

**ASBESTOS
ABATEMENT
PROJECT
SPECIFICATIONS**

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ASBESTOS ABATEMENT

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ASBESTOS ABATEMENT

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2 (2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM D4397 (2016) Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications

ASTM E1368 (2014) Visual Inspection of Asbestos Abatement Projects

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7 (2014) Compressed Air for Human Respiration; 6th Edition

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z87.1 (2020) Occupational and Educational Personal Eye and Face Protection Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701 (2019) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 2003-154 (2003; 4th Ed; Supple 3) NIOSH Manual of Analytical Methods

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90/018 (1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance

STATE OF ILLINOIS ADMINISTRATIVE CODE (IAC)

105 ILCS 105 Asbestos Abatement Act

225 ILCS 207 Commercial and Public Building Asbestos Abatement Act

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.134 Respiratory Protection

29 CFR 1910.147 The Control of Hazardous Energy (Lock Out/Tag Out)

29 CFR 1926.1101 Asbestos

29 CFR 1926.32 Safety and Health Regulations for

Construction - Definition

40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings

UNDERWRITERS LABORATORIES (UL)

UL 586	(2009; Reprint Dec 2017) UL Standard for Safety High-Efficiency Particulate, Air Filter Units
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1.4 DEFINITIONS

1.4.1 Amended Water

Water containing a wetting agent or surfactant with a surface tension of at least 29 dynes per square centimeter.

1.4.2 Asbestos-Containing Material (ACM)

Any materials containing more than one percent asbestos.

1.4.3 Authorized Person

Person(s) authorized by the Contractor and required by work duties to be present in the regulated areas.

1.4.4 Building Inspector

Person who inspects buildings for asbestos and has EPA Model Accreditation Plan (MAP) "Building Inspector" training; accreditation in accordance with 40 CFR 763, Subpart E, Appendix C, has EPA/State certification/license as a "Building Inspector."

1.4.5 Class I Asbestos Work

Activities defined by OSHA involving the removal of thermal system insulation (TSI) and surfacing ACM.

1.4.6 Class II Asbestos Work

Activities defined by OSHA involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Certain "incidental" roofing materials such as mastic, flashing, and cements when still intact are excluded from Class II asbestos work.

Removal of small amounts of these materials which would fit into a glovebag may be classified as a Class III job.

1.4.7 Class III Asbestos Work

Activities defined by OSHA that involve repair and maintenance operations, where ACM, including TSI and surfacing ACM, will likely be disturbed. Operations may include drilling, abrading, cutting a hole, cable pulling, crawling through tunnels or attics and spaces above the ceiling, where asbestos is actively disturbed or asbestos-containing debris is actively disturbed.

1.4.8 Clean Room

An uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

1.4.9 Competent Person

In addition to the definition in 29 CFR 1926.32 (f), a person who is capable of identifying existing asbestos hazards as defined in 29 CFR 1926.1101, selecting the appropriate control strategy, has the authority to take prompt corrective measures to eliminate them and has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training; has EPA/State certification/license as a "Contractor/Supervisor."

1.4.10 Contractor/Supervisor

Individual who supervises asbestos abatement work and has EPA Model Accreditation Plan "Contractor/Supervisor" training; has EPA/State certification as a "Contractor/Supervisor."

1.4.11 Critical Barrier

One or more layers of plastic sealed over all openings into a regulated area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a regulated area from migrating to an adjacent area.

1.4.12 Decontamination Area

An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment.

1.4.13 Disposal Bag

A 6 mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926.1101.

1.4.14 Disturbance

Activities that disrupt the matrix of ACM, crumble or pulverize ACM, or generate visible debris from ACM. Disturbance includes cutting away small amounts of ACM, no greater than the amount which can be contained in a standard sized glovebag or waste bag, not larger than 60 inches in length and width in order to access a building component.

1.4.15 Equipment Room or Area

An area adjacent to the regulated area used for the decontamination of employees and their equipment.

1.4.16 Fiber

A fibrous particulate, 5 micrometers or longer, with a length to width ratio of at least 3 to 1.

1.4.17 Friable ACM

A term defined in 40 CFR 61, Subpart M and EPA 340/1-90/018 meaning any material which contains more than 1 percent asbestos in accordance with 40 CFR 763, Polarized Light Microscopy (PLM), when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

1.4.18 Glovebag

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

1.4.19 High-Efficiency Particulate Air (HEPA) Filter

A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

1.4.20 Intact

ACM which has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix. Removal of "intact" asphaltic, resinous, cementitious products does not render the ACM non-intact simply by being separated into smaller pieces.

1.4.21 Negative Initial Exposure Assessment

A demonstration to show that employee exposure during an operation is expected to be consistently below the OSHA Permissible Exposure Limits (PELs).

1.4.22 NESHAP

National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is in 40 CFR 61, Subpart M.

1.4.23 Nonfriable ACM

A NESHAP term defined in 40 CFR 61, Subpart M and EPA 340/1-90/018 meaning any material containing more than 1 percent asbestos that, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure.

