-Containing Material (ACM): Any material containing more than 1% (one percent) by weight of asbestos of any type or mixture.

Asbestos Contaminated Elements (ACE): Building elements such as ceilings, walls, lights and ductwork that are contaminated by asbestos.

Asbestos-Containing Waste Material: Materials removed from an abatement area, which is or is suspected of being contaminated with an asbestos-containing material.

Authorized Visitor: Any person approved by the Owner, the contractor or any government agency, which has proven jurisdiction over asbestos-related work.

Barrier: Any surface that seals the work area to inhibit the movement of fibers.

Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.

Bridging Encapsulant: An encapsulant that forms a discrete layer on the surface of an asbestos matrix.

Bulk Test: The collection and analysis of samples of suspected asbestos materials. A small amount, or bulk, of the material is physically removed from the structure and placed in a rigid airtight container for transportation to an accredited lab for analysis.

Changing Area: Normally the first chamber of the personnel decontamination facilities, i.e., the "clean room".

Clearance Sample: An area sample taken to ascertain airborne fiber levels after removal clean-up and final inspection have been completed. Performed by the Owner's I.H. consultant.

Count: Refers to "Fiber Count," or the average number of asbestos fibers greater than five micrometers in length per cubic centimeter of air.

Demolition: The removal of any building component, system, finish or assembly of a facility.

Disposal Bag: 6 mil thick, air-liquid leak proof plastic bags used for transporting asbestos waste from abatement areas to disposal site. Each is labeled in accordance with OSHA regulations.

Drum: A rigid, impermeable container made of cardboard, metal or plastic which can be sealed in an air and watertight manner.

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

Encapsulation: Treatment of ACM with an encapsulant.

Enclosure: The construction of an air-tight, impermeable, permanent barrier around ACM to control the release of asbestos fibers into the air.

Entrance Port: A name sometimes used for the main entrance airlock in an OSHA defined negative air containment area.

EDF: Equipment Decontamination Facility.

F/cc: Abbreviation for fibers per cubic centimeter of air and standard measurement units used to measure the level of asbestos contamination in the air.

Filter: A media component used in respirators or other equipment to remove solid or liquid particles from the air.

Friable Asbestos Containing Material (F-ACM): Material that contains more than 1.0% asbestos by weight, which can be crumbled, pulverized, or reduced to powder by hand pressure when dry. In Allegheny County all asbestos is considered friable.

Glove Bag: A sack (typically constructed of 6 mil transparent polyethylene or polyvinyl chloride plastic) with two inward projecting long sleeve gloves, which are designed to enclose an object from which an ACM is to be removed.

High-Efficiency Particulate Absolute (HEPA) Filter: A filter which removes from the air 99.97% or more of monodisperse dioctyl phthalate (DOP) particles having a mean diameter of 0.3 micrometer.

HEPA Filter Vacuum Cleaner: High efficiency particulate (absolute) vacuum collection equipment with a HEPA filter system capable of collecting and retaining asbestos fibers.

Industrial Hygienist (I.H.) is a person with a college degree in engineering, chemistry, physics, medicine or related physical and biological science and a competence in Industrial Hygiene acquired through special studies and training. Meets all definition requirements of the American Industrial Hygiene Association (AIHA).

I.H. Technician is a person working under the supervision of the I.H. with special training, experience, certifications and licenses required for the industrial hygiene work assigned to perform. Requires a minimum experience as I. H. technician on three projects of similar size and complexity to this project.

Lock-Back: Encapsulation of all surfaces involves in abatement at the conclusion of ACM removal and before removal of primary barriers.

MCEF: Cellulose ester filter.

Negative Pressure: Air pressure lower than surrounding areas, created by exhausting air from a sealed space (work area).

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.

Negative Pressure System: A local exhaust system, utilizing HEPA filtration capable of maintaining a negative pressure inside the work area and a constant air flow from adjacent areas into the work area and exhausting that air outdoors.

NESHAP: National Emission Standards for Hazardous Air Pollutants.

Non – Friable Asbestos –Containing Material (NF-ACM): Material that contains more than 1% percent) asbestos by weight but cannot be crumbled, pulverized, or reduced to powder by and pressure when dry. Non-friable asbestos materials can release asbestos fibers when power tools such as grinders, drills, sanders, etc. are used on them.

OV: Organic vapor.

PAPR: Powered Air-Purifying Respirator.

PCM: Abbreviation for phase contrast microscopy. Phase contrast microscopy utilizes a light microscope for the purpose of counting fibers. Reference NIOSH 7400 Method.

PDF: Personnel Decontamination Facilities.

Penetrating Encapsulant: Encapsulant that is absorbed by the asbestos matrix without leaving a discrete surface layer.

Personal Air Sampling: Air sample collected with a special battery-powered portable pump unit that is fitted on the body of the monitored person. The collection device (filter cassette) is located within the individual's breathing zone.

Personal Monitoring: Sampling of the asbestos fiber concentrations within the breathing zone of a person.

Plastic Sheeting: Barrier material not as strong as polyethylene.

PLM: Abbreviation for polarized light microscopy with dispersion staining utilizing light

microscopy and refractive indices to identify type of asbestos present.

Polyethylene Sheeting: Strong plastic barrier material usually transparent.

Positive/Negative Pressure Fit Test: A negative-pressure respirator fit check, performed by placing the palm of one hand over the exhalation valve and exhaling (positive pressure) and feeling for exhalation valve and exhaling (positive pressure) and feeling for face-to-face fit leakage or, covering the filters cartridges with the palms of the hand and inhaling (negative pressure) while feeling for face-to-face fit leakage.

Pressure Differential System: System, which restricts airflow from adjacent areas into work area and continuously filters air from the HEPA filtration machine. Minimal exhaust ventilation is utilized by maintaining a pressure differential of 0.02" of H₂O.

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.

QNFT: Quantitative fit test.

Removal: Means removal of ACM and ACE. Accomplished with tools such as scrapers, chisels and nylon brushes.

Removal Encapsulant: A penetrating encapsulant specifically designed for removal of ACM rather than encapsulation.

Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.

Respiratory Protection Program Coordinator (RPPC): Individual who is authorized and responsible for all aspects of the contractor's respiratory protection program (RPP).

RPP: Respiratory Protection Program.

RPPC: Respiratory Protection Program Coordinator.

SAR: Supplied Air Respirator.

SCBA: Self-contained breathing apparatus.

Sealant: Another name for encapsulating material. This term also refers to the paint, which is used to cover brown coat ceilings after asbestos surfaces have been removed.

Sealed Work Area: Refers to the work area after containment barriers and decontamination facilities have been erected and a negative pressure air system installed.

Showers: Shower stalls installed in the Personnel Decontamination Facilities and used as part of the

decontamination process required for every person leaving the sealed work areas. Also used in the Equipment Decontamination Facilities to wash disposal bags.

S.O.P.: Standard Operating Procedures required to be submitted by contractor.

Station Sample or Area Sample: Refers to air samples collected at a specific spot, or station, with high-volume air pumps.

Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

TEM: Abbreviation for transmission electron microscopy. TEM is used for the purpose of fiber counting and has the analytical capacity of identifying asbestos fibers.

Testing: One of two types of testing done in relation to asbestos bulk and air testing.

VAT: Vinyl-asbestos floor tile.

Visible Emissions: Any emission containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

Wet Cleaning: The process of thoroughly eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with amended water or diluted removal encapsulant.

Wetting Agent: See Surfactant.

Work Area: Area where asbestos related work or removal operations are performed which is defined and isolated to prevent the spread of asbestos dust, fibers or debris, and the entry of unauthorized personnel. Work area is a Regulated Area as defined by OSHA regulation 29 CFR 1926. Also called containment area.

Worker Decontamination Facility (WDF): Another name for the main entrance/exit airlock system consisting of clean/change room, shower facilities, and equipment (dirty room).

1.07 REFERENCED STANDARDS ORGANIZATIONS

The following acronyms or abbreviations, as 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 date of contract documents.

