SECTION 02 82 13
ASBESTOS ABATEMENT
BASED ON DFD MASTER SPECIFICATION DATED 06/03/2016

PART 1 - GENERAL

SCOPE
Perform all operations in connection with asbestos abatement, encapsulation, removal and related work as shown on drawings and/or specified herein.

RELATED WORK
See City of Madison Special Provisions, Section D of the contract documents.

DESCRIPTION OF WORK;

Removal; The Contractor shall remove all asbestos related items as noted in the contract documents. In the event additional items ore quantities are found in the field the contractor shall notify the City Project Manager immediately and items shall also be removed under the contract.

Encapsulation; this section not used

Enclosure; this section not used

Contractor is responsible for Electrical work and permit as needed

Restoration: Refer to section 107.2 of the Special Provisions, Section D of the contract documents.

REFERENCES

General Reference:

All work under this contract shall be done in strict accordance with all applicable General and State regulations, standards and codes governing asbestos abatement and any other trade work done in conjunction with the abatement.

The most recent edition of any relevant regulation in force at the time of bid opening shall be in effect. Where conflict among the laws, rules, and regulations or with these specifications exists the most stringent requirements shall be utilized.

The Contractor shall make available, in the clean change area of the worker decontamination system, copies of this specification and all standards, regulations, and codes listed hereinafter.

Specific Reference:

Occupational Safety and Health Administration (OSHA):

Title 29 Code of Federal Regulations, Section 1910.134(d) - air Quality.

Title 29 Code of Federal Regulations, Section 1926.1101- Construction Industry, including the mandatory appendices;

Appendix A - OSHA Reference Method.

Appendix C - Qualitative and Quantitative Fit Testing Procedures.

Appendix D - Medical Questionnaires.

Appendix E - Interpretation and Classification of Chest Roentgenograms.

Nonmandatory appendices:

Appendix B - Detailed Procedures for Asbestos, Tremolite, Anthrophyllite, and Actinolite Sampling and Analysis.

Appendix F - Work Practices and Engineering Controls for Major Asbestos Removal, Renovation, and Demolition Operations.

Appendix G - Work Practices and Engineering Controls for Small Scale, Short Duration Asbestos Renovation and Maintenance Activities.

Appendix H - Substance Technical Information for Asbestos.

Appendix I - Medical Surveillance Guidelines for Asbestos, Tremolite, Anthrophyllite, and Actinolite.

Title 29 Code of Federal Regulations, Section 1926.59 - Hazard Communication Standard. Requires employers to inform their workers of the hazards of any chemicals used on the project and to train their employees in proper safeguards.

Environmental Protection Agency (EPA): Title 40 Code of Federal Regulations (CFR) Part 763 Subpart G - Asbestos Abatement Projects; worker Protection (effective March 27, 1987).

Environmental Protection Agency (EPA) Title 40 Code of Federal Regulations (CFR) Part 61 - National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision; Final Rule effective November 20, 1990.

Department of Health Services (H & SS) State of Wisconsin Administrative Rule, Chapter HSS 159, Asbestos Certification and Training.

Department of Natural Resources (DNR) State of Wisconsin Administrative Rule, Chapter NR 447, procedures for preventing emissions of particulate asbestos material to outside air, warning signs and waste disposal of asbestos materials.

Compressed Gas Association, Inc., New York, Pamphlet G-7, "Compressed Air for Human Respiration", and Specification G-7.1 "Commodity Specification for Air".

Department of Natural Resources (DNR) State of Wisconsin Administrative Rule Chapter NR 506, Landfill Operations Criteria for Disposal of Asbestos Containing Material.

QUALIFICATIONS

The prospective Contractor who is proposed to actually perform the asbestos abatement work, shall submit to the City of Madison Construction Manager the data hereinafter requested within ten (10) days after Bid Opening.

The proposed asbestos abatement Contractor will be awarded a Contract, only if data submitted is determined to be favorable in all instances, by the City of Madison Construction Manager, and the prospective Contractor further meets the qualifications requirements specified in the Instructions to Bidders.

The proposed asbestos abatement Contractor shall, if requested:

Demonstrate prior experience on asbestos abatement projects of similar nature and scope of that being bid, through the submission of letters of reference from building owners including the name, address, and telephone numbers of the contact persons who are specifically familiar with the referenced projects. At least three previous users of this service shall be submitted. Include descriptions of projects and records of all air monitoring data that was generated during the projects.

Submit a description of all major Asbestos Abatement Equipment owned by the prospective Contractor which is available for use on this project such as:

Respiratory protection equipment.

HEPA vacuum equipment.

Negative air pressure equipment.

Spray equipment for amended water.

Equipment used for shower facilities in decontamination enclosure system.

Submit a list of names, work responsibilities and evidence of certification for all employees that will be assigned to this project:

At least one firm principal, the firm's "competent person" and any other personnel performing supervisory duties must be certified by the Wisconsin Department of Health Services as having successfully completed a comprehensive 5-day course for Asbestos Abatement Contractors and Supervisors in conformance with Wisconsin Administrative Code DHS 159.

Contractor's employees who perform asbestos abatement activities must be certified by

the Wisconsin Department of Health Services as having successfully completed a

comprehensive 4-day course for Asbestos Abatement Workers in conformance with Wisconsin Administrative Code DHS 159.

DEFINITIONS

ACGIH: American Conference of Governmental Industrial Hygienists

AIHA: American Industrial Hygiene Association

Air Monitoring: The process of measuring the fiber content of a known volume of air collected during a specific period of time shall conform with Appendix A to OSHA 29 CFR 1926.1101 The procedure normally utilized for asbestos follows the NIOSH Standard Analytical Method 7400 for Asbestos in Air. For clearance air monitoring, electron microscopy methods may be utilized for lower detect ability limit and specific fiber identification.

Air Sampling Professional: The Professional contracted or employed by the Division to supervise and conduct air monitoring and analysis schemes. This individual shall not be affiliated in any way other than through this contact with the Contractor performing the abatement work.

ANSI: American National standards Institute

Asbestos: Means the asbestiform varieties of chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonite-grunerite); tremolite; anthrophyllite, and actinolite.

Asbestos Containing Material (ACM): Material composed of asbestos of any type and in an amount greater than 1%, either alone or mixed with other fibrous or nonfibrous materials.

Asbestos Containing Waste Material: Asbestos containing material or asbestos contaminated objects requiring disposal.

ASTM: American Society for Testing and Materials

Authorized Visitor: The Building Owner (and designated representatives) and any representative of a regulatory agency having jurisdiction over the project.

Certified Industrial Hygienist (CIH): An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.

Competent Person: Means an employee of the asbestos abatement contractor who is capable of identifying existing asbestos hazards in the workplace and who has the authority to take prompt corrective measures to eliminate them pursuant to OSHA 1926.1101(b).

Decontamination Enclosure: A decontamination system consisting of a clean room, a shower room, and an equipment room separated from each other and from the regulated area by airlocks. This system is used for all workers to enter and exit the regulated area and may also serve as equipment and waste pass out on small jobs.

Department of Natural Resources (DNR): A Wisconsin state agency that is responsible for enforcement of Chapter NR 447.

Encapsulation: The application of a bridging or penetrating liquid material to asbestos containing materials to control the release of asbestos fibers into the air. The bridging liquid material creates a membrane over the surface and the penetrating liquid material seeps through the surface and binds all components together.

