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1993 ANNUAL UPDATE OF PROCEDURAL DOCUMENTATION SUPPORTING FERNALD ENVIRONMENTAL MANAGEMENT PROJECT ASBESTOS REMOVALS (ASBESTOS PROGRAM) JUNE 1993 ASBESTOS PROGRAM PROCEDURES REMOVAL ACTION NO. 26

06/29/93

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REPORT

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1993 Annual Update of Procedural Documentation Supporting Fernald Environmental Management Project Asbestos Removals (Asbestos Program)

Asbestos Program Procedures

Removal Action No. 26

ASBESTOS ABATEMENT REMOVAL ACTION NO. 26

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2.0 GENERAL SUPPORTING DOCUMENTATION

2.1 * Asbestos Management Committee Charter, CH-2005 (4/20/92)

2.2 Asbestos Control Policy, PO-1003 (8/20/92)

2.3 Asbestos Management Plan, PL-3018, Rev. 1 (4/01/93)

2.4 * Asbestos Survey and Assessment for the FEMP

2.5 a. Large Project Asbestos Work Practices, SR-0002 (7/2/93)

b. * Asbestos Operations and Maintenance Work Practices, OM-0005 (8/1/92)

2.6 Control of Asbestos Work and Asbestos Work Permit, ES&H 1-1000/SPR-5-2 (2/15/93)

2.7 * Packaging, On-site Movement and Off-site Shipment of Material, PP-0314 (12/20/91)

2.8 Radiologically Non-contaminated Abestos Containing Material Waste Disposition, SSOP-0081 (9/3/92)

2.9 • Management of Hazardous Waste, FMPC-0519 (7/28/89)

2.10 * Asbestos Program Internal Audit/Self-Assessment System (12/19/91)

2.11 * FEMP Asbestos Training Requirements (9/10/91)

2.12 * STANDARD OPERATING PROCEDURES (S.O.P.)

• AVAILABLE UPON REQUEST. PREVIOUSLY SUBMITTED AS PART OF RA-26. 4/26/93 DKT

REMOVAL ACTION NO. 26
ASBESTOS ABATEMENT REMOVAL ACTION

1.1 Introduction

The orginal submittal provides a brief overview of the FEMP Asbestos Program, policies and procedures governing the program. The focus of this supplemental submittal is to transmit to the USEPA a revised and updated compilation of FEMP facility documentation supporting the FEMP Asbestos Program.

1.2 Asbestos Program Description

The FEMP Asbestos Program is a comprehensive program that is intended to provide management oversight and support for all activities that involve asbestos containing material (ACM) or are conducted in areas where ACM is located. The Program is defined by an evolving Asbestos Management Plan that enacts an Asbestos Control Policy focusing on worker protection, prevention of environmental emissions and compliance with the applicable regulations or legal agreements. An Asbestos Management Committee (AMC), representing the principal FEMP organizations involved in abatement activities, ensures the principles expressed in the Control Policy are established by developing sitewide procedures, setting specific abatement and management goals, periodically evaluating progress towards these goals, and communicating corrective activities or general information to their respective organizations. Many of the AMC members are State of Ohio certified Asbestos Hazard Evaluation Specialists (AHES) and Asbestos Hazard Abatement Specialists (AHAS), trained to ensure the Asbestos Program meets the requirements in OSHA 1926.58, OSHA 1910.120, CAA NESHAP subpart M, OAC 3745-20, DOE Orders, legal agreements and all the CERCLA regulations associated with the FEMP cleanup.

The Asbestos Program Coordinator is the chairman of the Asbestos Management Committee and reports to the Manager of the FERMCO Clean Air Program (CAP). The CAP is managed within the Clean Air Program unit of the FERMCO Environmental Protection Department, to ensure that the program is ultimately managed as part of CERCLA, multimedia (air, water, soil) environmental restoration of the FEMP.

Figure 1 is a logic flow sheet identifying the elements that comprise the Asbestos Program from identification of the hazardous material to final disposition of the removed ACM waste (covered as part of the Removal of Waste Inventories Removal Action #9). As illustrated in the FEMP Document Hierarchy (Figure 2), the various elements that comprise the Program are executed by describing the requirements (DOE Orders, Laws and Regulations, et al.) in Policy and Directives that are enacted through Sitewide and Department documents. A review of Figure 1, its relationship with the FEMP Document Hierarchy and the current site documents, best illustrates how the Program is directed to meet all the requirements.