AIHA American Industrial Hygiene Assoc.
 Wolves Ledges Parkway

Akron, OH

- ANSI American National Standards Institute
1430 Broadway
New York, NY 10018
212/354-3300
- ASTM American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103
215/299-5400
- CFR Code of Federal Regulations
Available from Government Printing Office
Washington, DC 20420
(usually first published in Federal Register)
- CGA Compressed Gas Association
1235 Jefferson Davis Highway
Arlington, VA 22202
703/979-0900
- CS Commercial Standard of NBS (U.S. Dept. of Commerce)
Government Printing Office
Washington, DC 20402
- EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460
202/382-3949
- MSHA Mine Safety and Health Administration
(Respiratory Protection Division) Ballston Tower #3
Department of Labor
Arlington, VA 22203
703/235-1452
- NBS National Bureau of Standards
(U.S. Dept. of Commerce)
Gaithersburg, MD 20234
301/921-1000
- NEC National Electrical Code (by NFPA)
- NEMA National Electrical Manufacturers Association
2101 L Street, NW

Washington, DC 20037
202/457-8400

NFPA National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
617/770-3000

NIOSH National Institute of Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, OH 45226
513/533-8236

OSHA Occupational Safety and Health Administration
(U.S. Dept. of Labor)
Government Printing Office
Washington, DC 20402

UL Underwriters Laboratories
Northbrook, IL 60062
312/272-8800

USA United States Army - Army Chemical Corps.
Department of Defense

1.08 CODES AND REGULATIONS

- A. Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.
- B. The Asbestos Abatement Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling and disposal of ACM and ACE, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations. Contractor shall hold the Owner and the Owner's Representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other on the part of himself, his employees, or his subcontractors. Contractor incurs all costs for sampling/analytical costs for sampling to comply with OSHA regulation.
- C. Abatement Contractor shall determine the applicability of any process patents he/she may be employing and be responsible for paying any fees, royalties or licenses that may be required for the use of patented processes.

1.09 FEDERAL REQUIREMENTS

- A. Federal requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials include, but are not limited to the following:
 - 1. Occupational Safety and Health Administration, (OSHA):
 - a. Respiratory Protection Title 29, Part 1910, Section 134 of the Code of Federal Regulations, Construction Industry Title 29, Part 1926, of the Code of Federal Regulations, Asbestos, 29CFR 1926-1101.
 - b. Access to Employee Exposure and Medical Records Title 29, Part 1910, Section 2 of the Code of Federal Regulations.
 - c. Hazard Communication Title 29, Part 1910, Section 1200 of the Code of Federal of Regulations.
 - 2. U.S. Environmental Protection Agency (EPA):
 - a. Asbestos Abatement Projects Rule 40 CFR Part 762 CPTS 62044, FRL 2843-9 Federal Register, Vol. 50 No. 134, July 12, 1985 P28530-28540.
 - b. Asbestos-Containing Materials in School - 40 CFR Part 763
 - c. National Emission Standard for Hazardous Air Pollutants, Title 40, Part 61, Sub-part M (Revised Sub-part B) of the Code of Federal Regulations.

1.10 STATE REQUIREMENTS

- A. State Requirements that govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:
 - 1. Pennsylvania Department of Environmental Protection (DEP) Title 25, Part I Subpart C, Article III, Chapters 124, 133 and 137. Contact the PA DER Bureau of Solid Waste Management in Pittsburgh, PA for details. Phone Number: (412) 665-2900
 - 2. Pennsylvania Department of Labor & Industry - Act 194.

1.11 LOCAL REQUIREMENTS

- A. Abide by all local requirements if these requirements are more stringent than state and federal that govern asbestos abatement work or hauling and disposal of asbestos waste materials.

1.12 STANDARDS

- A. Standards that govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:
1. American National Standards Institute (ANSI)
1430 Broadway
New York, NY 10018
(212) 354-3300
 - a. Fundamentals Governing the Design and Operation of Local Exhaust Systems Publications Z9.2-79
 - b. 2. Practices for Respiratory Protection Publication Z88.2
- B. Standards which govern encapsulation work include but are not limited to the following:
1. American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, PA 19103
(215) 299-5400
 - a. Specification for Encapsulants for Friable Asbestos Containing Building Materials Proposal P-189
 - b. Safety and Health Requirements Relating to Occupational Exposure to Asbestos - E-849-82

1.13 EPA GUIDANCE MATERIALS

- A. EPA guidance documents that discuss asbestos abatement work or hauling and disposal of asbestos waste materials are listed below. These documents are made part of this section by reference. EPA maintains an information number 1-800-334-8571 and publications can be ordered from (800) 424-9065 (554-1404 in Washington, DC):
1. Guidance for Controlling Asbestos-Containing Materials in Buildings (Purple Book) EPA 560/5-85-024.
 2. Asbestos Waste Management Guidance. EPA 530-SW-85-007.
 3. Asbestos in Buildings. Simplified Sampling Scheme for Friable Surfacing Materials.
 4. Commercial Laboratories with Polarized Light Microscopy Capabilities for bulk asbestos

identification.

5. A Guide to Respiratory Protection for the Asbestos Abatement Industry. EPA-560-OPTS-86-001.

1.14 NOTICES

- A. The Abatement Contractor shall send written notification as required by the US EPA, PA Department of Environmental Protection and PA Department of Labor and Industry.

1. Complete Abatement and Demolition/Renovation Notification Form and Submit to the following address:

Attn: Asbestos Abatement Permitting
Asbestos Notification
DEP Bureau of Air Quality
P.O. Box 8468
Harrisburg, PA 17105-8468

A photocopy of this notification must be sent to EPA Region III at the following address:

Asbestos NESHAP Coordinator (3WC32)
US EPA Region III
1650 Arch Street
Philadelphia, PA 19103

Notifications must contain original signatures for items 25 and 26 or they will be returned unprocessed.

Submit copies of notification forms to the Owner for facility records.

1.15 PERMITS

Permits: An annual "Industrial waste hauler permit" specifically for asbestos-containing materials (ACM), is required for transporting asbestos waste to a disposal site.

1.16 LICENSES

Maintain current licenses as required by applicable state or local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the work of this contract.

1.17 POSTING AND FILING OF REGULATIONS

Maintain two (2) copies of applicable federal, state and location regulations. Post one copy of each at the job site where workers will have ready, easy and daily exposure to the text. Keep on file in contractor's office one copy of each.

1.18 INDEMNIFICATION

- A. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the owner, the Owner/Engineer, the Industrial Hygienist, and their agents and employees from and against all claims, damages, losses, and expenses, including attorney's fees arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense; (a) is attributable to bodily injury to or destruction of tangible property (other than the work itself), including the loss of use resulting there from, and, (b) is caused in whole or in part by any negligent act or omission of the Contractor, his/her subcontractor, anyone directly or indirectly employed by any of them or
- B. Anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity, which would otherwise exist as to any party or person, described in this paragraph.
- C. In any and all claims against the owner, the Owner/Engineer, the Industrial Hygienist, or any of their agents or employees by any employee of the Contractor, his/her subcontractor, anyone directly or indirectly employed by any of them or anyone whose acts of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or his/her subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

The obligation of the Contractor shall not extend to the liability of the Owner/Engineer or the Industrial Hygienist, his agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, survey, change orders, designs, specifications, monitoring or air sampling.

1.19 PROJECT COORDINATION

Minimum administrative and supervisory requirements necessary for coordination of work on the project are personnel, contingency arrangements and security.

1.20 PERSONNEL

- A. Minimum administrative and supervisory requirements necessary for coordination of work on the project are personnel, contingency arrangements and security.

Administrative and Supervisory Personnel: Shall consist of appropriate number of qualified or

competent foremen. The contractor's "competent person" as defined by OSHA.

Non-Supervisory Personnel: An adequate number of qualified personnel shall be able to meet the schedule requirements of the project. Laborers employed for abatement throughout the project shall meet the minimum qualifications criteria described below. Personnel employed in this abatement work shall be pre-approved by the Owner's Representative. Submit a request for approval for any person intended to be employed in the project with name, social security, and qualifications.

