
USACE / NAVFAC / AFCESA / NASA UFGS-02 83 14.00 10 (April 2006)

Preparing Activity: USACE Replacing without change
UFGS-13280A (June 2004)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2009

SECTION TABLE OF CONTENTS

DIVISION 02 - EXISTING CONDITIONS

SECTION 02 82 14.00 10

ASBESTOS HAZARD CONTROL ACTIVITIES

04/06

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 DEFINITIONS
 - 1.2.1 Amended Water
 - 1.2.2 Asbestos-Containing Material (ACM)
 - 1.2.3 Authorized Person
 - 1.2.4 Building Inspector
 - 1.2.5 Class I Asbestos Work
 - 1.2.6 Class II Asbestos Work
 - 1.2.7 Class III Asbestos Work
 - 1.2.8 Class IV Asbestos Work
 - 1.2.9 Clean Room
 - 1.2.10 Competent Person
 - 1.2.11 Contractor/Supervisor
 - 1.2.12 Critical Barrier
 - 1.2.13 Decontamination Area
 - 1.2.14 Demolition
 - 1.2.15 Disposal Bag
 - 1.2.16 Disturbance
 - 1.2.17 Equipment Room or Area
 - 1.2.18 Fiber
 - 1.2.19 Friable ACM
 - 1.2.20 Glovebag
 - 1.2.21 High-Efficiency Particulate Air (HEPA) Filter
 - 1.2.22 Intact
 - 1.2.23 Model Accreditation Plan (MAP)
 - 1.2.24 Negative Initial Exposure Assessment
 - 1.2.25 NESHAP
 - 1.2.26 Nonfriable ACM
 - 1.2.27 Nonfriable ACM (Category I)
 - 1.2.28 Nonfriable ACM (Category II)
 - 1.2.29 Permissible Exposure Limits (PELs)
 - 1.2.29.1 PEL-Time Weighted Average(TWA)
 - 1.2.29.2 PEL-Excursion Limit
 - 1.2.30 Regulated Area

- 1.2.31 Removal
- 1.2.32 Repair
- 1.2.33 Surfacing ACM
- 1.2.34 Thermal System Insulation (TSI) ACM
- 1.2.35 Transite
- 1.2.36 Worker
- 1.3 SUBMITTALS
- 1.4 DESCRIPTION OF WORK
 - 1.4.1 Abatement Work Tasks
 - 1.4.2 Unexpected Discovery of Asbestos
 - 1.4.3 Wallboard/Joint Compound
- 1.5 QUALIFICATIONS
 - 1.5.1 Written Qualifications and Organization Report
 - 1.5.2 Specific Requirements
 - 1.5.2.1 Asbestos Abatement Contractor
 - 1.5.2.2 Designated Competent Person
 - 1.5.2.3 Project and Other Supervisors
 - 1.5.2.4 Designated Industrial Hygienist
 - 1.5.2.5 Asbestos Abatement Workers
 - 1.5.2.6 Worker Training and Certification of Worker Acknowledgment
 - 1.5.2.7 Physician
 - 1.5.2.8 Independent Testing Laboratory
 - 1.5.2.9 Disposal Facility, Transporter
 - 1.5.3 Federal, State or Local Citations on Previous Projects
- 1.6 REGULATORY REQUIREMENTS
- 1.7 SAFETY AND HEALTH PROGRAM AND PLANS
 - 1.7.1 Asbestos Hazard Abatement Plan Appendix
 - 1.7.2 Activity Hazard Analyses Appendix
- 1.8 PRECONSTRUCTION CONFERENCE
- 1.9 SECURITY
- 1.10 MEDICAL SURVEILLANCE REQUIREMENTS
- 1.11 TRAINING PROGRAM
- 1.12 RESPIRATORY PROTECTION PROGRAM
 - 1.12.1 Respiratory Fit Testing
 - 1.12.2 Respirator Selection and Use Requirements
- 1.13 LICENSES, PERMITS AND NOTIFICATIONS
- 1.14 PERSONAL PROTECTIVE EQUIPMENT
 - 1.14.1 Respirators
 - 1.14.2 Whole Body Protection
 - 1.14.2.1 Coveralls
 - 1.14.2.2 Gloves
 - 1.14.2.3 Foot Coverings
 - 1.14.2.4 Head Covering
 - 1.14.2.5 Protective Eye Wear
- 1.15 HYGIENE FACILITIES AND PRACTICES
 - 1.15.1 3-Stage Decontamination Area
 - 1.15.2 Load-Out Unit
 - 1.15.3 Single Stage Decontamination Area
 - 1.15.4 Decontamination Area Exit Procedures
 - 1.15.5 Smoking
- 1.16 REGULATED AREAS
- 1.17 WARNING SIGNS AND TAPE
- 1.18 WARNING LABELS
- 1.19 LOCAL EXHAUST SYSTEM
- 1.20 TOOLS
- 1.21 RENTAL EQUIPMENT
- 1.22 AIR MONITORING EQUIPMENT
- 1.23 EXPENDABLE SUPPLIES
 - 1.23.1 Glovebag

- 1.23.2 Duct Tape
- 1.23.3 Disposal Containers
- 1.23.4 Sheet Plastic
 - 1.23.4.1 Flame Resistant
 - 1.23.4.2 Reinforced
- 1.23.5 Mastic Removing Solvent
- 1.23.6 Leak-tight Wrapping
- 1.23.7 Viewing Inspection Window
- 1.23.8 Wetting Agents
- 1.23.9 Strippable Coating

PART 2 PRODUCTS

- 2.1 ENCAPSULANTS
- 2.2 ENCASEMENT PRODUCTS
- 2.3 RECYCLABLE MATERIALS

PART 3 EXECUTION

- 3.1 GENERAL REQUIREMENTS
- 3.2 PROTECTION OF ADJACENT WORK OR AREAS TO REMAIN
- 3.3 OBJECTS
 - 3.3.1 Removal of Mobile Objects
 - 3.3.2 Stationary Objects
- 3.4 BUILDING VENTILATION SYSTEM AND CRITICAL BARRIERS
- 3.5 PRECLEANING
- 3.6 METHODS OF COMPLIANCE
 - 3.6.1 Mandated Practices
 - 3.6.2 Control Methods
 - 3.6.3 Unacceptable Practices
 - 3.6.4 Class I Work Procedures
 - 3.6.5 Specific Control Methods for Class I Work
 - 3.6.5.1 Negative Pressure Enclosure (NPE) System
 - 3.6.5.2 Glovebag Systems
 - 3.6.5.3 Mini-Enclosures
 - 3.6.5.4 Wrap and Cut Operation
 - 3.6.6 Class II Work
 - 3.6.7 Specific Control Methods for Class II Work
 - 3.6.7.1 Vinyl and Asphalt Flooring Materials
 - 3.6.7.2 Roofing Material
 - 3.6.7.3 Cementitious Siding and Shingles or Transite Panels
 - 3.6.7.4 Gaskets
 - 3.6.8 Specific Control Methods for Class III Work
 - 3.6.9 Specific Control Methods for Class IV Work
 - 3.6.10 Methods for Asphaltic Wrap
 - 3.6.11 Class I Asbestos Work Response Action Detail Sheets
 - 3.6.12 Class II Asbestos Work Response Action Detail Sheets
 - 3.6.13 Abatement of Asbestos Contaminated Soil
 - 3.6.14 Enclosure of ACM
 - 3.6.15 Encapsulation of ACM
 - 3.6.16 Combination Encapsulation of Acoustical Wall and Ceiling
 - Plaster
 - 3.6.17 Response Action Detail Sheets for Repair of Class I Materials
 - 3.6.18 Response Action Detail Sheets for Repair of Class II Materials
 - 3.6.19 Encasement of ACM
 - 3.6.20 Sealing Contaminated Items Designated for Disposal
- 3.7 FINAL CLEANING AND VISUAL INSPECTION
- 3.8 LOCKDOWN
- 3.9 EXPOSURE ASSESSMENT AND AIR MONITORING

- 3.9.1 General Requirements
- 3.9.2 Initial Exposure Assessment
- 3.9.3 Negative Exposure Assessment
- 3.9.4 Independent Environmental Monitoring
- 3.9.5 Preabatement Environmental Air Monitoring
- 3.9.6 Environmental Air Monitoring During Abatement
- 3.9.7 Final Clearance Air Monitoring
 - 3.9.7.1 Final Clearance Requirements, NIOSH PCM Method
 - 3.9.7.2 Final Clearance Requirements, EPA TEM Method
 - 3.9.7.3 Air Clearance Failure
- 3.9.8 Air-Monitoring Results and Documentation
- 3.10 CLEARANCE CERTIFICATION
- 3.11 CLEANUP AND DISPOSAL
 - 3.11.1 Title to ACM Materials
 - 3.11.2 Collection and Disposal of Asbestos
 - 3.11.3 Scale Weight Measurement
 - 3.11.4 Weight Bills and Delivery Tickets
 - 3.11.5 Records and Management Plan
 - 3.11.5.1 Asbestos Waste Shipment Records
 - 3.11.5.2 Asbestos Management Plan

-- End of Section Table of Contents --

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ASBESTOS HAZARD CONTROL ACTIVITIES 04/06

NOTE: This guide specification covers the requirements for removal, encapsulation, enclosure encasement, or repair of friable and non-friable asbestos-containing material (ACM) which is encountered during the demolition, alteration, renovation, or maintenance of structures, substrates, equipment or portions thereof that contain asbestos; transportation, disposal, storage, containment of; and housekeeping activities on the site at which these activities are performed This specification is used in conjunction with Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS.

Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

This guide specification includes tailoring options for (1) No Detail Sheets, (2) Class I, II, III Abatement, (3) Class II Removal, and (4) Demolition. Selection of tailoring options for this Section, must be done in numerical order from (1) to (4); Option (1) includes (2), (3) and (4); option (2) includes (3) and (4) etc. Editing of each option (punctuation, paragraph numbers, proper listing sequences, etc.) to fit the project is still

required.

PART 1 GENERAL

NOTE: This specification includes asbestos abatement activities and requirements in accordance with 40 CFR Part 61, Subpart M (USEPA); Class I, Class II, Class III, and Class IV abatement operations per 29 CFR 1926.1101 (OSHA); training requirements in accordance with OSHA 29 CFR 1926.1101 and 40 CFR 763 (USEPA); selectable optional air monitoring requirements in accordance with 40 CFR 763; and is supplemented by Engineer Pamphlet (EP) 1110-1-11, "Asbestos Abatement Guideline Detail Sheets". This specification has been developed to be used with a comprehensive set of Asbestos Abatement Detail Sheets in EP 1110-1-11. The EP provides guidance instructions on the selection and use of 2 types of Detail Sheets: SET-UP DETAILS (describing the containment and control methods to be used) and RESPONSE ACTION DETAILS (describing the abatement technique to be employed (removal, encapsulation, encasement, enclosure or repair) and the specific work task item to be abated (ex. removal of acoustical ceiling plaster)). Each RESPONSE ACTION DETAIL references the applicable SET-UP DETAIL to be used. All Detail Sheets are identified by numeric designation. Each individual asbestos abatement work task, to include pertinent information for the task and the appropriate Detail Sheets, will be summarized at paragraph DESCRIPTION OF WORK and Table 1, and will not have to be repeated in this paragraph.

The designer must be an EPA/State Certified/Licensed Asbestos Project Designer.

The material and equipment required for each project are very dependent upon the abatement containment and control requirements (SET-UP DETAILS) to be used (RESPONSE ACTION DETAIL). Edit the materials and equipment paragraphs accordingly. Ensure that all necessary materials and equipment are specified.

The limits of asbestos abatement must be indicated on project drawings and in the specification in sufficient detail for the Contractor to submit an accurate bid. In addition, the project drawings will clearly show the asbestos abatement information required on the Note to paragraph DESCRIPTION OF WORK for Table 1, and where the limits of asbestos abatement will impact non-asbestos abatement work activities or interface with new work.

Demolition and/or renovation of structures that contain nonfriable Category I or II ACM that would be left in place during demolition is governed by 40

CFR Part 61 and state requirements. The USEPA has published guidance documents that will assist in this decision process. They include EPA 340/1-92/010(1992), "Guidelines for Catastrophic Emergency Situations Involving Asbestos"; 340/1-92/013(1992), "A Guide to Normal Demolition Practices Under the Asbestos NESHAP"; and EPA document dated 1994, "Asbestos/NESHAP Demolition Decision Tree". Consult with the USEPA regional office, USEPA regulations, state regulator and state requirements, and the Army guidance referenced in EP 1110-1-11 for the specific survey, assessment and decision steps to take prior to making a decision to leave nonfriable ACM in-place during building demolition, or to remove it prior to demolition. Friable ACM shall always be removed prior to any building demolition.

The USEPA has delegated the responsibility of approving landfills for the disposal of asbestos to most states. Verify with the state in which the project is located whether the state, USEPA, region, or local agency has jurisdiction and what the requirements are.

