

SECTION 02 82 00
ASBESTOS REMEDIATION

PART 1 GENERAL

1.01 REFERENCES

- A. 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.
1. American Society of Safety Professionals (ASSP): ASSP Z9.2, (2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems.
 2. ASTM International (ASTM):
 - a. C732, (2017; R 2022) Standard Test Method for Aging Effects of Artificial Weathering on Latex Sealants.
 - b. D522/D522M, (2017) Mandrel Bend Test of Attached Organic Coatings.
 - c. D2794, (1993; R 2019) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - d. D4397, (2016) Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
 - e. E84, (2020) Standard Test Method for Surface Burning Characteristics of Building Materials.
 - f. E96/E96M, (2022) Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.
 - g. E119, (2020) Standard Test Methods for Fire Tests of Building Construction and Materials.
 - h. E736/E736M, (2017) Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
 - i. E1368, (2014) Visual Inspection of Asbestos Abatement Projects.
 - j. E1494, (2012) Encapsulants for Spray- or Trowel-Applied Friable Asbestos-Containing Building Materials.
 3. Compressed Gas Association (CGA): G-7, (2014) Compressed Air for Human Respiration; 6th Edition.
 4. International Safety Equipment Association (ISEA): ANSI/ISEA Z87.1, (2020) Occupational and Educational Personal Eye and Face Protection Devices.
 5. National Fire Protection Association (NFPA): 701, (2019) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
 6. National Institute For Occupational Safety And Health (NIOSH): NMAM, (2016; 5th Ed) NIOSH Manual of Analytical Methods.

7. U.S. Environmental Protection Agency (EPA):
 - a. 340/1-90/018, (1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance.
 - b. 560/5-85-024, (1985) Guidance for Controlling Asbestos-Containing Materials in Buildings (Purple Book).
8. U.S. National Archives and Records Administration (NARA):
 - a. 29 CFR 1910.147, The Control of Hazardous Energy (Lock Out/Tag Out).
 - b. 29 CFR 1926.51, Sanitation.
 - c. 29 CFR 1926.59, Hazard Communication.
 - d. 29 CFR 1926.103, Respiratory Protection.
 - e. 29 CFR 1926.200, Accident Prevention Signs and Tags.
 - f. 29 CFR 1926.1101, Asbestos.
 - g. 40 CFR 61-SUBPART A, General Provisions.
 - h. 40 CFR 61-SUBPART M, National Emission Standard for Asbestos.
 - i. 40 CFR 763, Asbestos.
 - j. 42 CFR 84, Approval of Respiratory Protective Devices.
 - k. 49 CFR 107, Hazardous Materials Program Procedures.
 - l. 49 CFR 171, General Information, Regulations, and Definitions.
 - m. 49 CFR 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements.
 - n. 49 CFR 173, Shippers - General Requirements for Shipments and Packagings.
9. UL: 586, (2009; Reprint Dec 2017) UL Standard for Safety High-Efficiency Particulate, Air Filter Units.

1.02 DEFINITIONS

- A. ACM: Asbestos Containing Materials. Any material which contains greater than 1 percent asbestos.
- B. Amended Water: Water containing a wetting agent or surfactant with a maximum surface tension of 0.00042 psi.
- C. Area Sampling: Sampling of asbestos fiber concentrations which approximates the concentrations of asbestos in the theoretical breathing zone but is not actually collected in the breathing zone of an employee.
- D. Asbestos: The term asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, and actinolite asbestos and any of these minerals that has been chemically treated or altered.

- E. Asbestos Control Area: That area where asbestos removal operations are performed which is isolated by physical boundaries which assist in the prevention of the uncontrolled release of asbestos dust, fibers, or debris.
- F. Asbestos Fibers: Those fibers having an aspect ratio of at least 3:1 and longer than 5 micrometers as determined by National Institute for Occupational Safety and Health (NIOSH) Method 7400.
- G. Asbestos Permissible Exposure Limit: 0.1 fibers per cubic centimeter of air as an 8-hour time weighted average measured in the breathing zone as defined by 29 CFR 1926.1101 or other Federal legislation having legal jurisdiction for the protection of workers health.
- H. Authorized Person: Any person authorized by the Contractor and required by work duties to be present in the regulated areas.
- I. Background: The ambient airborne asbestos concentration in an uncontaminated area as measured prior to any asbestos hazard abatement efforts. Background concentrations for other (contaminated) areas are measured in similar but asbestos free locations.
- J. Competent Person (CP): A person meeting the requirements for competent person as specified in 29 CFR 1926.1101 including a person capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, and is specifically trained in a training course which meet the criteria of EPA's Model Accreditation Plan (40 CFR 763) for project designer or supervisor, or its equivalent. The competent person must have a current State of Asbestos Hazard Emergency Response Act (AHERA) asbestos contractors or supervisors license.
- K. Contractor: The Contractor is that individual, or entity under contract to perform the herein listed work.
- L. Disposal Bag: A 6-mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926.1101, used for transporting asbestos waste from containment to disposal site.
- M. 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 one standard sized glovebag or waste bag, not larger than 60 inches in length and width in order to access a building component.

- N. Encapsulation: The abatement of an asbestos hazard through the appropriate use of chemical encapsulants.
- O. Encapsulants: Specific materials in various forms used to chemically or physically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There is one type of encapsulant as follows which must comply with performance requirements as specified herein.
1. Lock-Down Encapsulant (used to seal off or “lock-down” minute asbestos fibers left on surfaces from which asbestos containing material has been removed).
- P. Friable Asbestos Material: 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, as determined using the method specified in 40 CFR 763, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
- Q. Glovebag Technique: Those asbestos removal and control techniques put forth in 29 CFR 1926.1101.
- R. Government Consultant (GC): That qualified person employed directly by the Government to monitor, sample, inspect the work or in some other way advise the Contracting Officer. The GC is normally a private consultant, but can be an employee of the Government.
- S. HEPA Filter Equipment: High efficiency particulate air (HEPA) filtered vacuum and exhaust ventilation equipment with a filter system capable of collecting and retaining asbestos fibers. Filters must retain 99.97 percent of particles 0.3 microns or larger as indicated in UL 586.
- T. Negative Pressure Enclosure (NPE): That engineering control technique described as a negative pressure enclosure in 29 CFR 1926.1101.
- U. NESHAP: National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is at 40 CFR 61-Subpart M.
- V. Nonfriable Asbestos Material: Material that contains asbestos in which the fibers have been immobilized by a bonding agent, coating, binder, or other material so that the asbestos is well bound and will not normally release asbestos fibers during any appropriate use, handling, storage or transportation. It is understood that asbestos fibers may be released under other conditions such as demolition, removal, or mishap.