B. Minimum Qualifications: Abatement Construction Company and assigned Personnel for this project shall meet the following minimum requirements:

1. The-Abatement-Construction-Company: Has an established asbestos abatement business has not defaulted on any project within the last 3 years; has not been cited or has not been a defending party of any legal action for violation of asbestos regulations during the last 3 years; carries liability insurance for asbestos abatement work; is licensed in whatever states is doing business and have such provisions; has on adequate number of qualified personnel available for this project; has an established written standard operating procedure for training, medical surveillance, entry & exit, procedures, respiratory protection, safety, emergency and monitoring; has available equipment, materials and supplies in adequate quantity, capacity and number to perform the work of this project.
2. Superintendent and Foremen: The superintendent has 4 years abatement construction experience of which 2 years as a foreman and 1 year as superintendent. Has completed 4 courses of specialized training 2 of which on management and supervision of asbestos abatement. Has medical records and other OSHA requirements. The Foremen have 3 years abatement construction experience of which 1 year as foremen has completed 2 courses of specialized training in asbestos abatement construction and regulations. One course shall be on management of asbestos contracts with content equivalent to the national asbestos training center/EPA course. Have medical records and other OSHA requirements. Have license where required by state or local government.

1.21 CONTINGENCY PLANS AND ARRANGEMENTS

Prepare a contingency plan for emergencies including fire, accident, failure of power, failure of negative air system, failure of supplied air system or any other event that may require modification of standard operating procedures during abatement. Include specific procedures to ensure safe exiting and to provide medical attention in the event of an emergency. Post the telephone numbers and locations of emergency services including fire, ambulance, doctor, hospital, police, power company and telephone company in the clean room of personnel decontamination facilities. Notify all these emergency services as to the danger of entering the containment area, and invite them to participate in an informal training program by the qualified I.H. on relevant aspects of asbestos abatement. Provide assistance on developing contingency plans for responding safely and efficiently to any emergency during abatement.

1.22 SECURITY

Provide a security system at the entrance of a containment area with a logbook to ensure that every entry to the containment area will be logged in and that only properly trained and outfitted workers will be allowed to enter. Entrance will be allowed also to any authorized Pittsburgh Board of Public Education and inspectors from regulatory agencies if properly fitted with protective clothing and respirators.

1.23 RESPIRATORY PROTECTION

Provide respiratory protection in accordance with these specifications, the OSHA regulations 29 CFR 1926.1101, 29 CFR 1910, Section 1001, 29 CFR 1910.134, EPA regulations 40 CFR 763.120, 121, ANSI standards Z88.2-1980, CGS Pamphlet G-7 and specification G-7.1, the NIOSH and MSHA standards and the following state and local requirements. In case of conflict, the most stringent requirements are applicable for this project.

1.24 RESPIRATORY PROTECTION PROGRAM (RPP)

- A. Develop, implement and maintain a respiratory protection program consisting of the following elements:
1. Written statement of company policy, including assignment of individual responsibility, accountability, and authority for required activities of the respiratory protection program.
 2. Written standard operating procedures governing the selection and use of respirators.
 3. Respiratory selection (from NIOSH/MSHA approved and certified models) on the basis of hazards to which the worker is exposed.
 4. Medical examination of workers to determine whether or not they may be assigned an activity where respiratory protection is required.
 5. User training in the proper use and limitations of respirators (as well as a way to evaluate the skill and knowledge obtained by the worker through training).
 6. Respiratory fit testing.
 7. Regular cleaning and disinfecting of respirators.
 8. Routine inspection of respirators during cleaning, and at least once a month and after each use for those respirators designated for emergency use.
 9. Storage of respirators in convenient, clean, and sanitary locations.

10. Surveillance of work area conditions and degree of employee exposure (e.g., through air monitoring).
11. Regular inspection and evaluation of the continued effectiveness of the program.
12. Recognition and resolution of special problems as they affect respirator use (e.g., facial hair, eye glasses, etc.)
13. Proper respirator use (procedures for donning and doffing respirators when entering and exiting the abatement area).

1.25 WRITTEN STATEMENT OF COMPANY POLICY

Provide a written statement of intent to provide a safe and healthful work place for workers. Written statement shall include assignment of individual responsibility, accountability, enforcement procedures and authority for required activities of the RPP.

Respirators for abatement work must be selected in accordance with OSHA regulations 29 CFR 1926.1101.

1.27 WORKER PROTECTION AND TRAINING PRIOR TO ENGAGING IN ABATEMENT WORK

Train workers in accordance with OSHA 29 CFR 1926.1101 and this section. Workers shall be trained and be knowledgeable on the following topics: Methods of recognizing ACM; health effects of asbestos exposure; effects of smoking and asbestos exposure; activities that could result in hazardous exposures; protective controls, practices and procedures to minimize exposure including engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures and waste transportation and disposal; review OSHA 29 CFR 1910.134 for respirators; medical surveillance program; review OSHA 29 CFR 1926.1101, and for air monitoring, personnel and area; review this section of the project specifications.

1.28 MEDICAL EXAMINATIONS

Provide medical examinations for all workers and any other employee entering the work area per OSHA 29 CFR 1926.1101 regardless of exposure levels. In addition, the contractor's physician shall perform an evaluation of each individual's ability to work in heat stress environments.

1.29 PROTECTIVE CLOTHING

Provide boots, hard hats, goggles and gloves for all workers. Equipment shall meet OSHA requirements for personal protection. Provide all persons entering the work area with disposable full body coveralls, disposable head covers and 18-inch boot type covers. Ensure that disposable clothes are not be compromised by employees. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the disposable gloves but shall not be used alone. Use tape to secure sleeves at the wrists and to secure foot coverings at the ankles.

1.30 ENTERING AND EXITING PROCEDURES

Ensure that each time workers enter the work area, they remove all street clothes in the changing room of the personnel decontamination unit and put on new disposable coveralls, new head covers, and clean respirators, then proceed through shower room to equipment room, and put on work boots.

1.31 DECONTAMINATION PROCEDURES

- A. Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the work area:
1. When exiting area, remove disposable coveralls, and all other clothes disposable head covers, and disposable footwear covers or boots in the equipment room.
 2. Still wearing respirators and completely naked, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos filters while showering. The following procedure is required as a minimum:
 - a. Thoroughly wet body from neck down. Wet hair as thoroughly as possible without wetting the respirator filter if using an air purifying type respirator.
 - b. Take a deep breath, hold it and/or exhale slowly, complete wetting of hair, thoroughly wetting face, respirator and filter (air purifying respirator). While still holding breath, remove respirator and hold it away from face before starting to breath.
 3. Dispose of wet filters from respirator.
 4. Carefully wash face piece of respirator inside and out.
 5. Shower completely with soap and water. Rinse thoroughly.
 6. Rinse shower room walls and floor prior to exit.
 7. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.

1.32 LIMITATIONS WITHIN WORK AREA

Ensure that workers do not eat, drink, smoke, chew gum or tobacco, or in any way break the protection of the respiratory protection system in the work area.

1.33 DECONTAMINATION FACILITIES

Provide each work area with a personnel and equipment decontamination facilities. Ensure that the decontamination facilities are the only means of ingress and egress for the work area.

1.34 GENERAL REQUIREMENTS

All persons entering and exiting the work area shall follow the entry and exit procedures required by the applicable regulations and these specifications. Construct walls and ceilings of decontamination facilities airtight with at least 6-mil polyethylene sheeting and attach to existing building components or to a temporary framework. Use a minimum of two layers of 6-mil clear/opaque polyethylene to cover floor. Construct doors from overlapping polyethylene sheets so that they overlap adjacent surfaces. Weigh sheets at bottom so that they quickly close after release. Put arrows on sheets showing direction of overlap and travel. If building is partially occupied construct solid barrier on the public side to protect sheeting.