Enclosure: The construction of an airtight, impermeable, permanent barrier around asbestos containing material to control the release of asbestos fibers into the air.

EPA: U. S. Environmental Protection Agency

Glovebag Technique: A method with limited applications for removing small amounts of friable asbestos-containing material from ducts, short piping runs, valves, joints, elbows, and other nonplanar surfaces in a noncontained (plasticized) regulated area. The glovebag is constructed and installed in such

a manner that it surrounds the object or material to be removed and contains all asbestos fibers released during the process.

HEPA Filter: A high efficiency particulate air filter capable of removing particles 0.3 microns in diameter with 99.97% efficiency.

HEPA Vacuum: A vacuum system equipped with HEPA filtration.

NESHAPS National Emission Standards for Hazardous Air Pollutants

OSHA: The Occupational Safety and Health Administration

Permissible Exposure Limits (PELS): No personnel associated with asbestos abatement work shall be exposed to an airborne concentration of asbestos in excess of the following limits, as determined by the method prescribed in Appendix A to OSHA 29 CFR 1926.1101, or by an equivalent method:

P.E.L. is 0.1 fiber per cubic centimeter of air as an eight (8) - hour time-weighted average.

Excursion Limit (EL) 1.0 fiber per cubic centimeter of air as averaged over a sampling period of thirty (30) minutes.

Regulated Area: An area identified by specific boundaries where airborne concentrations of asbestos exceed, or can reasonably be expected to exceed the P.E.L. and/or Excursion Limit. The regulated area may take the form of:

A temporary negative-pressure enclosure, or

An area specifically identified and segregated in any manner that minimizes the number of employees exposed to asbestos.

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

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

Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with water and afterwards thoroughly decontaminated or disposed of as asbestos contaminated waste.

SUBMITTALS AND NOTICES

The Contractor shall submit a completed Asbestos/Lead Abatement Certification (Form #DOA-4509) no later than the end of the seventh calendar day after the bid opening date.

Prior to Commencement of Work, Contractor shall:

File a "Notification of Demolition and/or Renovation Form 4500-113" with the parties named hereinafter, when required, at least 10 working days prior to commencement of demolition or renovation project involving any asbestos-containing material.

Air Management Asbestos Coordinator
Department of Natural Resources
P.O. Box 7921
Madison WI 53707-7921

File a "Asbestos Project Notification Form 00041" with the parties named hereinafter, when required, at least 2 working days prior to commencement of renovation project involving any asbestos-containing material.

Department of Health Services

Asbestos/Lead Section, Room 137
P.O Box 2659
Madison, WI 53701-2659

Submit the following documentation attached to completed form DOA-4523 prior to commencing work:

Manufacturer's information and MSDS for the mastic remover that the Contractor intends to use for floor tile mastic removal. Mastic remover shall be low odor and shall not contain known carcinogens.

A copy of the asbestos training certification card issued by Wisconsin Department of Health and Family Services pursuant to DHS 159 for all Contractor employees that will be working on the project.

Submit the following documentation at completion of the work:

Copies of all completed "Transportation and Disposal Manifest" forms for all asbestos waste materials removed from the regulated area during the abatement process.

Project Log per DHS 159.21(2)

Occupant Protection Plan per DHS 159.21(3).

During Abatement Activities, Contractor shall submit to the Owners Project Representative, if requested:

Shop drawings for layout and construction of decontamination enclosure systems and barriers for isolation of the regulated area as detailed in this specification and required by applicable regulations. If work is to be phased, a phasing schedule shall also be submitted.

Weekly (or as required) job progress reports detailing abatement activities. Include review of major problems and action taken, injury reports, equipment breakdown.
Logs documenting filter changes on respirators, HEPA vacuums, negative pressure ventilation units, local exhaust ventilation systems, and other engineering controls.

Results of bulk material analysis and air sampling data collected during the course of the abatement including OSHA compliance air monitoring results.

Results of materials testing conducted during the abatement for purposes of utilization during abatement activities (e. g., testing of encapsulant for depth of penetration, testing of materials for adherence to encapsulated surfaces).

Contractor shall post at the entrance to the regulated area a list containing the names, addresses, and telephone numbers of the Contractor, Fire Department and any other personnel who may be required to be contracted during abatement activities.

SITE SECURITY

Contractor shall be responsible for the security of the regulated area(s) during abatement operations in order to protect work efforts and equipment.

The regulated area shall be restricted to only authorized, trained, and protected personnel. These may include the Contractor's employees, employees of subcontractors, state representatives, and any other designated individuals. A list of authorized personnel shall be established prior to job start and posted in the clean room of the decontamination facility.

Contractor shall immediately decontaminate (if required) and evict any unauthorized individual entering the regulated area and notify the Construction Representative of action taken and identity of the unauthorized individual.

A log book shall be maintained in the clean room area of the decontamination system. Anyone who enters the regulated area must record name, affiliation, time in, and time out for each entry.

Access to the regulated area shall be through a single decontamination system located where shown on approved Shop Drawings. All other means of access (doors, windows, hallways, etc.) shall be blocked or locked so as to prevent entry to or exit from the regulated area. The only exceptions to this rule are the waste pass-out air lock which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits in case of fire or accident. Emergency exits shall not be locked from the inside, however, they shall be sealed with polyethylene sheeting and tape until needed.

EMERGENCY PLANNING

Written emergency plan shall be submitted through the Owners Project Representative and approved by the City of Madison Construction Manager prior to the initiation of abatement activities.

Emergency procedures shall be in written form and prominently posted in the clean change area and equipment room of the worker decontamination area. Everyone prior to entering the regulated area must read and sign these procedures to acknowledge receipt and understanding of work site layout, location of emergency exits and emergency procedures.

Emergency planning shall include notification of police, fire and emergency medical personnel of planned abatement activities, work schedule and layout of regulated area, particularly barriers that may affect response capabilities.

Emergency planning shall include considerations of fire, explosion, toxic atmospheres, electrical hazards, slips, trips and falls, confined spaces and heat related injury. Written procedures shall be developed and employee training in procedures shall be provided.

Employees shall be trained in evacuation procedures in the event of workplace emergencies under the following conditions:

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

For life threatening injury or illness, worker decontamination shall take least priority, after measures to stabilize the injured worker, remove the worker from the workplace and secure proper medical treatment.

Telephone numbers of all emergency response personnel shall be prominently posted in the clean change area and equipment room, along with the location of the nearest telephone.

PRECONSTRUCTION MEETING

The Contractor shall attend a preconstruction meeting to be conducted at a time and place designated by the Owners Project Representative. All parties having an active role in asbestos abatement will be in attendance.

The Contractor, Contractor's competent person and other supervisory personnel who will provide on-site direction of the abatement activities must attend.

At this meeting the Contractor shall provide all documentation as required by Article entitled: "Submittals and Notices," herein. In addition, the Contractor shall be prepared to provide detailed information concerning:

Preparation of regulated area.

Personal protective equipment including respiratory protection and protective clothing.

Employees who will participate in the project, including delineation of experience, training, certification, and assigned responsibilities during the project.

Decontamination procedures for personnel, regulated area and equipment.

Abatement methods and procedures to be utilized.

Required air monitoring procedures.

Procedures for handling and disposing of waste materials.

Procedures for final decontamination and cleanup.

A sequence of work and performance schedule.

Procedures for dealing with heat stress.

Emergency procedures.

Methods of adhering plastic sheeting to the surfaces to be covered.