- W. Permissible Exposure Limits (PELs):
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).
 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.
- X. Personal Sampling: Air sampling which is performed to determine asbestos fiber concentrations within the breathing zone of a specific employee, as performed in accordance with 29 CFR 1926.1101.
- Y. Private Qualified Person (PQP): That qualified person hired by the Contractor to perform the herein listed tasks.
- Z. Qualified Person (QP): A Registered Architect, Professional Engineer, Certified Industrial Hygienist, consultant, or other qualified person who has successfully completed training as a Building Inspector.
- AA. Contractor/Supervisor Abatement Worker; and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent. The QP must be qualified to perform visual inspections as indicated in ASTM E1368.
- BB. TEM: Refers to Transmission Electron Microscopy.
- CC. Time Weighted Average (TWA): The TWA is an 8-hour time weighted average airborne concentration of asbestos fibers.
- DD. Transite: A generic name for asbestos cement wallboard and pipe.
- EE. Wetting Agent: A chemical added to water to reduce the water's surface tension thereby increasing the water's ability to soak into the material to which it is applied. An equivalent wetting agent must have a surface tension of at most 0.00042 psi.
- FF. 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. The worker must be appropriately licensed for working in the State of Arizona.

1.03 REQUIREMENTS

- A. Description of Work: The work covered by this section includes the handling and control of asbestos containing materials and describes some of the resultant procedures and equipment required to protect workers, the environment and occupants of the building or area, or both, from contact with airborne asbestos fibers. The work also includes the disposal of any asbestos containing materials generated by the work. More specific operational procedures must be outlined in the Asbestos Hazard Abatement Plan called for elsewhere in this specification. The asbestos work includes the demolition and removal of 12 by 12 light brown vinyl floor tile and mastic located throughout, and pipe flange and gaskets located in the Water Treatment Plant and Pump house. The buildings will be evacuated during the asbestos abatement work. A competent person must supervise asbestos removal work as specified herein.
- B. Unexpected Discovery of Asbestos: Notify the Contracting Officer if any previously untested building components suspected to contain asbestos are impacted by the work.
- C. Medical Requirements: Provide medical requirements including but not limited to medical surveillance and medical record keeping as listed in 29 CFR 1926.1101.
 - 1. Medical Examinations: Before exposure to airborne asbestos fibers, provide workers with a comprehensive medical examination as required by 29 CFR 1926.1101 or other pertinent State or local directives. This requirement must have been satisfied within the 12 months prior to the start of work on this Contract. The same medical examination must be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation. Specifically identify x-ray films of asbestos workers to the consulting radiologist and mark medical record jackets with the word "ASBESTOS."
 - 2. Medical Records:
 - a. Maintain complete and accurate records of employees' medical examinations, medical records, and exposure data for a period of 50 years after termination of employment and make records of the required medical examinations and exposure data available for inspection and copying to:
 - 1) The Assistant Secretary of Labor for Occupational Safety and Health (OSHA), or authorized representatives of them, and an employee's physician upon the request of the employee or former employee.

- D. Employee Training: Submit certificates, prior to the start of work but after the main abatement submittal, signed by each employee indicating that the employee has received training in the proper handling of materials and wastes that contain asbestos in accordance with 40 CFR 763; understands the health implications and risks involved, including the illnesses possible from exposure to airborne asbestos fibers; understands the use and limits of the respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment as indicated in 29 CFR 1926.1101 on an initial and annual basis. Organize certificates by individual worker, not grouped by type of certification. Train personnel involved in the asbestos control work in accordance with United States Environmental Protection Agency (USEPA) Asbestos Hazard Emergency Response Act (AHERA) training criteria or State training criteria whichever is more stringent. Document the training by providing: Dates of training, training entity, course outline, names of instructors, and qualifications of instructors upon request by the Contracting Officer. Furnish each employee with respirator training and fit testing administered by the PQP as required by 29 CFR 1926.1101 and 29 CFR 1926.103. Fully cover engineering and other hazard control techniques and procedures. Asbestos workers must have a current AHERA asbestos worker's license.
- E. Permits, Licenses, and Notifications: Prior to the start of work, obtain necessary permits and licenses in conjunction with asbestos removal, encapsulation, hauling, and disposition, and furnish notification of such actions required by federal, state, regional, and local authorities. Notify the Arizona Department of Environmental Quality 10 calendar days prior to commencement of work in accordance with 40 CFR 61-Subpart M. Notify the Contracting Officer and other appropriate Government agencies in writing 20 calendar days prior to the start of asbestos work as indicated in applicable laws, ordinances, criteria, rules, and regulations. Submit copies of all Notifications to the Contracting Officer.
- F. Environment, Safety and Health Compliance: In addition to detailed requirements of this specification, comply with those applicable laws, ordinances, criteria, rules, and regulations of federal, state, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.1101, 40 CFR 61-Subpart A, 40 CFR 61-Subpart M, and 40 CFR 763. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances,

regulations, and referenced documents vary, the most stringent requirement as defined by the Government apply.