1.35 TEMPORARY UTILITIES

Water may be secured from the building's water system provided that back flow protection will be installed at the point of connection. Water supply must be properly pressure and temperature balanced at shower discharge. Provide adequate temporary electric power with ground fault protection and overhead wiring. Provide sub-panel for all temporary power in changing room.

1.36 PERSONNEL DECONTAMINATION FACILITIES (PDF)

- A. Provide PDF consisting of serial arrangement of change room, airlock, shower room, airlock, and equipment room. Provide adequately sized PDF to accommodate the number of employees scheduled for the project. The center chamber of the five chambers PDF shall be fitted with as many portable walk through shower stalls as necessary so that all employees will be able to go through the entire decontamination procedure within 15 minutes. Construct PDF of opaque or colored polyethylene for privacy. Construct PDF so that it will not allow for parallel routes of exit without showering. The PDF shall be constructed and arranged as follows:

1. Changing Room of PDF: The changing room of the PDF must be physically and visually separated from the rest of the building for the purpose of worker changing into protective clothing or dressing into street clothing. Construct using 6-mil minimum thickness polyethylene sheeting to provide an airtight room. Provide a minimum of two, three feet wide

flapped doorways constructed from sheet polyethylene. One doorway shall be from the outside and one from the airlock. Maintain floor of this room dry and clean at all times. Do not allow overflow from shower into this room. Damp wipe all surfaces twice after each shift change with a disinfectant solution. Provide in this room adequate supply of disposable bath towels and disposable protective clothing. Provide a portable Type "ABC" fire extinguisher in this room as per NFPA Standard 10. Require all persons to remove all street clothes in this room dress in disposable protective clothes. Ensure that any person entering this room will do so either from the outside with street clothes or from the showers completely naked and thoroughly washed.

2. Airlock separating changing room and shower room: Construct airlock using 6-mil polyethylene sheeting. Provide a minimum of two, three feet wide flapped doorways. One doorway shall be to the changing room the other doorway will be to the shower room. The airlock shall be a minimum of three feet in length.
3. Shower Room of PDF: The shower room of the PDF provides a completely water tight operational compartment to be used for transit of all persons exiting the work area from the changing room, or for showering by all persons headed out of the work area after undressing in the equipment room. Construct each stall and shower walls so that water running down the walls will drip into the pan. Install a freely draining smooth wooden floor on top of shower pan. Separate this room from the rest of the building and the adjacent tool and changing rooms with airtight walls fabricated of a minimum 6 mil polyethylene. Provide splash-proof entrances to the adjacent airlocks. Provide showerheads and controls, temporary cold and hot water and drainage, soap dish and continuous supply of soap and maintain sanitary conditions. Arrange controls so that a single individual can shower without assistance. Provide flexible hoses showerhead and a hose bib. Pump wastewater to drain or storage for use as amended water. If pumped to drain, provide 20 micron and 5 micron wastewater filters in line to drain. Change filters daily. Locate filters inside shower so that water lost during filter changes drains into shower pan. Hose down all surfaces of the showers room after each shift and clean debris from the shower pan. Dispose off residue as asbestos contaminated waste.
4. Airlock Separating Shower Room and Equipment Room: Construct airlock using 6-mil polyethylene sheeting. Provide a minimum of two, three feet wide flapped doorways. One doorway shall be to the shower room the other doorway will be to the equipment room. The airlock shall be minimum of three feet in length.
5. Equipment Room of PDF: The equipment room of the PDF provides a completely airtight compartment to be used to store work equipment, reusable footwear and warm clothing and as a transit and change station. Separate this room from the work area by a minimum 3' wide flap door of 6-mil polyethylene sheeting. Separate this room from the airlock, the work area and other rooms with airtight walls and ceiling constructed of a minimum 6-mil polyethylene sheeting. Damp wipe clean all surfaces of the equipment room after each shift change. Provide an additional floor layer of 6-mil clear polyethylene sheeting per shift change and remove contaminated layer after each shift. Provide temporary electrical sub-panel in this room to accommodate any power tools and equipment in work area. Provide benches for workers to sit.

1.37 EQUIPMENT DECONTAMINATION FACILITIES (EDF)

- A. Provide an EDF consisting of a serial arrangement of washroom, holding room and clean room for removal of equipment and material from work area. Do not allow entry or exit of people through EDF for other than emergencies. Clean debris and residue from inside EDF on a daily basis. Wipe down or hose down all surfaces after each shift and clean shower pan from debris.
- B. Wash Down Station: Provide an enclosed shower unit located in work area just outside wash Room as an equipment, bag and container cleaning station.
- C. Wash Room: Provide washroom for cleaning of bagged or containerized asbestos-containing waste materials passed from the work area. Construct washroom of 2x4 wood framing and flame-resistant polyethylene sheeting, at least 6 mil in thickness. Locate room so that packaged materials, after being wiped clean can be passed to the Holding Room. Separate this room from the work area by a single flap of 6-mil polyethylene sheeting.
- D. Holding Room: Provide Holding Room as a drop location for bagged asbestos-containing materials passed from the Wash Room. Construct Holding Room of 2x4 wood framing and flame-resistant polyethylene sheeting, at least 6 mil in thickness and located so that bagged materials cannot be passed from the Wash Room through the Holding Room to the Clean Room. Separate this room from the adjacent rooms by double flaps fabricated from +/- 1/16 inch thick single ply rubber roofing material either EDPM (ethylene-propylene or Neoprene).
- E. Clean Room: Provide a clean room to isolate the Holding Room from the building exterior. Construct Clean Room of 2x4 wood framing and polyethylene sheeting, at least 6 mil thickness to provide access to the Holding Room from the building exterior. Separate this room from the exterior by a single flap of 6-mil polyethylene sheeting. When a pressure differential system is selected, a rigid enclosure separation between the EDF clean room and adjacent areas will be constructed.

1.38 EQUIPMENT DECONTAMINATION PROCEDURES

At wash down station, thoroughly wet-clean contaminated equipment and/or sealed polyethylene bags and pass into wash room. When passing equipment and/or containers into the washroom, close all doorways of the EDF, other than the doorway between the wash down station and the washroom. Keep all outside personnel clear of the EDF. Once inside the washroom, wet-clean the bags and/or equipment. When cleaning is complete pass items into Holding Room. Close all doorways except the doorway between the holding room and the clean room. Workers from the building exterior shall enter Holding Room area and remove decontaminated equipment and/or containers for disposal.

Require these workers to wear full protective clothing and appropriate respiratory protection. At no time is a worker from an uncontaminated area allowed to enter the enclosure when a removal worker is inside.

1.39 NEGATIVE PRESSURE FILTRATION SYSTEMS

Provide enough HEPA filtered negative air units to completely exchange air in the work area 4 times/hour. Demonstrate the number of units needed per work area for 4 room air changes by calculating the volume flow rate (cfm) delivered by each unit under 2" pressure drop across filters. Provide at least one standby unit in the event of a machine failure or emergency such as contamination in surrounding non-work area. When a pressure differential system is selected provide enough HEPA filtration units to filter and circulate the air in the work area at a rate of 4 room air changes per hour.

1.40 NEGATIVE AIR MACHINES (HEPA UNITS)

- A. Cabinet: Shall be constructed of steel or other durable materials able to withstand damage from rough handling and transportation. Width of the cabinet should be less than 30 inches to fit through standard-size doorways. Cabinet shall be factory sealed to prevent asbestos-containing dusts from being released during use, transport, or maintenance. Access to and replacement of all filters shall be from intake end. Unit shall be mounted on casters or wheels.
- B. Fans: Rate capacity of fan according to usable air-moving capacity under actual operating conditions. Use centrifugal-type fan.
- C. Final Filters: The final filter shall be the HEPA type. The filter media (folded into closely pleated panels) must be completely sealed on all edges with a structurally rigid frame:
- D. Instrumentation: Each unit shall be equipped with a Magnahelic gauge or manometer to measure the pressure drop across filters and to indicate when filters have become loaded and need to be changed. A table indicating the useable air-handling capacity for various static pressure readings on the Magnahelic gauge shall be affixed near the gauge for reference, or the Magnahelic reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) air delivery calibration at that point. Provide units equipped with an elapsed time meter to show the total accumulated hours of operation.
- E. Safety and Warning Devices: Provide an electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter. Units shall be equipped with automatic shutdown system to stop fan in the event of a major rupture in the HEPA filter or blocked air discharge. Warning lights are required to indicated normal operation, too high a pressure drop across the filters (i.e., filter overloading), and too low of a pressure drop (i.e., major rupture in HEPA filter or obstructed discharge).
- F. Electrical components shall be approved by Underwriter's Laboratories (UL) and the National Electrical Manufacturers Association (NEMA). Each unit shall be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet shall be grounded.