For OSHA Class I asbestos abatement operations that involve the abatement of less than 1 square meter (10 square feet) or 8 linear meters (25 linear feet); Class II operations; Class III operations; or outdoor abatement operations; an enclosed containment regulated area (to include full containment, single or double bulkhead containment, or mini-containment) may not be required. The location of the item to be abated, type of material, and potential hazard must be reviewed and a judgment made by the designer as to whether or not a modified containment area, glovebag, or outdoor technique may be safely used. In a case where an enclosed containment regulated area is not required, many of the provisions in this specification should be deleted.

Confer with the Contracting Officer to determine if a special clause will be prepared and included for Contractor pre-qualification (see EP 1110-1-11) requirements.

The designer will not specify the use of any replacement material that contains asbestos.

1.1 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date,

and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2 (2001) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE Z87.1 (2003) Standard for Occupational and Educational Eye and Face Protection

ASTM INTERNATIONAL (ASTM)

ASTM D 1331 (1989; R 2001) Surface and Interfacial Tension of Solutions of Surface-Active Agents

ASTM D 4397 (2008) Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications

ASTM E 1368 (2005e1) Visual Inspection of Asbestos Abatement Projects

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7 (2008) Compressed Air for Human Respiration

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701 (2004) Fire Tests for Flame Propagation of Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 94-113 (1994; 4th Ed) NIOSH Manual of Analytical Methods

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008) Safety and Health Requirements Manual
EP 1110-1-11	(1997; Change 1) Asbestos Abatement Guideline Detail Sheets

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90/018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.134	Respiratory Protection
29 CFR 1910.141	Sanitation
29 CFR 1910.147	Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1926.1101	Asbestos
29 CFR 1926.32	Safety and Health Regulations for Construction - Definition
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings

UNDERWRITERS LABORATORIES (UL)

UL 586	(1996; Rev thru Aug 2008) Standard for High-Efficiency Particulate, Air Filter Units
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1.2 DEFINITIONS

1.2.1 Amended Water

Water containing a wetting agent or surfactant with a surface tension of at least 29 dynes per square centimeter when tested in accordance with

ASTM D 1331.

1.2.2 Asbestos-Containing Material (ACM)

Any materials containing more than one percent asbestos.

1.2.3 Authorized Person

Any person authorized by the Contractor and required by work duties to be present in the regulated areas.

1.2.4 Building Inspector

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

1.2.5 Class I Asbestos Work

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

1.2.6 Class II Asbestos Work

Activities defined by OSHA involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos - containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Certain "incidental" roofing materials such as mastic, flashing and cements when they are still intact are excluded from Class II asbestos work. Removal of small amounts of these materials which would fit into a glovebag may be classified as a Class III job.

1.2.7 Class III Asbestos Work

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

1.2.8 Class IV Asbestos Work

Maintenance and custodial construction activities during which employees contact but do not disturb ACM and activities to clean-up dust, waste and debris resulting from Class I, II, and III activities. This may include dusting surfaces where ACM waste and debris and accompanying dust exists and cleaning up loose ACM debris from TSI or surfacing ACM following construction

1.2.9 Clean Room

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

1.2.10 Competent Person

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

1.2.11 Contractor/Supervisor

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

1.2.12 Critical Barrier

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

1.2.13 Decontamination Area

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

1.2.14 Demolition

The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

1.2.15 Disposal Bag

A 0.15 mm 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.

1.2.16 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 1 standard sized glovebag or waste bag, not larger than 1.5 m 60 inches in length and width in order to access a building component.

1.2.17 Equipment Room or Area

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

1.2.18 Fiber

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

1.2.19 Friable ACM

A term defined in 40 CFR 61, Subpart M and EPA 340/1-90/018 meaning any material which contains more than 1 percent asbestos, 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.

1.2.20 Glovebag

Not more than a 1.5 by 1.5 m 60 by 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

1.2.21 High-Efficiency Particulate Air (HEPA) Filter

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

1.2.22 Intact

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

1.2.23 Model Accreditation Plan (MAP)

USEPA training accreditation requirements for persons who work with asbestos as specified in 40 CFR 763.

1.2.24 Negative Initial Exposure Assessment

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

1.2.25 NESHAP

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

1.2.26 Nonfriable ACM

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

1.2.27 Nonfriable ACM (Category I)

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

1.2.28 Nonfriable ACM (Category II)

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

1.2.29 Permissible Exposure Limits (PELs)

1.2.29.1 PEL-Time Weighted Average(TWA)

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

1.2.29.2 PEL-Excursion Limit

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

1.2.30 Regulated Area

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

1.2.31 Removal

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

1.2.32 Repair

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

1.2.33 Surfacing ACM

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

1.2.34 Thermal System Insulation (TSI) ACM

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

1.2.35 Transite

A generic name for asbestos cement wallboard and pipe.

1.2.36 Worker

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

1.3 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.][information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detailed Drawings[; G][; G, [_____]]

Descriptions, detailed drawings, and site layout to include worksite containment area(s), local exhaust systems locations, decontamination units and load-out units, other temporary waste storage facility, access tunnels, location of temporary utilities (electrical, water, sewer) and boundaries of each regulated area.

SD-03 Product Data

Asbestos Waste Shipment Records[; G][; G, [_____]]
Weight Bills and Delivery Tickets[; G][; G, [_____]]

Waste shipment records, weight bills and delivery tickets.

Encapsulants[; G][; G, [____]]
Respiratory Protection Program[; G][; G, [____]]
Cleanup and Disposal[; G][; G, [____]]

Manufacturer's catalog data for all materials and equipment to be used, including brand name, model, capacity, performance characteristics and any other pertinent information. Test results and certificates from the manufacturer of encapsulants substantiating compliance with performance requirements of this specification. Material Safety Data Sheets for all chemicals to be used onsite in the same format as implemented in the Contractor's HAZARD COMMUNICATION PROGRAM. Data shall include, but shall not be limited to, the following items:

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

Qualifications[; G][; G, [____]]

A written report providing evidence of qualifications for personnel, facilities and equipment assigned to the work.

Training Program

A copy of the written project site-specific training material as indicated in 29 CFR 1926.1101 that will be used to train onsite employees.

Licenses, Permits and Notifications[; G][; G, [____]]

Licenses, permits, and notifications.

SD-06 Test Reports

Exposure Assessment and Air Monitoring[; G][; G, [_____]]

Initial exposure assessments, negative exposure assessments, air-monitoring results and documentation.

Local Exhaust System

Pressure differential recordings.

SD-07 Certificates

Local Exhaust System

Manufacturer's certifications showing compliance with ANSI Z9.2 for:

- a. Vacuums.
- b. Water filtration equipment.
- c. Ventilation equipment.
- d. Other equipment required to contain airborne asbestos fibers.

Encapsulants[; G][; G, [_____]]

Certificates stating that encapsulants meet the applicable specified performance requirements.

Medical Surveillance Requirements

Required medical certification and the Physician's written opinion.

1.4 DESCRIPTION OF WORK

NOTE: Review the Notes under PART 1 GENERAL. For each individual ACM abatement work task, consult with the customer, review EP 1110-1-11 and enter the required work task data on Table 1, at the end of this Section, as described in the Notes section of the Table. There will be one data sheet for each abatement work task. Attach to each work task data sheet the selected Response Action Detail Sheet and its referenced Set-up Detail Sheets. Select applicable bracketed items in this section.

Discovery of Unexpected Asbestos: Suspect asbestos containing material that is discovered during demolition (in particular buildings constructed no later than 1980), which was previously inaccessible, must be sampled and analyzed for its asbestos content. The designer should anticipate additional sampling and analysis. The number of additional samples should be based on the extent of demolition

and previous survey data. Insert the number of bulk samples anticipated in the bracket in paragraph Unexpected Discovery of Asbestos. Sampling activities undertaken to determine the presence of additional ACM should be conducted by personnel who have successfully completed the EPA Model Accreditation (MAP) "Building Inspector" course and has EPA/State certification/license as a "Builder Inspector".

OSHA regulations address worker protection, NESHAPS (EPA) regulations address disposal requirements. There is a conflict between the OSHA asbestos standard and the EPA NESHAP standards regarding the compositing or segregating of multi-layered systems during analysis. For example, OSHA considers wallboard, joint compound and joint tape as separate products. Therefore, under OSHA the wallboard, the joint compound and the joint tape must be analyzed separately. EPA, however, looks at wallboard, joint compound and joint tape as a single system and requires only a single, composite analysis of the three components. Another example is floor tile and mastic; these materials may be samples together, but must be analyzed and reported separately. When analyzing samples consisting of more than one component, each sub-component shall be analyzed and the analytical results reported separately, but listed together as a single sample consisting of several components. Specify the requirement for collection and analysis of multi-layered systems.

This section covers all operations in which asbestos-containing materials (ACM) are encountered. These procedures and equipment are required to protect workers and building occupants from airborne asbestos fibers and ACM dust and debris. Activities include OSHA [Class I] [Class II] [Class III] [Class IV] work operations. This section also includes containment, storage, transportation and disposal of the generated ACM wastes. The Contractor shall submit Detailed Drawings in accordance with EP 1110-1-11 and as specified in the Submittals paragraph. When the detail sheets are not attached to this specification, the Contractor can get them from the web at:

<http://www.usace.army.mil/inet/usace-docs/eng-pamphlets/esp1110-1-11/toc.htm>

1.4.1 Abatement Work Tasks

The specific ACM to be abated is identified on [the detailed plans and project drawings] [Table 1]. A summary for each work task including the appropriate RESPONSE ACTION DETAIL SHEET (item to be abated and methods to be used) and SET-UP DETAIL SHEETS (containment techniques to include safety precautions and methods) is included in Table 1, "Individual Work Task Data Elements" at the end of this section.

1.4.2 Unexpected Discovery of Asbestos

For any previously untested building components suspected to contain asbestos and located in areas impacted by the work, the Contractor shall notify the Contracting Officer (CO) who will have the option of ordering up

to [_____] bulk samples to be obtained at the Contractor's expense and delivered to a laboratory accredited under the National Institute of Standards and Technology (NIST) "National Voluntary Laboratory Accreditation Program (NVLAP)" and analyzed by PLM. If the asbestos content is less than 10 percent, as determined by a method other than point counting, the asbestos content shall be verified by point counting. Any additional components identified as ACM that have been approved by the CO for removal shall be removed by the Contractor and will be paid for by an equitable adjustment to the contract price under the CONTRACT CLAUSE titled "changes". Sampling shall be conducted by personnel who have successfully completed the EPA Model Accreditation Plan (MAP) "Building Inspector" training course and is EPA/State certified/licensed as a "Building Inspector".

1.4.3 Wallboard/Joint Compound

NOTE: When both composite and discrete sampling and testing are done on wallboard/joint compound, include and edit the following to address the site specific situation.

[Both composite samples of the wallboard and discrete samples of the components (wallboard and joint compound) have been tested.] [Composite samples of the wallboard system were tested and found to contain [less than one percent asbestos] [____].] [Discrete samples of the wallboard were tested and found to contain [less than one percent asbestos] [____].] [Discrete samples of the joint compound were tested and found to contain [greater than one percent asbestos] [____].]

1.5 QUALIFICATIONS

NOTE: Normal practice is to have the Contractor hire 1 independent Industrial Hygienist (Contractor's Designated IH) to perform all required functions. However, some applicable laws forbid this approach and will dictate when the Contractor's Designated IH, the Contracting Officer's Designated IH or both will be required to perform the function involved. However, the Contractor will always hire an IH.

Check federal, state, and local requirements for qualifications and experience of the Contractor's Designated IH, Designated Competent Person, supervisor, and workers. Check customer requirements. Edit this paragraph accordingly.

1.5.1 Written Qualifications and Organization Report

The Contractor shall furnish a written qualifications and organization report providing evidence of qualifications of the Contractor, Contractor's Project Supervisor, Designated Competent Person, supervisors and workers; Designated IH; independent testing laboratory; all subContractors to be used including disposal transportation and disposal facility firms, subcontractor supervisors, subcontractor workers; and any others assigned

to perform asbestos abatement and support activities. The report shall include an organization chart showing the Contractor's staff organization chain of command and reporting relationship with all subContractors. The report shall be signed by the Contractor, the Contractor's onsite project manager, Designated Competent Person, Designated IH, designated testing laboratory and the principals of all subContractors to be used. The Contractor shall include the following statement in the report: "By signing this report 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."

1.5.2 Specific Requirements

The Contractor shall designate in writing, personnel meeting the following qualifications:

1.5.2.1 Asbestos Abatement Contractor

The Contractor shall be certified/licensed [by applicable state agencies] to perform asbestos-related activities.

1.5.2.2 Designated Competent Person

Evidence that the full-time Designated Competent Person is qualified in accordance with 29 CFR 1926.32 and 29 CFR 1926.1101, has EPA MAP "Contractor/Supervisor" training accreditation, has EPA/State certification/license as a "Contractor/Supervisor" and is experienced in the administration and supervision of asbestos abatement projects, including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite, etc. The Designated Competent Person shall be responsible for compliance with applicable federal, state and local requirements, the Contractor's Accident Prevention Plan (APP) and Asbestos Hazard Abatement Plan (AHAP). The Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training, [EPA/State certification/license] with the employee "Certificate of Worker Acknowledgment". The Contractor shall submit evidence that this person has a minimum of [2 years] [_____] of on-the-job asbestos abatement experience relevant to OSHA competent person requirements. The Designated Competent Person shall be onsite at all times during the conduct of this project.