- G. Respiratory Protection Program: Establish and implement a respirator program as required by 29 CFR 1926.1101, and 29 CFR 1926.103. Submit a written description of the program to the Contracting Officer. Submit a written program manual or operating procedure including methods of compliance with regulatory statutes.
 - 1. Respirator Program Records: Submit records of the respirator program as required by 29 CFR 1926.103, and 29 CFR 1926.1101.
 - 2. Respirator Fit Testing: The Contractor's PQP must conduct a qualitative or quantitative fit test conforming to 29 CFR 1926.103 for each worker required to wear a respirator, and any authorized visitors who enter a regulated area where respirators are required to be worn. A respirator fit test must be performed prior to initially wearing a respirator and every 12 months thereafter. If physical changes develop that will affect the fit, a new fit test must be performed. Functional fit checks must be performed each time a respirator is put on and in accordance with the manufacturer's recommendation.
 - 3. Respirator Selection and Use Requirements: Provide respirators, and ensure that they are used as required by 29 CFR 1926.1101 and in accordance with CGA G-7 and the manufacturer's recommendations. Respirators must be 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 must 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 must be made by the Contractor's Designated IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered.
- H. Asbestos Hazard Control Supervisor: The Contractor must be represented onsite by a supervisor, trained using the model Contractor accreditation plan as indicated in the Federal statutes for all portions of the herein listed work.
- I. Hazard Communication: Adhere to all parts of 29 CFR 1926.59 and provide the Contracting Officer with a copy of the Safety Data Sheets (SDS) for all materials brought to the Site.
- J. Asbestos Hazard Abatement Plan: Submit a detailed plan of the safety precautions such as lockout, tagout, tryout, fall protection, and confined space entry procedures and equipment and work procedures to be used in the removal and demolition of materials containing asbestos. The plan, not to be combined with other hazard abatement plans, must be prepared, signed, and sealed by the PQP. Provide a Table of Contents for each abatement submittal,

which follows the sequence of requirements in the Contract. The plan must include but not be limited to the precise personal protective equipment to be used including, but not limited to, respiratory protection, type of whole-body protection, the location of asbestos control areas including clean and dirty areas, buffer zones, showers, storage areas, change rooms, removal method, interface of trades involved in the construction, sequencing of asbestos related work, disposal plan, type of wetting agent and asbestos sealer to be used, locations of local exhaust equipment, planned air monitoring strategies, and a detailed description of the method to be employed in order to control environmental pollution. The plan must also include (both fire and medical emergency) response plans and an Activity Hazard Analyses (AHAs). The Asbestos Hazard Abatement Plan must be approved in writing prior to starting any asbestos work. The Contractor, Asbestos Hazard Control Supervisor, CP and PQP must meet with the Contracting Officer prior to beginning work, to discuss in detail the Asbestos Hazard Abatement Plan, including work procedures and safety precautions. Once approved by the Contracting Officer, the plan will be enforced as if an addition to the specification. Any changes required in the specification as a result of the plan must be identified specifically in the plan to allow for free discussion and approval by the Contracting Officer prior to starting Work.

- K. Testing Laboratory: Submit the name, address, and telephone number of each testing laboratory selected for the analysis, and reporting of airborne concentrations of asbestos fibers along with evidence that each laboratory selected holds the appropriate license and permits and certification that each laboratory is American Industrial Hygiene Association (AIHA) accredited and that persons counting the samples have been judged proficient by current inclusion on the AIHA Asbestos Analysis Registry (AAR) and successful participation of the laboratory in the Proficiency Analytical Testing (PAT) Program. Where analysis to determine asbestos content in bulk materials or transmission electron microscopy is required, submit evidence that the laboratory is accredited by the National Institute of Science and Technology (NIST) under National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis. The testing laboratory firm must be independent of the asbestos contractor and must have no employee or employer relationship which could constitute a conflict of interest.
- L. Landfill Approval: Submit written evidence that the landfill is approved for asbestos disposal by the U.S. Environmental Protection Agency, Region 8, and local regulatory agencies. Within 3 calendar days after delivery, submit detailed delivery tickets, prepared, signed, and dated by an agent of the landfill, certifying the amount of asbestos materials delivered to the landfill. Submit a copy of the waste shipment records within one day of the shipment leaving the Project Site.

- M. Transporter Certification: Submit written evidence that the transporter is approved to transport asbestos waste in accordance with the DOT requirements of 49 CFR 171, 49 CFR 172 and 49 CFR 173 as well as registration requirements of 49 CFR 107 and all other state and local regulatory agency requirements.
- N. Medical Certification: Provide a written certification for each worker and supervisor, signed by a licensed physician indicating that the worker and supervisor has met or exceeded all of the medical prerequisites listed herein and in 29 CFR 1926.1101 and 29 CFR 1926.103 as prescribed by law. Submit certificates prior to the start of work but after the main abatement submittal.

1.04 SUBMITTALS

A. Action Submittals:

- 1. Test Reports:
 - a. Air Sampling Results.
 - b. Pressure Differential Recordings for Local Exhaust System.
 - c. Clearance Sampling.
- 2. Certificates:
 - a. Employee Training.
 - b. Notifications.
 - c. Respiratory Protection Program.
 - d. Testing Laboratory.
 - e. Landfill Approval.
 - f. Delivery Tickets.
 - g. Waste Shipment Records.
 - h. Transporter Certification.
 - i. Medical Certification.
 - j. Private Qualified Person Documentation.
 - k. Designated Competent Person.
 - l. Worker's License.
 - m. Contractor's License.
 - n. Federal, State or Local Citations on Previous Projects.
 - o. Encapsulants.
 - p. Equipment Used to Contain Airborne Asbestos Fibers.
- 3. Closeout Submittals:
 - a. Permits and Licenses.
 - b. Notifications.
 - c. Respirator Program Records.
 - d. Rental Equipment.

B. Informational Submittals:

1. Product Data:

- a. Amended Water.
- b. Safety Data Sheets (SDS) for All Materials.
- c. Encapsulants.
- d. Respirators.
- e. Local Exhaust Equipment.
- f. Pressure Differential Automatic Recording Instrument.
- g. Vacuums.
- h. Water Filtration Systems.
- i. Ventilation Systems.

1.05 QUALITY ASSURANCE

- A. Private Qualified Person Documentation: Submit the name, address, and telephone number of the Private Qualified Person (PQP) selected to prepare the Asbestos Hazard Abatement Plan, direct monitoring and training, and documented evidence that the PQP has successfully completed training in and is accredited and where required is certified as, a Building Inspector, Contractor/Supervisor Abatement Worker as described by 40 CFR 763 and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent. The PQP and the asbestos contractor must not have an employee/employer relationship or financial relationship which could constitute a conflict of interest. The PQP must be a first tier subcontractor.
- B. Designated Competent Person Documentation: The Designated Competent Person must be 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. The Designated Competent Person must be onsite at all times when asbestos abatement activities are underway. Submit training certification and a current AHERA Asbestos Contractor's and Supervisor's License. Submit evidence that the Designated Competent Person has a minimum of 2 years of on-the-job asbestos abatement experience relevant to OSHA designated competent person requirements. The Designated Competent Person must be a first tier subcontractor.

