SECTION 02 82 13 – ASBESTOS ABATEMENT

PART 1 GENERAL

1.1 SCOPE

A. This section covers removal, patching, encapsulation, repair, or enclosure of materials that contain or are suspected to contain asbestos.

B. The contractor shall provide all labor, materials, equipment, services, permits, and insurance required to complete asbestos abatement procedures as indicated in these Specifications and/or the drawings.

C. The drawings and related appendix ACM test reports list asbestos-containing materials (ACMs) to be abated. Abatement includes soft (non-structural) demolition, exploratory inspections, protect and save items, and disposal of asbestos and non-asbestos materials as shown and/or described in the general notes, abatement notes, or the key notes on hazardous materials abatement drawings: A100. All work is to be performed within the same construction phasing sequence as renovation.

D. The quantities and locations of ACMs previously mentioned and indicated on the drawings, and the extent of work on the drawings, are only best estimates in this and related sections, limited by the physical constraints imposed by occupancy of the building. Accordingly, minor variations of plus or minus 10 percent of the estimated quantities of ACM within the limits of containment for each abatement stage are considered as having no impact on contract price and time of this contract. Locations of ACMs different than indicated on drawings but within the limits of the building are considered as having no impact on contract price and time of this contract.

1.2 DEFINITIONS

A. Abatement: Procedures to control fiber release from asbestos-containing building materials. Includes: encapsulation, enclosure, removal, repair, and related activities.

B. Aggressive Sampling: A method of air sampling that assures that the asbestos fibers remain airborne during the sampling time. All surfaces inside the work area will be agitated by the liberal use of compressed air. Fans will then be placed so as to keep all suspended fibers airborne, and run throughout the sampling period.

C. AHERA: Asbestos Hazard Emergency Response Act, 40 CFR Part 763.

D. Air Lock: A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least 3 feet apart.

E. Air Monitoring: The process of measuring the asbestos fiber content of a specific volume of air in a stated period of time.

F. Amended Water: Water containing a surfactant additive.

G. Asbestos-containing Material (ACM): Any material containing more than one percent asbestos as defined under NESHAPS CFR 40, Part 61, OAR Chapter 340, Division 248, OR-OSHA 437, 1926.1101, and OSHA 29 CFR Part 1926.1101.

H. Authorized Visitor: The owner or designated representative, or a representative of any regulatory or other agency having jurisdiction over the project, and having required training, medical, fit test, etc.

I. Certified Industrial Hygienist (CIH): An industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.

J. Construction, Manager/General Contractor (CMGC): A construction delivery method where the construction manager acts as the general contractor with schedule and cost risk. The CMGC provides design phase assistance in evaluating costs, schedule, and implications of systems and materials during design.

K. Class I Asbestos Work: Activities involving the removal of thermal system insulation (TSI) and surfacing ACM and presumed asbestos-containing materials (PACM).

L. Class II Asbestos Work: Activities involving the removal of ACM, which is not TSI or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and mastics.

M. Clean Room: An uncontaminated area or room that is part of the worker decontamination enclosure system, with provisions for storage of workers' street clothes and clean protective equipment.

N. Critical Barrier: Solid barrier constructed from minimum of 2-inch by 4-inch studs, 16-inch o.c.; 0.5-inch plywood or drywall sealed airtight and covered on both sides (where applicable) with two layers of 6-mil plastic.

O. Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing three overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway in a pleated fashion and securing one vertical side of each sheet on alternating sides of consecutive sheets. Two curtained doorways spaced a minimum of 3 feet apart to form an air lock.

P. Disposal: Procedures necessary to transport and deposit the asbestos-contaminated material in an approved waste disposal site in compliance with Environmental Protection Agency (EPA) and other applicable regulations.

Q. Enclosure: Procedures necessary to completely seal all asbestos-containing material behind airtight, impermeable, permanent barriers, including polyvinyl chloride (PVC) jackets.

R. Encapsulant (Sealant): A liquid material that can be applied to asbestos-containing material and which controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant), or by penetrating into the material and binding its components together (penetrating encapsulant).

S. Environmental Consultant: Environmental consultant specializing in asbestos abatement— PBS Engineering and Environmental Inc., 4412 SW Corbett Avenue, Portland, Oregon, 97239, 503.248.1939—or any subcontractor designated by PBS.

T. Equipment Room: A contaminated area or room, which is part of the worker decontamination enclosure system, with provisions for storage of contaminated clothing and equipment.

U. Fitting: With regard to pipe insulation, a fitting is any elbow, offset, reducer, tee, etc.

V. Fixed Object: Fixtures which are attached to the building or are too heavy or bulky to remove from the work area.

W. Glovebag: A manufactured device consisting of a transparent plastic bag with inward projecting sleeves, an internal tool pouch, provisions for fastening and sealing at the top and sides, and a receptacle in the b

ottom to hold asbestos waste. The glovebag is installed so as to surround the material to be removed and contain all fibers released during the process. Glovebags are used to remove insulation from small sections of pipe and fittings.

X. HEPA Filter: A high efficiency particulate air (absolute) filter capable of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 microns in length.

Y. HEPA Vacuum Equipment: High efficiency particulate air (absolute) filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers. Filters of
99.97 percent efficiency for retaining fibers of 0.3 microns in length or larger shall be installed for filtering discharge air.

Z. Independent Testing Laboratory: A laboratory financially independent from and hired by the owner, architect or contractor that is either AIHA-accredited for asbestos with demonstrated proficiency via the AIHA PAT program, or has analysts proficient in the AIHA AAR program for air sample analysis.

AA. Industrial Hygienist: An employee of the independent testing laboratory who is experienced and trained in asbestos sampling and analysis as specified.

BB. Insulating Cement: Cementitious material applied to pipe reducers, manifolds, etc.