1.5.2.3 Project and Other Supervisors

Evidence that the Project Supervisor and other supervisors have EPA MAP "Contractor/Supervisor" training accreditation. The Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training, EPA/State certification/license with the employee "Certificate of Worker Acknowledgment". The Contractor shall submit evidence that the Project Supervisor has a minimum of [2 years] [_____] of on-the-job asbestos abatement experience relevant to project supervisor responsibilities and the other supervisors have a minimum of [1 year] [_____] on-the-job

asbestos abatement experience commensurate with the responsibilities they will have on this project.

1.5.2.4 Designated Industrial Hygienist

The Contractor shall provide the resume for the Industrial Hygienist (IH) selected to prepare the Contractor's AHAP, prepare and perform training, direct air monitoring and assist the Contractor's Competent Person in implementing and ensuring that safety and health requirements are complied with during the performance of all required work. The Designated IH shall be a person who is [board certified in the practice of industrial hygiene] [or] [board eligible (meets all education and experience requirements)] as determined and documented by the American Board of Industrial Hygiene (ABIH), has EPA MAP "Contractor/Supervisor" training accreditation, [has EPA/State certification/license], and has a minimum of [2 years] [_____] of comprehensive experience in planning and overseeing asbestos abatement activities. The Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training and EPA/State certification/license with the employee "Certificate of Worker Acknowledgment". The Designated IH shall be completely independent from the Contractor according to federal, state, or local regulations; that is, shall not be a Contractor's employee or be an employee or principal of a firm in a business relationship with the Contractor negating such independent status. A copy of the Designated IH's current valid ABIH [certification] [confirmation of eligibility in writing from the ABIH] shall be included. The Designated IH shall [be onsite at all times] [visit the site at least [_____] per [month] [week]] for the duration of asbestos activities and shall be available for emergencies. In addition, the Contractor shall submit resumes of additional IH's and industrial hygiene technicians (IHT) who will be assisting the Designated IH in performing onsite tasks. IHs and IHTs supporting the Designated IH shall have a minimum of [2 years] [_____] of practical onsite asbestos abatement experience. The formal reporting relationship between the Designated IH and the support IHs and IHTs, the Designated Competent Person, and the Contractor shall be indicated.

1.5.2.5 Asbestos Abatement Workers

Asbestos abatement workers shall meet the requirements contained in 29 CFR 1926.1101, 40 CFR 61, Subpart M, and other applicable federal, state and local requirements. Worker training documentation shall be provided as required on the "Certificate of Workers Acknowledgment".

1.5.2.6 Worker Training and Certification of Worker Acknowledgment

Training documentation is required for each employee who will perform OSHA Class I, Class II, Class III, or Class IV asbestos abatement operations. Such documentation shall be submitted on a Contractor generated form titled "Certificate of Workers Acknowledgment", to be completed for each employee in the same format and containing the same information as the example certificate at the end of this section. Training course completion certificates (initial and most recent update refresher) required by the information checked on the form shall be attached.

1.5.2.7 Physician

The Contractor shall provide the resume of the physician who will or has performed the medical examinations and evaluations of the persons who will conduct the asbestos abatement work tasks. The physician shall be

currently licensed by the state where the workers will be or have been examined, have expertise in pneumoconiosis and shall be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1926.1101. The physician shall be familiar with the site's hazards and the scope of this project.

1.5.2.8 Independent Testing Laboratory

The Contractor shall identify the independent testing laboratory selected to perform the sample analyses and report the results. The testing laboratory shall be completely independent from the Contractor as recognized by federal, state or local regulations. Written verification of the following criteria, signed by the testing laboratory principal and the Contractor, shall be submitted:

(1) Phase contrast microscopy (PCM): The laboratory is fully equipped and proficient in conducting PCM of airborne samples using the methods specified by 29 CFR 1926.1101, OSHA method ID-160, the most current version of NIOSH 94-113 Method 7400. The laboratory shall be currently judged proficient (classified as acceptable) in counting airborne asbestos samples by PCM by successful participation in each of the last 4 rounds in the American Industrial Hygiene Association (AIHA) Proficiency Analytical Testing (PAT) Program or by participating in the AIHA PAT Program, and being judged proficient in counting samples.

(2) Polarized light microscopy (PLM): The laboratory is fully equipped and proficient in conducting PLM analyses of suspect ACM bulk samples in accordance with 40 CFR 763, Subpart E, Appendix E; the laboratory is currently accredited by NIST under the NVLAP for bulk asbestos analysis and will use analysts with demonstrated proficiency to conduct PLM analyses.

(3) Transmission electron microscopy (TEM): The laboratory is [fully equipped and proficient in conducting TEM analysis of airborne samples using the mandatory method specified by 40 CFR 763, Subpart E, Appendix E; the laboratory is currently accredited by NIST under the NVLAP for airborne sample analysis of asbestos by TEM; the laboratory will use analysts with demonstrated proficiency under NVLAP.] [proficient in conducting analysis for low asbestos concentration, enhanced analysis of floor tiles and bulk materials where multiple layers are present, using an improved EPA test method titled, "Method for the Determination of Asbestos in Bulk Building Materials".]

(4) PCM/TEM: The laboratory is fully equipped and each analyst is proficient in conducting PCM and TEM analysis of airborne samples using NIOSH 94-113 Method 7400 PCM and NIOSH 94-113 Method 7402 (TEM confirmation of asbestos content of PCM results) from the same filter.

1.5.2.9 Disposal Facility, Transporter

The Contractor shall provide written evidence that the landfill to be used is approved for asbestos disposal by the [USEPA] [and] [state] [and] [local] regulatory agencies. Copies of signed agreements between the Contractor (including subContractors and transporters) and the asbestos waste disposal facility to accept and dispose of all asbestos containing

waste shall be provided. The Contractor and transporters shall meet the DOT requirements of 49 CFR 171, 49 CFR 172, and 49 CFR 173 as well as registration requirements of 49 CFR 107 and other applicable state or local requirements. The disposal facility shall meet the requirements of 40 CFR 61, Sections .154 or .155, as required in 40 CFR 61 150(b), and other applicable state or local requirements.

1.5.3 Federal, State or Local Citations on Previous Projects

The Contractor and all subContractors shall submit a statement, signed by an officer of the company, containing a record of any citations issued by Federal, State or local regulatory agencies relating to asbestos activities (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including projects, dates, and reasons for terminations). If there are none, a negative declaration signed by an officer of the company shall be provided.

1.6 REGULATORY REQUIREMENTS

NOTE: The designer will list the state, regional or local laws, regulations, and statutes, by authority and document number, which apply to the asbestos work to be performed.

Designer should utilize and reference, where appropriate, Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS as a part of the contract documents or include the appropriate Department of Transportation (DOT) requirements from 49 CFR 107, 171, 172, and 173. If Section 02 81 00 is not included, edit this paragraph to include the DOT references. The contract documents must address all applicable DOT requirements including those for shipping, training, certifications, packaging, markings, labelings, and placards for shippers and transporters in addition to USACE, OSHA and EPA requirements.

Include the reference to 40 CFR 763 when asbestos abatement work occurs in an applicable school or where otherwise directed by the customer or required by state and local requirements. The designer will research the state, regional and local laws, regulations, or statutes for applicability.

This specification is used in conjunction with Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS.

In addition to detailed requirements of this specification, work performed under this contract shall comply with EM 385-1-1, applicable federal, state, and local laws, ordinances, criteria, rules and regulations regarding handling, storing, transporting, and disposing of asbestos waste materials. Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work.

Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply. The following state and local laws, rules and regulations regarding demolition, removal, encapsulation, construction alteration, repair, maintenance, renovation, spill/emergency cleanup, housekeeping, handling, storing, transporting and disposing of asbestos material apply: [_____].

1.7 SAFETY AND HEALTH PROGRAM AND PLANS

The Contractor shall prepare a written comprehensive site-specific Accident Prevention Plan (APP) at least [30] [_____] days prior to the preconstruction conference. The APP shall be in accordance with the format and requirements in Appendix A of EM 385-1-1. The APP shall incorporate an Asbestos Hazard Abatement Plan (AHAP), and Activity Hazard Analyses (AHAs) as separate appendices into one site-specific document. The APP shall take into consideration all the individual asbestos abatement work tasks identified in Table 1. See Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS for additional requirements.

1.7.1 Asbestos Hazard Abatement Plan Appendix

The AHAP shall include, but not be limited to, the following:

- a. The personal protective equipment to be used;
- b. The location and description of regulated areas including clean and dirty areas, access tunnels, and decontamination unit (clean room, shower room, equipment room, storage areas such as load-out unit);
- c. Initial exposure assessment in accordance with 29 CFR 1926.1101;
- d. Level of supervision;
- e. Method of notification of other employers at the worksite;
- f. Abatement method to include containment and control procedures;
- g. Interface of trades;
- h. Sequencing of asbestos related work;
- i. Storage and disposal procedures and plan;
- j. Type of wetting agent and asbestos encapsulant;
- k. Location of local exhaust equipment;
- l. Air monitoring methods (personal, environmental and clearance);
- m. Bulk sampling and analytical methods (if required);
- n. A detailed description of the method to be employed in order to control the spread of ACM wastes and airborne fiber;
- o. Fire and medical emergency response procedures;
- p. The security procedures to be used for all regulated areas.

1.7.2 Activity Hazard Analyses Appendix

AHAs for each major phase of work, shall be submitted and updated during the project. The AHAs format shall be in accordance with Figure 1-1 of EM 385-1-1. The analysis shall define the activities to be performed for a major phase of work, identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work shall not proceed on that phase until the AHA has been accepted and a preparatory meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activities, including the onsite Government representatives. The AHAs shall be continuously reviewed and, when appropriate, modified to address changing site conditions or operations.

1.8 PRECONSTRUCTION CONFERENCE

NOTE: Specify additional or modified requirements to be addressed in the preconstruction safety conference within the bracket if different from that described. Confer with the District's Construction Office and Safety and Occupational Health Office representatives to make this determination. Refer to EP 415-1-260, Chapter 9, Resident Engineers Management Guide. If this conference is addressed in another specification section, reference the appropriate section.

The Contractor and the Contractor's Designated Competent Person, Project Supervisor, and Designated IH shall meet with the Contracting Officer (CO) prior to beginning work at a safety preconstruction conference to discuss the details of the Contractor's submitted APP to include the AHAP and AHAs appendices. Deficiencies in the APP will be discussed. Onsite work shall not begin until the APP has been accepted.

1.9 SECURITY

NOTE: Specify onsite security requirements to be provided. Confer with the customer and the District's Construction organization for requirements.

[Twenty-four hour security guard] [Fenced and locked security area] [_____] shall be provided for each regulated area. A log book shall be kept documenting entry into and out of the regulated area. Entry into regulated areas shall only be by personnel authorized by the Contractor and the CO. Personnel authorized to enter regulated areas shall be trained, medically evaluated, and wear the required personal protective equipment.

1.10 MEDICAL SURVEILLANCE REQUIREMENTS

NOTE: Edit this paragraph in accordance with the most stringent, applicable law.

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

1.11 TRAINING PROGRAM

NOTE: The USEPA asbestos training requirements have been delegated to USEPA agreement states. Some states have adopted more stringent training requirements. Edit this paragraph in accordance with the most stringent requirement. Remove subparagraphs that do not apply.

EPA Model Accreditation Plan (MAP) training at 40 CFR 763, should be specified for OSHA Class I operations; for OSHA Class II asbestos operations where there will be more than one Class II material to be abated; or where there is only one Class II material to be abated but still required by the state where the work will be conducted.

The designer will specify the OSHA training requirements for Class II operations (where there is only one Class II material to be abated and the state where the work is to be conducted does not require the EPA MAP training indicated above, or the abatement only involves roofing materials) , Class III, or Class IV operations.

The Contractor shall establish a training program as specified by EPA MAP, training requirements at 40 CFR 763, the State of [_____] regulation no. [_____] , OSHA requirements at 29 CFR 1926.1101 (k)(9). Contractor employees shall complete the required training for the type of work they are to perform and such training shall be documented and provided to the CO.

- a. [Class I and II operations 32 hours Asbestos Worker Training]
- b. [Class II generic removal 8 hour Asbestos Worker Training]
- c. [Class III operations 16 hour O & M Training]
- d. [Class IV operations 2 hour Awareness Training]

Prior to commencement of work the Contractor's Designated IH and Competent Person shall instruct each worker about:

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

1.12 RESPIRATORY PROTECTION PROGRAM

The Contractor's Designated IH shall establish in writing, and implement a respiratory protection program in accordance with 29 CFR 1926.1101 and 29 CFR 1910.134. The Contractor's Designated IH shall establish minimum

respiratory protection requirements based on measured or anticipated levels of airborne asbestos fiber concentrations.