- C. Worker's License: Submit documentation that workers meet the requirements of 29 CFR 1926.1101, 40 CFR 61-Subpart M and have a current AHERA Asbestos Workers License.
- D. Contractor's License: Submit a copy of the asbestos contractor's license. Submit the following certification along with the license: "I certify that the personnel I am responsible for during the course of this Project fully understand the contents of 29 CFR 1926.1101, 40 CFR 61-Subpart M, and the Federal, State and local requirements for those asbestos abatement activities that they will be involved in." This certification statement must be signed by the Company's President or Chief Executive.
- E. Air Sampling Results: Complete fiber counting and provide results to the PQP for review within 16 hours of the "time off" of the sample pump. Notify the Contracting Officer immediately of any airborne levels of asbestos fibers in excess of the acceptable limits. Submit sampling results to the Contracting Officer and the affected Contractor employees where required by law within 3 days, signed by the testing laboratory employee performing air sampling, the employee that analyzed the sample, and the PQP. Notify the Contractor and the Contracting Officer immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.01 fibers per cubic centimeter or background whichever is higher. In no circumstance must levels exceed 0.1 fibers per cubic centimeter.
- F. Pressure Differential Recordings for Local Exhaust System: Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24 hours a day, until the temporary enclosure of the asbestos control area is removed. Submit pressure differential recordings for each work day to the PQP for review and to the Contracting Officer within 24 hours from the end of each work day.
- G. 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 within the last 5 years (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, a negative declaration signed by an officer of the company must be provided.

- H. Preconstruction Conference: Conduct a safety preconstruction conference to discuss the details of the Asbestos Hazard Abatement Plan, Accident Prevention Plan (APP) including the AHAs. The safety preconstruction conference must include the Contractor and their Designated Competent Person, Designated IH and Project Supervisor and the Contracting Officer. Deficiencies in the APP will be discussed. Onsite work must not begin until the APP has been accepted.

1.06 SECURITY

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

1.07 EQUIPMENT

- A. Rental Equipment: Provide a copy of the written notification to the rental company concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

PART 2 PRODUCTS

2.01 ENCAPSULANTS

- A. Encapsulants must conform to current USEPA requirements, contain no toxic or hazardous substances as defined in 29 CFR 1926.59, and conform to the following performance requirements.

1. Lock-down Encapsulant:

Requirement	Test Standard
Flame Spread: 25, Smoke Emission: 50	ASTM E84
Life Expectancy: 20 years	ASTM C732 Accelerated Aging Test
Permeability: Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance: Negligible affect on fire resistance rating over 3-hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E119
Bond Strength: 100 pounds of force/foot	ASTM E736/E736M
(Tests compatibility with cementitious and fibrous fireproofing)	

2.02 DUCT TAPE

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

2.03 DISPOSAL CONTAINERS

- A. Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers must be provided for ACM wastes as required by 29 CFR 1926.1101. Disposal containers can be in the form of:
 - 1. Disposal bags.
 - 2. Fiberboard drums.
 - 3. Cardboard boxes.

2.04 SHEET PLASTIC

- A. Sheet plastic must be polyethylene of 6 mil minimum thickness and must be provided in the largest sheet size necessary to minimize seams. Film must be clear and conform to ASTM D4397, except as specified below:
 - 1. Flame Resistant: Where a potential for fire exists, flame-resistant sheets must be provided. Film must be frosted or black and must conform to the requirements of NFPA 701.
 - 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 two layers of polyethylene film. Film must meet flame resistant standards of NFPA 701.

2.05 MASTIC REMOVING SOLVENT

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

2.06 LEAK-TIGHT WRAPPING

- A. 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 large tanks, boilers, insulated pipe segments and other materials. Upon placement of the ACM component or material, each layer must be individually leak-tight sealed with duct tape.

2.07 VIEWING INSPECTION WINDOW

- A. Where feasible, a minimum of one clear, 1/8-inch thick, acrylic sheet, 18 inches by 24 inches, must be installed as a viewing inspection window at eye level on a wall in each containment enclosure. The windows must be sealed leak-tight with industrial grade duct tape.

2.08 WETTING AGENTS

- A. Removal encapsulant (a penetrating encapsulant) must be provided 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 Article Encapsulants.

PART 3 EXECUTION

3.01 EQUIPMENT

- A. Provide the Contracting Officer, with at least two complete sets of personal protective equipment as required for entry to and inspection of the asbestos control area. Provide equivalent training to the Contracting Officer or a designated representative as provided to Contractor employees in the use of the required personal protective equipment. Provide manufacturer's certificate of compliance for all equipment used to contain airborne asbestos fibers.
- B. Air Monitoring Equipment:
 - 1. The Contractor's PQP must approve air monitoring equipment. The equipment must include, but must 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 3.5 liters per minute, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. The pumps must also be equipped with an automatic flow control unit which must 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 NMAM 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 degrees F to plus 140 degrees F and traceable to a NIST primary standard.
- C. Respirators: Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.
- 1. Respirators for Handling Asbestos: Provide personnel engaged in pre-cleaning, cleanup, handling, removal, or demolition of asbestos materials with respiratory protection as indicated in 29 CFR 1926.1101 and 29 CFR 1926.103. Breathing air must comply with CGA G-7.
- D. Exterior Whole Body Protection:
- 1. Outer Protective Clothing: Provide personnel exposed to asbestos with disposable “non-breathable,” whole body outer protective clothing, head coverings, gloves, and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but must not be used alone. Make sleeves secure at the wrists, make foot coverings secure at the ankles, and make clothing secure at the neck by the use of tape.
 - 2. Work Clothing: Provide cloth work clothes for wear under the outer protective clothing and foot coverings and either dispose of or properly decontaminate them as recommended by the PQP after each use.
 - 3. Personal Decontamination Unit: Provide a temporary, negative pressure unit with a separate decontamination locker room and clean locker room with a shower that complies with 29 CFR 1926.51(f)(4)(ii) through (V) in between for personnel required to wear whole body protective clothing. Provide two separate lockers for each asbestos worker, one in each locker room. Keep street clothing and street shoes in the clean locker. HEPA vacuum and remove asbestos contaminated disposable protective clothing while still wearing respirators at the boundary of the asbestos work area and seal in impermeable bags or containers for disposal. Do not wear work clothing between home and work. Locate