CC. Isolated Work Area: A totally contained area of the facility where abatement activities are performed.

DD. Movable Object: Furnishings which are not attached to the building structure and can be removed from the work area.

EE. Negative-air Glovebag: A manufactured device consisting of a transparent plastic bag with inward projecting sleeves, an internal tool pouch, provisions for fastening and sealing it at the top and sides, and a receptacle in the bottom to hold asbestos waste. The glovebag is installed so as to surround the material to be removed and contain all fibers released through the process, with provisions for allowing continuous airflow through the bag while maintaining negative pressure inside.

FF. Owner Representative: Designated by the owner, or designated employee of the owner representative.

GG. PACM: Presumed asbestos-containing materials.

HH. Pressure Differential Fan System: An air-purifying fan system located within or outside the isolated work area, which draws air out of the work area through a HEPA filter, thus keeping the static air pressure in the work area lower than in adjacent areas, and preventing escape of contaminated air from work area to adjacent areas.

II. Public Area: Any area outside the isolated work area. When work area isolation measures are removed, the work area becomes a public area.

JJ. Removal: All operations where ACM and/or PACM are taken out or stripped from structures or substrates, and include demolition activities.

KK. Shower Room: A room between the clean room and the equipment room in the worker decontamination enclosure system, which is equipped with hot and cold running water controllable at the faucet and soap and shampoo, and which is suitably arranged for complete showering during decontamination. The shower room must be separated from the clean room and equipment room by air locks.

LL. Special Fitting: With regard to pipe insulation, a special fitting is any valve, union, strainer, thermometer, flange, etc.

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

NN. Tack Coat: A coat of penetrating encapsulant applied to all surfaces from which asbestos- containing materials have been removed.

OO. Thermal System Insulation (TSI): ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

PP. Vacuum Loader Removal: Wetting and pneumatic conveying of loose material through a vacuum hose to a sealed collection tank specially equipped to prevent escape of fibers.

QQ. Wet Cleaning: The process of eliminating asbestos from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.

RR. Worker Decontamination Enclosure System: A showering facility for workers, typically consisting of a clean room, a shower room, and an equipment room. Each of these rooms is separated from the others by air locks. The equipment room is separated from the work area by a curtained doorway. The clean room is separated from the public area by a curtained doorway.

SS. Worksite Entry Logbook: A logbook kept in the clean room, which must be signed by everyone entering or leaving the work area. All pages of the logbook must be the same as the sample page bound into these Specifications.

1.3 DOCUMENTS INCORPORATED BY REFERENCE

A. The current issue of each document shall govern. Where conflict among requirements or with these Specifications exists, the most stringent requirements shall apply.

1. Environmental Protection Agency National Emissions Standards for Hazardous Air Pollutants (NESHAPS). (Code of Federal Regulations Title 40, Part 61, Subparts A and M.)

2. Environmental Protection Agency Office of Toxic Substances Guidance Document, "Guidance for Controlling Friable Asbestos-Containing Materials in Buildings." EPA Report Number 560/5-85-024 ("Purple Book").

3. Department of Labor Occupational Safety and Health Administration (OSHA):

a. Title 29 Code of Federal Regulations Section 1910.1001--General Industry Standard for Asbestos.

b. Title 29 Code of Federal Regulations Section 1910.134--General Industry Standard for Respiratory Protection.

c. Title 29 Code of Federal Regulations Section 1910 et al.--Occupational Exposure to Asbestos; Final Rule.

d. Title 29 Code of Federal Regulations 1926.1101--Construction Standard for Asbestos.

e. Title 29 Code of Federal Regulations Section 1910.1020--Access to Employee Exposure and Medical Records.

f. Title 29 Code of Federal Regulations Section 1910.1200--Hazard Communication.

4. National Institute for Occupational Safety and Health (NIOSH), 42 CFR, Part 84, Respiratory Protective Devices.

5. American National Standards Institute (ANSI) NY; ANSI Standard Z 88.2-1980 "American National Standards Practice for Respiratory Protection," latest edition.

6. Oregon Administrative Rules Chapter 340, Division 248, Department of Environmental Quality; Chapter 340, Division 33, Licensing and Certification Requirements.

7. Oregon Administrative Rules Chapter 437, Divisions 2 and 3.

8. Oregon Revised Statutes (ORS), Chapters 279C, Certified Asbestos Contractors and Prevailing Wage; 656, Workers Compensation; and 701, Construction Contractors and Contracts.

9. All related electrical work shall be performed in accordance with the National Electrical Code.

10. All local ordinances, regulations, or rules pertaining to asbestos, including its storage, transportation, and disposal.

1.4 SUBMITTALS AND NOTICES

A. Contractors shall submit an electronic copy of each submittal package as indicated below.

B. Contractors shall submit to the architect and environmental consultant the following information prior to beginning work on the project.

1. CONTRACTOR'S LICENSE. Proof that the asbestos abatement contractor is currently, and for the duration of the project, licensed in the State of Oregon to perform asbestos abatement, per ORS Chapter 701, and OAR Chapter 340, Division 248.

2. ASBESTOS SUPERVISOR. The name and resume of experience of the assigned on-site foreman. At a minimum, the foreman shall have successfully completed the DEQ Asbestos Supervisor course as approved by the State of Oregon. Other c

riteria such as references and similar projects will also be reviewed. At the architect or environmental consultant's request, the contractor shall arrange an oral interview with the assigned on-site foreman. The owner, architect, and environmental consultant reserve the right to reject the foreman from the work at any time during the project. The contractor shall then assign another on-site foreman for the owner, architect, and environmental consultant's approval as previously described.