1.41 MONITORING

Continuously monitor and record the pressure differential between the work area and the building outside of the work area.

1.42 SUPPLEMENTAL MAKEUP AIR INLETS

Provide where required for proper airflow through the workspace by making openings in the plastic sheeting to allow air from outside the building into the work area. Locate auxiliary makeup air inlets as far as possible from the exhaust unit (e.g., on an opposite wall), off the floor (preferably near the ceiling), and away from barriers that separate the work area from occupied clean areas. Cover with flaps to reseal automatically if the negative pressure system should shut down for any reason. Spray flap and around opening with spray adhesive so that flap seals if it closes.

1.43 TESTING THE SYSTEM

Test negative pressure system before any ACM is wetted or removed. After the work area has been prepared, the decontamination facility set up, and the exhaust unit(s) installed, start the unit(s) (one at a time). Demonstrate operation and testing of negative pressure system to the Owner's Representative.

1.44 DEMONSTRATION OF NEGATIVE AIR SYSTEM OPERATION

A. Demonstrate the operation of the negative pressure system to the I.H. to include, but not be limited to, the following:

1. Plastic barriers and sheeting move lightly in toward work area.
2. Curtain of decontamination units move lightly in toward work area. Demonstrate pressure differential system will maintain -0.02" of H₂O.
3. Noticeable movement of air through the decontamination unit. Use smoke tube to demonstrate air movement from Clean Room to Shower Room, from Shower Room to Equipment Room, and from Equipment Room to Work Area.
4. Positive motion of air across all areas in which work is to be performed. Use smoke tubes to demonstrate air motion. Use a differential pressure meter or manometer to demonstrate a pressure difference of at least 0.02 inches of water across every barrier separating the Work Area from the balance of the building or outside. Modify the negative pressure system as necessary to successfully demonstrate the above.

1.45 USE OF SYSTEM DURING ABATEMENT OPERATIONS

Start exhaust units before beginning work (before any ACM is disturbed). After abatement work has begun, run units continuously to maintain a constant negative pressure until decontamination of the work area is complete. Do not turn off units at the end of the work shift or when abatement operations temporarily stop. Do not shut down negative air system during abatement operations procedures, unless authorized by the Owner's Representative in writing. Start abatement work at a location farthest from the exhaust units and proceed toward them. If an electric power failure occurs, immediately stop all removal work and do not resume until power is restored and all exhaust units are operating again. At completion of abatement work, allow exhaust units to run as specified under this section, to remove airborne fibers that may have been generated during abatement work and cleanup and to purge the work area with clean makeup air. Units may be required to run after decontamination, if dry or only partially wetted asbestos material was encountered during any abatement work.

1.46 DISMANTLING THE SYSTEM

When a final inspection and the results of the final air tests indicate that the area has been decontaminated, exhaust units may be removed from the work area. Before removal from the work area, remove and properly dispose of pre-filters, and seal intake to the machine with 6 mil polyethylene to prevent environmental contamination from the pre-filters.

1.47 CONTAINMENT BARRIERS AND COVERINGS OF WORK AREA

Seal off perimeter of work area to completely isolate abatement areas and to contain all airborne asbestos contamination created by abatement work. Cover all windows, doors, ducts, vents and any other surface that acts as a route of entry/exit into the work area. These are considered critical barriers and must be maintained at all times. Should the area beyond the seal off limits become contaminated as a consequence of the work, enclose those areas in accordance with procedures described in this section at no additional cost.

1.48 PREPARATION PRIOR TO SEALING OFF

Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to erection of temporary plastic sheeting enclosure. Remove all uncontaminated removable furniture, equipment, and/or supplies from the work area before commencing work, or completely cover with two layers of polyethylene sheeting, at least 6 mil in thickness, securely taped in place with duct tape. Such furniture and equipment shall be considered outside the work area unless covering plastic or seal is breached. Disable ventilating systems or any other system bringing air into or out of the work area. Disable system utilizing positive means that will prevent accidental premature restarting of equipment, i.e., disconnecting wires, removing circuit breakers, lockable switch, etc.

1.49 CONTROL ACCESS TO WORK AREA

Permit access to the work area only through the PDF. All other means of access shall be closed off and sealed and warning signs displayed on the clean side of the sealed access. Where the work area is immediately adjacent to occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil in thickness so that the work procedures are not visible to building occupants. Where the area adjacent to the work area is accessible to the public, construct a solid barrier on the public side of the sheeting to protect the sheeting. Construct barrier with nominal 2 X 4 wood or metal studs 16" on center, securely anchored to prevent movement, covered with minimum 1/4" thick hardboard, 1/2" gypsum wallboard or 1/2" plywood. Provide warning signs at each visual and physical barrier per OSHA requirements. Do not proceed with any such alternatives without prior written approval by the Owner

1.50 CRITICAL BARRIERS

Completely separate the work area from other portion of the building, with sheet plastic barriers at least 6 mil in thickness, or by sealing with duct tape. Individually seal all ventilation openings (supply and exhaust), lighting fixtures, doorways, windows, convectors and speakers, and other openings into the work area with duct tape alone or with polyethylene sheeting at least 6 mil in thickness, taped securely in place with duct tape. Maintain seal until all work including project decontamination is completed. Take care in sealing off lighting fixtures to avoid melting or burning of sheeting. Provide sheet plastic barriers at least 6 mil in thickness as required to completely seal openings from the work area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape or spray cement.

1.51 PRIMARY BARRIERS

Clean all contaminated furniture, equipment and supplies with HEPA vacuum cleaner or wet cleaning, as specified in this Section, prior to being moved or covered. Clean all surfaces in work area with HEPA vacuum or by wet wiping prior to the installation of any sheet plastic. Enclose work area with two layers of plastic sheeting on floor and one layer on walls. Cover floor of work area with 2 individual layers of clear flame-resistant polyethylene sheeting, each at least 6 mil in thickness, turn up walls at least 12 inches to form a sharp right angle bend at junction of floor and wall so that there is no radius which could be stepped on causing the wall attachment to be pulled loose. Both spray-glue and duct tape all seams in floor coverings. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently from bottom layer. Remove all electrical and mechanical items, such as lighting fixtures, clocks, diffusers, registers, etc., which cover any part of the surface to be worked on with the work. Cover all walls in work area including critical sheet plastic barriers with one layer of flame resistant polyethylene sheeting, at least 6 mil in thickness, mechanically supported and sealed with duct tape or spray-glue in the same manner as "Critical Barrier" sheet plastic barriers. Tape all joints with duct tape.

1.52 SECONDARY BARRIERS

Secondary layer of plastic as a drop cloth to protect the primary layer from debris generated by the

asbestos abatement work is specified elsewhere in this section.

1.53 EXTENSION OF WORK AREA

If the enclosure barrier is breached in any manner that could allow the passage of asbestos debris or airborne fibers, then where possible, add affected area to the work area. Enclose contaminated area as described by this Section of the specification and decontaminate. If contaminated area cannot be added to work area, decontamination measures shall start immediately after contamination is discovered and work will stop in work area. Decontamination procedures will continue until exposure returns to background levels.