showers between the decontamination locker room and the clean locker room and require that all employees shower before changing into street clothes. Collect used shower water and filter with approved water filtration equipment to remove asbestos contamination. Wastewater filters must be installed in series with the first stage pore size 20 microns and the second stage pore size of 5 microns. Dispose of filters and residue as asbestos waste. Discharge clean water to the sanitary system. Dispose of asbestos contaminated work clothing as asbestos contaminated waste. Keep the floor of the decontamination unit's clean room dry and clean at all times. Proper housekeeping and hygiene requirements must be maintained. Provide soap and towels for showering, washing, and drying. Cloth towels provided must be disposed of as ACM waste or must be laundered in accordance with 29 CFR 1926.1101. Physically attach the decontamination units to the asbestos control area. Construct both a personnel decontamination unit and an equipment decontamination unit onto and integral with each asbestos control area.

4. Eye Protection: Provide eye protection that complies with ANSI/ISEA Z87.1 when operations present a potential eye injury hazard. Provide goggles to personnel engaged in asbestos abatement operations when the use of a full face respirator is not required.
- E. Regulated Areas: All Class I, II, and III asbestos work must be conducted within regulated areas. The regulated area must be demarcated 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.
- F. Load-out Unit: Provide a temporary load-out unit that is adjacent and connected to the regulated area. Attach the load-out unit in a leak-tight manner to each regulated area.
- G. Warning Signs and Labels: Provide bilingual warning sign printed in English and Spanish at all approaches to asbestos control areas. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos.

Containers with preprinted warning labels conforming to the requirements are acceptable.

1. Warning Sign:
 - a. Provide vertical format conforming to 29 CFR 1926.200, and 29 CFR 1926.1101 minimum 20 inches by 14 inches displaying the following legend in the lower panel:

Legend	Notation
DANGER	1-inch Sans Serif Gothic or Block
ASBESTOS	1-inch Sans Serif Gothic or Block
MAY CAUSE CANCER	1-inch Sans Serif Gothic or Block
CAUSES DAMAGE TO LUNGS	1/4-inch Sans Serif Gothic or Block
AUTHORIZED PERSONNEL ONLY	1/4-inch Sans Serif Gothic or Block
WEAR RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA	1/- inch Sans Serif Gothic or Block

- b. Spacing between lines must be at least equal to the height of the upper of any two lines.
2. Warning Labels:
 - a. Provide labels conforming to 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST AVOID CREATING DUST

- H. Local Exhaust System: Provide a local exhaust system in the asbestos control area in accordance with ASSP Z9.2 and 29 CFR 1926.1101 that will provide at least four air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24 hours per day, until the asbestos control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the asbestos control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.
- I. Tools: Vacuums must be leak proof to the filter and equipped with HEPA filters. Filters on vacuums must conform to ASSP Z9.2 and UL 586. Do not use power tools to remove asbestos containing materials unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation systems. Remove all residual asbestos from reusable tools prior to storage or reuse. Reusable tools must be thoroughly decontaminated prior to being removed from the regulated areas.
- J. Rental Equipment: If rental equipment is to be used, furnish written notification to the rental agency concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.
- K. Glovebags: Submit written manufacturers proof that glovebags will not break down under expected temperatures and conditions.
- L. Single Stage Decontamination Area: A decontamination area (equipment room/area) must be provided for Class I work involving less than 25 feet or 10 square feet of TSI or surfacing ACM, and for Class II and Class III asbestos work operations where exposures exceed the PELs or where there is no negative exposure assessment. The equipment room or area must be adjacent to the regulated area for the decontamination of employees, material, and their equipment which could be contaminated with asbestos. The area must be covered by an impermeable drop cloth on the floor or horizontal working surface. The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area.
- M. Decontamination Area Exit Procedures:
 - 1. Ensure that the following procedures are followed:
 - a. Before leaving the regulated area, remove all gross contamination and debris from work clothing using a HEPA vacuum.

- b. Employees must remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers for disposal or laundering.
- c. Employees must not remove their respirators until showering.
- d. Employees must shower prior to entering the clean room. If a shower has not been located between the equipment room and the clean room or the work is performed outdoors, ensure that employees engaged in Class I asbestos jobs: a) Remove asbestos contamination from their work suits in the equipment room or decontamination area using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or b) Remove their contaminated work suits in the equipment room, without cleaning worksuits, and proceed to a shower that is not adjacent to the work area.

3.02 WORK PROCEDURE

- A. Perform asbestos related work in accordance with 29 CFR 1926.1101, 40 CFR 61-Subpart M, and as specified herein. Use wet or if given prior EPA approval, dry removal procedures and negative pressure enclosure techniques. Wear and utilize protective clothing and equipment as specified herein. No eating, smoking, drinking, chewing gum, tobacco, or applying cosmetics is permitted in the asbestos work or control areas. Personnel of other trades not engaged in the removal and demolition of asbestos containing material must not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection and training provisions of this specification are complied with by the trade personnel. Shut down the building heating, ventilating, and air conditioning system, cap the openings to the system, and provide temporary heating, ventilation, and air conditioning prior to the commencement of asbestos work. Power to the regulated area must be locked-out and tagged in accordance with 29 CFR 1910.147. Disconnect electrical service when wet removal is performed and provide temporary electrical service with verifiable ground fault circuit interrupter (GFCI) protection prior to the use of any water. All electrical work must be performed by a licensed electrician. 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 must resume only upon notification by the Contracting Officer. Corrective actions must be documented. If an asbestos fiber release or spill occurs outside of the asbestos control area, stop work immediately, correct the condition to the satisfaction of the Contracting Officer including clearance sampling, prior to resumption of work.