1.12.1 Respiratory Fit Testing

The Contractor's Designated IH shall conduct a qualitative or quantitative fit test conforming to Appendix A of 29 CFR 1910.134 for each worker required to wear a respirator, and any authorized visitors who enter a regulated area where respirators are required to be worn. A respirator fit test shall 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 shall be performed. Functional fit checks shall be performed each time a respirator is put on and in accordance with the manufacturer's recommendation.

1.12.2 Respirator Selection and Use Requirements

The Contractor shall 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 shall 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 shall 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 shall be made by the Contractor's Designated IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered.

1.13 LICENSES, PERMITS AND NOTIFICATIONS

NOTE: Determine whether a license or permit is required, who is responsible for submitting required notifications, and which agency has jurisdiction whether the city, county, state, and/or USEPA. Choose the appropriate bracketed items.

Necessary licenses, permits and notifications shall be obtained in conjunction with the project's asbestos abatement, transportation and disposal actions and timely notification furnished of such actions as required by federal, state, regional, and local authorities. The [Contractor shall] [Government will] notify the [Regional Office of the USEPA] [state's environmental protection agency responsible for asbestos air emissions] [local air pollution control district/agency] [state OSHA program] [and the CO] in writing, at least [10] [_____] days prior to the commencement of work, in accordance with 40 CFR 61, Subpart M, and state and local requirements to include the mandatory "Notification of Demolition and Renovation Record" form and other required notification documents. Notification shall be by Certified Mail, Return Receipt Requested. The Contractor shall furnish copies of the receipts to the CO, in writing, prior to the commencement of work. Local fire department shall be notified 3 days before fireproofing material is removed from a building and the notice shall specify whether or not the material contains asbestos. The Contractor is responsible for the associated fees/costs for licenses, permits, and notifications.

1.14 PERSONAL PROTECTIVE EQUIPMENT

NOTE: Modify the number of sets of personal protective equipment as required, depending on the size of the asbestos abatement project.

[Three] [_____] complete sets of personal protective equipment shall be made available to the CO and authorized visitors for entry to the regulated area. The CO and authorized visitors shall be provided with training equivalent to that provided to Contractor employees in the selection, fitting, and use of personal protective equipment and the site safety and health requirements. Contractor workers shall be provided with personal protective clothing and equipment and the Contractor shall ensure that it is worn properly. The Contractor's Designated **IH and Designated** Competent Person shall select and approve all the required personal protective clothing and equipment.

1.14.1 Respirators

Respirators shall be in accordance with paragraph RESPIRATORY PROTECTION PROGRAM.

1.14.2 Whole Body Protection

NOTE: Check state, local and customer requirements and then select the appropriate information.

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

1.14.2.1 Coveralls

[Disposable-impermeable] [Disposable-breathable] [Reusable] coveralls with a zipper front shall be provided. Sleeves shall be secured at the wrists, and foot coverings secured at the ankles. See DETAIL SHEET 13.

1.14.2.2 Gloves

Gloves shall be provided to protect the hands where there is the potential for hand injuries (i.e., scrapes, punctures, cuts, etc.).

1.14.2.3 Foot Coverings

Cloth socks shall be provided and worn next to the skin. Footwear, as required by OSHA and **EM 385-1-1**, that is appropriate for safety and health

hazards in the area shall be worn. Reusable footwear removed from the regulated area shall be thoroughly decontaminated or disposed of as ACM waste.

1.14.2.4 Head Covering

Hood type [disposable] [reusable] head covering shall be provided. In addition, protective head gear (hard hats) shall be provided as required. Hard hats shall only be removed from the regulated area after being thoroughly decontaminated.

1.14.2.5 Protective Eye Wear

Eye protection shall be provided, when operations present a potential eye injury hazard, and shall meet the requirements of ASSE/SAFE Z87.1.

1.15 HYGIENE FACILITIES AND PRACTICES

NOTE: Check state, local and customer requirements; consult with in-house engineering, safety and health staff; and select the appropriate information. Remove subparagraphs that do not apply.

A 3-stage decontamination area that includes an equipment, shower and clean room is required for all Class I work involving over 7.5 m (25 feet) or 0.9 square meters (10 square feet) of TSI or surfacing ACM, unless showers are not feasible. A single stage decontamination area or equipment room is required for Class I work involving less than 7.5 m (25 feet) or 0.9 square meters (10 square feet) of TSI or surfacing ACM, and for Class II and Class III asbestos work operations where exposures exceed a PEL-TWA or where there is no negative exposure assessment produced before the operation.

The Contractor shall establish a decontamination area for the decontamination of employees, material and equipment. The Contractor shall ensure that employees enter and exit the regulated area through the decontamination area.

1.15.1 3-Stage Decontamination Area

[A temporary negative pressure decontamination unit that is adjacent and attached in a leak-tight manner to the regulated area shall be provided as described in SET-UP DETAIL SHEET Numbers 22 and 23.] The decontamination unit shall have an equipment room and a clean room separated by a shower that complies with 29 CFR 1910.141, unless the Contractor can demonstrate that such facilities are not feasible. Equipment and surfaces of containers filled with ACM shall be cleaned prior to removing them from the equipment room or area. Two separate lockers shall be provided for each asbestos worker, one in the equipment room and one in the clean room. The Contractor shall provide a minimum of [2] [_____] showers. Wastewater shall be collected and filtered to remove asbestos contamination. Filters and residue shall be disposed of as asbestos contaminated material, in accordance with DETAIL SHEETS 9 and 14. [Filtered water shall be discharged to the sanitary sewer system.] Wastewater filters shall be

installed in series with the first stage pore size of 20 microns and the second stage pore size of 5 microns. The floor of the decontamination unit's clean room shall be kept dry and clean at all times. Proper housekeeping and hygiene requirements shall be maintained. Soap and towels shall be provided for showering, washing and drying. Any cloth towels provided shall be disposed of as ACM waste or shall be laundered in accordance with 29 CFR 1926.1101.

1.15.2 Load-Out Unit

A temporary load-out unit that is adjacent and connected to the regulated area and [access tunnel] shall be provided as described in DETAIL SHEET Number [20] [and] [25]. The load-out unit shall be attached in a leak-tight manner to each regulated area.

1.15.3 Single Stage Decontamination Area

A decontamination area (equipment room/area) shall be provided for Class I work involving less than 7.5 m 25 feet or 0.9 square meters 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 shall be adjacent to the regulated area for the decontamination of employees, material, and their equipment which could be contaminated with asbestos. The area shall 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.

1.15.4 Decontamination Area Exit Procedures

The Contractor shall 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 shall remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers (see Detail Sheets 9A and 14) for disposal and/or laundering.
- c. Employees shall not remove their respirators until showering.
- d. Employees shall 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, the Contractor shall 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.

1.15.5 Smoking

Smoking, if allowed by the Contractor, shall only be permitted in designated areas approved by the CO.

1.16 REGULATED AREAS

All Class I, II, and III asbestos work shall be conducted within regulated areas. The regulated area shall be demarcated to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Access to regulated areas shall be limited to authorized persons. The Contractor shall control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

1.17 WARNING SIGNS AND TAPE

NOTE: "Respirators and Protective Clothing Are Required In this Area" will be added to the warning sign when protective equipment is required.

Warning signs and tape printed [bilingually] [in English] [and] [_____] shall be provided at the regulated boundaries and entrances to regulated areas. Signs shall be located to allow personnel to read the signs and take the necessary protective steps required before entering the area. Warning signs, as shown and described in DETAIL SHEET 11, and displaying the following legend in the lower panel:

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

See DETAIL SHEET 11 and DETAIL SHEET 15.
Decontamination unit signage shall be as shown and described on DETAILED SHEET 15.

1.18 WARNING LABELS

Warning labels shall be affixed to all asbestos disposal containers, asbestos materials, scrap, waste debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to requirements are acceptable. See DETAIL SHEET 14,

1.19 LOCAL EXHAUST SYSTEM

NOTE: Determine the requirements for local exhaust ventilation.

Local exhaust units shall conform to ANSI Z9.2 and 29 CFR 1926.1101. Filters on local exhaust system equipment shall conform to ANSI Z9.2 and UL 586. Filter shall be UL labeled.

1.20 TOOLS

NOTE: Where there is a requirement to collect and transport large volumes of ACM waste using a

self-contained trailer or truck mounted asbestos
power vacuum system, specify vacuum equipment
similar to that described in DETAIL SHEET 26.

Vacuums shall be equipped with HEPA filters, of sufficient capacity and necessary capture velocity at the nozzle or nozzle attachment to efficiently collect, transport and retain the ACM waste material. Power tools shall not be used to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system. Reusable tools shall be thoroughly decontaminated prior to being removed from regulated areas.

1.21 RENTAL EQUIPMENT

If rental equipment is to be used, written notification shall be provided to the rental agency, concerning the intended use of the equipment, the possibility of asbestos contamination of the equipment and the steps that will be taken to decontaminate such equipment.

1.22 AIR MONITORING EQUIPMENT

**NOTE: Delete the EPA Transmission Electron
Microscopy (TEM) method if it will not be employed.**

The Contractor's Designated IH shall approve air monitoring equipment. The equipment shall include, but shall 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 shall also be equipped with an automatic flow control unit which shall 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 94-113 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 20 to plus 60 degrees C minus 4 to plus 140 degrees F and traceable to a NIST primary standard.

1.23 EXPENDABLE SUPPLIES

1.23.1 Glovebag

Glovebags shall be provided as described in 29 CFR 1926.1101 and SET-UP DETAIL SHEET 10. The glovebag assembly shall be 0.15 mm 6 mil thick plastic, prefabricated and seamless at the bottom with preprinted OSHA warning label.

1.23.2 Duct Tape

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

1.23.3 Disposal Containers

NOTE: Consult customer, federal, state, and local requirements for the type of disposal container allowed.

Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers shall be provided for ACM wastes as required by 29 CFR 1926.1101 and DETAIL SHEETS 9A, 9B, 9C and 14. Disposal containers can be in the form of:

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

1.23.4 Sheet Plastic

NOTE: Consult customer, federal, state and local requirements. If necessary, specify the type of sheet to be used and select the color and surface treatment.

Sheet plastic shall be polyethylene of 0.15 mm 6 mil minimum thickness and shall be provided in the largest sheet size necessary to minimize seams ,[as indicated on the project drawings]. Film shall be [clear] [frosted] [or] [black] and conform to ASTM D 4397, except as specified below:

1.23.4.1 Flame Resistant

Where a potential for fire exists, flame-resistant sheets shall be provided. Film shall be [frosted] [or] [black] and shall conform to the requirements of NFPA 701.

1.23.4.2 Reinforced

Reinforced sheets shall 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 shall consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between 2 layers of

polyethylene film. Film shall meet flame resistant standards of NFPA 701.

1.23.5 Mastic Removing Solvent

Mastic removing solvent shall be nonflammable and shall not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used onsite shall have a flash point greater than 60 degrees C 140 degrees F.

1.23.6 Leak-tight Wrapping

Two layers of 0.15 mm 6 mil minimum thick polyethylene sheet stock shall be used for the containment of removed asbestos-containing components or materials such as reactor vessels, large tanks, boilers, insulated pipe segments and other materials too large to be placed in disposal bags as described in DETAIL SHEET 9B. Upon placement of the ACM component or material, each layer shall be individually leak-tight sealed with duct tape.

1.23.7 Viewing Inspection Window

Where feasible, a minimum of 1 clear, 3 mm 1/8 inch thick, acrylic sheet, 450 by 610 mm 18 by 24 inches, shall be installed as a viewing inspection window at eye level on a wall in each containment enclosure. The windows shall be sealed leak-tight with industrial grade duct tape.

1.23.8 Wetting Agents

NOTE: Review the abatement methods to be employed
and edit the paragraph accordingly.

Amended water shall meet the requirements of ASTM D 1331. Removal encapsulant (a penetrating encapsulant) shall 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 shall be capable of wetting the ACM and retarding fiber release during disturbance of the ACM greater than or equal to that provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS.

1.23.9 Strippable Coating

NOTE: Review abatement methods to be employed and
delete if not required.

Strippable coating in aerosol cans shall be used to adhere to surfaces and to be removed cleanly by stripping, at the completion of work.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

NOTE: Materials in various forms are used to
chemically or physically entrap asbestos fibers in
various configurations to prevent these fibers from
becoming airborne. There are four types of

encapsulants, as follows, which must comply with performance requirements as specified herein;

- a. Removal encapsulant (can be used as a wetting agent).
- b. Bridging encapsulant (used to provide a tough, durable surface coating to asbestos containing material).
- c. Penetrating encapsulant (used to penetrate the asbestos containing material encapsulating all asbestos fibers and preventing fiber release due to routine mechanical damage).
- d. Lock-down encapsulant (used to seal off or "lock-down" minute asbestos fibers left on surfaces from which asbestos containing material has been removed).

Encapsulants shall conform to USEPA requirements, shall contain no toxic or hazardous substances and no solvent.

2.2 ENCASEMENT PRODUCTS

NOTE: This technique is not used often. Before specifying, consult state requirements and ensure that the materials, use requirements and warranties are fully developed with the customer. See RESPONSE ACTION DETAIL SHEETS 66, 67, 69 and 90.