3. INSURANCE CERTIFICATE. A copy of the certificate of asbestos-specific liability insurance policy.

4. WORKER CERTIFICATION. Written proof indicating that all employees impacting asbestos-containing materials are State of Oregon certified asbestos workers. Proof shall include a signature from the contractor's principal indicating that all employees assigned to this project have completed such a program, and photocopies of certificates.

5. RESPIRATOR PROGRAM. Written proof indicating that the respirator program complies with all parts of OSHA asbestos regulations CFR Title 29, 1910.134 and 1926.1101, and OR-OSHA Chapter 437, 1910.134 and 1926.1101.

6. MEDICAL PROGRAM. Written proof that the medical exam program complies with OSHA asbestos regulations CFR Title 29, 1926.1101 and OR-OSHA Chapter 437, 1926.1101.

7. EMERGENCY PLANS. A written emergency control and cleanup plan to be followed by the contractor in the event of an accidental breach in containment, power failure, and accidental disturbance of ACMs in non-isolated areas.

8. NOTIFICATION. A copy of written notification to DEQ of the proposed asbestos work not fewer than ten days before work commences on this project.

9. DISPOSAL PLAN. Written proof that all required permits and arrangements regarding transportation and disposal of asbestos-containing or contaminated materials, supplies, etc. have been obtained. The disposal site must be approved by the EPA and/or DEQ and other responsible agencies.

10. WORK PLAN. A written work plan satisfactory to the architect and environmental consultant describing the schedule for a

sbestos abatement, decontamination procedures, and plans for construction and location of decontamination enclosure systems, pressure differential exhaust fans, etc. in compliance with these Specifications and applicable regulations, including calculations for determining required number of negative air filtration units. The plan shall schedule the systematic flow of work throughout the facility per Specifications on a day-by-day basis, outlining room-by-room, or area-by-area procedures and planned alternative control measures. The contractor shall keep close coordination of work with the architect and environmental consultant.

11. AIR MONITORING. Information pertaining to the proposed air monitoring program for this project, if appropriate. This information shall include the name(s) of the certified industrial hygienist appointed, the name of the onsite industrial hygiene technician working under his supervision, types of equipment, and sampling schedule, sampling procedures, calibration recordkeeping, and testing laboratory proposed.

12. PRODUCT INFORMATION. Complete product information for any materials and products for which the contractor requests approval for use on this job (other than those specified).

13. EMERGENCY PHONE NUMBER. A local phone number at which the contractor or on-site foreman can be reached on a 24-hour basis during the course of the work.

C. Contractor shall not begin work until submittals are reviewed and accepted by the architect and the environmental consultant. Allow a ten-day review period.

D. During the work, the contractor shall submit to the architect and environmental consultant on a periodic basis as agreed to by the architect, environmental consultant, and contractor:

1. Waste shipment and disposal documentation
2. Air monitoring data
3. Notification updates

E. Contractor shall submit to the architect and environmental consultant in writing all information required above regarding any new asbestos workers hired by or subcontracted to the contractor before these new asbestos abatement workers begin work.

F. Prior to removal of decontamination systems and isolation barriers, the contractor shall obtain specific written permission from the environmental consultant.

G. Prior to making final application for payment the contractor shall:

1. Complete all work under this contract.

2. Submit to the environmental consultant all required submittals including all waste shipment records completely filled out and signed.

3. Submit to the owner and architect all certified payroll reports for work on this contract and other information as described elsewhere in the Specifications, if appropriate under the contract.

4. Submit to the environmental consultant as-abated drawings along with a signed affidavit stating that all ACMs have been removed as indicated on the drawings.

H. See other sections of these Specifications and EPA, OSHA, and other standards referenced therein, for further information and requirements not included above.

1.5 BUILDING PROTECTION

A. Building Security and Protection

1. The contractor shall post adequate warning signs at all potential entrances to work areas as required by the EPA and OSHA.

2. The contractor shall protect all existing fixed equipment, building finishes that are to remain, and existing systems and functions from damage during the abatement process. Extra precautions are to be taken in protecting existing electrical panels, light fixtures, etc. Any damage to existing building, services, and/or equipment shall be remedied by the contractor at their expense.

3. The contractor shall clean external surfaces of contaminated containers and equipment thoroughly by wet sponging and HEPA vacuum.

4. The contractor shall maintain access and use of existing fire lanes.

1.6 PERSONNEL PERSONAL PROTECTION

A. Training

1. Prior to commencing work, the contractor shall ensure that all workers have been trained as specified.

2. The contractor shall provide and post, in the clean room(s) and equipment room(s), the decontamination, respirator, and work procedures to be followed by the workers.

3. For demolition of non-asbestos containing walls and ceilings in areas containing friable asbestos materials, the contractor has the option to train qualified demolition workers. Such training shall be the sole responsibility of the contractor and shall consist of a minimum of eight hours, unless applicable regulatory agencies accept a lesser amount of classroom time. Topics shall include the background of asbestos, health effects, personnel protection, use of worker decontamination, and other topics. Training shall be acceptable to OR-OSHA, DEQ and other applicable agencies.

B. Personnel Personal Protective Equipment for Asbestos Removal

1. Work clothes shall consist of disposable full-body coveralls and head and foot covers (Tyvek or approved), boots, or sneakers. Eye, hearing, fall protection and hard hats should be available as appropriate.

2. At minimum, respiratory protection shall be approved by National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA); the Department of Labor; the Department of Health, Education and Welfare; Centers for Disease Control; and as listed below. Respiratory protection shall provide workers with a maximum calculated fiber level inside the mask of 0.01 f/cc.

   a. Glovebag or modified glovebag: full-face mask, powered air-purifying respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 100.

   b. Demolition of walls and ceilings that may impact friable ACM: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color c

ode). Protection factor: 10.

c. Pre-abatement work in close proximity to friable ACM: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

d. Abatement in isolated areas: full-face mask, powered air-purifying respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 100.

e. HEPA vacuuming and wet cleaning of surfaces: half-face mask, negative- pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

f. Vinyl asbestos floor tile removal: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

g. Handling of double-bagged asbestos-contaminated waste: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

3. Additional respiratory protection shall be as required by CFR 29 1910.134 and 1926.1101, OR-OSHA Chapter 437, 1910.134 and 1926.1101.