- B. Building Ventilation System and Critical Barriers: Building ventilation system supply and return air ducts in a regulated area must be isolated by airtight seals to prevent the spread of contamination throughout the system. The airtight seals must consist of two layers of polyethylene. Edges to wall, ceiling and floor surfaces must be sealed with industrial grade duct tape.
1. A Competent Person must supervise the work.
 2. For indoor work, critical barriers must be placed over all openings to the regulated area.
 3. Impermeable drop cloths must be placed on surfaces beneath all removal activity.
- C. Protection of Existing Work to Remain: Perform work without damage or contamination of adjacent work. Where such work is damaged or contaminated as verified by the Contracting Officer using visual inspection or sample analysis, it must be restored to its original condition or decontaminated by the Contractor at no expense to the Government as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust, or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, stop work immediately. Then clean up the spill. When satisfactory visual inspection and air sampling results are obtained from the PQP work may proceed at the discretion of the Contracting Officer.
- D. Furnishings: Furniture and equipment will be removed from the area of work by the Government before asbestos work begins.
- E. Precleaning: Wet wipe and HEPA vacuum all surfaces potentially contaminated with asbestos prior to establishment of an enclosure.
- F. Asbestos Control Area Requirements:
1. Negative Pressure Enclosure: Removal of asbestos contaminated acoustical ceiling tiles, spray applied fireproofing, thermal system insulation, gypsum wallboard/joint compound require the use of a negative pressure enclosure. Block and seal openings in areas where the release of airborne asbestos fibers can be expected. Establish an asbestos negative pressure enclosure with the use of curtains, portable partitions, or other enclosures in order to prevent the escape of asbestos fibers from the contaminated asbestos work area. Negative pressure enclosure development must include protective covering of uncontaminated walls, and ceilings with a continuous membrane of two layers of minimum 6-mil plastic sheet sealed with tape to prevent water or other damage. Provide two layers of 6-mil plastic sheet over floors and extend a minimum of 12 inches up walls. Seal all joints with tape. Provide local exhaust system in the asbestos control area. Openings will be allowed in enclosures of asbestos control areas for personnel and

equipment entry and exit, the supply and exhaust of air for the local exhaust system and the removal of properly containerized asbestos containing materials. Replace local exhaust system filters as required to maintain the efficiency of the system.

2. Glovebag: If the construction of a negative pressure enclosure is infeasible for the removal of pipe flange gaskets located in the Water Treatment Plant and Pumphouse use alternate techniques as indicated in 29 CFR 1926.1101. Establish designated limits for the asbestos regulated area with the use of rope or other continuous barriers, and maintain all other requirements for asbestos control areas. The PQP must conduct personal samples of each worker engaged in asbestos handling (removal, disposal, transport, and other associated work) throughout the duration of the Project. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers at any time exceeds background or 0.01 fibers per cubic centimeter whichever is greater, stop work, evacuate personnel in adjacent areas or provide personnel with approved protective equipment at the discretion of the Contracting Officer. This sampling may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those obtained by the Contractor, the Government will determine which results predominate. If adjacent areas are contaminated as determined by the Contracting Officer, clean the contaminated areas, monitor, and visually inspect the area as specified herein.
3. Regulated Area for Class II Removal: Removal of asbestos containing floor tile/mastic are Class II removal activities. Establish designated limits for the asbestos regulated work area with the use of red barrier tape; install critical barriers, splash guards and signs, and maintain all other requirements for asbestos control area except local exhaust. Place impermeable drop cloths on surfaces beneath removal activity extending out 3 feet in all directions. A detached decontamination system may be used. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If workers the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

- G. Removal Procedures: Wet asbestos material with a fine spray of amended water during removal, cutting, or other handling to reduce the emission of airborne fibers. Remove material and immediately place in 6-mil plastic disposal bags. Remove asbestos containing material in a gradual manner, with continuous application of the amended water or wetting agent in such a manner that no asbestos material is disturbed prior to being adequately wetted. Where unusual circumstances prohibit the use of 6-mil plastic bags, submit an alternate proposal for containment of asbestos fibers to the Contracting

Officer for approval. For example, in the case where both piping and insulation are to be removed, the Contractor may elect to wet the insulation, wrap the pipes and insulation in plastic and remove the pipe by sections. Containerize asbestos containing material while wet. Do not allow asbestos material to accumulate or become dry. Lower and otherwise handle asbestos containing material as indicated in 40 CFR 61-Subpart M.

1. Sealing Contaminated Items Designated for Disposal: Remove contaminated architectural, mechanical, and electrical appurtenances such as venetian blinds, full-height partitions, carpeting, duct work, pipes and fittings, radiators, light fixtures, conduit, panels, and other contaminated items designated for removal by completely coating the items with an asbestos lock-down encapsulant at the demolition site before removing the items from the asbestos control area. These items need not be vacuumed. The asbestos lock-down encapsulant must be tinted a contrasting color and spray-applied by airless method. Thoroughness of sealing operation must be visually gauged by the extent of colored coating on exposed surfaces. Lock-down encapsulants must comply with the performance requirements specified herein.
2. Exposed Pipe Insulation Edges: Contain edges of asbestos insulation to remain that are exposed by a removal operation. Wet and cut the rough ends true and square with sharp tools and then encapsulate the edges with a 1/4-inch thick layer of non-asbestos containing insulating cement troweled to a smooth hard finish. When cement is dry, lag the end with a layer of non-asbestos lagging cloth, overlapping the existing ends by at least 4 inches. When insulating cement and cloth is an impractical method of sealing a raw edge of asbestos, take appropriate steps to seal the raw edges as approved by the Contracting Officer.

H. Methods of Compliance:

1. Mandated Practices:
 - a. The specific abatement techniques and items identified must be detailed in the Contractor's AHAP. Use the following engineering controls and work practices in all operations, regardless of the levels of exposure:
 - 1) Vacuum cleaners equipped with HEPA filters.
 - 2) 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.
 - 3) Prompt clean-up and disposal.
 - 4) Inspection and repair of polyethylene.
 - 5) Cleaning of equipment and surfaces of containers prior to removing them from the equipment room or area.

2. Control Methods:
 - a. Use the following control methods:
 - 1) Local exhaust ventilation equipped with HEPA filter.
 - 2) Enclosure or isolation of processes producing asbestos dust.
 - 3) 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 must supplement them by the use of respiratory protection.
3. Unacceptable Practices:
 - a. The following work practices must not be used:
 - 1) High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.
 - 2) 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.
 - 3) Dry sweeping, shoveling, or other dry clean up.
 - 4) Employee rotation as a means of reducing employee exposure to asbestos.