Encasement shall consist of primary cellular polymer coat, polymer finish coat, and any other finish coat as approved by the CO.

[2.3 RECYCLABLE MATERIALS

Recyclable materials shall conform to EPA requirements in accordance with Section 01 62 35 RECYCLED/RECOVERED MATERIALS.

]PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

NOTE: EPA NESHAP at 40 CFR 61, Subpart M and OSHA 29 CFR 1926.1101(g)(1)(ii) require adequately wet removal procedures. There are two exceptions to this policy allowing dry removal; they are specified in the EPA 340/1-90/019 NESHAP guidance handbook. In most cases, use wet removal procedures because it is the preferred method and the least hazardous. Dry removal is an option that should be used only where wet removal may damage adjacent areas or equipment, or where safety hazards are identified. If dry removal alone is allowed, carefully edit the specification to remove references to amended water and wetting down procedures and to include a requirement for a written variance submitted by the Contractor, along with the written approval of any regulatory authority having jurisdiction, to the CO

for review.

Requirements for abatement of asbestos outdoors varies considerably with the work and the location involved. Specify minimum requirements for abatement of asbestos outdoors where construction of a containment is not practical. The designer will provide the best suited, specific requirements necessary for the particular project to prohibit or reduce asbestos exposure to other Contractor employees, customer resources and the general public.

Asbestos abatement work tasks shall be performed [as shown on the detailed plans and drawings,] as summarized in Table 1. The Contractor shall use the engineering controls and work practices required in 29 CFR 1926.1101(g) in all operations regardless of the levels of exposure. Personnel shall wear and utilize protective clothing and equipment. The Contractor shall not permit eating, smoking, drinking, chewing or applying cosmetics in the regulated area. Personnel of other trades, shall not be exposed at any time to airborne concentrations of asbestos unless all the administrative and personal protective provisions of the Contractor's APP are complied with. Power to the regulated area shall be locked-out and tagged in accordance with 29 CFR 1910.147, and temporary electrical service with ground fault circuit interrupters shall be provided as needed. Temporary electrical service shall be disconnected when necessary for wet removal. The Contractor shall 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. The Contractor shall correct the condition to the satisfaction of the CO, including visual inspection and air sampling. Work shall resume only upon notification by the CO. Corrective actions shall be documented.

3.2 PROTECTION OF ADJACENT WORK OR AREAS TO REMAIN

Asbestos abatement shall be performed without damage to or contamination of adjacent work or area. Where such work or area is damaged or contaminated, it shall be restored to its original condition or decontaminated by the Contractor at no expense to the Government. When spills occur, work shall stop in all effected areas immediately and the spill shall be cleaned. When satisfactory visual inspection and air sampling analysis results are obtained and have been evaluated by the Contractor's Designated IH and the CO, work shall proceed.

3.3 OBJECTS

NOTE: When the Government will remove objects, furniture and equipment, there are no Contractor requirements; therefore, select the first bracketed sentence. If the Contractor is to remove or protect objects and furnishings, complete DETAIL SHEET 27, and include appropriate bracketed sentences and paragraphs. Remove subparagraphs that do not apply.

3.3.1 Removal of Mobile Objects

[The Government will remove Furniture, [_____] and equipment from the area of work before work begins.] [DETAIL SHEET 27 contains a summary of Contractor's required handling, cleaning and storage and reinstallation of furniture and equipment located in each abatement area. Furnishings identified in DETAIL SHEET 27 [are] [are not] considered contaminated with asbestos fibers. Furnishings shall be precleaned using HEPA filtered vacuum followed by [wet wiping] [and] [or] [steam cleaning]. These objects shall be removed to an area or site designated on DETAIL SHEET 27 and as identified by the CO, and stored; or other appropriate action taken as identified on DETAIL SHEET 27. Carpets, draperies, and other items which may not be suitable for onsite wet cleaning methods shall be [properly cleaned in accordance with 29 CFR 1926.1101] [disposed of as asbestos contaminated material].]

3.3.2 Stationary Objects

Stationary objects, furniture, [_____] and equipment as shown on DETAIL SHEET 27, shall remain in place [and shall be precleaned using HEPA vacuum followed by adequate wet wiping.] Stationary objects and furnishings shall be covered with 2 layers of polyethylene and edges sealed with duct tape.

3.4 BUILDING VENTILATION SYSTEM AND CRITICAL BARRIERS

NOTE: Before specifying, consult with the customer for type of HVAC filters. HVAC filters will be replaced if there is a breach of the critical barriers to the HVAC system; in that case, HVAC filters should be removed, disposed of as asbestos waste, and replaced with like filters at the Contractor's expense.

Building ventilation system supply and return air ducts in a regulated area shall be [shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910.147.] [isolated by airtight seals to prevent the spread of contamination throughout the system.] The airtight seals shall consist of [air-tight rigid covers for building ventilation supply and exhaust grills where the ventilation system is required to remain in service during abatement] [2 layers of polyethylene]. Edges to wall, ceiling and floor surfaces shall be sealed with industrial grade duct tape.

3.5 PRECLEANING

NOTE: Before specifying, identify surfaces to be precleaned.

[Surfaces shall be [cleaned by HEPA vacuum] [and] [adequately wet wiped] prior to establishment of containment.] [The following surfaces [_____] shall be [____].]

3.6 METHODS OF COMPLIANCE

NOTE: Remove subparagraphs that do not apply.

3.6.1 Mandated Practices

NOTE: There is an exception to the mandated practices for roofing materials which are conducted in accordance with 29 CFR 1926.1101(g)(8)(ii). See RESPONSE ACTION DETAIL SHEETS 74 or 75 for roofing practices.

The specific abatement techniques and items identified shall be detailed in the Contractor's AHAP. The Contractor shall use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

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

3.6.2 Control Methods

The Contractor shall use the following control methods:

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

3.6.3 Unacceptable Practices

The following work practices shall not be used:

- a. High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.
- b. Compressed air used to remove asbestos containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.
- c. Dry sweeping, shoveling, or other dry clean up.
- d. Employee rotation as a means of reducing employee exposure to

asbestos.

3.6.4 Class I Work Procedures

Note: OSHA believes that most outdoor Class I work may be safely done without enclosures (ref. OSHA Instruction CPL 2-2.63, change 1, dated 9 January 1996); that is, OSHA does not require enclosures. An exposure assessment must be made prior to outdoor work to determine other required controls. Remove this paragraph when not required in the project.

In addition to requirements of paragraphs Mandated Practices and Control Methods, the following engineering controls and work practices shall be used:

- a. A Competent Person shall supervise the installation and operation of the control methods.
- b. For jobs involving the removal of more than 7.5 m 25 feet or 0.9 square m 10 square feet of TSI or surfacing material, the Contractor shall place critical barriers over all openings to the regulated area.
- c. HVAC systems shall be isolated in the regulated area by sealing with a double layer of plastic or air-tight rigid covers.
- d. Impermeable dropcloths (0.15 mm 6 mil or greater thickness) shall 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 shall be ventilated with a HEPA unit and employees must use PPE.

3.6.5 Specific Control Methods for Class I Work

NOTE: Remove these paragraph and/or subparagraphs when not required in the project.

3.6.5.1 Negative Pressure Enclosure (NPE) System

NOTE: Before specifying a negative pressure enclosure system, the designer should determine if an enclosure system is feasible. The enclosure should be the minimum area to encompass all the working surfaces yet allow unencumbered movement by the workers, provide unrestricted air flow past the workers, and ensure walking surfaces can be kept free of tripping hazards.

The NPE system shall be as shown in SETUP DETAIL SHEET [2] [3] [4] [8].
The system shall provide at least 4 air changes per hour inside the

containment. The local exhaust unit equipment shall be operated 24 hours per day until the containment is removed. The NPE shall be smoke tested for leaks at the beginning of each shift and be sufficient to maintain a minimum pressure differential of minus 0.5 mm 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential shall be monitored continuously, 24 hours per day, with an automatic manometric recording instrument and Records shall be provided daily on the same day collected to the CO. The CO shall be notified immediately if the pressure differential falls below the prescribed minimum. The building ventilation system shall not be used as the local exhaust system for the regulated area. The NPE shall terminate outdoors unless an alternate arrangement is allowed by the CO. All filters used shall be new at the beginning of the project and shall be periodically changed as necessary and disposed of as ACM waste.

3.6.5.2 Glovebag Systems

Glovebag systems shall be as shown in SETUP DETAIL SHEET 10. Glovebags shall 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 shall be used only once and shall not be moved. Glovebags shall not be used on surfaces that have temperatures exceeding 66 degrees C 150 degrees F. Prior to disposal, glovebags shall be collapsed using a HEPA vacuum. Before beginning the operation, loose and friable material adjacent to the glovebag operation shall be wrapped and sealed in 2 layers of plastic or otherwise rendered intact. At least 2 persons shall perform glovebag removal. Asbestos regulated work areas shall be established as shown on [detailed drawings and plans] [Table 1] for glovebag abatement. Designated boundary limits for the asbestos work shall be established with rope or other continuous barriers and all other requirements for asbestos control areas shall be maintained, including area signage and boundary warning tape as specified in SET-UP DETAIL SHEET 11.

- a. The Contractor shall attach HEPA vacuum systems to the bag to prevent collapse during removal of ACM.
- b. The negative pressure glove boxes shall 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 shall be created in the system using a HEPA filtration system. The box shall be smoke tested for leaks prior to each use.

3.6.5.3 Mini-Enclosures

[Single bulkhead containment] [Double bulkhead containment] [or] [Mini-containment (small walk-in enclosure)] as shown in SETUP DETAIL SHEET [5] [6] [7] to accommodate no more than 2 persons, may be used if the disturbance or removal can be completely contained by the enclosure. The mini-enclosure shall be inspected for leaks and smoke tested before each use. Air movement shall be directed away from the employee's breathing zone within the mini-enclosure.

3.6.5.4 Wrap and Cut Operation

Note: When pipes are insulated with ACM, removal of the entire pipe may be more protective, easier, and more cost-effective than stripping the asbestos

insulation from the pipe. The wrap and cut procedure consists of 2 distinct operations. The wrap portion requires the removal of small amounts of asbestos from either side of the pipe to be cut; this will be a Class I or III operation depending on the amount of asbestos removed. Once the asbestos is removed and wrapped, the pipe is then cut. OSHA considers the cutting portion of the job as unclassified, as it does not involve asbestos removal. If the wrap and cut operation is conducted in a negative pressure enclosure system, the glovebag step is not required, although recommended.

Wrap and cut operations shall be as shown in SETUP DETAIL SHEET [9B] [10]. Prior to cutting pipe, the asbestos-containing insulation shall be wrapped with polyethylene and securely sealed with duct tape to prevent asbestos becoming airborne as a result of the cutting process. The following steps shall be taken: install glovebag, strip back sections to be cut 150 mm 6 inches from point of cut, and cut pipe into manageable sections.

3.6.6 Class II Work

NOTE: Class II work may also be performed using a method allowed for Class I work, except that glovebags and glove boxes are allowed if they fully enclose the Class II material to be removed. Remove this paragraph when not required in the project.

In addition to the requirements of paragraphs Mandated Practices and Control Methods, the following engineering controls and work practices shall be used:

- a. A Competent Person shall supervise the work.
- b. For indoor work, critical barriers shall be placed over all openings to the regulated area.
- c. Impermeable dropcloths shall be placed on surfaces beneath all removal activity.

3.6.7 Specific Control Methods for Class II Work

NOTE: If the removal of the adhesive is necessary, wet methods should be used when removing residual adhesive. The adhesive must be either wet-scraped manually or removed using low speed floor machine (300 RPM or less) and wetted sand or a removal solution. The adhesive residues must be placed in an impermeable trash bag while still wet. Remaining water or dirt in the area must then be HEPA vacuumed.

Removal of "intact" cements, coatings, mastics, and flashings is not Class II work. ACM is not rendered non-intact simply by being separated into smaller pieces.

Remove these paragraph and/or subparagraphs when not required in the project.

3.6.7.1 Vinyl and Asphalt Flooring Materials

When removing vinyl and asphalt flooring materials [which contain ACM] [from a building in which ACM has not been verified], the Contractor shall use the following practices as shown in RESPONSE ACTION DETAIL SHEET [56] [57] [58] [59] [60] [61] [62] [63] [64]. Resilient sheeting shall be removed by adequately wet methods. Tiles shall be removed intact (if possible); wetting is not required when tiles are heated and removed intact. Flooring or its backing shall not be sanded. Scraping of residual adhesive and/or backing shall be performed using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. The Contractor shall use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors.

3.6.7.2 Roofing Material

NOTE: Removal or repair of sections of intact roofing less than 2.3 square meters (25 square feet) in area does not require use of wet methods or HEPA vacuuming as long as manual methods, which do not render the material non-intact, are used to remove the material without creating visible dust. In determining whether a job involves less than 2.3 square meters (25 square feet), the designer should specify all removal and repair work to be performed on the same roof on the same day.