Figure 1 has been revised to clearly separate the actions from the policies and procedures. Each action is governed by specific policies or procedures which are indicated within that illustrated action.

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1.2 Asbestos Program Description (cont)

Identification of Asbestos Containing Material (ACM)

As Figure 1 indicates, the first element of the Program involves identification of the ACM at the FEMP. A site survey was completed in February, 1992 by certified Asbestos Hazard Evaluation Specialists (AHES) who were contracted to do an Asbestos Hazard Evaluation and Response Act (AHERA) based survey of the entire site. Certified Asbestos Hazard Evaluation Specialists from the site oversaw the surveyors, and validated every aspect of the survey to ensure the sampling, analysis, labeling and disposition of the sampled material met the AHERA, OSHA and CAA requirements.

The Asbestos Survey & Assessment report, provided in the first submittal, summarizes 3000 pages of detailed information from the evaluation of 74 buildings. Over 2,500,000 sq. ft. of asbestos transite, 120,000 linear ft. of asbestos pipe insulation and 32,000 sq. ft. of miscellaneous ACM (tile, etc.) have been identified in 56 buildings on-site. The Site Survey is part of the supporting documentation in the Administrative Record for Operating Unit (OU) 3, and was transmitted to the DOE Fernald Office, February 28, 1992.

Characterization of the ACM

The original Asbestos Management Plan (AMP) also provided for a two step characterization of the ACM, utilizing the AHERA hazard ranking, and the Air Force "grade" algorithm to assess the condition and potential for disturbance of the material. Each homogeneous area was numerically prioritized to categorize the material for in-situ maintenance or removal. The survey is kept current through ongoing site hazard assessments performed by certified AHES and Industrial Hygiene technicians. Facility inspections are also conducted in the presence of certified AHES, and the survey records are updated by Clean Air Program (CAP) personnel to reflect progress in ongoing asbestos abatement projects.

Determining the Appropriate Abatement

The determination of appropriate abatement is a process that involves a comprehensive evaluation of the hazards of the ACM and the other CERCLA hazardous substances within the particular facility.

Friable material with a significant hazard ranking is targeted for immediate abatement. Non-friable asbestos is evaluated with information from the ongoing Health & Safety Hazard Assessments, the OU3 RI/FS, Safe Shutdown Program, and other OU3 removal actions to determine whether abatement is appropriate and compatible with final remedial design for OU3.

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ASBESTOS ABATEMENT REMOVAL ACTION

1.2 Asbestos Program Description (cont)

Since much of the ACM on the site is presently non-friable, the consideration for radiological concerns is often as great as the hazard associated with airborne asbestos fibers. Therefore, the ongoing abatement activity addressing the potentially more hazardous ACM on the site is performed by a dedicated team of asbestos workers who are certified by the Ohio Department of Health (ODOH) as Asbestos Hazard Abatement Specialists who are also trained in the other radiological, physical, and chemical hazards at the FEMP.

Agency Notification

Once the determination of the appropriate action has been made, the Hamilton County-Department of Enviromental Services (HC-DOES) is notified of all demolition and renovation activities, as prescribed. These notifications are made for all demolitions and renovations, regardless of size. This fulfills the reporting requirements of 40 CFR 61.145 and OAC 3745-20.

In-situ Maintenance

If it is determined that small scale, short duration abatement work or wet wrapping is required, the site Asbestos Operations & Maintenance (O&M) Work Practices manual details the in-situ maintenance or minor removal/renovation practices to be followed.

These standards comply fully with the construction and general abatement requirements of OSHA 1926.58 and OSHA 1910.120 for small scale, short duration work. All work performed is done by certified abatement workers or ODOH licensed asbestos abatement contractors.