4. As part of the contractor's respiratory protection program, all workers shall be provided with a selection of brands and sizes of respirators to choose from. At minimum, all workers shall be qualitatively fit-tested at the time of respirator selection per OR-OSHA Workers Compensation Department Rule 22-069 (4)(e)(5)(i), and semiannually thereafter.

5. Contractor shall supply replacement filter cartridges, as required. Cartridges that have become wet or clogged shall be replaced immediately.

C. Worker Decontamination Enclosure System

1. The contractor shall construct a personnel decontamination facility i

mmediately outside of the isolated work area consisting of three chambers and two air locks as follows:

a. The equipment room shall consist of an air lock to the shower room, and a curtained doorway to the work area.

b. The shower room shall have two air locks, one to the equipment room and one to the clean room. All showers shall have hot and cold water controllable at the taps and be installed in this room. The contractor shall supply and maintain soap, shampoo, and towels at all times in the shower area. Shower wastewater shall be filtered to remove all fibers larger than 5 microns or as required by local regulations, before disposal in the municipal sewer system, or shall be collected and disposed of as asbestos-contaminated material. Water discharge permits shall be obtained and all regulations complied with as required by local municipalities. Water filters shall be disposed of as asbestos-contaminated material.

c. The clean room shall consist of an air lock to the shower room and a curtained doorway to the adjacent building area. The clean room shall contain a first aid kit, the worksite entry logbook, a place to sit down, and storage for workers' and visitors' clothing and shoes. Work, respirator, and decontamination procedures; regulations; and prevailing wage rates shall be conspicuously posted. A supply of clean protective clothing, respirators and cartridges shall remain in the clean room at all times.

d. A monometer measuring pressure differential within and outside the containment shall be installed and remain operable on any containment from the start of abatement work until work is complete, and satisfactory clearance results are obtained. Air pressure within the containment shall remain at or below -0.02 inches of water (compared to ambient air pressure) throughout.

2. Contractor shall not begin asbestos abatement work unless this system is functional, in good repair, and has been found acceptable for specification compliance by the environmental consultant.

D. Personnel Protection Procedures in Isolated Work Areas

1. Each worker shall, upon entering the jobsite, remove street c

lothes in the clean change room, put on and fit-test their respirator, put on clean protective clothing, and sign in on the worksite entry logbook before entering the equipment room or the work area.

2. Workers shall, each time they leave the work area, remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove and dispose of disposable work clothes; remove and store shoes, boots, and other equipment except respirators; still wearing the respirator, proceed to the showers; clean the outside of the respirator with soap and water while showering; remove the respirator; thoroughly shampoo and wash themselves; remove filters; dispose of filters in the container provided for that purpose; and wash and rinse the inside of the respirator.

3. Following showering and drying off, each worker shall proceed directly to the clean change room and dress in clean clothes at the end of each day's work, or before eating, smoking, or drinking. Before reentering the work area from the clean change room, each worker shall put on his respirator with clean filters, dress in clean protective clothing, and sign in on the worksite entry logbook.

4. Contaminated work footwear and other equipment shall be stored in the equipment room when not being used in the work area. Upon completion of asbestos abatement, footwear shall be disposed of as contaminated waste or cleaned thoroughly inside and out, using soap and water before removing from work area.

5. Workers shall not eat, drink, or chew gum at the worksite except in the established clean room. Smoking or using other tobacco products is prohibited.

6. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos-containing or contaminated material and until final cleanup is completed.

E. Access to Isolated Work Areas by Others

1. Except for emergency personnel, the contractor shall limit access to the work area to authorized visitors.

2. The contractor shall provide protective clothing, respirators and equipment for all authorized visitors, as specified above.

3. All authorized visitors shall be subject to the personnel protection provisions specified above, and shall sign in and out on the worksite entry logbook.

F. Personnel Personal Protection during Work in Non-Isolated Work Areas

1. Work clothes per Section 1.06 B.

2. Respiratory protection per Section 1.06 B.

3. Worker protection procedures will differ from Section 1.06 D, in that two layers of coveralls shall be worn after removal of street clothes. Worker decontamination through a worker decontamination enclosure is required. The first layer of coveralls must be removed when exiting the glovebag work area. The worker shall immediately proceed to the worker decontamination unit. The remaining requirements of Section 1.06 D still apply.

4. Contractor shall submit to the architect and environmental consultant for approval, an emergency control and cleanup plan to be followed in the event of asbestos contamination during glovebag use. Contractor shall ensure that all workers are thoroughly familiar with the approved plan.

5. Contractor shall promptly remove all bags as they are used to the bag holding and decontamination enclosure system.

G. Emergency Precautions

1. The contractor shall establish emergency and fire exits from the work area, and shall ensure that these exits are well marked and remain unobstructed.

2. The contractor shall be prepared to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated without delay for decontamination.

3. The contractor shall notify the local fire department of the asbestos abatement project prior to beginning work area preparation.

1.7 SAFETY

A. With regard to the work of this contract, the safety of the contractor's employees, the owner's employees, and the public is the sole responsibility of the contractor.