DELIVERY, STORAGE AND HANDLING

Deliver all materials in the original packages, containers or bundles bearing the name of the manufacturer and the brand name.

Damaged, deteriorating or previously used materials shall not be used and shall be removed from the work site and disposed of properly.

PART 2 - PRODUCTS

MATERIALS

Polyethylene sheeting for walls and stationary objects shall be a minimum of four (4) mil thick. For floors and all other uses sheeting of at least six (6) mil thickness shall be used in widths selected to minimize the frequency of joints.

Polyethylene sheeting utilized for decontamination enclosure shall be opaque white or black in color.

Flame retardant polyethylene sheeting shall be utilized when working near heat sources.

Hardboard or plywood, minimum 1/4 inch thick shall be furnished to protect finished floor surfaces such as carpet or hardwood floors to prevent damage from scaffolds or falling objects. Such protection shall also be provided for polyethylene sheeting under the scaffold area if the material being removed has sharp projections which could readily puncture the enclosure material.

Disposal bags shall be of six (6) mil polyethylene, preprinted with labels as required by OSHA Requirement 29 CFR 1926.1101 (k) (8).

Disposal drums for transporting disposal bags shall be metal or fiberboard with locking ring tops.

Stick-on labels as per EPA, OSHA or DNR requirements for disposal containers.

Surfactant (Wetting Agent):

For use with materials containing asbestos identified as "Amosite", shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, mixed in a proportion of one (1) fluid ounce to five (5) gallons of water or as specified by manufacturer.

For all materials containing asbestos identified as "chrysotile", "crocidolite", or types other than Amosite, shall consist of soapy water mixed in a proportion of two (2) fluid ounces of liquid soap to five (5) gallons of water.

Where regulated area temperature may cause freezing of the amended water solution, the addition of ethylene glycol in amounts sufficient to prevent freezing is permitted.

Asbestos Removal Encapsulant (substitute for surfactant): In lieu of using a wetting agent in water to control airborne fibers, and asbestos removal encapsulant may be used. Products that meet these needs are: Serpiflex Shield manufactured by International Protective Coatings Carol 725 Carol Ave., Ocean, NJ 07710; and BWE 5000, by Better Working Environments, Inc., 3716 Scripps Way, Las Vegas, NV 89103; or an approved equal.

Encapsulating Material:

Bridging type encapsulant (for sealing masonry and concrete walls, barrier surfaces during cleanup phase and asbestos containing surfaces to remain in place) shall be capable of being applied with airless spray equipment, able to withstand light impact or abrasion without releasing fibers, water insoluble when cured, and must retain sufficient integrity after six (6) years to allow recoating. Products that meet these requirements are: Cable Coating No. 2B by American Coating Corporation and Decadix Fire Check by Pentagon Plastics.

Penetrating type encapsulant (for sealing scratch coat plaster, wood grounds and wood blocking which have been in contact with asbestos containing material and also exposed ends of pipe insulation) shall not be noxious or toxic to applicator or subsequent occupants, shall have high flame retardance and low toxic fume and smoke emission ratings, shall have some permeability to water vapor to prevent condensation accumulation. Acceptable products are Cafco-Bond-Seal by U.Sl Mineral, Protector Sealant (32-20 and 32-21) by H.B. Fuller Co., and SK-13 Emulsion by National Cellulose.

EQUIPMENT

Negative Pressure Ventilation Units:

A sufficient quantity of negative pressure ventilation units equipped with HEPA filtration and operated in accordance with ANSI Z9.2-79 (local exhaust ventilation requirements) and EPA guidance document EPA 560/5-83-002 Guidance for Controlling Friable Asbestos-Containing Material in Buildings Appendix F: Recommended Specifications and Operating Procedures for the Use of Negative Pressure Systems for Asbestos Abatement shall be utilized so as to provide one workplace air change every 15 minutes.

To calculate total air flow requirement:

$$\text{Total } Ft^3/\text{Min.} = \frac{\text{Volume of Regulated area (in } Ft^3)}{15 \text{ Min.}}$$

To calculate the number of units needed for the abatement:

$$\text{Number of Units Needed} = \frac{\text{Total } Ft^3/\text{Min.}}{0.75(\text{Capacity of Unit in } Ft^3/\text{Min.})}$$

The air filtering equipment shall be capable of filtering asbestos fibers at 0.3 um at 99.9 percent efficiency. Prefilters, which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of prefiltration are required. The first-stage prefilter shall be a low efficiency type (e.g., for particles 10 um and larger). The second-stage (or intermediate) filter shall have a medium efficiency (e.g., effective for particles down to 5 um). Prefilters and intermediate filters shall be installed either on or in the intake grid of the unit and held in place with special housings or clamps.

Exhaust air from the regulated area shall maintain a negative pressure of 0.02 inches of water (head). The ventilation shall operate on a 24 hours basis throughout the abatement process until final clearance has been approved.

Air Purifying Respirators:

Respirator bodies shall be of half face or full face type with removable cartridges. Single use, disposable or quarter face respirators shall not be used. Full face respirators shall be equipped with a nose cup or other anti fogging devices as would be appropriate for use in air temperatures less than 32 degrees F.

Filter cartridges shall, at a minimum, be HEPA type filters certified by NIOSH under 30 CFR Part 11 or with filters certified for particulates under 42 CFR Part 84.

Supplied Air Respirator System:

The equipment used shall be capable of producing air of the quality and volume required by OSHA Standard (29 CFR 1910) Section 1910.134 and Compressed Gas Association, Inc., New York, Pamphlet G-7, "Compressed Air for Human Respiration", and Specification G-7.1 "Commodity Specification for Air", applied to the job site conditions and crew size. The standards above shall be augmented by provisions of this specification with the more stringent standard governing.

Face piece and hose shall be by same manufacturer and shall be certified by NIOSH/MSHA as an approved Type "C" respirator assembly for continuous flow or pressure demand with a positive pressure face piece.

Backup air supply shall be provided that is adequate to allow a minimum of one-half hour escape time for each six man crew. The one-half hour shall be based upon all connections to the backup air supply being in use by an average sized adult male engaged in moderately strenuous activity or by the air requirements of the particular respirator in use is greater.

Warning device shall be located in the regulated area which will be clearly audible in all parts of the regulated area and can be heard above the noise level produced by equipment and work procedures in use. This warning device shall warn of:

Compressor shutdown or other fault requiring use of backup air supply.

Carbon Monoxide (CO) levels in excess of 50 PPM/V over 8 hours.

Carbon Monoxide (C)) levels shall be continually monitored and recorded. This monitor shall be placed in the air line between backup air supply and workers and shall also sound an alarm as specified under "Warning Devices".

The compressor shall automatically be shutdown and the alarms sounded if any of the following occur:

Carbon Monoxide (CO) concentrations exceed 500 PPM/V in the air line between the filter bank and backup air supply.

Compressor temperature exceeds normal operating range.

Compressor motor shall be an electric motor. Compressors driven by gas or diesel engines shall not be used.

An after cooler shall be provided at the entry to the filter system which is capable of reducing temperatures to outside ambient air temperatures.

System configuration shall permit the recharging of 1/2 hours 2260 PSI SCBA cylinders.