1.54 MONITORING, INSPECTION AND TESTING

- A. Perform throughout abatement work monitoring, inspection and testing inside the work area in accordance with OSHA requirements and these specifications. The Owner will employ an independent industrial hygienist consultant to perform various services on their behalf. The consultant will perform the necessary monitoring, inspection, testing and other support services to ensure that work proceeds in accordance with these specifications, that the abated areas or abated buildings have been successfully decontaminated. The work of the consultant in no way relieves the abatement contractor from his responsibility to perform his work in accordance with contract documents, to perform continuous inspection, monitoring and testing for the safety of his employees, and to perform other such services as specified in this section. The cost of the consultant and his services will be born by the Owner except for repeated final inspection and testing that may be required due to unsatisfactory initial results. **These repeated final inspections and testing, if required, will be paid for by the contractor.**
- B. If fibers counted by the consultant during abatement work, either inside or outside the work area utilizing NIOSH 7400 air-monitoring methods exceed the specified respective limits, then contractor shall stop work. Asbestos contractor may request confirmation of above results by analysis of samples with TEM. Request must be in writing and submitted to the Owner's Representative. **Cost for the confirmation of results will be born by the contractor for both the collection and analysis of samples and for the time delay that may result for this confirmation.**

1.55 OUTLINE SCOPE OF SERVICES OF THE OWNER'S REPRESENTATIVE

- A. The purpose of the work of the consultant is to: Assure quality, resolve problems, and prevent the spread of contamination beyond the work area. In addition, the consultant's work includes performance of final inspection and testing to determine whether a space or a building has been adequately decontaminated. All air monitoring is to be done utilizing PCM with an option to utilize TEM after approval from the Owner's Representative. The consultant will perform the following tasks:
 - 1. Establish background levels a day before abatement work will start. This will include taking

background samples (at least 5) and retaining samples for possible TEM analysis.

2. Perform continuous air monitoring, inspection and testing outside the work during actual abatement work area to detect any faults in the work area isolation and any adverse impact of surroundings from work area activities.
 3. Perform unannounced site visits to spot-check overall compliance of work with contract documents. These visits may include any inspection, monitoring and testing inside and outside the work area and all aspects of operation except personnel monitoring.
 4. Provide support to the Owner such as evaluation of submittals from the abatement contractor, resolution of unforeseen developments in abatement work, etc.
 5. Perform final inspection and testing of a decontaminated area or building at the conclusion of the abatement and clean-up work to certify compliance with specified decontamination standards.
 6. Issue certificate of decontamination for each area or building and project report.
- B. All data, inspection results and testing results generated by the Owner's Representative will be available to the contractor for information and consideration. Contractor shall provide cooperation and support to the Owner's Representative for efficient and smooth performance of their work.
- C. Monitoring and inspection results of the Owner's Representative will be used by the Owner to issue any stop removal orders to the contractor during abatement work and to accept or reject area or a building as decontaminated. The Owner's Representative will make available to the contractor the plan for sample collection and analysis for continuous monitoring outside the work areas and the

plan of final inspection and testing for each space or building prior to executing each plan. Plan will include location for samples, name and qualification of person taking samples, whether on site analysis and/or lab analysis will be utilized, methodology of analysis, lab information and qualifications of on-site analyst.

1.56 MONITORING, INSPECTION AND TESTING BY ABATEMENT CONTRACTOR

The contractor is responsible for managing all monitoring, inspection and testing required by the OSHA regulation 29 CFR 1926.1101, and for continuous monitoring of all sub-systems and procedures affecting the safety of the contractor's employees. Safety of the contractor's employees a an I.H. technician, who shall be trained and shall have specialized field experience in air sampling. Keep a daily log of personnel and area samples taken and analyzed and make such log available to the Owner's Representative. Log shall contain information on the persons sampled, the date of sample collection the time of sample start and finish, flow rate, sample volume and fibers/cc. Log shall also contain information on area samples showing location of sample, date sample was taken, start and finish times for sample, flow rate, volume and fibers/cc. Take and analyze personnel samples for at least 25% of the workers in each shift, but not less than two, and one area sample per

1000 sq. ft. of work space per shift but not less than one per room where active abatement takes place.

1.57 STANDARD OPERATING PROCEDURES (SOP)

- A. Asbestos Contractor shall have established standard operating procedures (SOP) in printed form and loose-leaf folder consisting of simplified text, diagrams, sketches and pictures that establish and explains clearly the ways and procedures to be followed during all phases of work by his employees. The SOP must be modified as necessary to address any specific requirements of the project and shall be submitted for review and approval prior to the start of any abatement work. The minimum topics and areas to be covered by the SOP are:
1. Minimum Personnel Qualifications.
 2. Contingency Plans and Arrangements.
 3. Security and Safety in the Workplace.
 4. Respiratory Protection Systems and Training.
 5. Worker Protection, Medical Examinations, Record keeping, Protective Clothing, Entering and Exiting Procedures.
 6. Work Area Limitations.
 7. Decontamination Facilities, PDF and EDF.
 8. Negative Pressure Systems.
 9. Containment Barriers and Coverings of Work Area.
 10. Monitoring, Inspection and Testing.
 11. Removal of ACM and ACE.
 12. Project Decontamination.
 13. Encapsulation of Procedures.
 14. Work Area Clearance.
 15. Disposal of ACM and ACE Waste
 16. Project Closeout.

1.58 SUBMITTALS

- A. Submit to the Owner's Representative a minimum of 10 days prior to commencement of work for review and approval 5 copies of the following:
1. Detailed work schedule for the entire project reflecting contract documents and the phasing and schedule requirement.
 2. Staff organization chart showing all persons to be employed in what capacity. Their identification and qualifications, the "Certificate of Worker's Training" and the "Affidavit of Medical Surveillance and Respiratory Protection". Provide evidence of qualifications training and licensing.
 3. The specifics of the material and equipment to be used for this project with brand names, model numbers, performance characteristics, pictures or diagrams, and number available, for the following:
 - a. Negative pressure air units, HEPA vacuums, air monitoring pumps and calibration devices, pressure differential monitor/recorder and emergency power systems.
 - b. Wastewater filtration system, shower stall and containment barriers.
 - c. Encapsulant sprayers, low-pressure water sprayers, bridging encapsulant, glove bags, removal tools and fire extinguishers.
 - d. Respirators and protective clothing.
 4. Specific notifications and arrangements made with regulatory entities having jurisdiction and the specific contingency arrangements made with local health, fire and safety authorities and any other notifications and arrangements required by the specifications.
 5. Name, location and phone number of the landfill, proof that landfill is approved for ACM disposal, the type of trucks for waste transportation, and if a waste disposal sub-contractor will be used, provide name, address and phone number of sub-contractor.
 6. Name, location and qualification of the analytical laboratory to be used for the analysis of samples required to meet OSHA regulations 29 CFR 1926.1101.
 7. Qualifications Verification: Submit the following evidence of qualifications. Ensure that all references are current and verifiable by phone numbers provided and documentation submitted.
 - a. List project experience for the past 5 years, the top projects most similar to this project. Include the project name, start and completion dates, reference name and telephone

- number, the contract cost and other pertinent information.
- b. List projects halted by an Owner, A/E, I.H. or regulatory agencies within the past 5 years. List the reason for the work stoppage, date corrective actions reference names and telephone numbers.
 - c. List asbestos abatement citations, penalties, damages paid and legal actions taken against the company in last five years. Provide full references for easy verification.
8. Personnel:
- a. Superintendent and Foremen - Provide copies of training certificates, years of abatement experience, years of abatement experience as superintendent and as foreman, current medical exams and respiratory fit test documentation.
 - b. Laborers - Provide copies of training certificates, current medical exams and respiratory fit tests.
9. Licenses, Insurance, Standard Operating Procedure:
- a. Provide copies of current licenses from regulatory agencies.
 - b. Provide copies of certificates of insurance.
 - c. Provide copies of the following: information on who provides training and how often, who provides medical surveillance and how often, how air monitoring executed and list references of independent labs and I.H.'s familiar with your air monitoring and your standard operating procedure.
 - d. Provide copies of monitoring results of five referenced projects listed under in Minimum Qualification section. Describe analytical methods used on these projects.
10. ENCAPSULANTS
1. Submit before start of work product data for surfactants and/or removal Encapsulants, instructions for use and recommendations of manufacturer and data substantiating compliance with requirements.
 2. Submit certification from manufacturer that the wetting product will wet ACM as required by NESHAP's 40 CFR 61, Subpart M.
 3. Submit the material safety data sheet in accordance with OSHA Standard 29 CFR 1910.1200, for each encapsulant and any other hazardous substance (as defined CFR1910.1200).