When removing roofing materials which contain ACM as described in 29 CFR 1926.1101(g)(8)(ii), the Contractor shall use the following practices as shown in RESPONSE ACTION DETAIL SHEET [74] [75]. Roofing material shall be removed in an intact state. Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards. When removing built-up roofs, with asbestos-containing roofing felts and an aggregate surface, using a power roof cutter, all dust resulting from the cutting operations shall be collected by a HEPA dust collector, or shall be HEPA vacuumed by vacuuming along the cut line. Asbestos-containing roofing material shall not be dropped or thrown to the ground, but shall be lowered to the ground via covered, dust-tight chute, crane, hoist or other method approved by the CO. Any ACM that is not intact shall be lowered to the ground as soon as practicable, but not later than the end of the work shift. While the material remains on the roof it shall be kept wet or placed in an impermeable waste bag or wrapped in plastic sheeting. Intact ACM shall be lowered to the ground as soon as practicable, but not later than the end of the work shift. Unwrapped material shall be transferred to a closed receptacle. Critical barriers shall be placed over roof level heating and ventilation air intakes.

3.6.7.3 Cementitious Siding and Shingles or Transite Panels

NOTE: Alternate work practices which do not involve hand removal may be specified according to 29 CFR 1926.1101(g)(8)(vi), "Alternative Work Practices and Controls"; EPA 340/1-92/013 "A Guide to Normal Demolition Practices Under the Asbestos NESHAP"; EPA document Asbestos/Demolition Decision Tree (1994); state and local requirements; and Department of Army Memorandum ENVR-EP, subject: "Policy guidance on interpretation of revised EPA asbestos rule affecting demolition and renovation of buildings" dated 22 Jan 1992. For application on multiple building demolition or siding removal, pilot tests to determine feasibility, practicality, and compliance are recommended.

When removing cementitious asbestos-containing siding, shingles or transite panels the Contractor shall use the following work practices shown in RESPONSE ACTION DETAIL SHEET [81] [82] [83]. Intentionally cutting, abrading or breaking is prohibited. Each panel or shingle shall be sprayed with amended water prior to removal. Nails shall be cut with flat, sharp instruments. Unwrapped or unbagged panels or shingles shall be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift.

3.6.7.4 Gaskets

Gaskets shall 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 shall be undertaken within a glovebag. Any scraping to remove residue shall be performed wet.

3.6.8 Specific Control Methods for Class III Work

NOTE: Repair and maintenance is considered Class III work if it involves less than 1 glovebag of material, regardless of the time it takes to do the job. If the job involves more than 1 glovebag of TSI or surfacing material then it is a class III job. If the job involves more than 1 bag of other ACM then it is a Class II job.

Taking bulk samples during an asbestos survey is a Class III operation, and, as in all class III operations, a respirator is required when there is no negative exposure assessment.

Class III asbestos work shall be conducted using engineering and work practice controls which minimize the exposure to employees performing the asbestos work. The work shall be performed using wet methods and, to the extent feasible, using local exhaust. The Contractor shall use impermeable drop cloths and shall isolate the operation, using mini-enclosures or glovebag systems, where the disturbance involves drilling, cutting,

abrading, sanding, chipping, breaking, or sawing of TSI or surfacing material.

3.6.9 Specific Control Methods for Class IV Work

Class IV jobs shall be conducted using wet methods and HEPA vacuums. Employees cleaning up debris and waste in a regulated area where respirators are required shall wear the selected respirators.

[3.6.10 Methods for Asphaltic Wrap

Removal or disturbance of pipeline asphaltic wrap shall be performed using wet methods.]

3.6.11 Class I Asbestos Work Response Action Detail Sheets

NOTE: Remove items in this subparagraph that do not apply.

The following Class I Asbestos Work Response Action Detail Sheet is specified on Table 1 for each individual work task to be performed:

- a. Troweled Wall Plaster on Masonry: See Sheet 32
- b. Troweled Wall Plaster on Stud Wall: See Sheet 33
- c. Troweled Ceiling Plaster on Structural Substrate: See Sheet 35
- d. Troweled Ceiling Plaster on Hung Ceiling: See Sheet 36
- e. Acoustical Wall Plaster on Masonry: See Sheet 42
- f. Acoustical Ceiling Plaster (Non-Asbestos Substrate): See Sheet 44
- g. Asbestos Decorative Paint on Plaster: See Sheet 46
- h. Asbestos-contaminated Masonry for Masonry Chimney: See Sheet 50
- i. Asbestos-contaminated Masonry Wall or Thermal Insulation: See Sheet 51
- j. Fireproofing or Thermal Surface Insulation: See Sheet 68
- k. Acoustical Ceiling Insulation: See Sheet 70
- l. Exterior Asbestos Stucco: See Sheet 79
- m. Duct Insulation: Air circulation is not permitted in ductwork while abatement work is in progress. See Sheet 101. The HVAC system shall be isolated or inoperative and locked out of service prior to removal of duct insulation. Air circulation is not permitted in ductwork during abatement work.
- n. Pipe Insulation (Using a Glovebag): See Sheet 87
- o. Horizontal Pipe Insulation (Using a Containment Area): See Sheet 88

- p. Pipe Insulation (Using a Mini-Containment Area): See Sheet 89
- q. Storage Tank and Boiler Breeching Insulation: See Sheet 93.
Storage tanks and boilers shall be valved off and allowed a sufficient amount of time to cool down prior to abatement work. Insulation shall be sprayed with a mist of amended water or removal encapsulant. Amended water or removal encapsulant shall be allowed to saturate material to substrate. Cover jackets shall be slit at seams, and sections removed and hand-placed in a polyethylene disposable bag. Exposed surfaces shall be continuously sprayed with amended water to minimize airborne dust. Insulation on tanks and boiler breeching shall not be allowed to drop to the floor. Lagging on piping and insulation on fittings shall be removed. A penetrating encapsulant shall be sprayed on all exposed tank, boiler and boiler breeching surfaces.
- r. Troweled Wall Plaster on Studs: See Sheet 30
- s. Troweled Ceiling or Wall Plaster on Masonry: See Sheet 31
- t. Acoustical Ceiling on Wall Plaster: See Sheet 41
- u. Interior Stucco: See Sheet 78
- v. Exterior Stucco: See Sheet 80
- w. Pipe and Fitting Insulation (using Glovebag): See Sheet 86
- x. Storage Tank and Boiler Breeching: See Sheet 92
- y. Duct Insulation: See Sheet 100.

3.6.12 Class II Asbestos Work Response Action Detail Sheets

NOTE: Remove items in this subparagraph that do not apply.

The following Class II Asbestos Work Response Action Detail Sheet is specified on Table 1 for each individual work task to be performed:

- a. Light Curtain: See Sheet 47
- b. Interior Asbestos Cement, Fiberboard and Drywall Panels: See Sheet 48
- c. Suspended Asbestos Cement Ceiling Tile: See Sheet 52
- d. Asbestos Cement Architectural Products: See Sheet 53
- e. Glued-on Acoustical Ceiling and Wall Tile: See Sheet 55
- f. Suspended Acoustical Ceiling Tile: See Sheet 54
- g. Vinyl or Vinyl Asbestos Tile Adhered to Concrete Floor System by Asbestos-Containing Adhesive: See Sheet 56

- h. Vinyl or Vinyl Asbestos Tile Adhered to Wood Floor System by Asbestos Containing Adhesive: See Sheet 60
- i. Vinyl Asbestos Tile Adhered to Concrete Floor System by Asbestos Containing Adhesive: See Sheet 57
- j. Vinyl Asbestos Tile Adhered to Concrete Floor System by Asbestos Free Adhesive: See Sheet 58
- k. Vinyl Asbestos Tile and Chemical Dissolution of Asbestos-Containing Adhesives on Concrete Floor System: See Sheet 59
- l. Vinyl Asbestos Tile Adhered to Wood Floor System by Asbestos-Containing Adhesive: See Sheet 61
- m. Vinyl Asbestos Tile Adhered to Wood Floor System by Asbestos Free Adhesive: See Sheet 62
- n. Sheet Flooring Adhered Wood Floor System: See Sheet 63
- o. Asbestos-Containing Sheet Flooring Adhered to Concrete Floor System by Asbestos-Containing Adhesive: See Sheet 64
- p. Carpeting (Asbestos-Containing or Contaminated): See Sheet 65
- q. Miscellaneous Asbestos-Containing Materials: See Sheet 45
- r. Built-Up Roofing and Flashing: See Sheet 74
- s. Roof, Shingles and Underlayment: See Sheet 75
- t. Asbestos Cement Siding: See Sheet 81
- u. Asbestos Cement Roofing: See Sheet 82
- v. Asbestos-Containing Walkway Cover: See Sheet 83
- w. Asbestos-Contaminated Metal Siding: See Sheet 84
- x. Asbestos Cement Sunscreen Louvers: See Sheet 85
- y. Electrical Wiring and Fixtures: See Sheet 95
- z. Asbestos Insulated Electrical Fixture: See Sheet 96
- aa. Boiler Firebox Insulation: Firebox lining shall be removed from out-of-service boilers before the boiler is dismantled: See Sheet 97.

3.6.13 Abatement of Asbestos Contaminated Soil

NOTE: Soil encapsulation will not be an option in traffic areas. Remove this subparagraph if it does not apply. Consult with customer, federal, state, and local agency for requirements for asbestos contaminated soil abatement requirements.

[Asbestos contaminated soil shall be removed from areas to a minimum depth of [50] [_____] mm [2] [_____] inches. Soil shall be thoroughly dampened with amended water and then removed by manual shoveling into labeled containers. See DETAIL SHEET 73.] [The Contractor has the option to propose encapsulation of soil instead of removal. Since soil encapsulation is highly dependent on soil chemistry, available skills for application and proprietary products, the Contractor shall first test the proposed soil encapsulant on a minimum 9.3 square meter 100 square feet of soil area onsite. The test shall be witnessed by the CO and the manufacturer's representative. A written application for encapsulation shall be submitted to the CO with test results, encapsulant manufacturer's positive recommendation for use, a guarantee for satisfactory performance for 10 years, and limitation of application. If the application is accepted, the soil encapsulation shall proceed in compliance with all provisions and instructions of the encapsulant manufacturer and under the supervision of a person certified by the manufacturer who is trained and experienced in the proper application of the soil encapsulant. See DETAIL SHEET 72.] [A concrete slab of minimum [50] [_____] mm [2] [_____] inch thickness shall be poured over the entire soil surface. Soil surface shall be thoroughly dampened before pouring concrete. Soil encapsulators and supervisors shall be primarily concrete workers trained to work in asbestos contaminated environments. See DETAIL SHEET 71.]

3.6.14 Enclosure of ACM

NOTE: Select the applicable requirements for the
required enclosure method. Delete encapsulation
methods and materials which are not used.

Isolation of ACM by construction of a permanent enclosure shall be conducted as specified in Section [_____]. Enclosures shall be as follows:

- a. Enclosure of Acoustical Wall Plaster on Masonry Wall: See Detail Sheet 37
- b. Enclosure of Asbestos Contaminated Soil: See Detail Sheet 71
- c. Enclosure of Acoustical Ceiling Plaster, Spray-on Fireproofing and Thermal Insulation Plaster: See Detail Sheet 43.

3.6.15 Encapsulation of ACM

NOTE: Remove items in this subparagraph that do not
apply.

Prior to applying any encapsulant, the entire surface area shall be inspected for loose, or damaged asbestos material:

- a. Penetrating Encapsulation: Before penetrating encapsulation is applied, asbestos removal work in the area shall be complete. Substrate shall be evaluated before application to ensure that the encapsulant will not cause the substrate to fail in any way. Plug samples shall be taken to determine if full penetration has been achieved. If full penetration has not been achieved, surfaces

shall be recoated while the matrix is still wet, until full penetration is achieved: See Detail Sheet 39.

- b. Bridging Encapsulation: The surface shall be encapsulated in sections of 93 square m 1000 square feet or less as recommended by the encapsulant manufacturer. Upon completion of each section, the dry thickness of the bridging encapsulation shall be measured. Additional bridging encapsulant shall be applied to obtain the desired encapsulant thickness. Additional coats shall blend with the original bridging encapsulant. Bridging encapsulation shall include:

- (1) Troweled Wall Plaster: See Detail Sheet 29
- (2) Troweled Ceiling Plaster: See Detail Sheet 34
- (3) Acoustical Wall Plaster: See Detail Sheet 38
- (4) Acoustical Ceiling Plaster: See Detail Sheet 34
- (5) Asbestos Cement Wall, Fiberboard and Drywall Panels: See Detail Sheet 49
- (6) Exterior Asbestos Stucco: See Detail Sheet 76
- (7) Interior Asbestos Stucco: See Detail Sheet 77
- (8) Storage Tank and Boiler Breeching: See Detail Sheet 91
- (9) Boiler and Piping Gasket: See Detail Sheet 98.

3.6.16 Combination Encapsulation of Acoustical Wall and Ceiling Plaster

The combination penetrating/bridging encapsulation system shall be installed by first applying the penetrating encapsulant and then the bridging encapsulant: See Detail Sheet 40.

3.6.17 Response Action Detail Sheets for Repair of Class I Materials

NOTE: Remove items in this subparagraph that do not apply.