Compressed air systems shall be designed to provide air volumes and pressures to accommodate respirator manufacturer's specifications. The compressed air systems shall have a receiver of adequate capacity to allow escape of all respirator wearers from contaminated areas in the event of compressor

failure. Compressors must meet the requirements of 29 CFR 1910.134 (d). Compressors must have an in-line carbon monoxide monitor; periodic inspection of the carbon monoxide monitor must be evidenced. Documentation of adequacy of compressed air systems/respiratory protection system must be retained on site. This documentation will include a list of compatible components with the maximum number and type of respirators that may be used with the system. Periodic testing of compressed air shall insure that systems provide air of sufficient quality (Grade D breathing air as described in Compressed Gas Association Commodity Specifications G-7.1).

Full body disposable protective clothing, including head, body and foot coverings consisting of material impenetrable by asbestos fibers (Tyvek^{R} or equivalent) shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing.

Additional safety equipment, such as hard hats meeting the requirements of ANSI Standard Z89.1-1981, eye protection meeting the requirements of ANSI Standard Z87.1-1979, safety shoes meeting the requirements of ANSI Standard Z41.1-1967, disposable PVC gloves, as necessary, shall be provided to all workers and authorized visitors.

Nonskid footwear shall be provided to all abatement workers. Disposable clothing shall be adequately sealed to the footwear to prevent body contamination.

Provide sufficient supply of disposable mops, rags and sponges for work area decontamination.

Provide scaffolds, ladders, lifts and hand tools such as scrapers, wire cutters, brushes, utility knives, wire saws, as the work requires.

Sprayers with pumps capable of providing 14-15 pounds per square inch (psi) at the nozzle tip at a flow rate of 2 gallons per minute for spraying amended water.

Rubber dust pans and rubber squeegees shall be provided for cleanup.

Brushes utilized for removing loose asbestos containing material shall have nylon or fiber bristles, not metal.

A sufficient supply of HEPA filtered vacuum systems shall be available during cleanup.

Airless spray equipment with an adjustable low pressure nozzle shall be provided for spraying encapsulants. Nozzle tip size and pressure adjustment shall conform to encapsulant manufacturers written recommendations.

Heavy duty power cables for temporary electrical service and a portable electric generator for maintaining negative pressure in the work area in case of power failure.

Warning Signs and Labels: As required OSHA Regulation 29 CFR 1926.1101(k).

Other equipment the Contractor deems necessary for asbestos abatement work shall be submitted to the City of Madison Construction Manager for approval prior to their use.

PART 3 - EXECUTION

GENERAL COMPLIANCE MEASURES

Mandatory Protection Conditions: Contractor's employees shall wear appropriate respiratory protection and protective clothing under the following conditions:

During installation or implementation of engineering work practices and control measures.

During maintenance and repair activities for which control measures, hereinafter described, are not feasible.

Whenever the control measures are not yet sufficient to reduce exposure below the Permissible Exposure Limits (TWA and/or Excursion Limits).

Whenever emergency conditions exist.

Control Measures: The Contractor shall use one or any combination of the following control methods to achieve compliance with the "Permissible Exposure Limits" defined hereinbefore:

Local exhaust ventilation equipped with HEPA filter dust collection systems.

General dilution ventilation equipped with HEPA filtration systems on both exhaust and return air.

Vacuum cleaners equipped with HEPA filters.

Enclosure or isolation of processes producing airborne asbestos fibers and dust.

Use of wet methods, wetting agents or removal encapsulants to control employee exposures during their performance of asbestos abatement activities. Where wet methods would result in equipment damage or a safety hazard, dry removal is allowed with written approval from WDNR pursuant to NR447.08(3)(b).

Prompt disposal of wastes contaminated with asbestos in leak-tight containers.

Supplement to Control Measures: Whenever the control measures described above are not sufficient to reduce the employee exposure to or below the "Permissible Exposure Limits" (TWA and/or Excursion Limit), the Contractor shall continue to use the control measures to maintain the employee exposure to the lowest levels attainable and supplement them with the use of appropriate respiratory protection and protective clothing.

Negative-Pressure Enclosure: A negative-pressure enclosure shall be employed whenever feasible, prior to commencing removal, demolition and renovation operations involving asbestos containing materials.

Types of Respiratory Protection: The following Table represents the minimum respiratory protection required for given airborne concentrations of asbestos:

Airborne Concentration of Asbestos, Tremolite, Anthophylite, Actinolite, or a Combination of These Minerals	Required Respirator
Not in excess of 1 f/cc (10 X PEL)	1. Half-mask air purifying respirator equipped with high-efficiency filters.
Not in excess of 5 f/cc (50 X PEL)	1. Full faceplate air purifying respirator equipped with high-efficiency filters.
Not in excess of 10 f/cc (100 X PEL)	1. Any powered air purifying respirator equipped with high efficiency filters. 2. Any supplied air respirator operated in continuous flow mode.
Not in excess of 100 f/cc (1000 X PEL)	1. Full face piece supplied air respirator operated in pressure demand mode.
Greater than 100 f/cc (1,000 X PEL) or unknown concentration	1. Full face piece supplied air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

NOTE: Respirators assigned for higher environmental concentrations may be used at lower concentrations.

A high-efficiency filter means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers in diameter or larger.

Employee Rotation: The Contractor shall not use employee rotation as a means of compliance with Permissible Exposure Limits (TWA and/or Excursion Limit).

Supervision: The Contractor shall have a project supervisor on site at all times that only supervises the project and is responsible to assure contract and regulatory compliance.

PREPARATION OF REGULATED AREA

Post the following warning signs at all approaches to a regulated area per OSHA 1926.110(k)(7). Signs shall be posted at a distance sufficiently far enough away from the regulated area to permit any person to read the sign and take the necessary protective measures before entering the area marked by the signs.

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD

AUTHORZIED PERSONNEL ONLY

Post the Occupant Protection Plan at the entrance to the regulated area per DHS 159.21(3).

Post at the entrance to the regulated area a list containing the names, addresses and telephone numbers of the Contractor, Fire Department and any other personnel who may be required to be contacted during abatement activities.

Maintain Project Log per DHS 159.21(2).

Shutdown and lock out all heating, cooling and air conditioning system (HVAC) components that are in, supply or pass through the regulated area. Appropriate equipment and control measures shall be utilized to prevent contamination of building spaces. Seal all intake and exhaust vents in the work area with tape and two layers of 6 mil polyethylene. Also seal any seams in system components that pass through the regulated area.

All electrical circuits to the area in which asbestos abatement work is to take place must be disconnected. The regulated area and other uncontaminated areas that were dependent on the disconnected electrical circuits shall be serviced by a temporary electrical service provided by owner. In accordance with the latest issue of the National Electrical Code, temporary electrical service shall be equipped with combination ground fault interrupted and circuit breakers meeting the requirements of UL for Class A, Group 1 devices. The ground fault interrupter portion shall be solid state type, insulated and isolated from the breaker mechanism. A test mechanism shall provide overload and short circuit protection and shall be operated by a toggle switch with over-center switching mechanism so that contact cannot be held closed.

Preclean all movable objects within the regulated area using a HEPA filtered vacuum or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the regulated area and carefully stored in an uncontaminated location.

Preclean all fixed objects in the regulated area using HEPA filtered vacuums or wet cleaning techniques as appropriate, if contamination is visibly covering them. Careful attention must be paid to machinery and behind grills or gratings where access may be difficult but contamination significant. Also pay particular attention to wall, floor and ceiling penetrations behind fixed items. After precleaning, enclose fixed objects in four (4) mil polyethylene sheeting and seal securely in place with tape.

Preclean all surfaces in the regulated area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb asbestos containing materials during the precleaning phase.