1.8 LIABILITY

A. The contractor is an independent contractor and not an employee of the owner, architect or of the environmental consultant. The owner, architect, and environmental consultant shall have no liability to the contractor or any third persons for contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the owner, architect, or the environmental consultant to discover a violation by the contractor of any of the provisions of these Specifications, or to require the contractor to fully perform and follow any of them, such failure shall not constitute a waiver of any of the requirements of these Specifications, which shall remain fully binding upon the contractor.

1.9 DELIVERY

A. The contractor shall deliver all materials to the worksite in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name.

1.10 STORAGE

A. The contractor shall store all materials subject to damage off the ground, away from wet or damp surfaces or heat sources, and under cover sufficient to prevent damage, contamination, or fire.

1.11 PROTECTION

A. Damaged or deteriorating materials shall not be used and shall be removed from the premises by the contractor. Materials that become contaminated with asbestos shall be disposed of in accordance with the applicable regulations by the contractor.

1.12 SUBCONTRACTORS

A. Any subcontractors employed by the contractor shall be bound to all work and safety standards specified elsewhere in this Specification. Subcontractor's personnel shall be fully trained and supervised by the contractor during performance of this work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Plastic Sheet: Plastic sheet shall be flame-retardant polyethylene material sized in lengths and widths to minimize the frequency of joints. The minimum thickness shall be 6-mil.

B. Plastic Bags: Plastic bags shall be 6-mil polyethylene printed with warning labels per OSHA and EPA regulations.

C. Tape: Tape shall be capable of sealing joints of adjacent sheets of plastic and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water. Minimum of 2- inch-wide tape must be used.

D. Disposal Containers: Disposal containers shall be suitable to receive and retain any asbestos-containing or contaminated materials until disposal at an approved site. The containers shall be labeled in accordance with OSHA and EPA regulations. Containers must be both air and watertight, and have hard top, bottom, and sides.

E. Warning Labels and Signs: Warning labels and signs shall be posted as required by OR- OSHA, ODOT, and DEQ regulations.

F. Amended Water: Clean potable water containing a surfactant additive. The surfactant additive shall be 50 percent polyoxyethylene ether and 50 percent polyethylene ester, or equivalent, and shall be mixed with water at a concentration of one-ounce surfactant to 5 gallons of water, or as recommended by the manufacturer in the case of an equivalent.

G. Encapsulants (Sealants): Encapsulants shall be of the bridging or penetrating variety and shall be listed as satisfactory by the EPA. Encapsulants shall provide a suitable substrate bonding agent for application of new material where appropriate. Penetrating Encapsulant: No. 207 Special Sealer #33775-27A as manufactured by Makus-Cincinnatus, Inc.; Asbestop 30B-2 as manufactured by Asbesco Corp.; Cable Coating 22-P as manufactured by American Coatings Corp., or approved. Bridging Encapsulant: Decadex Firecheck, manufacturer's standard color Magnolia, as manufactured by Pentagon Plastics, Inc.; Cable Coating 2-B, manufacturer's standard color gray, as manufactured by American Coatings Corp.; or approved.

H. Rewettable Lagging Cloth: Twelve-ounce glass fabric lagging cloth saturated with dried lagging adhesive. Dip-Lag as manufactured by C

laremont Co. or approved.

I. Enclosure: Protective plastic jacketing systems, framed gypsum board enclosures, suspended ceilings or other materials as specified elsewhere.

J. Other Materials: Provide all other materials such as lumber, nails, and hardware, which may be required to construct and dismantle the decontamination area and the barriers that isolate the work area, and as required to complete the work as specified.

2.2 TOOLS AND EQUIPMENT

A. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

B. Air-purifying Equipment: Air-purifying equipment shall consist of high-efficiency particulate air (HEPA) filtration systems. No air movement system or air equipment shall discharge asbestos fibers outside the work area. Each unit shall be capable of variable volume from a minimum of 500 cubic feet per minute (CFM) to at least 1700 CFM under load and shall have at least two stages of pre-filtration ahead of the HEPA final filter. Each unit shall be equipped with an elapsed time indicator (hour meter), static pressure gauge with low flow alarm, be overload protected, and shall be equipped with heat and smoke sensors that will visually and audibly warn workers and turn off unit fan within 30 seconds. The units shall be Micro-Trap Portable Air Filtration System manufactured by Asbestos Control Technology, Inc., and HOG 2000 Negative-air Protection System manufactured by Control Resource Systems, or approved.

C. Pressure Differential Monitoring Equipment: A combination sensing, alarm, and recording device shall be in operation at all times during use of the HEPA air-purifying equipment. The unit shall be a Neg-A-Master, manufactured by Control Resource Systems, Inc., or an approved.

D. Water-purifying Equipment: Capable of removing all fibers longer than 5 microns or as required by local regulations from water used in abatement work and decontamination showers. Control Resource Systems, Inc. AQUA-HOG or approved.

E. Airless Sprayer: An airless sprayer, suitable for application of penetrating encapsulant material, shall be used.

F. Vacuum Equipment: All vacuum equipment utilized in the work area s

hall be high- efficiency particulate air (HEPA) equipment, and suitable for wet/dry usage.

G. Scaffolding: Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations. All special scaffolding shall have drawings and calculations stamped and signed by a civil or structural engineer registered in the State of Oregon.

H. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transit, and unloading of contaminated waste without exposure to persons or property. Equipment shall have a hard top, bottom, and sides. If equipment is rented, notify rental agency in advance, in writing, of intended use of equipment.

I. Electrical: Electrical tools, equipment and lighting shall meet all applicable codes and regulations. Ground fault protection, as required by OSHA, shall be in effect at all times. The contractor shall take all additional precautions and measures necessary to ensure a safe working environment during wet removal.

J. Glovebags: Bags shall be clean poly bags, seamless at the bottom, with preprinted asbestos warning labels, 6-mil PVC with attached TYVEK arms and latex gloves. Bags shall be Profo' Bag manufactured by Asbestos Control Technology, Inc., or Asbest'O'Saf/SAC by Control Resource Systems, Inc., or approved.