I. Class I Work Procedures:

1. In addition to requirements of Subparagraph Mandated Practices and Subparagraph Control Methods, the following engineering controls and work practices must be used:
 - a. A Competent Person must 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. HVAC systems must be isolated in the regulated area by sealing with a double layer of plastic or air-tight rigid covers.
 - d. Impermeable drop cloths (6-mil or greater thickness) must be placed 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, the regulated area must be ventilated with a HEPA unit and employees must use PPE.

J. Specific Control Methods for Class I Work:

1. Use Class I work procedures, control methods and removal methods for the following ACM:
 - a. Spray Applied Fireproofing.
 - b. Gypsum Wallboard and Joint Compound.
 - c. Thermal System Insulation and Mudded Pipe Fittings.
 - d. Plaster and Textured Ceilings and Walls.
 - e. Vermiculite.
2. Negative Pressure Enclosure (NPE) System: The system must provide at least four air changes per hour inside the containment. The local exhaust unit equipment must be operated 24 hours per day until the containment is removed. The NPE must be smoke tested for leaks at the beginning of each shift and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential must be monitored continuously, 24 hours per day, with an automatic manometric recording instrument and Records must be provided daily on the same day collected to the Contracting Officer. The Contracting Officer must be notified 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. The NPE must terminate outdoors unless an alternate arrangement is allowed by the Contracting Officer. All filters used must be new at the beginning of the Project and must be periodically changed as necessary and disposed of as ACM waste.
3. Glovebag Systems: Glovebags must be used without modification, smoke-tested for leaks, and completely cover the circumference of pipe or other structures where the work is to be done. Glovebags must be used only once and must not be moved. Glovebags must not be used on surfaces that have temperatures exceeding 150 degrees F. Prior to disposal, glovebags must be collapsed using a HEPA vacuum. Before beginning the operation, loose and friable material adjacent to the glovebag operation must be wrapped and sealed in two layers of plastic or otherwise rendered intact. At least two persons must perform glovebag removal. Asbestos regulated work areas must be established for glovebag abatement. Designated boundary limits for the asbestos work must be established with rope or other continuous barriers and all other requirements for asbestos control areas must be maintained, including area signage and boundary warning tape.
 - a. Attach HEPA vacuum systems to the bag to prevent collapse during removal of ACM.
 - b. The negative pressure glove boxes must be fitted 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. A negative pressure

must be created in the system using a HEPA filtration system. The box must be smoke tested for leaks prior to each use.

4. Mini-Enclosure: Double bulkhead containment or Mini-containment (small walk-in enclosure) to accommodate no more than two persons, may be used if the disturbance or removal can be completely contained by the enclosure. The mini-enclosure must be inspected for leaks and smoke tested before each use. Air movement must be directed away from the employee's breathing zone within the mini-enclosure.
5. Wrap and Cut Operation: Prior to cutting pipe, the asbestos-containing insulation must be wrapped with polyethylene and securely sealed with duct tape to prevent asbestos becoming airborne as a result of the cutting process.
 - a. The following steps must be taken: Install glovebag, strip back sections to be cut 6 inches from point of cut, and cut pipe into manageable sections.
6. Class I Removal Method: Class I ACM must be removed using a control method described above. Prepare work area as previously specified. Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area. Spread one layer of 6-mil seamless plastic sheeting on the floor below the work area. Remove ACM thermal system insulation and mudded pipe fittings using mechanical means and wet methods and immediately place into 6-mil thickness disposal bag. Continue wet cleaning until surfaces are free of visible debris. Bag all asbestos debris which has fallen to the floor as asbestos-containing debris. Place all debris in plastic disposal bags of 6-mil minimum thickness. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-Subpart M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers or the designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work, and immediately correct the situation.

K. Class II Work Procedures:

1. In addition to the requirements of Subparagraph Mandated Practices and Subparagraph Control Methods, the following engineering controls and work practices must be used:
 - a. A Competent Person must supervise the work.
 - b. For indoor work, critical barriers must be placed over all openings to the regulated area.
 - c. Impermeable drop cloths must be placed on surfaces beneath all removal activity.

L. Specific Control Methods for Class II Work:

1. Vinyl and Asphaltic Flooring Materials: Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. When removing vinyl floor tile and mastic which contains ACM, use the following practices. Remove floor tile and mastic using adequately wet methods. Remove floor tiles intact (if possible). Do not sand flooring or its backing. Scrape residual adhesive and backing using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-Subpart M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If workers the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.
2. Sealants and Mastic: Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, and signs, and maintain all other requirements for asbestos control area except local exhaust. Spread 6-mil plastic sheeting on the ground around the perimeter of the work area extending out in all directions. Using adequately wet methods, carefully remove the ACM sealants and

mastics using a scraper or knife blade. As it is removed place the material into a disposal bag. Make every effort to keep the asbestos material from falling to the ground or work area floor below. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter and disposable dust bag. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve “adequately wet” conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in

40 CFR 61-Subpart M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or at designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3. Gaskets: Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Gaskets must be thoroughly wetted with amended water prior to removal and immediately placed in a disposal container. If a gasket is visibly deteriorated and unlikely to be removed intact, removal must be undertaken within a glovebag. Any scraping to remove residue must be performed wet. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve “adequately wet” conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

- M. Air Sampling: Perform sampling of airborne concentrations of asbestos fibers in accordance with 29 CFR 1926.1101, the Contractor’s air monitoring plan and as specified herein. Sampling performed in accordance with 29 CFR 1926.1101 must be performed by the PQP. Sampling performed for environmental and quality control reasons must be performed by the PQP.

Unless otherwise specified, use NIOSH Method 7400 for sampling and analysis. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those results obtained by the Contractor, the Government will determine which results predominate. 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.

1. Sampling Prior to Asbestos Work: Provide area air sampling and establish the baseline 1 day prior to the masking and sealing operations for each demolition and removal site. Establish the background by performing area sampling in similar but uncontaminated sites in the building.
2. Sampling During Asbestos Work: The PQP must provide personal and area sampling as indicated in 29 CFR 1926.1101 and governing environmental regulations. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Air sample fiber counting must be completed and results provided within 24 hours (breathing zone samples), and 24 hours (environmental/clearance monitoring) after completion of a sampling period. In addition, provided the same type of work is being performed, provide area sampling at least once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately. Where alternate methods are used, perform personal and area air sampling at locations and frequencies that will accurately characterize the evolving airborne asbestos levels. The written results must be signed by testing laboratory analyst, testing laboratory principal. The air sampling results must be documented on a Contractor's daily air monitoring log.
 - a. The air sampling results must be documented on a Contractor's daily air monitoring log.
3. Final Clearance Requirements, NIOSH PCM Method: For PCM sampling and analysis using NIOSH NMAM 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 using NIOSH NMAM Method 7402 (TEM) at Contractor's expense. If any confirmation sample result is greater than 0.01 asbestos f/cc, abatement is incomplete and cleaning must be

repeated at the Contractor's expense. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria must be done at the Contractor's expense.