Seal off all windows, doorways, elevator openings, corridors, tunnels, entrances, drains, ducts, grills, grates, diffusers, skylights and any other openings between the regulated area and uncontaminated areas outside of the regulated area (including the outside of the building, tunnels and crawl spaces) with four (4) mil polyethylene sheeting and tape.

Wall Covering:

Where surfacing materials are being removed from overhead, walls shall be covered with two (2) layers of four (4) mil polyethylene sheeting, starting at top of wall and extending down and across the floor area until it meets in the center of the floor. Here the covering sheets shall be taped together to form a monolithic covering which completely encases the regulated area.

Polyethylene sheets shall be sized to minimize seams. Seams shall be staggered and separated by a distance of at least six (6) feet.

Wall sheeting shall be secured adequately to prevent it from falling away from the walls. This may require additional support/attachment when negative pressure ventilation systems are utilized.

Floor Covering:

The floor area which has previously been covered with sheeting extended from the walls, shall be covered with one additional layer of six (6) mil (minimum) sheeting. Provide additional protection such as plywood, canvas, or extra plastic sheeting for floors requiring special protection such as carpeting, hardwood flooring and tile floors which may be damaged by water leakage, ladder feet or scaffold wheels. Additional layers of sheeting may be utilized as drop cloths to aid in cleanup of bulk materials.

Polyethylene sheets shall be sized to minimize seams. If the floor area necessitates seams, those on successive layers of sheeting shall be staggered to reduce the potential for water to penetrate to the flooring material. A distance of at least six (6) feet between seams is sufficient. Do not locate any parallel seams at wall/floor joints.

Floor sheeting shall extend at least 24" up the side walls of the work area.

DECONTAMINATION ENCLOSURE SYSTEM

A decontamination enclosure system shall be provided at each location where workers will enter or exit a regulated area.

Plans for construction, including materials and layout, shall be submitted as shop drawings and approved by the City of Madison Construction Manager prior to work initiation. Decontamination enclosure systems constructed at the work site shall utilize six (6) mil opaque black or white polyethylene sheeting or other acceptable materials for privacy. Detailed descriptions of portable, prefabricated units, if used, must be submitted for the City of Madison Construction Manager for approval. Plans must include floor plan with dimensions, materials, size, thickness, plumbing and electrical utilities.

The decontamination enclosure system shall consist of at least a clean room, a shower room, and an equipment room, each separated from each other and from the regulated area by air locks.

Entry to and exit from all airlocks and decontamination enclosure system chambers shall be through curtained doorways consisting of two sheets of overlapping six (6) mil polyethylene sheeting. The curtain doorway sheets shall be secured at the top and one side opposite each other. All curtains shall have weights attached to the bottom to insure that they hang straight and maintain a seal over the doorway when not in use. Doorway designs, providing equivalent protection and acceptable to the City of Madison Construction Manager may be utilized.

Access between any two rooms in the decontamination enclosure system shall be through an airlock with at least three (3) feet separating each curtained doorway. Pathways into (from clean to contaminated) and out from (contaminated to clean) the regulated area shall be clearly designated.

Clean room shall be sized to adequately accommodate the work crew. Clean disposable clothing, replacement filters for respirators, disposable towels and other necessary items shall be provided in adequate supply at the clean room. A location for postings shall also be provided in this area. Whenever possible, a lockable door shall be used to permit access into the clean room from outside the regulated area.

Shower room shall contain one or more shower heads as necessary to adequately accommodate workers. Each shower head shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to insure against leakage of any kind. An adequate supply of soap and disposable towels shall be supplied by the Contractor and available at all times. Shower water shall be drained, collected and filtered as specified in the Article entitled: "Water Collection and Disposal," herein.

The equipment room shall be used for storage of equipment and tools at the end of a shift after workers have been decontaminated using a HEPA filtered vacuum and/or wet cleaning techniques as appropriate. Replacement filters (in sealed containers until used) for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers or surfactant and other materials and equipment that may be required during the abatement may also be stored here as needed. A walk-off pan (a small children's swimming pool or equivalent filled with water) shall be located in the regulated area just outside the equipment room for workers to clean off foot coverings after leaving the regulated area and prevent excessive contamination of the worker decontamination enclosure system. A drum lined with a labeled six (6) mil polyethylene bag for collection of disposable clothing shall be located in this room. Contaminated rubber

boots or other reusable footwear shall be stored in this area for reuse the following workday.

Waste Container Pass-Out Airlock:

The waste container pass-out airlock shall be constructed at some location away from the worker decontamination enclosure system. Wherever possible, this shall be located where there is direct access from the regulated area to the outside of the building.

This airlock system shall consist of an airlock, a container staging area, and another airlock with access to outside the regulated area.

The waste container pass-out airlock shall be constructed in similar fashion to the worker decontamination enclosure system using similar materials and airlock and curtain doorway designs.

This airlock system shall not be used to enter or exit the regulated area. The airlock system shall be tightly sealed when not in use.

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

TEMPORARY ISOLATION PARTITIONS

Large rooms or open areas that require temporary air tight barriers to separate a contaminated regulated area from an uncontaminated area shall be provided with temporary partitions, constructed in the following manner:

Walls shall be constructed of wood or metal framing to support barriers in all openings larger than 4' x 8'.

A sheathing material (plywood, drywall) of at least 3/8" thickness shall be applied to work side of barrier.

Cover the work side of partition with a double layer of four (4) mil polyethylene sheeting with staggered joints and seal in place.

Provide at least one (12" x 12") window in the barrier system, where feasible, for the purpose of viewing into the regulated area. The window shall consist of heavy gauge plastic or clear safety glass. Panes shall be framed into the barrier system and completely sealed to prevent any leakage of air through the unit.

MAINTENANCE OF ENCLOSURE SYSTEM

Following completion of the construction of all polyethylene barriers and decontamination system enclosures, initiate negative pressure system and allow overnight settling to insure that barriers will remain intact and secured to walls and fixtures before beginning actual abatement activities.

All polyethylene barriers and decontamination enclosure systems shall be inspected at least twice daily by the Contractor's competent person prior to the start of each day's abatement activities and following the completion of the day's abatement activities. Document inspections and observations in the daily project log.

Damage and defects in the enclosure system are to be repaired immediately upon discovery.

Use smoke tubes to test the effectiveness of the barrier system when directed by Owners Project Representative.

Anytime during the abatement activities, if visible construction related dust or debris is observed outside of the regulated area or if damage occurs to barriers, work shall immediately stop, repairs shall be made to barriers, and debris/residue cleaned up using appropriate HEPA vacuuming and wet mopping procedures.

Openings made in the enclosure system to accommodate negative air pressure system shall be made airtight with tape and caulking as needed. If more than one unit is installed, they should be turned on one at a time, checking the integrity of wall barriers for secure attachment and need for additional reinforcement. Insure that adequate power supply is available to satisfy the requirements of the ventilating and exhaust units. Negative pressure units shall be exhausted to the outside of the building. They shall not be exhausted into occupied areas of the building. Careful installation and daily inspections shall be done to insure that the ducting does not release fibers into uncontaminated building areas.

Use of enclosure system shall not commence until the following has been accomplished:

Enclosure systems have been constructed, inspected, and tested.

Negative pressure systems are functioning adequately.

All pre-abatement submissions, notifications, postings and permits have been provided and approved by the City of Madison Construction Manager, as applicable.

All equipment for abatement, cleanup and disposal are on hand.

All worker training is completed.