1.4.24 Nonfriable ACM (Category I)

A NESHAP term defined in 40 CFR 61, Subpart E and EPA 340/1-90/018 meaning asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos.

1.4.25 Nonfriable ACM (Category II)

A NESHAP term defined in 40 CFR 61, Subpart E and EPA 340/1-90/018 meaning any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos.

1.4.26 Permissible Exposure Limits (PELs)

1.4.26.1 PEL-Time Weighted Average (TWA)

Concentration of asbestos not in excess of 0.1 fibers per cubic centimeter of air (f/cc) as an 8 hour time weighted average (TWA).

1.4.26.2 PEL-Excursion Limit

An airborne concentration of asbestos not in excess of 1.0 f/cc of air as averaged over a sampling period of 30 minutes.

1.4.27 Regulated Area

An OSHA term defined in 29 CFR 1926.1101 meaning an area established by the Contractor to demarcate areas where Class I, II, and III asbestos work is conducted; also any adjoining area where debris and waste from such asbestos work accumulate; and an area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limit.

1.4.28 Removal

All operations where ACM is taken out or stripped from structures or substrates, and includes demolition operations.

1.4.29 Repair

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

1.4.30 Surfacing ACM

Asbestos-containing material which contains more than 1 percent asbestos and is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

1.4.31 Thermal System Insulation (TSI) ACM

ACM which contains more than 1 percent asbestos and is applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

1.4.32 Transite

A generic name for asbestos cement wallboard and pipe.

1.4.33 Worker

Individual (not designated as the Competent Person or a supervisor) who performs asbestos work and has completed asbestos worker training required by 29 CFR 1926.1101, to include EPA Model Accreditation Plan (MAP) "Worker" training; accreditation if required by the OSHA Class of work to be performed or by the State where the work is to be performed.

1.5 DESCRIPTION OF WORK

The potential handling of friable and nonfriable materials (with potential to become friable upon demolition) containing asbestos which is encountered during removal and demolition operations and the incidental procedures and equipment required to protect workers and occupants of the building or area, or both, from contact with airborne asbestos fibers. Dispose removed asbestos-containing materials in accordance with 29 CFR 1926.1101; 40 CFR 61, Subpart A; 40 CFR 61, Subpart M; 105 ILCS 105; 225 ILCS 207; and the requirements as specified.

1.6 QUALITY ASSURANCE

In addition to detailed requirements, perform work in accordance with EM 385-1-1, applicable Federal, State, and local laws, ordinances, criteria, rules and regulations regarding handling, storing, transporting, and disposing. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where specified, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements will govern.

1.6.1 Qualifications and Organization Report

Submit qualifications and organization report providing evidence of qualifications of the Contractor, Contractor's Project Supervisor, Competent Person, supervisors and workers;;
; all subcontractors procured including disposal transportation and disposal facility firms, subcontractor supervisors, subcontractor workers; and any others assigned to perform asbestos abatement and support activities. The report will be signed by the Contractor, the Contractor's onsite project manager, Competent Person, , and the principals of all subcontractors to be used.

1.6.2 Specific Requirements

Personnel meeting the following qualifications:

- a. Asbestos Abatement Contractor: Certified/licensed by applicable State agencies to perform asbestos-related activities.
- b. Competent Person: Qualified in accordance with 29 CFR 1926.32 and 29 CFR 1926.1101, has EPA MAP "Contractor/Supervisor" training accreditation, has EPA/State certification/license as a "Contractor/Supervisor" and is experienced in the administration and supervision of asbestos abatement projects, including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite, etc. The Competent Person is responsible for compliance with applicable federal, state and

local requirements, the Contractor's Accident Prevention Plan (APP) and Asbestos Hazard Abatement Plan (AHAP). Submit the "Contractor/Supervisor" course completion certificate and current certificate for required refresher training, EPA/State certification/license with the employee "Certificate of Worker Acknowledgment." Employee evidence to have minimum of 2 years of on-the-job asbestos abatement experience relevant to OSHA competent person requirements. The Competent Person to be on-site at all times during the operations of asbestos removal.

- c. Project and Other Supervisors: Furnish EPA MAP "Contractor/Supervisor" training accreditation. Submit the "Contractor/Supervisor" course completion certificate and current certificate for required refresher training, EPA/State certification/license with the employee "Certificate of Worker Acknowledgment." Submit evidence the Project Supervisor has a minimum of 2 years of on-the-job asbestos abatement experience relevant to project supervisor responsibilities and the other supervisors have a minimum of 1 year on-the-job asbestos abatement experience commensurate with the responsibilities as specified.
- e. Asbestos Abatement Workers: Meet the requirements stated in 29 CFR 1926.1101, 40 CFR 61, Subpart M, and other applicable federal, state and local requirements. Provide worker training documentation as required on the "Certificate of Workers Acknowledgment." Training documentation is required for each employee who will perform OSHA Class I, Class II, Class III, or Class IV asbestos abatement operations. Attach training course completion certificates (initial and current update refresher) required by the information checked on the form.
- f.
- g. Disposal Facility, Transporter: Submit evidence that the landfill is approved for asbestos disposal by the USEPA, state, and local regulatory agencies. Provide signed agreements between the Contractor (including subcontractors and transporters) and the asbestos waste disposal facility to accept and dispose all asbestos-containing waste. The Contractor and transporters to meet the State's DOT requirements in accordance with 49 CFR 171, 49 CFR 172, and 49 CFR 173 as well as registration requirements in accordance with 49 CFR 107 and other applicable State or local requirements. The disposal facility in accordance with 40 CFR 61, Sections .154 or .155, as required in 40 CFR 61 150(b), and other applicable State or local requirements.