4. Final Clearance Requirements, EPA TEM Method: For EPA TEM sampling and analysis, using the EPA Method specified in 40 CFR 763, abatement inside the regulated area is considered complete when the arithmetic mean asbestos concentration of the five 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 three blank samples must be analyzed. If the three blank samples are greater than 70 S/mm, resampling must be done. If less than 70 S/mm, the five outside samples must be analyzed and a Z-test analysis performed. When the Z-test results are less than 1.65, the decontamination must be 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, resampling with results to meet the above clearance criteria must be done at the Contractor's expense.
 5. Sampling After Final Clean-Up (Clearance Sampling): Provide area sampling of asbestos fibers using aggressive air sampling techniques as defined in the EPA 560/5-85-024 and establish an airborne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the enclosure or the asbestos work control area. After final cleanup and the asbestos control area is dry but prior to clearance sampling, the PQP must perform a visual inspection in accordance with ASTM E1368 to ensure that the asbestos control and work area is free of any accumulations of dirt, dust, or debris. Prepare a written report signed and dated by the PQP documenting that the asbestos control area is free of dust, dirt, and debris and all waste has been removed. Use transmission electron microscopy (TEM) to analyze clearance samples and report the results in accordance with current NIOSH criteria. The asbestos fiber counts from these samples must be less than 0.01 fibers per cubic centimeter or be not greater than the background, whichever is greater. Should any of the final samples indicate a higher value take appropriate actions to reclean the area and repeat the sampling and TEM analysis at the Contractor's expense.
 6. 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.
- N. Lock-Down: Prior to removal of plastic barriers and after pre-clearance clean up of gross contamination, the PQP must conduct a visual inspection of all areas affected by the removal in accordance with ASTM E1368. Inspect for any visible fibers. Spray apply a post removal (lock-down) encapsulant to ceiling, walls, floors, and other areas exposed in the removal area. The exposed area includes but is not limited to plastic barriers, furnishings, and

articles to be discarded as well as dirty change room, air locks for bag removal and decontamination chambers.

- O. Site Inspection: While performing asbestos engineering control work, the Contractor must be subject to onsite inspection by the Contracting Officer who may be assisted by or represented by safety or industrial hygiene personnel. If the work is found to be in violation of this specification, the Contracting Officer or his representative will issue a stop work order to be in effect immediately and until the violation is resolved. All related costs including standby time required to resolve the violation must be at the Contractor's expense.

3.03 CLEAN-UP AND DISPOSAL

- A. Housekeeping: Essential parts of asbestos dust control are housekeeping and clean-up procedures. Maintain surfaces of the asbestos control area free of accumulations of asbestos fibers. Give meticulous attention to restricting the spread of dust and debris; keep waste from being distributed over the general area. Use HEPA filtered vacuum cleaners. **DO NOT BLOW DOWN THE SPACE WITH COMPRESSED AIR.** When asbestos removal is complete, all asbestos waste is removed from the Work Site, and final clean-up is completed, the Contracting Officer will attest that the area is safe before the signs can be removed. After final clean-up and acceptable airborne concentrations are attained but before the HEPA unit is turned off and the enclosure removed, remove all pre-filters on the building HVAC system and provide new pre-filters. Dispose of filters as asbestos contaminated materials. Reestablish HVAC mechanical, and electrical systems in proper working order. The Contracting Officer will visually inspect all surfaces within the enclosure for residual material or accumulated dust or debris. The Contractor must re-clean all areas showing dust or residual materials. If re-cleaning is required, air sample and establish an acceptable asbestos airborne concentration after re-cleaning. The Contracting Officer must agree that the area is safe in writing before unrestricted entry will be permitted. The Government must have the option to perform monitoring to determine if the areas are safe before entry is permitted.
- B. Title to Materials: All waste materials, except as specified otherwise, become the property of the Contractor, and must be disposed of as specified in applicable local, state, and federal regulations and herein.
- C. Disposal of Asbestos:
 - 1. Procedure for Disposal: Coordinate all waste disposal manifests with the Contracting Officer and NAVFAC EV. Collect asbestos waste, contaminated wastewater filters, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing

which may produce airborne concentrations of asbestos fibers and place in sealed fiber-proof, waterproof, non-returnable containers (e.g., double plastic bags 6 mils thick, cartons, drums, or cans). Wastes within the containers must be adequately wet in accordance with 40 CFR 61-Subpart M. Affix a warning and Department of Transportation (DOT) label to each container including the bags or use at least 6-mil thick bags with the approved warnings and DOT labeling preprinted on the bag. Clearly indicate on the outside of each container the name of the waste generator and the location at which the waste was generated. Prevent contamination of the transport vehicle (especially if the transport vehicle is a rented truck likely to be used in the future for non-asbestos purposes). These precautions include lining the vehicle cargo area with plastic sheeting (similar to work area enclosure) and thorough cleaning of the cargo area after transport and unloading of asbestos debris is complete. Dispose of waste asbestos material at an Environmental Protection Agency (EPA) or State-approved asbestos landfill off Government property. For temporary storage, store sealed impermeable bags in asbestos waste drums or skids. An area for interim storage of asbestos waste-containing drums or skids will be assigned by the Contracting Officer or his authorized representative. Comply with 40 CFR 61-Subpart M, state, regional, and local standards for hauling and disposal. Sealed plastic bags may be dumped from drums into the burial site unless the bags have been broken or damaged. Damaged bags must remain in the drum and the entire contaminated drum must be buried. Uncontaminated drums may be recycled. Workers unloading the sealed drums must wear appropriate respirators and personal protective equipment when handling asbestos materials at the disposal site.

END OF SECTION