Contractor has received written notice to commence abatement work from the Division, based on recommendation of the Owners Project Representative.

WORKPLACE ENTRY AND EXIT PROCEDURES

All workers and authorized personnel shall enter the regulated area through the decontamination enclosure system.

All personnel who enter the regulated area must sign the registration log, located in the clean room, both upon entry and exiting the area.

All personnel shall proceed first to the clean room, remove all street clothes, and appropriately don respiratory protection (as approved for the job conditions) and disposable coveralls, head covering and foot covering. Hard hats, eye protection and gloves shall also be utilized if required. Clean respirators and protective clothing shall be provided and utilized by each person for <u>each separate entry</u> into the regulated area.

Personnel wearing designated personal protective equipment shall proceed from the clean room through the decontamination enclosure system to the regulated area.

Before leaving the regulated area all personnel shall remove gross contamination from the outside of respirators and protective clothing by brushing or wet wiping procedures. (Small HEPA vacuums with brush attachments may be utilized for this purpose.) Each person shall clean bottoms of protective footwear in the walk-off pan just prior to entering the equipment room.

Personnel shall proceed to equipment room where they remove all protective equipment except respirators. Deposit disposable clothing into appropriately labeled containers for disposal.

Reusable, contaminated footwear shall be stored in the equipment room when not in use in the regulated area. Upon completion of abatement it shall be disposed of as asbestos contaminated waste. Rubber boots may be decontaminated at the completion of the abatement for reuse.

Still wearing respirators, personnel shall proceed to the shower area, clean the outside of the respirators and the exposed face area under running water prior to removal of respirator and shower and shampoo to remove residual asbestos contamination. Various types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered disconnect protection may be disconnected in the equipment room and worn into the shower. A powered air purifying respirator face piece will have to be disconnected from the filter/power pack assembly which is not waterproof, upon entering the shower. Cartridges must be in place for each new entry into the regulated area.

After showering and drying off, proceed to the clean room and don street clothing even though there will be later reentry into the regulated area or street clothes if it is the end of the work shift.

Workers shall NOT eat, drink, smoke, chew gum or tobacco in the regulated area. To eat, drink or smoke, workers shall follow the procedure described above, then dress in street clothes before entering the nonregulated areas of the building.

These procedures shall be posted in the clean room and equipment room.

WASTE CONTAINER PASS-OUT PROCEDURE

Asbestos contaminated waste that has been containerized shall be transported out of the regulated area through the waste container pass-out airlock (or through the decontamination enclosure if a separate airlock has not been constructed).

The inside team wearing protective clothing and respirators appropriate for the contaminated regulated area shall clean the entire surface, including bottoms, of properly labeled bags, using HEPA vacuums and wet wiping techniques and transport them into the waste container pass-out airlock where they will be placed into another properly labeled bag. No worker from the inside team shall further exit the regulated area through this airlock.

Workers from outside the regulated area wearing appropriately assigned respirators, shall enter the airlock from outside the regulated area. No worker from the outside team shall further enter the regulated area through this airlock.

The exit from this airlock shall be secured to prevent unauthorized entry.

WATER COLLECTION AND DISPOSAL

All water resulting from precleaning operation, excess from floor of regulated area and the final cleaning operation shall be collected and placed in sealed containers for disposal as contaminated material.

Water from the decontamination shower shall be collected in a holding tank and filtered to remove particles of 0.5 microns or larger size before draining water into sanitary sewer system. The drainage and filtering system shall consist of the following:

A centrifugal pump capable of pumping at least 25 gallons/minute.

Two filter cartridge housings, one serving as a prefilter, utilizing at least 6 cylindrical 100 micron filters (reusable type) and the other serving as final filter with 6 cylindrical 0.5 micron filters.

Maintain two sets (6 cylinders per set) of 100 micron filters, to allow one set to be cleaned while the other set is in use.

A common garden hose may be connected to final filter housing to drain water to sanitary sewer system.

WET REMOVAL PROCEDURE

Wet all asbestos containing material with an amended water solution, or removal encapsulant, using equipment capable of providing a fine spray mist, in order to reduce airborne fiber concentrations when the material is disturbed. Saturate the material to the substrate. Keep all removed material wet to prevent

fiber release until it can be containerized for disposal. If regulated area temperatures are below 32°F. and amended water is subject to freezing, modify as specified for surfactant in Article entitled: "Materials," herein. Maintain a high humidity in the regulated area by misting or spraying to assist in fiber settling and reduce airborne concentrations.

Saturated asbestos containing material shall be removed in manageable sections. Removed material should be containerized before moving to a new location for continuance of work. Surrounding areas shall be periodically sprayed and maintained in a wet condition until visible material is cleaned up.

Material removed from building structures or components shall not be dropped or thrown to the floor. Material should be removed as intact sections or components whenever possible and carefully lowered to the floor. If this cannot be done for materials greater than 50 feet above the floor, a dust-tight chute shall be constructed to transport the material to containers on the floor or the material may be containerized at elevated levels (e.g. on scaffolds) and carefully lowered to the ground by mechanical means. For materials between 15 and 50 feet above the ground they may be containerized at elevated levels or dropped onto inclined chutes or scaffolding for subsequent collection and containerization.

Bags shall be considered full when half their capacity have been filled. They should be securely sealed to prevent accidental opening and leakage by tying tops of bags in an overhand knot or by taping in gooseneck fashion. Do not seal bags with wire or cord.

Large components removed intact may be wrapped in two (2) layers of six (6) mil polyethylene sheeting secured with tape for transport to the approved disposal site.

Asbestos containing waste with sharp edged components (e.g., nails, screws, metal lath, tin sheeting) shall be placed into drums for disposal in lieu of polyethylene bags. Drums shall be marked to differentiate contents from those drums containing bagged material.

After completion of all stripping work, surfaces from which asbestos containing materials have been removed such as plaster base coat or metal deck, etc., the surfaces shall be wet brushed and sponged to remove all visible residue.

CEILING SYSTEM REMOVAL

Remove, clean and enclose in polyethylene the ceiling mounted objects such as lights and other items that may interfere with the abatement process and were not previously cleaned and sealed off. Utilize localized spraying of amended water, or HEPA vacuums, to reduce fiber dispersal during the removal of these fixtures.

Remove ceiling (tiles) (panels) within the regulated area carefully. If panels are to be reused, vacuum them with a HEPA filtered vacuum cleaner and carefully damp sponge and wrap cleaned (tiles) (panels) in four (4) mil polyethylene sheeting and seal with tape. Store as designated by Owners Project Representative (preferably outside of the regulated area). If (tiles) (panels) are to be discarded it is not necessary to clean them, but wrap in a similar fashion and stage for disposal in the waste container pass-out airlock.

Where suspended ceiling T-grid components must be removed to perform the abatement, HEPA vacuum and wet sponge each piece after removal from hangers. Wrap clean grid pieces in four (4) mil polyethylene sheeting and seal with tape. Store as designated by Owners Project Representative or in waste staging area if designated for disposal.

When removal of ceiling grid suspension system is not necessary for accessibility, to the asbestos containing materials leave the system in place and clean properly following completion of abatement, as specified in the Article of this section entitled: "Cleanup Procedure."

Remove plaster/drywall ceilings including lath, furring channel system, wire mesh, ties, clips, screws, nails and other accessory items as necessary and dispose of them as asbestos contaminated waste material.

As work progresses, spray ceiling materials and debris with amended water to keep wet until containerized for disposal.