1.6.3 Federal, State, or Local Citations on Previous Projects

Submit a statement, signed by an officer of the company, containing a record of any citations issued by Federal, State or local regulatory agencies relating to asbestos activities (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including

projects, dates, and reasons for terminations). If there are none, submit a negative declaration signed by an officer of the company.

1.6.4 Preconstruction Conference

The Contractor and the Contractor's Competent Person and Project Supervisor to meet with the project team prior to beginning work at a safety preconstruction conference to discuss the details of the Contractor's submitted APP to include the AHAP and AHAs appendices. Deficiencies in the APP will be discussed. Do not begin onsite work until the APP has been accepted.

1.8 SECURITY

Keep a log book documenting entry into and out of the regulated area. Entry into regulated areas to only be by personnel authorized by the Contractor and the Contracting Officer. Personnel authorized to enter regulated areas will be trained, medically evaluated, and wear the required personal protective equipment.

1.8.1 Licenses, Permits and Notifications

Obtain necessary licenses, permits and notifications in conjunction with the project's asbestos abatement, transportation and disposal actions and timely notification furnished of such actions as required by federal, state, regional, and local authorities. Notify the State's environmental protection agency responsible for asbestos air emissions and the Contracting Officer in writing, at least 10 calendar days prior to the commencement of work in accordance with 40 CFR 61, Subpart M, and state and local requirements to include the mandatory "Notification of Demolition and Renovation Record" form and other required notification documents. Notify by Certified Mail, Return Receipt Requested. Submit the receipts to the Contracting Officer prior to the commencement of work. Notify the local fire department 3 days before fireproofing material is removed from a building and the notice to specify whether or not the material contains asbestos. The associated fees/costs for licenses, permits, and notifications are the responsibility of the Contractor.

1.8.2 Regulated Areas

Conduct all Class I, II, and III asbestos work within regulated areas. Demarcate the regulated area to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

1.8.3 Warning Signs and Tape

Provide warning signs and tape printed in English at the regulated boundaries and entrances to regulated areas. Locate signs to allow personnel to read the signs and take the necessary protective steps required before entering the area. The warning signs displaying the following:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

1.8.4 Warning Labels

Affix warning labels to all asbestos disposal containers, asbestos materials, scrap, waste debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to requirements are acceptable.

1.9 MEDICAL SURVEILLANCE REQUIREMENTS

Medical surveillance requirements in accordance with 29 CFR 1926.1101. Asbestos workers to be enrolled in a medical surveillance program that meets 29 CFR 1926.1101 (m) requirements and other pertinent State or local requirements. This requirement to have been satisfied within the last 12 months.

1.9.1 Respiratory Protection Program

The Contractor shall establish in writing and implement a respiratory protection program in accordance with 29 CFR 1926.1101 and 29 CFR 1910.134. The Contractor shall establish minimum respiratory protection requirements based on measured or anticipated levels of airborne asbestos fiber concentrations.

1.9.2 Respiratory Fit Testing

The Contractor shall conduct a qualitative or quantitative fit test in accordance with Appendix A of 29 CFR 1910.134 for each worker required to wear a respirator, and any authorized visitors who enter a regulated area where respirators are required to be worn. Perform a respirator fit test prior to initially wearing a respirator and every 12 months thereafter. If physical changes develop that will affect the fit, perform a new fit test. Perform functional fit checks each time a respirator is put on and in accordance with the manufacturer's recommendation.

1.9.3 Respirator Selection and Use Requirements

Provide respirators and ensure that they are used in accordance with 29 CFR 1926.1101, CGA G-7 and the manufacturer's recommendations. Provide as approved by the National Institute for Occupational Safety and Health (NIOSH), under the provisions of 42 CFR 84, for use in environments containing airborne asbestos fibers. For air-purifying respirators, the particulate filter to be high-efficiency particulate air (HEPA)/(N-,R-,P-100). The initial respirator selection and the decisions regarding the upgrading or downgrading of respirator type to be made by the Contractor's IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered.

1.9.4 Personal Protective Equipment

Make complete sets of personal protective equipment to the Contracting

Officer and authorized visitors for entry to the regulated area. Provide Contracting Officer and authorized visitors with training equivalent to that provided to Contractor employees in the selection, fitting, and use of personal protective equipment and the site safety and health requirements. Provide workers with personal protective clothing and equipment and ensure that it is worn properly. The IH and Competent Person to select and approve all the required personal protective clothing and equipment.