Asbestos Removal

When large scale removals, demolitions, or renovations involving ACM are required, the "Large Project Asbestos Work Practices" document provides the necessary guidance and specifications. This is a abatement project of more than 160 square feet or 260 linear feet. The major abatement projects require management oversight by the Industrial Hygiene Section to ensure compliance with the removal and renovation requirements with USEPA, OSHA, CAA and CERCLA regulations.

The Asbestos O&M manual also provides guidance for minor removals. Interim storage of the removed ACM is addressed in the Waste Management procedure for "Control and Utilization of Contaminated Trash Dumpsters".

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ASBESTOS ABATEMENT REMOVAL ACTION

1.2 Asbestos Program Description (cont)

Asbestos Waste Management

As the Asbestos Control Policy indicates, removed waste is managed as part of the comprehensive Waste Management Program at the FEMP. This program has been previously described and is maintained in the annual compendium submittal for Removal Action #9.

To ensure a safe program transition after the radiologically contaminated ACM is removed, packaging requirements specified by the "Packaging of Low Level Waste" procedure, and directions previously discussed in the "Control & Utilization of Contaminated Trash" procedure, provide guidance for the preparation of asbestos waste for management within the sitewide Waste Management Program.

Presently, there are approximately 4,000,000 lbs. of packaged ACM waste stored at the FEMP. Most, if not all, of this material is targeted for shipment to the Nevada Test Site (NTS) as low level radioactive waste. Authorization to ship contaminated asbestos waste is still being negotiated with NTS, but other DOE and commercial asbestos landfills are being considered.

Ongoing Hazard Assessment

During the implementation of the Asbestos Program from the "Identification of the ACM" hazard to its "Removal" and final disposition under "Waste Management", the condition and potential for disturbance of the asbestos material require surveillance and assessment to ensure the current characterization of the ACM is accurate.

DOE Order 5480.10 prescribes the type of Industrial Hygiene Program that is required to ensure hazards such as ACM are routinely investigated.

Long Term Plans

As the condition and quantities of ACM are subject to change, other activities at this site affect and sometimes mandate changes in the plans for removal or in-situ maintenance of asbestos. The long term plans for removal or in-situ maintenance of asbestos are presently being developed compatible with the "Facility Utilization Report", "OU3 RI/FS Work Plan Addendum", "OU3 Remedial Investigation Report", and the "OU3 Feasibility Study Report". All of these documents are scheduled for submittal, so the current plans only reflect information from the "Asbestos Survey Assessment for the FEMP" and the "Safe Shutdown Program". OU3 is working with an A/E to develop the specification for the abatement of nearly 3,000 linear ft. of asbestos pipe insulation and approximately 100,000 sq. ft. of deteriorated asbestos transite from five buildings at the FEMP.

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ASBESTOS ABATEMENT REMOVAL ACTION

1.2 Asbestos Program Description (cont)

On-site segregation of non-radiologically contaminated ACM from radiologically contaminated material is being pursued in an effort to broaden the possibilities for off-site disposal, as well as reduce the costs and burden of burial as low level waste at NTS.

Training and Quality Assurance

The Training and Quality Assurance support systems are designed to ensure that all the ACM regulatory requirements, Asbestos program site procedural requirements and related hazardous material requirements are not only communicated, but are implemented correctly, and updated to represent the most accurate information available.

Training is an integral part of nearly every element of the Asbestos Program. General sitewide hazard training per the requirements of OSHA 1910.120 is administered by the Centralized Training section of the ES&H department. Additional specific Asbestos Program training, performed by EPA approved trainers, is provided for Asbestos Abatement workers and their supervisors.

The FEMP "Asbestos Training Requirements" mandated for the supervisors and Asbestos abatement workers exceeds the requirements specified in OSHA 1926.58, as all abatement workers receive EPA approved 32 hour OSHA 'competent person' training, regardless of the size of the abatement activity. All site personnel receive Asbestos Awareness training as part of the accredited sitewide training program developed to meet the requirements of OSHA 1910.120. Additional OSHA training for facility owners and other personnel is provided to ensure individuals responsible for buildings containing ACM have a heightened awareness of their particular hazards.