PIPE TUNNEL OR CRAWL SPACE REMOVAL WORK

A decontamination enclosure shall be provided at the entrance to the pipe tunnel or crawl space. All requirements for regulated area entry and exit procedures and waste container pass-out procedures, as hereinbefore specified, shall apply to this work.

All openings within the pipe tunnel or crawl space shall be sealed with four (4) mil polyethylene and tape. The existing surfaces within the space will not be required to be covered with polyethylene sheeting.

A negative pressure system shall be required to maintain the security of the work space and the integrated decontamination enclosure.

All loose and fallen asbestos-containing material shall be very carefully cleaned up with an industrial vacuum equipped with HEPA filter.

After asbestos abatement work has been completed in the crawl space or pipe tunnel, all ceiling, wall and floor surfaces shall be cleaned with the HEPA equipped vacuum. All cleaned surfaces shall be sealed with an approved encapsulant.

FLOORING REMOVAL

Where flooring removal is specified with the use of solvents to remove flooring adhesive, the substrate shall have no adhesive residue or debris remaining. Contractor shall wash the substrate with soap and water to remove all solvent. Contractor shall be responsible for the cost of repair or replacement of any building components damaged by excessive use of solvents.

Where flooring removal is specified without the use of solvents to remove flooring adhesive, the contractor shall diligently remove adhesive by scraping process so that all trowel marks are removed and a uniform substrate, smooth to the touch, is attained. Contractor shall coordinate with the flooring installer to insure that the remaining substrate is suitable for replacement flooring installation.

SMALL SCALE - SHORT DURATION REMOVAL PROCEDURE

Glovebag Method:

All workers who are permitted to use the glovebag technique must be trained, experienced and skilled in this method.

All tools and materials that will be required during the removal procedure, shall be placed into the tool pouch.

Glovebag shall be installed so that it completely encompassed the surface where removal work will take place. The side seams of the glovebag shall be cut the appropriate length to accommodate a size that will fit over the removal area. The bag shall be placed in position, the edges of the bag shall be folded together and sealed with tape. All openings in the bag shall be sealed with duct tape (or equivalent material). The bottom seam of the bag must also be sealed with tape to prevent leakage.

Workers performing asbestos removal with glovebag shall wear (as a minimum) half mask dual--cartridge HEPA--equipped respirator, and full protective clothing to protect against the possibility of accidental leakage.

All material removed within the glovebag shall be thoroughly wetted with wetting agent, or removal encapsulant, applied with airless sprayer through the side port provided in the bag. After asbestos containing material has been removed, the exposed base surface must be thoroughly cleaned and wet wiped until all traces of asbestos-containing material is removed.

Create constant negative pressure by running a HEPA vacuum hose into bag.

Any exposed edges of asbestos-containing that will remain after bag is removed, shall be encapsulated with a bridging encapsulant to seal the material from releasing fibers to the atmosphere. Provide neatly beveled and coated terminations where insulation terminates suitable for a butt joint with new insulation.

In all glovebag removal settings, all doors, windows and other openings to the functional space must be sealed with a minimum of four (4) mil polyethylene sheeting. The HVAC system must be shut down. Once the area is completely sealed off, negative air pressure must be introduced to the entire functional space.

In glove bag settings which involve small scale short duration removal the immediate area shall be prepared using the following techniques; polyethylene drop cloths (minimum 6 mil) on floor and walls in a 12 foot perimeter of the removal area, negative air machine present and running in the immediate area. Glove bag must be placed under variable negative pressure during removal stages. A centralized five stage decontamination system must be established in the building for this method of glovebag removal.

Mini-Enclosure Method:

A mini-enclosure may be built around an area which is too large for glovebag method, but is of small-scale and short duration work and would not warrant large enclosure.

The mini-enclosure can be small enough to restrict the space to use by one worker. A small change room shall be contiguous to the mini-enclosure. The change room shall be a minimum of three (3) feet square.

The mini-enclosure shall be constructed by affixing plastic sheeting to existing walls and covering the floor with plastic sheeting which shall extend up walls at least 24 inches and sealed with tape. If existing walls are not available, a 2 x 4 wood frame shall be constructed and two (2) layers of six (6) mil polyethylene sheeting applied to the interior side of frame to allow clean "take-down," at completion. Sheeting shall be sealed with tape.

The change room shall be constructed of 2 x 4 wood framing to which shall be applied two (2) layers of six (6) mil polyethylene sheeting to interior side of frame and sealed with tape. The change room shall be provided with double six (6) mil polyethylene curtains at the exit and the entrance to the mini work enclosure. Both curtains in each opening shall be secured at the top and one side opposite from the other.

A hose from a HEPA vacuum shall be extended through the wall of the Mini-Enclosure and the opening around the hose shall be sealed with tape. The HEPA vacuum shall run continuously during the time asbestos abatement work is taking place.

All abatement work shall be conducted using the wet removal method and all debris from such work shall be bagged and disposed of as contaminated material. Upon completion, the interior surfaces of the regulated area shall be cleaned and sprayed with an encapsulant.

Worker using the mini-enclosure method shall wear two (2) Tyvek^{R} or equivalent disposable work suit and the appropriate HEPA filtered dual cartridge respiratory protection. Upon completion of the work and before leaving the change area, worker shall remove outer work suit and then proceed to a shower that is not contiguous with the work area.

The polyethylene enclosure, comprising the regulated area and the change room, shall be collapsed inwardly, bagged and disposed of as contaminated material.

ENCAPSULATION PROCEDURES

Clean and isolate the regulated area as specified in Article entitled: "Preparation of Regulated Area", hereinbefore.

Repair damaged and missing areas of existing materials with nonasbestos-containing substitutes. Material must adhere adequately to existing surfaces and provide an adequate base for application of encapsulating agents. Filler material shall be applied in accordance with manufacturer's recommended specifications.

Spray apply with airless equipment with low nozzle pressure to all surfaces where asbestos is removed or surfaces containing asbestos that are to remain in place. Spray must completely encapsulate any remaining asbestos, permanently locking it in place.

Apply a minimum of one (1) coat with coverage in strict accordance with manufacturer's recommendations. Surfaces must be dry and free of dirt, oil and dust.

ENCLOSURE PROCEDURE

Clean and isolate the regulated area as specified in Article entitled: "Preparation of Regulated Area" hereinbefore.

Spray areas that will be disturbed during the installation of hangers or other support/framing materials for the enclosure with water containing the specified surfactant. Keep these areas damp to reduce airborne fiber concentrations.

Remove loose or hanging asbestos containing materials.

After installation of hangers and other fixing devices and before installation of enclosure, repair damaged areas of fireproofing/thermal insulation materials as required using a nonasbestos-containing replacement material. Prepare surfaces and apply replacement material in accordance with manufacturer's recommendations.

AIR MONITORING

Daily Personal Air Monitoring (OSHA Compliance):

> Daily determination of employee exposure shall be made by collecting one or more breathing zone samples that are representative of the 8-hour TWA, full-shift exposure for each employee in each regulated area; and one or more breathing zone air samples that are representative of 30-minute exposures associated with operations that are most likely to produce exposures above the excursion limit for employees in each regulated area.
>
> OSHA P.E.L. As required by 29CFR 1926.1101(c). Within the breathing zone of each worker category (i.e., wetter, receiver, bagger) 25% of the crew or one per job category.

All samples collected shall be analyzed by a laboratory accredited by the American Industrial Hygiene Association.