1.9.5 Whole Body Protection

Provide personnel exposed to or having the potential to be exposed to airborne concentrations of asbestos that exceed the PELs, or for all OSHA Classes of work for which a required negative exposure assessment is not produced, with whole body protection and such protection worn properly. Disposable whole body protection to be disposed as asbestos contaminated waste upon exiting from the regulated area. Reusable whole body protection worn to be either disposed as asbestos contaminated waste upon exiting from the regulated area or be properly laundered in accordance with 29 CFR 1926.1101. The Contractor's Competent Person, in consultation with the IH, has the authority to take immediate action to upgrade or downgrade whole body protection when there is an immediate danger to the health and safety of the wearer. Provide eye protection when operations present a potential eye injury hazard, and be in accordance with ANSI/ISEA Z87.1.

1.10 HYGIENE

Establish a decontamination area for the decontamination of employees, material and equipment. Ensure that employees enter and exit the regulated area through the decontamination area. Smoking, if allowed by the Contractor, is only allowed in areas approved by the Contracting Officer.

1.11 TRAINING PROGRAM

Establish and submit a training program as specified by EPA MAP, training requirements at 40 CFR 763, the State's regulations, and OSHA requirements at 29 CFR 1926.1101 (k) (9). Contractor employees must complete the required training for the type of work they are to perform and such training documented and provided to the Contracting Officer.

- a. Class I and II operations 32 hours Asbestos Worker Training.
- b. Class II generic removal 8 hour Asbestos Worker Training.
- c. Class III operations 16 hour O&M Training.

Prior to commencement of work the Contractor's Competent Person must instruct each worker about:

- a. The hazards and health effects of the specific types of ACM to be abated; and
- b. The content and requirements of the Contractor's APP to include the AHAP and AHAs and site-specific safety and health precautions.

PART 2 PRODUCTS

2.1 EXPENDABLE SUPPLIES

2.1.1 Glovebag

Provide glovebags as described in 29 CFR 1926.1101. Provide glovebag assembly as 6 mil thick plastic, prefabricated and seamless at the bottom with preprinted OSHA warning label.

2.1.2 Duct Tape

Industrial grade duct tape of appropriate widths suitable for bonding sheet plastic and disposal container.

2.1.3 Disposal Containers

Provide leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers for ACM wastes as required by 29 CFR 1926.1101. Disposal containers can be in the form of:

- a. Disposal Bags
- b. Fiberboard Drums
- c. Cardboard Boxes

2.1.4 Sheet Plastic

Provide polyethylene sheet plastic of 6 mil minimum thickness and in the largest sheet size necessary to minimize seams. Film must be in accordance with ASTM D4397, except as specified below:

2.1.4.1 Flame Resistant

Where a potential for fire exists, provide flame-resistant sheets. Film must be in accordance with NFPA 701.

2.1.4.2 Reinforced

Reinforced sheets must be provided where high skin strength is required, such as where it constitutes the only barrier between the regulated area and the outdoor environment. The sheet stock must consist of translucent, nylon-reinforced, or woven-polyethylene thread laminated between 2 layers of polyethylene film. Film must meet flame resistant standards in accordance with NFPA 701.

2.1.5 Mastic Removing Solvent

Mastic removing solvent must be nonflammable and must not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used on-site must have a flash point greater than 140 degrees F.

2.1.6 Leak-tight Wrapping

Provide two layers of 6 mil minimum thick polyethylene sheet stock must be used for the containment of removed asbestos-containing components or materials such as reactor vessels, large tanks, boilers, insulated pipe segments, and other materials too large to be placed in disposal bags. Upon placement of the ACM component or material, each layer must be individually leak-tight sealed with duct tape.

2.1.8 Wetting Agents

Provide removal encapsulant (a penetrating encapsulant) when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water. The removal encapsulant must be capable of wetting the ACM and retarding fiber release during disturbance of the ACM greater than or equal to that provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS.

2.1.9 Strippable Coating

Provide strippable coating in aerosol cans to adhere to surfaces and remove cleanly by stripping, at the completion of work.

2.2 EQUIPMENT

2.2.1 Tools

Equipped vacuums with HEPA filters, of sufficient capacity and necessary capture velocity at the nozzle or nozzle attachment to efficiently collect, transport and retain the ACM waste material. Do not use power tools to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system. Decontaminate reusable tools prior to being removed from regulated areas.

2.2.2 Rental Equipment

If rental equipment is used, provide written notification to the rental agency concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment and to decontaminate such equipment.

2.2.3 Air Monitoring Equipment

The air monitoring equipment includes, but is not be limited to:

- a. High-volume sampling pumps that can be calibrated and operated at a constant airflow up to 16 liters per minute.
- b. Low-volume, battery powered, body-attachable, portable personal pumps that can be calibrated to a constant airflow up to approximately 3-1/2 liters per minute, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. Equip the pumps with an automatic flow control unit which will maintain a constant flow, even as filter resistance increases due to accumulation of fiber and debris on the filter surface.