K. Remote Filter Housing: Stainless steel housing with pre-filters and HEPA filter sealed to cabinet flanges by Century Equipment Advance Guard II or approved equal.

L. Other Tools and Equipment: Provide other suitable tools for removal, enclosure, encapsulation, patching, and disposal activities including, but not limited to, hand-held scrapers, wire brushes, sponges, and rounded-edge shovels.

PART 3 EXECUTION

3.1 FULL ISOLATION WORK AREA PREPARATION

A. Contractor shall perform the following isolation procedures in the order in which they are presented. Any alternative control measures considered for Class I work shall be performed in accordance with 29 CFR 1926.1101.

1. Shut down, remove filters, and isolate HVAC systems to prevent contamination and fiber dispersal. Coordinate with building users and CMGC prior to shutdown.

2. Coordinate all electrical, safety, and other service connections, requirements, and equipment with the CMGC. Use a journeyman electrician at a minimum. It is the contractor's responsibility to verify operation of systems that will be shut off during abatement. If any system is found to be defective or not operating satisfactorily, the contractor shall notify the CMGC or environmental consultant in writing prior to shutoff.

3. Install critical barriers as follows: seal off all openings, including, but not limited to, doorways, windows, and other penetrations of the work area, with solid critical barriers except openings left for HEPA air-purification system, which shall be properly HEPA-filtered. Where doors exist, sealing may be done by closing the door, sealing with tape on both sides, and then covering both sides with two layers of plastic sheeting.

4. Pre-clean movable objects, such as furniture and equipment to be removed (and carpeting), within the proposed work areas using HEPA-filtered vacuum equipment and/or wet cleaning methods as appropriate, and remove such objects from work areas to a temporary location, or consolidate such objects away from removal work and enclose with critical barriers.

5. Pre-clean fixed objects within the proposed work areas using HEPA-filtered vacuum equipment and/or wet cleaning methods as appropriate, and enclose with critical barriers. Equipment that must continue operating shall be enclosed and ventilated to avoid damage.

6. Set up the worker decontamination enclosure system (decon). Once this system is installed and abatement commences, it shall be utilized in the specified manner for the ingress and egress of all personnel and equipment, except in emergency situations. All personnel shall sign the worksite entry logbook each time they pass in or out of the decontamination enclosure.

7. Install a HEPA air-purifying equipment pressure differential fan system to ensure a lower static pressure in the isolated work area than in surrounding areas, a flow of air through all parts of the isolated work area towards the air-purifying equipment, and minimum air contamination levels at abatement worker breathing zones.

Discharge from air-purifying equipment shall be ducted outside the building. Use one or more units of capacity as recommended by the manufacturer for the volume of the isolated work area, but in no case shall airflow be less than six air changes every 60 minutes with a minimum pressure differential of 0.02 inches wg between the work area and the decon clean room.

8. Cover floor and wall surfaces with plastic sheeting sealed with tape. Cover floors first so that plastic extends at least 12 inches up on walls, then cover walls with plastic sheeting to overlap floor plastic by a minimum of 24 inches, thus overlapping the horizontal floor material by a minimum of 12 inches. Install additional layer of plastic sheeting on floor and walls in similar manner. The contractor may use mechanical fastening techniques, such as tack strips, as necessary to secure wall plastic sheeting. The contractor shall repair any damage resulting from mechanical fasteners.

9. Maintain emergency and fire exits from the work areas, or establish alternative exits satisfactory to the local building or fire department officials. Ensure that all exits remain unobstructed and well-marked.

10. Adequate portable fire extinguishing equipment shall be maintained within the work area as defined by OSHA and/or local fire department officials.

B. No asbestos abatement work shall occur unless the work area isolation has been found acceptable for Specification compliance by the environmental consultant.

C. Isolated work area enclosure system maintenance. The contractor shall be responsible for daily documentation of the following:

1. Prior to the first use and at the beginning of each shift during abatement work, containments shall be given a complete visual inspection by the contractor's shift foreman and industrial hygienist. This shall include inspection of the HEPA air-purification system and associated filters. A smoke tube test by the shift foreman shall then be made of the worker decontamination enclosure system and other critical areas to verify that the isolated area is under negative air pressure. Work shall not begin until all defects have been repaired.

2. Periodic inspections shall be made as required during each shift to assure continued proper functioning of the containment and HEPA s

ystem.

3.2 NON-ISOLATED WORK AREA PREPARATION

A. The contractor shall perform the following procedures in the order in which they are presented and describe procedures for glovebag and other work in non-isolated work areas. Any alternative control measures considered for Class II work shall be performed in accordance with 29 CFR 1926.1101.

1. Shut down HVAC systems. Coordinate with building users and the CMGC prior to shutdown.

2. Restrict access to work area and post warning signs. Do not perform glovebag work or any abatement work in an occupied area.

3. Completely pre-clean entire work area using HEPA vacuum equipment or wet cleaning methods.

4. Set up the worker decontamination enclosure system. Once this system is installed and abatement commences, it shall be utilized in the specified manner for the ingress and egress of all personnel, except in emergency situations. All personnel shall sign the worksite entry logbook each time they pass in or out of the decontamination enclosure.

5. At the direction of the environmental consultant, install HEPA exhaust fan in work area. Duct fan intake to immediate area of work in such a manner that any fibers released will be drawn away from the worker and into intake duct.

6. Cover floor and other surfaces below work area with 6-mil plastic sheeting. Seal openings and install curtained doorways and air locks as directed by the environmental consultant.

7. Have emergency cleanup equipment and supplies, including HEPA vacuum, amended water, disposal bags, mop, buckets, towels, and sponges on hand prior to start of abatement work.