The Owners Project Representative has the authority to stop the abatement work under the provisions of the General Conditions of this contract at anytime the Construction Representative determines either personally or through the services of an air sampling professional that conditions are not in compliance with the specifications and applicable regulations. The stoppage of work shall continue until conditions have been corrected and corrective steps have been taken to the satisfaction of the Construction Representative. Standby time required to resolve violations shall be at the Contractor's expense.

CLEANUP PROCEDURE

Remove and containerize all visible accumulations of asbestos containing material and asbestos contaminated debris utilizing rubber dust pans and rubber squeegees to move material around. Do not use metal shovels to pick up or move accumulated waste. Special care shall be taken to minimize damage to floor sheeting.

Wet clean all surfaces in the regulated area using rags, mops and sponges as appropriate. (Note: Some HEPA vacuums might not be wet-dry vacuums.)

Prior to removing the inner layer of plastic sheeting, the sheeting shall be sprayed with an encapsulant, so that any residue remaining will be adhered to the plastic sheeting.

Remove the cleaned inner layer of plastic sheeting from walls and floors. Windows, doors, HVAC system vents and all other openings shall remain sealed. The negative pressure ventilation units shall remain in continuous operation. Decontamination enclosure systems shall remain in place and be utilized.

Remove all containerized waste from the regulated area and waste container pass-out airlock.

The City's Designated Project Representative, DNR Representative and the Contractor shall inspect the regulated area for visible residue. If any accumulation of residue is observed, it will be assumed to be asbestos and the cleaning cycle shall be repeated.

After cleaning the regulated area the Contractor may either spray the remaining barrier material with encapsulant or, wait at least 24 hours to allow fibers to settle and HEPA vacuum and wet clean all objects and surfaces in the regulated area again.

Decontaminate all tools and equipment and remove at the appropriate time in the cleaning sequence.

DISPOSAL PROCEDURES

As the work progresses to prevent exceeding available storage capacity onsite, sealed and labelled containers of asbestos-containing waste shall be removed and transported directly to the prearranged disposal location, which must be an authorized site in accordance with regulatory requirements of NESHAP and Wisconsin Administrative Rule NR 447.13 and NR 506.10. Use of intermediate storage locations is not accepted disposal procedure. Mark vehicles used to transport asbestos-containing waste in accordance with Nr 447.12(4)(a)1 to 3. Comply with US DOT Hazardous Material regulations, 49 CFR 171-180.

The Contractor shall provide documentation in the form of a transportation and disposal manifest that will provide a chain-of-custody record of all asbestos-containing waste from project site to the disposal site. All asbestos-containing waste generated must be accounted for by these records and copies of all such records shall be delivered to the Construction Representative.

Transportation to the Landfill:

Contractor shall provide an enclosed lockable waste container, consisting of a truck, trailer or dumpster, for storage and transportation of waste. The waste container shall be locked while unattended and during transportation of waste. Once bags have been removed from the regulated area, they shall be loaded directly into the waste container for transportation.

The waste container shall be free of debris and lined with six (6) mil polyethylene sheeting to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first and extend up the side walls. Wall sheeting shall be overlapped and taped into place.

Drums shall be placed on level surfaces in the waste container and packed tightly together to prevent shifting and tipping. Large components shall be secured to prevent shifting and bags placed on top. Do not throw containers into waste container.

Personnel loading asbestos containing waste shall be protected by disposable clothing including head, body and foot protection and at a minimum, half-face piece, air-purifying, dual cartridge respirators equipped with HEPA filters.

Any debris or residue observed on containers or surfaces outside of the regulated area resulting from cleanup or disposal activities shall be immediately cleaned up using HEPA filtered vacuum equipment and/or wet methods.

Disposal at the Landfill:

Upon reaching the landfill, trucks are to approach the dump location as closely as possible for unloading of the asbestos containing waste.

Bags, drums and components shall be inspected as they are off-loaded at the disposal site. Damaged containers shall be very carefully taped shut and repacked into drums or bags as applicable.

Waste containers shall be placed on the ground at the disposal site, not pushed or thrown out of trucks (weight of wet material could rupture bags).

Personnel off-loading containers at the disposal site shall wear protective equipment consisting of disposable head, body and foot protection and, at a minimum, half-face piece, air-purifying, dual cartridge respirators equipped with HEPA filters.

Following the removal of all containerized waste, the truck cargo area shall be decontaminated using HEPA vacuums and wet methods to meet the no visible residue criteria. Polyethylene sheeting shall be removed and discarded along with contaminated cleaning materials and protective clothing, in bags or drums at the disposal site.

REESTABLISHMENT OF REGULATED AREA

Reestablishment of the regulated area shall occur only after completion of cleanup procedures and documentation has been performed to the satisfaction of the Project Representative.

Resecure mounted objects removed from their former positions during area preparation activities.

Resecure and relocate objects that were removed to temporary locations back to their original positions.

Reestablish HVAC, mechanical and electrical systems in proper working order. Remove potentially contaminated HVAC system filters and dispose of as asbestos contaminated waste. Decontaminate filter assembly using HEPA vacuums and wet cleaning techniques.

END OF SECTION

State of Wisconsin
Department of Administration
DOA-4509 (R03/2003)
Chapters HSS 159 & 163

Division of Facilities Development
Mailing Address: **Post Office Box 7866, Madison, WI 53707-7866**
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http://www.doa.state.wi.us/dfd

EXHIBIT C

Asbestos/Lead Abatement Certification

The apparent low bidder on any project involving asbestos and/or lead abatement activity must provide the following statement notarized and signed by an officer of the firm, before the end of the seventh calendar day after the bid opening.

Note: For certified statements 1-3 below: If no exceptions exist, state "None"; otherwise include project(s), date(s), description and resolution for each (attach additional sheets if necessary).

This is to certify that _____
Firm Name

1) has not been issued any citations by federal, state or local regulatory agencies relating to asbestos or lead abatement activity, except as follows:

_____

2) has not had an asbestos or lead abatement contract terminated prior to completion, except as follows:

_____

3) has not been named in any asbestos or lead related legal proceedings/claims in which the firm (or employees scheduled to participate in this project) was involved as contractor or subcontractor, except as follows:

_____

4) has all employees or agents who may be exposed to airborne asbestos in excess of the OSHA PEL medically determined to be physically capable of working while wearing the respirator

5) will utilize only HEPA vacuums, negative pressure ventilation units and other local exhaust ventilation equipment conforming to ANSI Z9.2-79 and that water filtration unit(s) are used in conformance with manufacturer's specifications

6) has notified rental agencies that rental equipment will be used in abatement areas or to transport asbestos contaminated waste, if contractor intends to use rented equipment

7) will utilize only NIOSH approved respiratory protective devices and that respirator fit-testing for all contractor employees and agents, who must enter the regulated area, are performed in accordance with procedures as detailed in Title 29 CFR 1926.1101, Appendix C, Qualitative and Quantitative Fit Testing Procedures

8) maintains a written hazard communication program indicating how the contractor plans to meet the requirements of OSHA 29 CFR 1926.59 relative to labeling, handling of material safety data sheets and training of employees.

The undersigned states that all of the above information is true and correct to the best of his/her knowledge.

Dated _____ _____
Authorized Signature

_____
Printed Name

_____
Title

State of Wisconsin

County _____ _____
Firm Name

Signed or attested before me on _____ day _____ , _____

By:_____ _____County, WI
Notary Public

(STAMP OR SEAL) My Commission Expires_____, 20 _____.