- c. Single use standard 25 mm diameter cassette, open face, 0.8 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive extension cowl, and shrink bands for personal air sampling.
- d. Single use standard 25 mm diameter cassette, open face, 0.45 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive cowl, and shrink bands when conducting environmental area sampling using NIOSH 2003-154 Methods 7400 and 7402, (and the transmission electric microscopy method specified at 40 CFR 763 if required).
- e. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 4 to plus 140 degrees F and traceable to a NIST primary standard.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Use the engineering controls and work practices required in 29 CFR 1926.1101 (g) in all operations regardless of the levels of exposure. Wear and use protective clothing and equipment. Do not permit eating, smoking, drinking, chewing, or applying cosmetics in the regulated area. Personnel of other trades, must not be exposed to airborne concentrations of asbestos unless all the administrative and personal protective provisions of the Contractor's APP are complied with. Power to the regulated area must be locked-out and tagged in accordance with 29 CFR 1910.147, and provide temporary electrical service with ground fault circuit interrupters as needed. Disconnect temporary electrical service when necessary for wet removal. Stop abatement work in the regulated area immediately when the airborne total fiber concentration: (1) equals or exceeds 0.01 f/cc, or the pre-abatement concentration, whichever is greater, outside the regulated area; or (2) equals or exceeds 1.0 f/cc inside the regulated area. Correct the condition to the satisfaction of the Contracting Officer, including visual inspection and air sampling. Work may resume only upon notification by the Contracting Officer. Document corrective actions taken.

3.2 PROTECTION OF ADJACENT WORK OR AREAS TO REMAIN

Perform asbestos abatement without damage to, or contamination of, adjacent work or area. Where such work or area is damaged or contaminated, restore to original condition or decontaminated at no additional cost to the Owner. When spills occur, work must stop in all affected areas immediately and the spill must be cleaned. When satisfactory visual inspection and air sampling analysis results are obtained and have been evaluated by the Contractor's IH and the Contracting Officer, work may proceed.

3.3 OBJECTS

3.3.1 Removal of Mobile Objects

The Owner will remove furniture and equipment to be salvaged or reused from the area of work before work begins.

3.3.2 Stationary Objects

Stationary objects and equipment to remain in place must be precleaned using HEPA vacuum followed by adequate wet wiping. Cover stationary objects and equipment with 2 layers of polyethylene and seal edges with duct tape.

3.4 BUILDING VENTILATION SYSTEM AND CRITICAL BARRIERS

Building ventilation system supply and return air ducts in a regulated area must be shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910.147.

3.5 PRECLEANING

Clean surfaces by HEPA vacuum and adequately wet wiped prior to establishment of containment.

3.6 METHODS OF COMPLIANCE

3.6.1 Mandated Practices

Detail the specific abatement techniques and items identified in the Contractor's AHAP. Use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

- a. Vacuum cleaners equipped with HEPA filters.
- b. Wet methods or wetting agents except where it can be demonstrated that the use of wet methods is unfeasible due to the creation of electrical hazards, equipment malfunction, and in roofing.
- c. Prompt clean-up and dispose.
- d. Inspection and repair of polyethylene.
- e. Cleaning of equipment and surfaces of containers prior to removing them from the equipment room or area.

3.6.2 Control Methods

- a. Local exhaust ventilation equipped with HEPA filter;
- b. Enclosure or isolation of processes producing asbestos dust;
- c. Where the feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PELs, use them to reduce employee exposure to the lowest levels attainable and supplement them by the use of respiratory protection.

3.6.3 Unacceptable Practices

- a. High-speed abrasive disc saws that are not equipped with point of cu ventilator or enclosures with HEPA filtered exhaust air.

- b. Compressed air used to remove asbestos-containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.
- c. Dry sweeping, shoveling, or other dry clean up.
- d. Employee rotation as a means of reducing employee exposure to asbestos.

3.6.4 Class I Work Procedures

In addition to requirements of paragraphs "Mandated Practices" and "Control Methods," use the following engineering controls and work practices:

- a. A Competent Person to supervise the installation and operation of the control methods.
- b. For jobs involving the removal of more than 25 feet or 10 square feet of TSI or surfacing material, place critical barriers over all openings to the regulated area.
- c. Isolate HVAC systems in the regulated area by sealing with a double layer of plastic or air-tight rigid covers.
- d. Place impermeable drop cloths (6 mil or greater thickness) on surfaces beneath all removal activity.
- e. Where a negative exposure assessment has not been provided or where exposure monitoring shows the PEL was exceeded, ventilate the regulated area with a HEPA unit and employees to use PPE.