B. No asbestos abatement work shall occur unless the work area has been found acceptable for specification compliance by the environmental consultant or industrial hygiene technician.

3.3 REMOVAL OF ASBESTOS-CONTAINING MATERIALS IN FULL ISOLATION W

ORK AREAS

A. The contractor shall isolate the work area as specified.

B. The contractor shall remove all asbestos-containing pipe insulation, surfacing material, and other asbestos-containing materials as defined in the project-specific scope of work.

1. The contractor shall spray the asbestos material with amended water. A fine spray of this solution shall be applied to prevent fiber disturbance preceding the removal of the asbestos material. The asbestos shall be sufficiently saturated to prevent emission of airborne fibers in excess of specified fiber levels.

2. The contractor shall remove asbestos material while damp and pack it in sealable plastic bags (6-mil minimum thickness). Bags shall be moved to bag load-out facility or equipment room in the worker decontamination system. Wash outside surface and place inside a second plastic bag (6-mil minimum thickness) bearing a DEQ warning label and name of waste generator and location from which waste was generated.

3. After completion of stripping work, contractor shall clean all surfaces from which asbestos has been removed by brushing and/or wet sponging or cleaning by an equivalent method to remove all visible material. During this work, the surfaces being cleaned shall be kept wet. Avoid using wire brushes if possible.

4. The contractor shall collect all water used in the removal and cleaning process and dispose of as contaminated waste or filter to remove all fibers more than five microns in length before disposal in the municipal sewer system, or as required by local regulations. Water filters shall be disposed of as asbestos-contaminated material.

C. Removal of non-friable materials, such as floor tiles, shall be accomplished by such manner as to minimize breakage and to maintain non-friability. Do not drop, throw, saw, or scrape non-friable materials during removal, handling or disposal. The use of spud bars to remove floor tiles is an acceptable practice.

D. Contractor shall maintain a safe and uncluttered work area, worker decontamination system, and bag load-out facility on a daily basis.

3.4 REMOVAL OF ASBESTOS-CONTAINING MATERIALS IN NON-ISOLATED AREAS

A. The contractor shall apply spray coat of amended water to material to be removed. Keep material damp during entire removal process.

B. Glovebag work shall be as follows. All removal using the glovebag method shall be performed strictly according to regulations, manufacturer's printed instructions, and as demonstrated by the manufacturer's representative or as further specified in this section. Workers are not to smoke or wear hand or wrist jewelry while using glovebags.

1. The contractor shall coordinate shutoff of all sources of heat to objects to be worked on. No work shall be done on objects above 150 degrees Fahrenheit (oF).

2. The contractor shall install port for HEPA vacuum hose to create reduced pressure inside glovebag. Installing fresh air intake and/or bridging to prevent collapse of bag are acceptable. Reduced pressure shall be maintained throughout entire abatement procedure.

3. During the removal phase, the contractor shall utilize amended water to reduce potential for airborne fibers.

4. After completion of insulation removal and cleaning, but prior to removal of glovebag, the contractor shall apply a single tack coat of penetrating encapsulant to surface of pipe and any remaining non-asbestos insulation, within the glovebag.

5. After the pipe has been sealed, but prior to removal of glovebag, the contractor shall thoroughly wash the upper chamber of the glovebag and seal the contents of the bag in the lower chamber.

6. The contractor shall seal flap if used and, utilizing a HEPA vacuum, remove all contaminated air in the upper chamber.

7. The procedures set forth in Section 02 82 13.11 shall be followed in case of a spill or if air analysis indicates a fiber count in excess of limits.

8. The contractor shall promptly double bag the glovebag after removal is complete, place it into a sealed container, and remove to the bag holding enclosure.

9. The contractor shall cover ends of remaining existing insulation with rewettable lagging cloth; extend lagging cloth a minimum of 6 inches back along existing insulation.

C. Wrap and cut method shall be as follows: at intervals determined by the contractor, glovebag remove 2 to 3 feet of asbestos-containing pipe insulation as specified. Seal remaining pipe, with asbestos-containing pipe insulation intact, in two separate layers of 6- mil plastic sheeting. Cut pipe wrap sections at ends, taking care to not damage adjacent wrapped or unwrapped insulated sections. Label double-wrapped pipe as specified for disposal. Obtain approval of landfill prior to utilizing this method. Dispose as contaminated waste in accordance with Specifications and approved landfill requirements.

D. Removal of cement asbestos board and similar material shall be as follows: material shall be removed one sheet or piece at a time. Material shall be kept continuously wet. Cut or remove fasteners one at a time while running HEPA vacuum at the point where work is being done so as to collect all dislodged particles and fibers.

1. When all fasteners have been removed, carefully remove entire sheet or piece and wrap in 6-mil plastic sheeting while still wet. Do not drop, throw, break, saw, or scrape cement asbestos board during removal, handling or disposal.

2. Label, transport, and dispose of wrapped sheets as specified in the Disposal section.

3. Clean entire substrate with HEPA vacuum or wet cleaning methods and leave ready for application of replacement material.

3.5 CLEANUP IN FULL ISOLATION WORK AREAS

A. At the conclusion of removal in the isolated work area, conduct cleanup in the sequence described below. Windows, doors, HVAC vents, etc. shall remain sealed and HEPA- filtered pressure differential fan systems shall remain in service.

1. REMOVE MATERIAL AND EQUIPMENT. The contractor shall remove visible accumulations of material and debris (including filters removed from HVAC equipment and HEPA air-purification equipment). The contractor shall include all sealed containers and equipment used in the work area in the cleanup, and remove t

hem from work area, after decontamination of outer surfaces.

2. FIRST CLEAN. The contractor shall clean all surfaces in the work area and any other contaminated areas with water and/or with HEPA-filtered vacuum equipment.