- a. Troweled Wall Plaster on Studs: See Detail Sheet 30
- b. Troweled Ceiling or Wall Plaster on Masonry: See Detail Sheet 31
- c. Acoustical Ceiling on Wall Plaster: See Detail Sheet 41
- d. Interior Stucco: See Detail Sheet 78
- e. Exterior Stucco: See Detail Sheet 80
- f. Pipe and Fitting Insulation (using Glovebag): See Detail Sheet 86
- g. Storage Tank and Boiler Breeching: See Detail Sheet 92
- h. Duct Insulation: See Detail Sheet 100
- i. Exposed Pipe Insulation Edges: Asbestos insulation to remain shall have exposed edges contained. Wet and cut the rough ends true and square with sharp tools and then encapsulate the edges with a 6 mm 1/4 inch thick layer of non-asbestos-containing insulating cement troweled to a smooth finish; when cement is dry, lag the end with a layer of non-asbestos lagging cloth, overlapping the existing ends by 100 mm 4 inches.

3.6.18 Response Action Detail Sheets for Repair of Class II Materials

- a. Vinyl or Vinyl Asbestos Tile Adhered to Concrete Floor System by Asbestos-Containing Adhesive: See Detail Sheet 56
- b. Vinyl or Vinyl Asbestos Tile Adhered to Wood Floor System by Asbestos Containing Adhesive: See Detail Sheet 60.

3.6.19 Encasement of ACM

NOTE: Delete items not required for the project.

Prior to applying the first layer of the polymer system, the structural stability of the ACM shall be verified. Encasement materials shall not be applied until all removal work within the regulated area has been completed and materials to be encased have been decontaminated. The asbestos substrate shall be completely encased. A polymer finish containing fiberglass shall be applied over the low density cellular foam to a thickness of 25 mm 1 inch. All system components shall be applied according to the system manufacturer's instructions and data. Encasement shall be applied to:

- a. Beams and Decking: See Detail Sheet 66
- b. Columns: See Detail Sheet 67
- c. Acoustical Ceiling Insulation: See Detail Sheet 69
- d. Storage Tank and Boiler Breeching: See Detail Sheet 90.

3.6.20 Sealing Contaminated Items Designated for Disposal

NOTE: Use this paragraph only when asbestos contaminated items are also designated for removal and disposal.

Contaminated items designated for removal shall be coated with an asbestos lockdown encapsulant before being removed from the asbestos control area. The asbestos lockdown encapsulant shall be tinted a contrasting color and shall be spray applied by airless method. Thoroughness of sealing operation shall be visually gauged by the extent of colored coating on exposed surfaces.

3.7 FINAL CLEANING AND VISUAL INSPECTION

After completion of all asbestos removal work and the gross amounts of asbestos have been removed from every surface, any remaining visible accumulations of asbestos shall be collected. For all classes of indoor asbestos abatement projects a final cleaning shall be performed using HEPA vacuum and wet cleaning of all exposed surfaces and objects in the regulated area. Upon completion of the cleaning, the Contractor shall conduct a visual pre-inspection of the cleaned area in preparation for a final inspection before final air clearance monitoring. The Contractor and the CO shall conduct a final visual inspection of the cleaned regulated

area in accordance with ASTM E 1368 and document the results on the Final Cleaning and Visual Inspection as specified on the SET-UP DETAIL SHEET 19. If the CO rejects the clean regulated area as not meeting final cleaning requirements, the Contractor shall reclean as necessary and have a follow-on inspection conducted with the CO. Recleaning and follow-up reinspection shall be at the Contractor's expense.

3.8 LOCKDOWN

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

3.9 EXPOSURE ASSESSMENT AND AIR MONITORING

NOTE: Air sampling regimen depends on the abatement techniques specified and applicable laws. Consult the state, local and customer requirements and edit accordingly.

3.9.1 General Requirements

a. Exposure assessment, air monitoring and analysis of airborne concentration of asbestos fibers shall be performed in accordance with 29 CFR 1926.1101, and the Contractor's air monitoring plan. Results of breathing zone samples shall be posted at the job site and made available to the CO.

b. Worker Exposure.

(1) The Contractor's Designated IH shall collect samples representative of the exposure of each employee who is assigned to work within a regulated area. Breathing zone samples shall be taken for at least 25 percent of the workers in each shift, or a minimum of 2, whichever is greater. Air monitoring results at the 95 percent confidence level shall be calculated as shown in Table 2 at the end of this section.

(2) [[The Contractor shall] [The CO will] provide an onsite independent testing laboratory with qualified analysts and appropriate equipment to conduct sample analyses of air samples using the methods prescribed in 29 CFR 1926.1101, to include NIOSH 94-113 Method 7400.]

(3) The Contractor's workers shall not be exposed to an airborne fiber concentration in excess of 1.0 f/cc, as averaged over a sampling period of 30 minutes. Should a personal excursion concentration of 1.0 f/cc expressed as a 30-minute sample occur inside a regulated work area, the Contractor shall stop work immediately, notify the Contracting Officer, and implement additional engineering controls and work practice controls to reduce airborne fiber levels below prescribed limits in the work area. Work shall not restart until authorized by the CO.

c. Environmental Exposure

(1) All environmental air monitoring shall be performed by [the

Contractor's Designated IH] [and] [Contracting Officer's IH].

(2) Environmental and final clearance air monitoring shall be performed using NIOSH 94-113 Method 7400 (PCM) with optional confirmation of results by [OSHA] [or] [EPA] TEM.

(3) For environmental and final clearance, air monitoring shall be conducted at a sufficient velocity and duration to establish the limit of detection of the method used at 0.005 f/cc.

(4) When confirming asbestos fiber concentrations (asbestos f/cc) from environmental and final clearance samples, use TEM in accordance with NIOSH 94-113 Method 7402. When such confirmation is conducted, it shall be from the same sample filter used for the NIOSH 94-113 Method 7400 PCM analysis. All confirmation of asbestos fiber concentrations, using NIOSH 94-113 Method 7402, shall be at the Contractor's expense.

(5) Monitoring may be duplicated by the Government at the discretion of the CO and at the Government's expense.

(6) The Contractor shall maintain a fiber concentration inside a regulated area less than or equal to 0.1 f/cc expressed as an 8 hour, time-weighted average (TWA) during the conduct of the asbestos abatement.

(7) At the discretion of the Contracting Officer, fiber concentration may exceed 0.1 f/cc but shall not exceed 1.0 f/cc expressed as an 8-hour TWA. Should an environmental concentration of 1.0 f/cc expressed as an 8-hour TWA occur inside a regulated work area, the Contractor shall stop work immediately, notify the Contracting Officer, and implement additional engineering controls and work practice controls to reduce airborne fiber levels below prescribed limits in the work area. Work shall not restart until authorized by the CO.

3.9.2 Initial Exposure Assessment

NOTE: Delete last sentence if not applicable.

The Contractor's Designated IH shall conduct an exposure assessment immediately before or at the initiation of an asbestos abatement operation to ascertain expected exposures during that operation. The assessment shall be completed in time to comply with the requirements, which are triggered by exposure data or the lack of a negative exposure assessment, and to provide information necessary to assure that all control systems planned are appropriate for that operation. The assessment shall take into consideration both the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the Contractor which indicate the levels of airborne asbestos likely to be encountered on the job. [For Class I asbestos work, until the employer conducts exposure monitoring and documents that employees on that job will not be exposed in excess of PELs, or otherwise makes a negative exposure assessment, the Contractor shall presume that employees are exposed in excess of the PEL-TWA and PEL-Excursion Limit.]

3.9.3 Negative Exposure Assessment

The Contractor shall provide a negative exposure assessment for the specific asbestos job which will be performed. The negative exposure assessment shall be provided within [_____] days of the initiation of the project and conform to the following criteria:

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

3.9.4 Independent Environmental Monitoring

NOTE: Select the bracketed paragraph and edit if the Government plans to retain an independent air monitoring firm to perform any of the following environmental air monitoring activities ,pre-abatement, during abatement, or final clearance.

[The Government has retained an independent air monitoring firm to perform [pre-abatement] [during abatement][final clearance air monitoring]. The air monitoring Contractor has been provided a copy of the contract that includes this abatement work. The abatement Contractor will provide the air monitoring Contractor with an up-to-date copy of the accepted AHAP, APP and pertinent detailed drawings. The air monitoring Contractor is required to comply with the abatement Contractor's safety and health requirements. The abatement Contractor will coordinate all onsite activities with the air monitoring Contractor, the COR, and other affected parties as directed by the COR. The abatement Contractor will provide the air monitoring Contractor with an up-to-date schedule of abatement Contractor work

activities. The air monitoring Contractor will coordinate with the abatement Contractor and the COR during the performance Government required air monitoring. The abatement Contractor is responsible for performing exposure assessment and personal air monitoring of abatement Contractor's work. The air monitoring Contractor is responsible for performing these tasks for its employee.]

3.9.5 Preabatement Environmental Air Monitoring

NOTE: The designer shall research the state, regional and local laws, regulations, statutes, etc., to determine air monitoring requirements. Demolition projects may not require clearance monitoring.

Preabatement environmental air monitoring shall be established [1 day] [_____] prior to the masking and sealing operations for each regulated area to determine background concentrations before abatement work begins. As a minimum, preabatement air samples shall be collected using NIOSH 94-113 Method 7400, PCM at these locations: outside the building; inside the building, but outside the regulated area perimeter; and inside each regulated work area. One sample shall be collected for every 185 square meters 2000 square feet of floor space. At least 2 samples shall be collected outside the building: at the exhaust of the HEPA unit; and downwind from the abatement site. The PCM samples shall be analyzed within 24 hours; and if any result in fiber concentration greater than 0.01 f/cc, asbestos fiber concentration shall be confirmed using NIOSH 94-113 Method 7402 (TEM).

3.9.6 Environmental Air Monitoring During Abatement

Until an exposure assessment is provided to the CO, environmental air monitoring shall be conducted at locations and frequencies that will accurately characterize any evolving airborne asbestos fiber concentrations. The assessment shall demonstrate that the product or material containing asbestos minerals, or the abatement involving such product or material, cannot release airborne asbestos fibers in concentrations exceeding 0.01 f/cc as a TWA under those work conditions having the greatest potential for releasing asbestos. The monitoring shall be at least once per shift at locations including, but not limited to, close to the work inside a regulated area; preabatement sampling locations; outside entrances to a regulated area; close to glovebag operations; representative locations outside of the perimeter of a regulated area; inside clean room; and at the exhaust discharge point of local exhaust system ducted to the outside of a containment (if used). If the sampling outside regulated area shows airborne fiber levels have exceeded background or 0.01 f/cc, whichever is greater, work shall be stopped immediately, and the Contracting Officer notified. The condition causing the increase shall be corrected. Work shall not restart until authorized by the CO.

3.9.7 Final Clearance Air Monitoring

NOTE: The designer will research the state, regional and local laws, regulations, statutes, etc., and consult with the customers to determine final air clearance monitoring requirements.

(Demolition projects may not require clearance sampling). Remove and/or edit the subparagraphs accordingly.

[The Contractor's Designated IH shall] [The CO's IH will] conduct final clearance air monitoring using aggressive air sampling techniques as defined in 40 CFR 763, Subpart E, Appendix A, Unit III, TEM Method B.7(d-f) and Table 4 of this section for all indoor asbestos abatement projects. Clearance air monitoring is not required for outside work or for soil cleanups.

3.9.7.1 Final Clearance Requirements, NIOSH PCM Method

For PCM sampling and analysis using NIOSH 94-113 Method 7400, the fiber concentration inside the abated regulated area, for each airborne sample, shall 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) shall be confirmed from that same filter using NIOSH 94-113 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 shall be repeated. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria shall be done.

3.9.7.2 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 5 inside samples is less than or equal to 70 structures per square millimeter (70 S/mm). When the arithmetic mean is greater than 70 S/mm, the 3 blank samples shall be analyzed. If the 3 blank samples are greater than 70 S/mm, resampling shall be done. If less than 70 S/mm, the 5 outside samples shall be analyzed and a Z-test analysis performed. When the Z-test results are less than 1.65, the decontamination shall be considered complete. If the Z-test results are more than 1.65, the abatement is incomplete and cleaning shall be repeated. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria shall be done.

3.9.7.3 Air Clearance Failure

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

3.9.8 Air-Monitoring Results and Documentation

NOTE: Consult with customer on turn around time for sample results in the blank. This is sometimes dependent upon the location of the abatement project and the availability of testing laboratories to turn sample results quickly. Some state or local regulators, Corps of Engineer districts or customers may require the CO retain an air sampling firm to provide air monitoring quality assurance.