3.6.5 Specific Control Methods for Class I Work

3.6.5.1 Negative Pressure Enclosure (NPE) System

Provide at least 4 air changes per hour inside the containment. Operate local exhaust unit equipment 24 hours per day until the containment is removed. Smoke test for leaks at the beginning of each shift and must be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Monitor pressure differential continuously, 24 hours per day, with an automatic manometric recording instrument and provide records daily on the same day collected to the Contracting Officer. Notify the Contracting Officer immediately if the pressure differential falls below the prescribed minimum. The building ventilation system must not be used as the local exhaust system for the regulated area. Terminate NPE outdoors unless an alternate arrangement is approved. Provide filters at the beginning of the project, periodically change as necessary, and disposed as ACM waste.

3.6.5.2 Glovebag Systems

Use without modification, smoke-tested for leaks, and completely cover the circumference of pipe or other structures where the work is to be

completed. Use glovebags only once and do not move. Glovebags are not to be used on surfaces that have temperatures exceeding 150 degrees F. Prior to disposal, collapse glovebags using a HEPA vacuum. Before beginning the operation, wrap loose and friable material adjacent to the glovebag operation and seal in 2 layers of plastic or otherwise rendered intact. At least 2 people must perform glovebag removal. Establish asbestos regulated work areas as determined by the Competent Person for glovebag abatement. Establish boundary limits for the asbestos work with rope or other continuous barriers and maintain all other requirements for asbestos control areas, including area signage and boundary warning tape.

- a. Attach HEPA vacuum systems to the bag to prevent collapse during removal of ACM.
- b. Fit the negative pressure glove boxes with gloved apertures and a bagging outlet and constructed with rigid sides from metal or other material which can withstand the weight of the ACM and water used during removal. Create negative pressure in the system using a HEPA filtration system. Smoke test the box for leaks prior to each use.

3.6.5.3 Mini-Enclosures

Single bulkhead containment, double bulkhead containment, or mini-containment (small walk-in enclosure) accommodating no more than 2 persons may be used if the disturbance or removal can be completely contained by the enclosure. Inspect the mini-enclosure for leaks and smoke test before each use. Direct air movement away from the employee's breathing zone within the mini-enclosure.

3.6.5.4 Wrap and Cut Operation

Prior to cutting pipe, wrap the asbestos-containing insulation with polyethylene and securely seal with duct tape to prevent asbestos becoming airborne as a result of the cutting process. The following steps must be taken: install glovebag, strip back sections must be cut 6 inches from point of cut, and cut pipe into manageable sections.

3.6.6 Class II Work

In addition to the requirements of paragraphs "Mandated Practices" and "Control Methods," use the following engineering controls and work practices:

- a. A Competent Person to supervise the work.
- b. For indoor work, place critical barriers over all openings to the regulated area.
- c. Place impermeable drop cloths on surfaces beneath all removal activity.

3.6.7 Specific Control Methods for Class III Work

Conduct Class III asbestos work using engineering and work practice controls which minimize the exposure to employees performing the asbestos work. Perform using wet methods and, to the extent feasible, using local exhaust. Use impermeable drop cloths and isolate the operation, using mini-enclosures or glovebag systems, where the disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of TSI or surfacing material.

3.7 FINAL CLEANING AND VISUAL INSPECTION

After thoroughly cleaning areas as specified, collect and remove any remaining visible accumulations of asbestos. For all classes of abatement removals perform a final cleaning using HEPA vacuum and wet cleaning of all exposed surfaces and objects in the regulated area. Upon completion of the cleaning, conduct a visual pre-inspection of the cleaned area in preparation for a final inspection before final air clearance monitoring. The Contractor and the Contracting Officer will conduct a final visual inspection of the cleaned regulated area in accordance with ASTM E1368 and document the results on the Final Cleaning and Visual Inspection. If the Contracting Officer rejects the clean regulated area as not meeting final cleaning requirements, reclean as necessary and have a follow-on inspection conducted with the Contracting Officer. Complete recleaning and follow-up reinspection at no additional cost.

3.8 LOCKDOWN

Prior to removal of plastic barriers and after final visual inspection, spray apply a (lockdown) encapsulant to ceiling, walls, floors, and other surfaces in the regulated area.

3.9 EXPOSURE ASSESSMENT AND AIR MONITORING

3.9.1 General Requirements

- a. Perform exposure assessment, air monitoring, and analysis of airborne concentration of asbestos fibers in accordance with 29 CFR 1926.1101. Results of breathing zone samples must be posted at the job site and made available to the Contracting Officer. Submit all documentation regarding initial exposure assessments, negative exposure assessments, and air-monitoring results.
- b. Worker Exposure:
 - (1) Contractor must collect samples representative of the exposure of each employee who is assigned to work within a regulated area. Take breathing zone samples for at least 25 percent of the workers in each shift, or a minimum of 2, whichever is greater.
 - (2)
 - (3) Workers must not be exposed to an airborne fiber concentration in excess of 1.0 f/cc, as averaged over a sampling period of 30 minutes. Should a personal excursion concentration of 1.0 f/cc expressed as a 30-minute sample

occur inside a regulated work area, stop work immediately, notify the Contracting Officer, and implement additional engineering controls and work practice controls to reduce airborne fiber levels below prescribed limits in the work area. Do not restart work until authorized by the Contracting Officer.