1.59 SUBMITTALS DURING ABATEMENT

Maintain a daily log at the job site documenting the dates and times of the following: Meetings, purpose, attendees and brief discussion; all persons entering/exiting work area; special or unusual events, such as barrier breaching, equipment failures, emergencies and any cause for stop of work; air monitoring tests and test results; submit complete daily log to Owner's Representative.

1.60 SUBMITTALS AT COMPLETION OF ABATEMENT

The contractor shall submit a project report consisting of the daily log book and the documentation of events during abatement, waste disposal manifests and receipts signed by the operator of licensed landfill, personal air sampling records, and certification that asbestos was abated according to applicable regulations.

PART 2 - PRODUCTS

2.01 ASBESTOS ABATEMENT PRODUCTS

- A. The list of required equipment and materials will include, but is not necessarily limited to the following:
1. Respirators: Provide respiratory protection in accordance with OSHA Regulation 29 CFR 1926.1101 and ANSI Z88.2-1980. No employee or visitor shall enter the area without this protection until all visible asbestos has been removed from this area. Employees or visitors shall wear this type respirator. Respirators shall be NIOSH/MSHA approved.
 2. Protective Clothing
 3. Recyclable protective clothing shall be 1-piece with fully closable openings, integrated plastic b
 4. Wetting Agents - The asbestos material will be sprayed with water containing an additive to enhance penetration. The additive, or wetting agent, will be polyoxethylene at a concentration of one (1) ounce per five (5) gallons of water. A fine spray of this solution must be applied to prevent fiber disturbance preceding the removal of the asbestos material. The asbestos will be sufficiently saturated to prevent emission of airborne fibers in excess of the exposure limits prescribed in the current OSHA standards referenced in these specifications.
 5. Polyethylene sheeting: Six (6) mills, for vertical protection (walls, doors, and windows) and for all other uses (floors, fixed equipment, HVAC supply and return openings).
 6. Polyethylene bags (with warning labels) 6-mil (.006") minimum for disposal. All asbestos that is removed shall be double bagged.
 7. Tape: High quality vinyl or fabric dust tape.
 8. Negative Pressure Filtration Equipment: Air movement and filtering equipment equipped with HEPA filters rated at 99.97% removal down to 0.3 microns, and of sufficient capacity to provide a minimum of four (4) air changes per hour for each active work area.
 9. Airless Spray Equipment: Electric airless spray equipment for saturating and mist fiber control. Low pressure (500 psi) equipment must be available on-site and utilized as required.
 10. Vacuum: HEPA rated for surface cleaning and housekeeping. Hand operated and power tools such as, but not limited to, saws, scorers, abrasive wheels and drills should be provided with local exhaust ventilation systems with HEPA filters.
 11. Hand tools: Brooms, plastic shovels, scrapers, brushes, etc., in sufficient quantity to ensure

the appropriate level of housekeeping.

12. Water Filtration System: Shower and contaminated water filtration system.
13. GFI Equipment: All electrical connectors in the work area must be through "ground fault" protected.
14. Flooring Removal Machine: Infra-red heat unit with HEPA filtration/purification system outlets/circuits
15. Shot Blasting Machine: Used for adhesive removal - a dust free, self-contained surface preparation system for use on concrete floors, consisting of a shot blasting device utilizing steel abrasive shot specially sized for adhesive removal and a separate dust collector vacuum device equipped with a HEPA filtration system. Debris shall be transferred directly into DOT H-17, 55-gallon drums for disposal as asbestos waste, with no transfer to other disposal containers required.
16. Glove Bags: Glove bags if used on this project are Asbestos Control Technology ProfoBag, or approved equal.
17. Penetrating Encapsulant: Penetrating encapsulants to be used on this project are International Cellulose Corporation SK-13 Asbestos Encapsulant, International Protective Coatings Corporation Serpiflex Shield, Fiberlock Technology ABC Asbestos Binding Compound Concentrate, and others listed as acceptable in the Environmental Protection Agency - Battelle Laboratory Encapsulant Study, or approved equal.
18. Bridging Encapsulant: Bridging encapsulants to be used on this project are American Coatings Corporation Cable Coating 2B, Decadex Laboratories Firecheck, Fiberlock Technology ABC Asbestos Binding Compound Concentrate, or approved equal.

2.02 PERSONNEL PROTECTION

- A. Personnel protection is required for laborers, mechanics, supervision and visitors at the work site during the set-up and abatement operations
- B. Each worker shall be supplied with a minimum of two (2) complete protective work clothes and respirator filter changes per day for the complete duration of the project. Hard hats are required which meet ANSI Z-89.1 standards. Safety toe footwear is to be worn underneath the disposable or recyclable shoe covers and must meet the requirements and specifications in ANSI Z-41-1. Eye wear and face protection must meet the standards and specifications of ANSI Z-87.1.
- C. In addition to sets of protective work clothes for workers, the Contractor shall have on hand two (2) additional sets of disposable or recyclable work clothes, per day and respirators for personnel who are authorized to inspect the work site. Hard hats are required which meet ANSI Z-89.1 standards. Safety toe footwear is to be worn underneath the disposable or recyclable shoe covers and must meet

the requirements and specifications in ANSI Z-41.1. Eye wear and face protection must meet the standards and specifications of ANSA Z-87.1.

- D. Respirators approved for asbestos use and laborers and mechanics as a minimum will wear protective work clothes during set-up operations (plastic draping, light-fixture dropping or removal, etc.).
- E. All personnel in the active work area will wear appropriate respirators.
- F. Upon leaving the active work area, filters will be discarded cartridges removed and respirators cleaned in disinfectant solution and clean water rinse.
- G. Clean respirators will be stored in plastic bags when not in use.
- H. Respirators will be inspected daily for broken, missing, or deteriorated parts.

2.03 SUBMITTALS

- A. Contractor shall provide five (5) copies of documents describing the proposed equipment and materials for this project to the Owner's Representative Submittals shall include descriptions and specifications of proposed equipment and materials and material safety data sheets for all chemicals, solvents, glues, and encapsulants.
- B. The Owner's Representative will make suitable recommendations to the Owner regarding the use of such material and equipment on this project.

PART 3 - EXECUTION

3.01 PRE-ABATEMENT INSPECTION AND PREPARATIONS

A. Prior to beginning any work on the containment barriers, the contractor will:

1. Ensure that all furniture, machinery, equipment, curtains, drapes, blinds and other movable objects which the General Contractor and Owner is bound to remove from the work area have been removed or protected.
2. Ensure that preabatement demolition has been completed for each work area prior to abatement work.
3. Shut down and seal off all heating, cooling, ventilating or other air handling systems serving the work area. The environment of the work area shall be completely isolated from all other airflows in the building. Owner's Representative will monitor shutdown.
4. Shut down all electrical circuits, which pose a potential hazard on the job. Exact electrical arrangements will be tailored to the particular space and systems involved. All electrical circuits will be turned off at the box outside the removal area, not just the wall switch. Potential for electrical shock is a major threat to life in a work area where large amounts of water will be sprayed on ceilings, conduits, lighting fixtures and other electrical items. Electrical lines, which are used to power work lights and equipment will conform to all electrical safety standards and will be protected by a ground fault interrupter.

3.02 PRE-ABATEMENT CONSTRUCTION AND OPERATIONS

Perform all preparatory work for each work area. Execute the preparatory work in accordance with this specification. Upon satisfactory inspection of the installation and systems and satisfactory demonstration of operations the Owner's Representative will notify the contractor in writing to proceed with abatement work.