Air sample fiber counting shall be completed and results provided within 24 hours (breathing zone samples), and [_____] hours (environmental/clearance monitoring) after completion of a sampling period. The CO shall be notified immediately of any airborne levels of asbestos fibers in excess of established requirements. Written sampling results shall be provided within 5 working days of the date of collection. The written results shall be signed by testing laboratory analyst, testing laboratory principal and the [Contractor's Designated IH] [CO's IH]. The air sampling results shall be documented on a Contractor's daily air monitoring log. The daily air monitoring log shall contain the following information for each sample:

- a. Sampling and analytical method used;
- b. Date sample collected;
- c. Sample number;
- d. Sample type: BZ = Breathing Zone (Personal), P = Preabatement, E = Environmental, C = Abatement Clearance;
- e. Location/activity/name where sample collected;
- f. Sampling pump manufacturer, model and serial number, beginning flow rate, end flow rate, average flow rate (L/min);
- g. Calibration date, time, method, location, name of calibrator, signature;
- h. Sample period (start time, stop time, elapsed time (minutes));
- i. Total air volume sampled (liters);
- j. Sample results (f/cc and S/mm square) if EPA methods are required for final clearance;
- k. Laboratory name, location, analytical method, analyst, confidence level. In addition, the printed name and a signature and date block for the Industrial Hygienist who conducted the sampling and for the Industrial Hygienist who reviewed the daily air monitoring log verifying the accuracy of the information.

3.10 CLEARANCE CERTIFICATION

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

are safe before entry is permitted.

3.11 CLEANUP AND DISPOSAL

3.11.1 Title to ACM Materials

ACM material resulting from abatement work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of as specified and in accordance with applicable federal, state and local regulations.

3.11.2 Collection and Disposal of Asbestos

NOTE: Consult 40 CFR 61, Subpart M, customer, state, regional and local requirements.

All ACM waste shall be collected including contaminated wastewater filters, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing and placed in leak-tight containers. Waste within the containers shall be wetted in case the container is breached. Asbestos-containing waste shall be disposed of [at an EPA, state and local approved asbestos landfill] [off Government property]. For temporary storage, sealed impermeable containers shall be stored in an asbestos waste load-out unit or in a storage/transportation conveyance (i.e., dumpster, roll-off waste boxes, etc.) in a manner acceptable to and in an area assigned by the CO. Procedure for hauling and disposal shall comply with 40 CFR 61, Subpart M, state, regional, and local standards.

3.11.3 Scale Weight Measurement

NOTE: Remove this subparagraph when not required or edit accordingly.

Scales used for measurement shall be public scales. Weighing shall be at a point nearest the work at which a public scale is available. Scales shall be standard truck scales of the beam type; scales shall be equipped with the type registering beam and an "over and under" indicator; and shall be capable of accommodating the entire vehicle. Scales shall be tested, approved and sealed by an inspector of the State of [_____]. Scales shall be calibrated and resealed as often as necessary and at least once every three months to ensure continuous accuracy. Vehicles used for hauling ACM shall be weighed empty daily at such time as directed and each vehicle shall bear a plainly legible identification mark.

3.11.4 Weight Bills and Delivery Tickets

NOTE: Remove this subparagraph when not required or edit accordingly.

Copies of weight bills and delivery tickets shall be submitted to the CO during the progress of the work. The Contractor shall furnish the CO scale tickets for each load of ACM weighed and certified. These tickets shall include tare weight; identification mark for each vehicle weighed; and

date, time and location of loading and unloading. Tickets shall be furnished at the point and time individual trucks arrive at the worksite. A master log of all vehicle loading shall be furnished for each day of loading operations. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified weigh bills and/or certified tickets and manifests of all ACM actually disposed by the Contractor for this contract.

3.11.5 Records and Management Plan

3.11.5.1 Asbestos Waste Shipment Records

The Contractor shall complete and provide the CO final completed copies of the Waste Shipment Record for all shipments of waste material as specified in 40 CFR 61, Subpart M and other required state waste manifest shipment records, within 3 days of delivery to the landfill. Each Waste Shipment Record shall be signed and dated by the [Contractor] [CO], the waste transporter and disposal facility operator.

3.11.5.2 Asbestos Management Plan

The Contractor shall provide a summary, in electronic form, of site activities (bulk samples, asbestos removed, repaired, encased, etc.) for updating the installation Asbestos Management Plan.

TABLE 1

INDIVIDUAL WORK TASK DATA ELEMENTS

Sheet _____ of _____

There is a separate data sheet for each individual work task.

1. WORK TASK DESIGNATION NUMBER _____
2. LOCATION OF WORK TASK _____
3. BRIEF DESCRIPTION OF MATERIAL TO BE ABATED: _____

 a. Type of Asbestos _____
 b. Percent asbestos content _____%
4. ABATEMENT TECHNIQUE TO BE USED _____
5. OSHA ASBESTOS CLASS DESIGNATION FOR WORK TASK _____
6. EPA NESHAP FRIABILITY DESIGNATION FOR WORK TASK
 Friable _____ Non-friable Category I _____
 Non-friable Category II _____
7. FORM _____ and CONDITION OF ACM: GOOD _____ FAIR _____ POOR _____
8. QUANTITY: METERS _____, SQUARE METERS _____
- 8a. QUANTITY: LINEAR FT. _____, SQUARE FT. _____
9. RESPONSE ACTION DETAIL SHEET NUMBER FOR WORK TASK _____
10. SET-UP DETAIL SHEET NUMBERS
 FOR WORK TASK _____, _____, _____, _____,
 _____, _____, _____, _____.

NOTES:

- (1) Numeric sequence of individual work tasks (1,2,3,4, etc.) for each regulated area. Each category of EPA friability/OSHA class has a separate task.
- (2) Specific location of work (building, floor, area, e.g., Building 1421, 2nd Floor, Rm 201)
- (3) A description of material to be abated (example: horizontal pipe, cement wall panels, tile, stucco, etc.) type of asbestos (chrysotile, amosite, crocidolite, etc.); and % asbestos content.
- (4) Technique to be used: Removal = REM; Encapsulation = ENCAP; Encasement = ENCAS; Enclosure = ENCL; Repair = REP.
- (5) Class designation: Class I, II, III, or IV (OSHA designation).
- (6) Friability of materials: Check the applicable EPA NESHAP friability designation.
- (7) Form: Interior or Exterior Architectural = IA or EA; Mechanical/Electrical = ME.
 Condition: Good = G; Fair = F; Poor = P.
- (8) Quantity of ACM for each work task in meters or square meters.
- (8a) Quantity of ACM for each work task in linear feet or square feet.
- (9) Response Action Detail Sheet specifies the material to be abated and the methods to be used. There is only one Response Action Detail Sheet for each abatement task.
- (10) Set-up Detail Sheets indicate containment and control methods used in support of the response action (referenced in the selected Response Action Detail Sheet).

TABLE 2

FORMULA FOR CALCULATION OF THE 95 PERCENT CONFIDENCE LEVEL
(Reference: NIOSH 7400)

$$\text{Fibers/cc(01.95 percent CL)} = X + [(X) * (1.645) * (CV)]$$

Where: $X = ((E)(AC))/((V)(1000))$

$$E = ((F/Nf) - (B/Nb))/Af$$

CV = The precision value; 0.45 shall be used unless the analytical laboratory provides the Contracting Officer with documentation (Round Robin Program participation and results) that the laboratory's precision is better.

AC = Effective collection area of the filter in square millimeters

V = Air volume sampled in liters

E = Fiber density on the filter in fibers per square millimeter

F/Nf = Total fiber count per graticule field

B/Nb = Mean field blank count per graticule field

Af = Graticule field area in square millimeters

$$\text{TWA} = C1/T1 + C2/T2 = Cn/Tn$$

Where: C = Concentration of contaminant

T = Time sampled.

TABLE 3
NIOSH METHOD 7400
PCM ENVIRONMENTAL AIR SAMPLING PROTOCOL (NON-PERSONAL)

Sample Location	Minimum No. of Samples	Filter Pore Size (Note 1)	Min. Vol. (Note 2) (Liters)	Sampling Rate (liters/min.)
Inside Abatement Area	0.5/140 Square Meters (Notes 3 & 4)	0.45 microns	3850	2-16
Each Room in 1 Abatement Area Less than 140 Square meters		0.45 microns	3850	2-16
Field Blank	2	0.45 microns	0	0
Laboratory Blank	1	0.45 microns	0	0

Notes:

1. Type of filter is Mixed Cellulose Ester.
2. Ensure detection limit for PCM analysis is established at 0.005 fibers/cc.
3. One sample shall be added for each additional 140 square meters. (The corresponding I-P units are 5/1500 square feet).
4. A minimum of 5 samples are to be taken per abatement area, plus 2 field blanks.

TABLE 4

EPA AHERA METHOD: TEM AIR SAMPLING PROTOCOL

Location Sampled	Minimum No. of Samples	Filter Pore Size	Min. Vol. (Liters)	Sampling Rate (liters/min.)
Inside Abatement Area	5	0.45 microns	1500	2-16
Outside Abatement Area	5	0.45 microns	1500	2-16
Field Blank	2	0.45 microns	0	0
Laboratory Blank	1	0.45 microns	0	0

Notes:

1. Type of filter is Mixed Cellulose Ester.
2. The detection limit for TEM analysis is 70 structures/square mm.

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME _____ CONTRACT NO. _____
PROJECT ADDRESS _____
CONTRACTOR FIRM NAME _____
EMPLOYEE'S NAME _____, _____, _____,
(Print) (Last) (First) (MI)

Social Security Number: _____-_____-_____, (Optional)

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH TYPES OF LUNG DISEASE AND CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS, THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NONSMOKING PUBLIC.

Your employer's contract for the above project requires that you be provided and you complete formal asbestos training specific to the type of work you will perform and project specific training; that you be supplied with proper personal protective equipment including a respirator, that you be trained in its use; and that you receive a medical examination to evaluate your physical capacity to perform your assigned work tasks, under the environmental conditions expected, while wearing the required personal protective equipment. These things are to be done at no cost to you. By signing this certification, you are acknowledging that your employer has met these obligations to you. The Contractor's Designated Industrial Hygienist will check the block(s) for the type of formal training you have completed. Review the checked blocks prior to signing this certification.

FORMAL TRAINING:

_____ a. For Competent Persons and Supervisors: I have completed EPA's Model Accreditation Program (MAP) training course, "Contractor/Supervisor", that meets this State's requirements.

_____ b. For Workers:
_____ (1) For OSHA Class I work: I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (2) For OSHA Class II work (where there will be abatement of more than one type of Class II materials, i.e., roofing, siding, floor tile, etc.): I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (3) For OSHA Class II work (there will only be abatement of one type of Class II material):
_____ (a) I have completed an 8-hour training class on the elements of 29 CFR 1926.1101(k)(9)(viii), in addition to the specific work practices and engineering controls of 29 CFR 1926.1101(g) and hands-on training.
_____ (b) I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (4) For OSHA Class III work: I have completed at least a 16-hour course consistent with EPA requirements for training of local education agency maintenance and custodial staff at 40 CFR 763, Section .92(a)(2) and the elements of 29 CFR 1926.1101(k)(9)(viii), in addition to the specific work practices and engineering controls at 29 CFR 1926.1101, and hands-on training.

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

_____ (5) For OSHA Class IV work: I have completed at least a 2-hr course consistent with EPA requirements for training of local education agency maintenance and custodial staff at 40 CFR 763, (a)(1), and the elements of 29 CFR 1926.1101(k)(9)(viii), in addition to the specific work practices and engineering controls at 29 CFR 1926.1101(g) and hands-on training.

_____ c. Workers, Supervisors and the Designated Competent Person: I have completed annual refresher training as required by EPA's MAP that meets this State's requirements.

PROJECT SPECIFIC TRAINING:

_____ I have been provided and have completed the project specific training required by this Contract. My employer's Designated Industrial Hygienist and Designated Competent Person conducted the training.

RESPIRATORY PROTECTION:

_____ I have been trained in accordance with the criteria in the Contractor's Respiratory Protection program. I have been trained in the dangers of handling and breathing asbestos dust and in the proper work procedures and use and limitations of the respirator(s) I will wear. I have been trained in and will abide by the facial hair and contact lens use policy of my employer.

RESPIRATOR FIT-TEST TRAINING:

_____ I have been trained in the proper selection, fit, use, care, cleaning, maintenance, and storage of the respirator(s) that I will wear. I have been fit-tested in accordance with the criteria in the Contractor's Respiratory Program and have received a satisfactory fit. I have been assigned my individual respirator. I have been taught how to properly perform positive and negative pressure fit-check upon donning negative pressure respirators each time.

EPA/[STATE] CERTIFICATION/LICENSE

I have an EPA/[_____] certification/license as:
Building Inspector/Management Planner; Certification # _____
Contractor/Supervisor, Certification # _____
Project Designer, Certification # _____
Worker, Certification # _____

MEDICAL EXAMINATION:

_____ I have had a medical examination within the last twelve months which was paid for by my employer. The examination included: health history, pulmonary function tests, and may have included an evaluation of a chest x-ray. A physician made a determination regarding my physical capacity to perform work tasks on the project while wearing personal protective equipment including a respirator. I was personally provided a copy and informed of the results of that examination. My employer's Industrial Hygienist evaluated the medical certification provided by the physician and checked the appropriate blank below. The physician determined that there:

_____ were no limitations to performing the required work tasks.
_____ were identified physical limitations to performing the required work tasks.

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

Date of the medical examination _____

Employee Signature _____ date _____

Contractor's Industrial

Hygienist Signature _____ date _____

-- End of Section --