c. Environmental Exposure:

- (1) An IH must perform all environmental air monitoring.
- (2) Perform environmental and final clearance air monitoring in accordance with NIOSH 2003-154 Method 7400 (PCM) with optional confirmation of results by TEM.
- (3) For environmental and final clearance, conduct air monitoring at a sufficient velocity and duration to establish the limit of detection of the method used at 0.01 f/cc.
- (4) When confirming asbestos fiber concentrations (asbestos f/cc) from environmental and final clearance samples, use TEM in accordance with NIOSH 2003-154 Method 7402. When such confirmation is conducted, provide from the same sample filter used for the NIOSH 2003-154 Method 7400 PCM analysis. All confirmation of asbestos fiber concentrations must be in accordance with NIOSH 2003-154 Method 7402.
- (5)
- (6) Maintain a fiber concentration inside a regulated area less than or equal to 0.1 f/cc expressed as an 8 hour, time-weighted average (TWA) during the conduct of the asbestos abatement.
- (7) At the discretion of the Contracting Officer, fiber concentration may exceed 0.1 f/cc but is not to exceed 1.0 f/cc expressed as an 8-hour TWA. Should an environmental concentration of 1.0 f/cc expressed as an 8-hour TWA occur inside a regulated work area, stop work immediately, notify the Contracting Officer, and implement additional engineering controls and work practice controls to reduce airborne fiber levels below prescribed limits in the work area. Do not restart work until authorized by the Contracting Officer.

3.9.2 Initial Exposure Assessment

IH must conduct an exposure assessment immediately before or at the initiation of an asbestos abatement operation to ascertain expected exposures during that operation. The assessment must be completed in time to comply with the requirements, which are triggered by exposure data or the lack of a negative exposure assessment, and to provide information necessary to ensure that all control systems planned are appropriate for that operation. The assessment must take into consideration both the monitoring results and all observations,

information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the Contractor which indicate the levels of airborne asbestos likely to be encountered on the job. For Class I asbestos work, until the employer conducts exposure monitoring and documents that employees on that job is not to be exposed in excess of PELs, or otherwise makes a negative exposure assessment, presume that employees are exposed in excess of the PEL-TWA and PEL-Excursion Limit.

3.9.3 Negative Exposure Assessment

Provide a negative exposure assessment for the specific asbestos job performed within 10 days of the initiation of the project in accordance with:

- a. **Objective Data:** Demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the PEL-TWA and PEL-Excursion Limit under those work conditions having the greatest potential for releasing asbestos.
- b. **Prior Asbestos Jobs:** Monitored prior asbestos jobs for the PEL and the PEL-Excursion Limit within 12 months of the current job, the monitoring and analysis were performed in accordance with asbestos standard in effect; the data were obtained during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations; the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job; and these data show that under the conditions prevailing and which will prevail in the current workplace, there is a high degree of certainty that the monitoring covered exposure from employee exposures will not exceed the PEL-TWA and PEL-Excursion Limit.
- c. **Initial Exposure Monitoring:** The results of initial exposure monitoring of the current job, made from breathing zone air samples that are representative of the 8-hour PEL-TWA and 30-minute short-term exposures of each employee. The monitoring covered exposure from operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

3.9.5 Final Clearance Air Monitoring

IH must conduct final clearance air monitoring using aggressive air sampling techniques in accordance with 40 CFR 763, Subpart E, Appendix A, Unit III, and TEM Method B.7(d-f) for all indoor asbestos abatement projects. Clearance air monitoring is not required for outside work or for soil cleanups.

3.9.5.1 Final Clearance Requirements, NIOSH PCM Method

For PCM sampling and analysis in accordance with NIOSH 2003-154 Method 7400, the fiber concentration inside the abated regulated area, for

each airborne sample, must be less than 0.01 f/cc. The abatement inside the regulated area is considered complete when every PCM final clearance sample is below the clearance limit. If any sample result is greater than 0.01 total f/cc, the asbestos fiber concentration (asbestos f/cc) must be confirmed from that same filter in accordance with NIOSH 2003-154 Method 7402 (TEM) at no additional cost to the Owner. If any confirmation sample result is greater than 0.01 asbestos f/cc, abatement is incomplete and cleaning must be repeated. Upon completion of any required recleaning, complete resampling with results in accordance with clearance criteria.

3.9.5.2 Final Clearance Requirements, EPA TEM Method

For EPA TEM sampling and analysis, using the EPA Method in accordance with 40 CFR 763, abatement inside the regulated area is considered complete when the arithmetic mean asbestos concentration of the 5 inside samples is less than or equal to 70 structures per square millimeter (70 S/mm). When the arithmetic mean is greater than 70 S/mm, the 3 blank samples must be analyzed. If the 3 blank samples are greater than 70 S/mm, complete resampling. If less than 70 S/mm, the 5 outside samples must be analyzed and a Z-test analysis performed. When the Z-test results are less than 1.65, the decontamination is considered complete. If the Z-test results are more than 1.65, the abatement is incomplete, and cleaning must be repeated. Upon completion of any required recleaning, complete resampling with results in accordance with clearance criteria.