3. WAIT 24 HOURS. After the first cleaning of the work area, 24 hours shall be allowed for dust to settle. During this settling period, no entry to the work area shall be allowed.

4. SECOND CLEAN. Wet-clean or clean with HEPA-filtered vacuum equipment all surfaces in the work area. After completion of the second cleaning operation, perform a complete visual inspection of the work area to ensure that the work area is free of visible debris.

5. VISUAL INSPECTION. Prior to application of post-removal encapsulant, contact the environmental consultant for a visual observation of the work area. The work area shall be free of visible debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. The contractor shall contact the environmental consultant at least 24 hours prior to desired inspection time.

6. REMOVE PLASTIC SHEETING. After visual observation by the consultant, the contractor shall apply a coat of approved encapsulant to all surfaces in the work area where asbestos has been removed and to disposable plastic sheeting as a post-removal encapsulant. Encapsulant application shall follow all applicable manufacturer's recommendations and shall provide a compatible bonding agent for application of new material.

7. FINAL CLEAN. After the encapsulation is complete, the contractor shall remove all noncritical plastic and clean all floors, walls, fixtures and other surfaces within the work area with only critical barriers in place using wet methods or HEPA- filtered vacuum equipment. Plastic sheeting over carpets may remain in place.

8. CONTACT ENVIRONMENTAL CONSULTANT. Contact the environmental consultant for a visual observation of the work area. The work area shall be free of visible debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. The contractor shall contact the environmental consultant at least 24 hours prior to desired inspection time. The consultant shall conduct final air monitoring as specified after work area has been a

llowed sufficient time to dry.

9. TEARDOWN. When the final observation by the environmental consultant and air sampling test results are satisfactory, the contractor shall then remove the decontamination systems and remaining barriers.

10. DISPOSAL. The contractor shall properly dispose of all waste materials. All polyethylene material, tape, cleaning material, and contaminated clothing shall be double-bagged, sealed and labeled as described above for asbestos waste material.

3.6 CLEANUP IN NON-ISOLATED WORK AREAS

A. FIRST CLEAN. The contractor shall remove visible accumulations of asbestos material and debris. All surfaces within the affected work area shall be cleaned. Cleaning shall be with amended water and/or HEPA-filtered vacuum equipment. In a large open area, the affected work area shall include the immediate work area and an area that encompasses at least 6 feet in all directions or as defined by the environmental consultant. In small work areas, the affected work area shall include the entire room.

B. AFFECTED AREA. The affected work area may be further defined in the scope of work by the environmental consultant. During the work, high fiber levels as indicated by air monitoring results may increase the area to be cleaned. The increase in the affected area due to high fiber levels or other indications of fiber dispersal will be defined by the environmental consultant, and the contractor shall bear all costs of additional cleaning.

C. VISUAL INSPECTION. After completion of the cleaning operation, the environmental consultant shall perform a visual observation of the affected work area to ensure that the affected work area is free of visible dust and debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. The contractor shall contact environmental consultant at least 24 hours prior to desired inspection time.

D. ENCAPSULANT. After visual observation by the environmental consultant, the contractor shall spray-apply encapsulant to the material substrate, all temporary plastic sheeting and other temporary protective materials.

E. CLEARANCE SAMPLING. Post-abatement air sampling shall be at the discretion of the environmental consultant and will be determined by the o

ngoing sample results.

F. TEARDOWN. When the final observation by the environmental consultant and air sampling test results (if required) are satisfactory, the temporary plastic sheeting and other temporary protective materials shall be removed by the contractor.

G. DISPOSAL. The contractor shall properly dispose of all waste materials, all polyethylene material, tape, cleaning material, and contaminated clothing shall be double-bagged, sealed, and labeled as described for asbestos waste material.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

A. When cleanup is complete, the contractor shall:

1. Relocate objects moved to temporary locations in the course of the work to their former positions. Coordinate with the General Contractor and Owner’s Project Manager.

2. All surfaces soiled, discolored, or damaged by removal of tape, adhesive, or other work of this contract shall be cleaned, repaired, and/or repainted to match existing surfaces. The contractor shall bear all costs associated with damage incurred during the abatement, which includes, but is not limited to, perimeter plaster walls, wall murals, windows, and mullions

3. If the contractor uses caulking to seal cracks in concrete floor the caulking must be removed to architect’s satisfaction at completion of project.

4. Mechanical, electrical, and other systems shut down by the contractor shall be returned to complete and functional operation.

5. Objects removed in the course of work in their former positions shall be re-secured, including air dampers in plenums, and adjusted for proper operation.

3.8 DISPOSAL

A. The contractor shall affix warning labels, having waterproof print and permanent adhesive, to the lid and sides of all containers. Warning labels shall be conspicuous and legible, and contain the following words:

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

B. The contractor shall determine current waste handling, transportation, and disposal regulations for the work site and for each waste disposal landfill. The contractor must comply with these regulations and all Department of Transportation, DEQ, and EPA requirements. Double-bagged material in containers shall be delivered to the pre-designated disposal site for burial. Labels and all necessary signs shall be in accordance with DEQ and OSHA standards.

C. The contractor shall remove decontaminated containers from the site as soon as possible. The disposal site shall be notified in advance of material delivery to assure immediate burial of containers.

D. If the bags are broken or damaged, or the container is contaminated, the contractor shall clean and decontaminate the entire container for reuse.

E. The contractor shall submit three copies of written proof of disposal at approved disposal site to the environmental consultant prior to completion of the abatement work specified in this section. Copies of the DEQ Waste Shipment Record ASN-4 shall be used and completely filled out, signed, and accompanied by tickets and/or receipts from disposal site.

END OF SECTION