3.03 REMOVAL OF ACM AND ACE

Use amended water for wetting of ACM prior to removal. A removal encapsulant may be used instead of amended water with the written approval from the Owner's Representative.

3.04 SECONDARY BARRIER AND WALKWAYS

Install walkways with 6 mil black plastic sheeting between active removal areas and decontamination facilities (PDF and EDF) to protect primary layer from track material. Install walkways at the beginning of, and remove at the end of each work shift.

3.05 REMOVAL OF ASBESTOS- CONTAINING MATERIALS

- A. Mix surfactant with water in accordance with the dilution ratios specified herein for periodic spray of fine mist throughout active work area.
- B. Using a fine spray, thoroughly saturate the material to be removed. Perforate or carefully separate, using wet methods, an outer covering that is painted or jacketed in order to allow penetration and wetting of the material. Where necessary, carefully remove covering while wetting to minimize fiber release.
- C. Absorb any excess water on the floor with disposable towels or mops.
- D. Remove the saturated asbestos material in small sections. As it is removed, pack the material into properly, labeled, sealed double bags of 6 mil minimum. Material shall not be allowed to dry out prior to insertion into the bags.
- E. Pack saturated materials into two 6 mil disposal bags and seal with duct tape.
- F. Using the floor squeegee, push the liquefied mastic from one section to the next as removal progresses.

3.06 LOCK-BACK ENCAPSULATION

- A. Lock-back encapsulation is an integral part of asbestos abatement. At the conclusion of removal and before the removal of primary barriers, all surfaces associated insulation removal shall be coated with a lock-back encapsulation.
- B. Apply encapsulant in strict accordance with the manufacture's instruction with an airless spray gun or bug sprayer.

3.07 DISPOSAL OF ACM AND ACM WASTE MATERIAL

Dispose friable ACM and debris, which is packaged in accordance with these specifications at the approved landfill. Dispose of non-friable ACM in accordance with the applicable regulations. Carefully load containerized waste on sealed trucks for transport. Ensure that unauthorized persons do not have access to the material outside of the work area. Take bags from the work area directly through the EDF process to a sealed truck.

3.08 PROJECT DECONTAMINATION

- A. If the asbestos abatement work is in a space that is uncontaminated before start of the work, the decontamination procedure is a two step procedure; two cleanings of the primary barrier plastic to remove contamination, thus preventing contamination of the building when the work area isolation barriers are removed
- B. The work of decontamination includes the decontamination of the air within the work area and the decontamination and removal of temporary facilities installed prior to abatement work including Primary and Critical Barriers, Decontamination Facilities (PDF and EDF) and Negative Pressure Systems. The work of decontamination includes the cleaning, and decontamination of all surfaces (ceiling, walls, and floor) of the Work Area, and all furniture or equipment in the Work Area.
- C. Before decontamination work starts, all ACM and ACE from the work area shall be removed, all waste collected and removed, and the secondary barrier of polyethylene sheeting removed, (where applicable) and disposed of along with any gross debris generated by the work. At the start of work for decontamination, the following will be in place:
 - 1. Primary barrier consisting of two layers of polyethylene sheeting on floor and one layer on walls (where applicable).
 - 2. Critical barrier, which forms the sole barrier between the work area and other portions of the building or the outside.
 - 3. Critical barrier sheeting over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers and other openings.
 - 4. Decontamination facilities for personnel and equipment in operating condition and negative pressure system in operation (where applicable).

3.09 FIRST CLEANING

Carry out a first cleaning of all surfaces of the work area including items of remaining sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping, and/or a HEPA filtered vacuum. Do not perform dry dusting or dry sweeping. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces. Remove all filters in air handling system(s) and dispose of as asbestos containing waste in accordance with requirements of these specifications. Wait 24 hours to allow negative air machines to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain negative pressure system in operation for the entire 24-hour period.

3.10 SECOND CLEANING

- A. Perform a thorough cleaning of all surfaces of the work area in the same manner as the first cleaning. Immediately following the second cleaning, remove all Primary Barrier sheeting and Equipment Decontamination Facilities, (where applicable) leaving only:
1. Critical barrier, which forms the sole barrier between the work area and other portions of the building or the outside.
 2. Critical barrier sheeting over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers and other openings.
 3. Decontamination facilities for personnel in operating condition.
 4. Negative pressure system in continuous operation.

3.11 FINAL INSPECTION AND TESTING

Notify Owner's Representative in advance for the performance of final inspection and testing. Final inspection will include the entire work area, the personnel decontamination facilities, all plastic sheeting, seals over ventilation openings, doorways, windows and other openings. If any debris, residue on surfaces, dust or other matter is detected the final cleaning shall be repeated. Dust samples may be collected and analyzed at the discretion of the consultant to confirm visual findings. When the area is visually clean the final testing will commence.

3.12 FINAL TESTING

After a satisfactory visual inspection the consultant will undertake the final testing. Air samples will be taken and analyzed in accordance with the procedures for Phase Contrast Microscopy (PCM). **Additional inspection and testing will be at the expense of the contractor.**

3.13 FINAL TESTING PROCEDURES

- A. Contractors Release Criteria: Work in an area is complete when the work area is visually clean and airborne fiber levels have been reduced to or below 0.01 f/cc as measured with PCM or the fiber concentration within the work area is less than 70.0 structures per square millimeter as measured by TEM.
- B. Final Clearance Sampling: To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, the Owner's Representative will secure samples and analyze them according to the following procedures:
1. Fibers Counted: "Fibers" referred to in this section shall be either all fibers regardless of composition as counted in the NIOSH 7400 methods, or asbestos fibers of any size as counted using TEM.
 2. Aggressive Sampling: All final air testing samples will be taken using aggressive sampling

techniques. Prior to final air sample collection, the exhaust from forced air equipment (leaf blower with at least 1 horsepower electric motor) will be swept against all walls, ceilings, floors, ledges and other surfaces in the room. This procedure will be continued for 5 minutes per 10,000 cubic feet of room volume. One 20-inch diameter fan per 10,000 cubic feet of room volume will be mounted in a central location at approximately 6 feet above floor, directed toward ceiling and operated at low speed for the entire period of sample collection. Air samples will be collected in areas subject to normal air circulation away from room corners, obstructed locations, and sites near windows, doors or vents. After air sampling pumps have been shut off, fans shall be shut off. The negative air system will continue to operate.

3.14 SCHEDULE OF AIR SAMPLES WITH PCM

The consultant will perform background, perimeter and work area samples during construction, and clearance samples. Background samples will be taken before work begins for a baseline measurement. The Owner's Representative will sample at a rate of one sample per 1000 sq. ft. of work area with a minimum of two area samples for small containment areas. NIOSH 7400 method will be utilized for background and sampling during construction.

3.15 LABORATORY TESTING FOR PCM

The services of a testing laboratory will be employed by the Owner to perform laboratory analysis of the air samples. A technician will be at the job site, and samples will be sent daily to the lab so that verbal reports on air samples can be obtained within 24 hours. A complete record, certified by the testing laboratory, of all air monitoring tests and results will be furnished to the Owner's Representative.

3.16 LABORATORY TESTING FOR TEM

Samples shall be sent to a qualified testing laboratory by overnight courier for analysis by TEM. Verbal results shall be available within 24 hours after receipt of sample by the laboratory. A complete record, certified by the testing laboratory, of all TEM results will be furnished to the Owner's Representative.

3.17 ABATEMENT CLOSEOUT AND CERTIFICATE OF COMPLIANCE

- A. At completion of abatement work, seal negative air machines with 6-mil polyethylene sheet and duct tape to form a tight seal at intake end before being moved from work area. Asbestos abatement work is complete upon meeting the work area clearance criteria and fulfilling the following:
 - 1. Remove all equipment, materials, and debris from the work site.

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2. Dispose of all asbestos containing waste material as specified elsewhere in this section
3. Repair or replace all interior finishes damaged during the course of asbestos abatement work.
4. Fulfill other project closeout requirements as specified elsewhere in this section.

END OF SECTION 02080