1.3 Integration with Operating Unit 3 (OU3)

General Information

A system for performing self-assessments and asbestos program evaluations pursuant to the DOE Self-Assessment Guidance Document has been instituted to ensure training, program elements and site documents are kept current with newly promulgated regulations or revisions to existing requirements. Audits along with other Asbestos Program quality assurance surveillance, are performed in support of this process. These complement the implementation of the sitewide Quality Assurance Plan, and ensure that the work practices follow the updated documents. Violations are noted in QA Deviation Corrective Action Reports that are reported to the Environmental Protection Department, where plans to correct the problem are developed and managed to completion.

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1.3 Integration with Operating Unit 3 (OU3) (Cont.)

It is recognized that revisions to existing policies and procedures to respond to evolving program needs or unique site conditions are an integral part of a successful program. The enclosed procedures are intended to meet current regulatory requirements while retaining the flexibility to respond to changes in an efficient manner. Changes or updates to the provided documentation may be necessary to ensure the continuity of operations, based on new requirements. Consistent with arrangements made in the January 15, 1992, Phase III annual review of potential new removal actions, updates to the compendium of existing procedures and documentation for the ongoing Asbestos Abatement Removal Action will be submitted to the USEPA for review and approval on an annual basis, on June 30th of each year.

The inventory of asbestos and asbestos contaminated materials that currently exist on pipes, buildings, walls, tanks, and other surfaces of equipment used in the nine production plants are within the scope of OU3 ongoing RI/FS.

Consistent with the provisions of the NCP, removal actions will be appropriately integrated with ongoing RI/FS, ensuring that appropriate documentation is entered into the Administrative Record. This integration is required to document any action taken which may affect site conditions relative to the OU as well as to ensure the removal action is supportive of potential final remedial objectives. Within the FEMP Administrative Record, a separate file has been established for placement of supporting documentation for the Asbestos Removals (Asbestos Program) Removal Action No. 26. Included in the Administrative Record file are all key program documentation, including this submittal consisting of current Asbestos Abatement Removal Action work procedures, and a compilation of appropriate materials disposition records for ACM encompassed within this Removal Action.

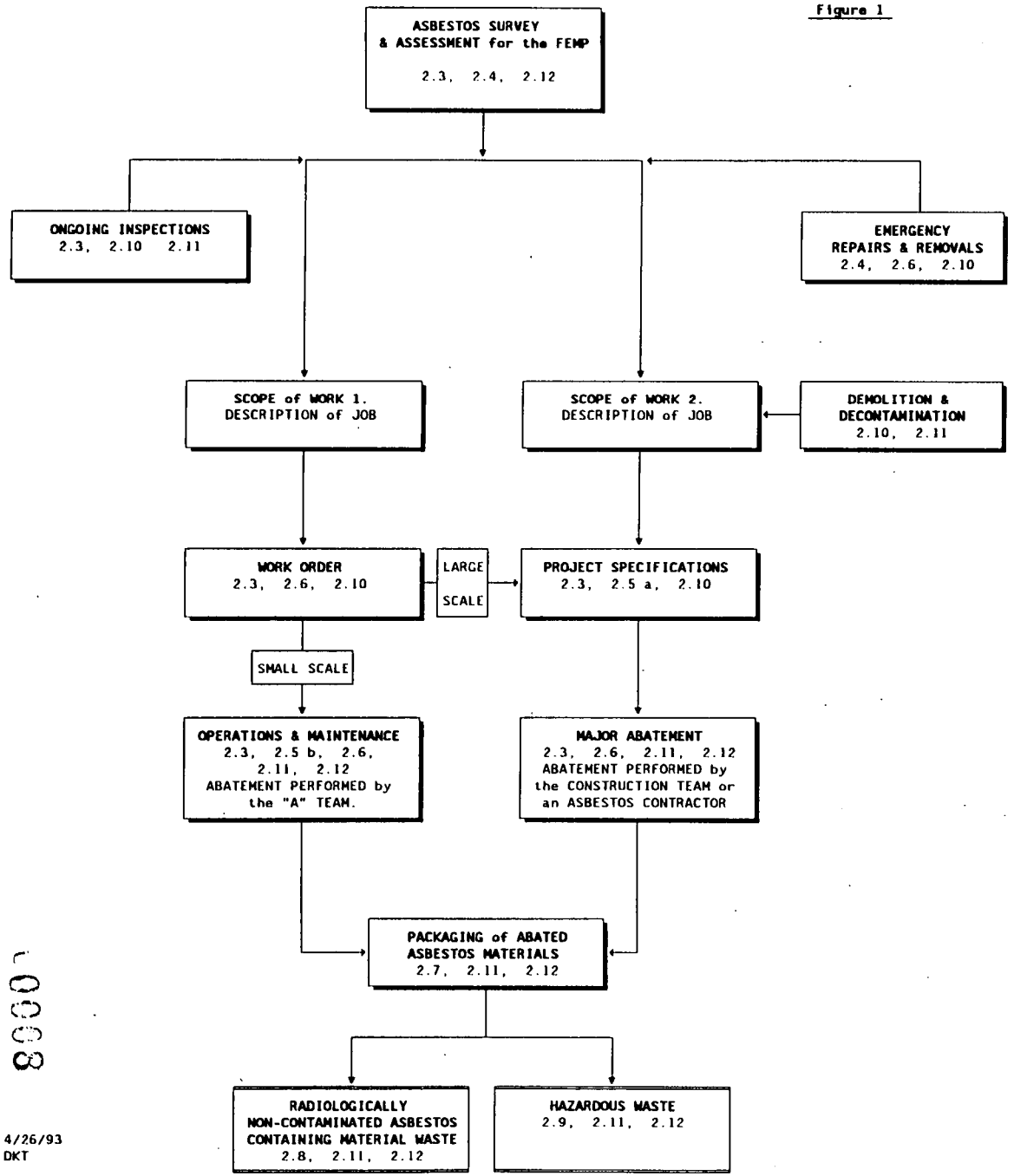
The implementation of Asbestos Abatement Removal Action activities clearly supports the remedial objectives for OU3 by providing a necessary preliminary step for preparation of these areas for subsequent remedial activities. The Program actions are consistent with final remedial actions based on the fact that mitigation of personnel/environmental risk and safe, permanent disposition of FEMP wastes/materials are ultimate goals.