3.9.5.3 Air Clearance Failure

If clearance sampling results fail to meet the final clearance requirements, pay all costs associated with the required recleaning, resampling, and analysis, until final clearance requirements are met.

3.9.6 Air-Monitoring Results and Documentation

Complete air sample fiber counting and submit results within 24 hours (breathing zone samples), and 48 hours (environmental/clearance monitoring) after completion of a sampling period. Notify the Contracting Officer immediately of any airborne levels of asbestos fibers in excess of established requirements. Submit written sampling results within 5 working days of the date of collection. The written results must be signed by testing laboratory analyst, testing laboratory principal and the Contractor's IH. Document air sampling results on the Contractor's daily air monitoring log. The daily air monitoring log must contain the following information for each sample:

- a. Sampling and analytical method used;
- b. Date sample collected;
- c. Sample number;
- d. Sample type: BZ = Breathing Zone (Personal), P = Pre-abatement, E = Environmental, C = Abatement Clearance;

- e. Location/activity/name where sample collected;
- f. Sampling pump manufacturer, model and serial number, beginning flow rate, end flow rate, average flow rate (L/min);
- g. Calibration date, time, method, location, name of calibrator, signature;
- h. Sample period (start time, stop time, elapsed time (minutes));
- i. Total air volume sampled (liters);
- j. Sample results (f/cc and S/mm square) if EPA methods are required for final clearance; and
- k. Laboratory name, location, analytical method, analyst, confidence level. In addition, the printed name and a signature and date block for the IH who conducted the sampling and for the IH who reviewed the daily air monitoring log verifying the accuracy of the information.

3.10 CLEARANCE CERTIFICATION

When asbestos abatement is complete, ACM waste is removed from the regulated areas, and final clean-up is completed, the Contracting Officer will allow the warning signs and boundary warning tape to be removed. After final clean-up and acceptable airborne concentrations are attained, but before the HEPA unit is turned off and the containment removed, remove all pre-filters on the building HVAC system and provide pre-filters. Dispose such filters as asbestos contaminated materials. HVAC, mechanical, and electrical systems must be re-established in proper working order. The Contractor and the Contracting Officer will visually inspect all surfaces within the containment for residual material or accumulated debris. Reclean all areas showing dust or residual materials. The Contracting Officer will certify in writing that the area is safe before unrestricted entry is permitted. The Owner will have the option to perform monitoring to certify the areas are safe before entry is permitted.

3.11 CLEANUP AND DISPOSAL

3.11.1 Title to ACM Materials

ACM material resulting from abatement work, except as specified otherwise, becomes the property of the Contractor and must be disposed of as specified and in accordance with applicable Federal, State and local regulations.

3.11.2 Collection and Disposal of Asbestos

Collect all ACM waste including contaminated wastewater filters, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing, and place in leak-tight containers. Wet waste within the containers to avoid breaching. Dispose waste at an EPA, State and local approved asbestos landfill. For temporary storage, store sealed impermeable containers in an asbestos waste load-out unit or in a

storage/transportation conveyance (i.e., dumpster, roll-off waste boxes, etc.) in an acceptable manner and in an area as directed. Procedures for hauling and disposal must be in accordance with 40 CFR 61, Subpart M, State, regional, and local standards. Submit manufacturer's catalog data for all materials and equipment to be used, including brand name, model, capacity, performance characteristics and any other pertinent information. Submit test results and certificates from the manufacturer of encapsulants substantiating compliance with performance requirements as specified. Submit Safety Data Sheets for all chemicals to be used on-site in the same format as implemented in the HAZARD COMMUNICATION PROGRAM. Data must include, but not be limited to, the following items:

- a. High Efficiency Filtered Air (HEPA) local exhaust equipment;
- b. Vacuum cleaning equipment;
- c. Pressure differential monitor for HEPA local exhaust equipment;;
- d. Air monitoring equipment
- e. Respirators;
- f. Personal protective clothing and equipment;
- g. Glovebags. Written manufacturer's proof that glovebags will not break down under expected temperatures and conditions;
- h. Duct Tape;
- i. Disposal Containers;
- j. Sheet Plastic;
- k. Wetting Agent;
- l. Strippable Coating;
- m. Prefabricated Decontamination Unit; and
- n. Material Safety Data Sheets (for all chemicals proposed).

3.11.3 Records and Management Plan

3.11.3.1 Asbestos Waste Shipment Records

Complete and submit final completed copies of the Waste Shipment Record for all shipments of waste material in accordance with 40 CFR 61, Subpart M and other required State waste manifest shipment records, within 3 days of delivery to the landfill. Each Waste Shipment Record must be signed and dated by the Contractor, the waste transporter, and disposal facility operator.

3.11.3.2 Asbestos Management Plan

Provide a summary of site activities (bulk samples, asbestos removed,

repaired, encased, etc.).