Close coordination will be maintained with the ongoing RI/FS for OU3 and other removal actions to ensure that planned activities appropriately support RI/FS field investigations and alternative evaluations by incorporating interim abatements of ACM into baseline risk determination and site characterizations.

ASBESTOS ABATEMENT REMOVAL ACTION NO. 26

PROGRAM CONFIGURATION

Figure 1



PROCEDURES AND DOCUMENTS REGULATING RA-26

REFERENCES for Figure 1

SUPPORTING DOCUMENTATION	REFERENCE NUMBER	DATE
2.1 ASBESTOS MANAGEMENT COMMITTEE	CH 2005	4/20/92
2.2 ASBESTOS CONTROL POLICY	PO 1003	8/20/92
2.3 ASBESTOS MANAGEMENT PLAN	PL 3018 Rev 1	3/31/93
2.4 ASBESTOS SURVEY & ASSESSMENT	PREVIOUSLY SUBMITTED	
2.5 a. LARGE PROJECT ASBESTOS WORK PRACTICES	SR 0002	7/2/93
b. ASBESTOS OPERATIONS & MAINTENANCE WORK PRACTICE	OM 0005	8/1/92
2.6 CONTROL of ASBESTOS WORK & ISSUING of PERMITS	ES&H-1-1000/ SPR 5-2	2/15/93
2.7 PACKAGING of ABATED ASBESTOS MATERIALS	PP 0314	12/20/91
2.8 RADIOLOGICALLY NON-CONTAMINATED ASBESTOS CONTAINING MATERIAL WASTE	SSOP 0081	9/3/92
2.9 MANAGEMENT of HAZARDOUS WASTE	FMPC 0519	7/28/89
2.10 ASBESTOS PROGRAM QUALITY ASSURANCE PROGRAM		12/19/91
2.11 TRAINING PROGRAM		4/10/91
2.12 ESSENTIAL SITE STANDARD OPERATING PROCEDURES INCLUDE:		
a. SITE DOCUMENTATION SYSTEM	PP 0103	8/28/91
b. DEVIATION & CORRECTIVE ACTION REPORTING	SSOP 0023	6/27/91
c. CENTRALIZED TRAINING PROGRAM MANUAL	RM FMPC 0002	
d. FMPC QUALITY ASSURANCE PLAN	RM 0012	
e. SITE HEALTH & SAFETY PLAN		
f. FMPC RESPIRATORY PROTECTION MANUAL	FMPC 2152	4/27/90
g. FEMP RADIATION CONTROL MANUAL	FMPC 2084 Rev 4	12/31/90
h. RADIATION CONTROL	FMPC 505	12/2/88
i. COMPLETION of NEPA DOCUMENTATION	FMPC 518	5/7/90
j. CONTROL of PERMITS for ACCOMPLISHING HAZARDOUS WORK	FMPC 516	4/23/91
k. ASBESTOS ABATEMENT 1992/1993	NEPA CX-362	11/12/91

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ASBESTOS PROGRAM
FERMCO SITE DOCUMENT PROGRAM HEIRARCHY

DRIVERS

1. DOE ORDERS
2. FEDERAL & STATE LAWS
3. CORPORATE DIRECTIVES
4. CONTRACTUAL AGREEMENTS

POLICY & MANAGEMENT DIRECTIVES

1. DEPARTMENT & COMMITTEE CHARTERS
2. POLICY & PROCEDURES

1. CHARTER: A document defining the work scope & responsibilities of a department, committee, council, board or function.
2. POLICY & PROCEDURE: A statement of management policy followed by a series of administrative instructions, including responsibilities & principal actions affecting two or more departments.

SITE OPERATING & INTERFACING DOCUMENTS

1. PLANS
2. INFORMATION DOCUMENTS
3. REQUIREMENTS DOCUMENTS
4. SITE OPERATING DOCS

1. PLAN: A document identified as required by a driver or information defining actions to be taken to meet a requirement.
2. INFORMATION DOCUMENT: Information compiled on a subject and presented to be informative for personnel of the FEMP or as required by external organizations.
3. REQUIREMENTS DOCUMENT: A document defining requirements for an activity affecting two or more FERMCO organizations.
4. SITE OPERATING DOCUMENT: A procedure that provides detailed operating instructions for an activity to two or more FERMCO organizations.

DEPARTMENT DOCUMENTS

1. DEPARTMENT PROCEDURES
2. PLANS
3. MANUALS

1. DEPARTMENT PROCEDURE: A procedure that provides instructions to only one FERMCO organization.
2. PLAN: A document identified as required by DRIVER for only one FERMCO organization in order to meet a requirement.
3. MANUAL: A document that provides detailed requirements/instructions affecting only one FERMCO organization.

Figure 2

March 9, 1993

1.6 ASBESTOS PROGRAM ACRONYM LIST

ACM	-Asbestos Containing Material
AHAS	-Asbestos Hazard Abatement Specialist
AHERA	-Asbestos Hazard Evaluation Response Act
AHES	-Asbestos Hazard Evaluation Specialist
AMC	-Asbestos Management Committee
AMP	-Asbestos Management Plan
ARAR	-Applicable or Relevant and Appropriate Requirement
BI/MP	-Building Inspector/Management Planner
CA	-Consent Agreement
CAA	-Clean Air Act
CAP	-Clean Air Program
CERCLA	-Comprehensive Environmental Response, Compensation and Liability Act
CRU	-CERCLA/RCRA Unit
DOE	-Department of Energy
ES&H	-Environmental Safety & Health
FEMP	-Fernald Environmental Management Project
FERMCO	-Fernald Environmental Restoration Management Corporation
HC-DOES	-Hamilton County-Department of Environmental Services
NCP	-National Contingency Plan
NEPA	-National Environmental Policy Act
NESHAP	-National Emission Standards for Hazardous Air Pollutants
NTS	-Nevada Test Site

1.6 ASBESTOS PROGRAM ACRONYM LIST (Cont.)

OAC	-Ohio Administrative Code
ODOH	-Ohio Department of Health
OSHA	-Occupational Safety and Health Administration
OU	-Operating Unit
QA	-Quality Assurance
RA	-Removal Action
RCRA	-Resource Conservation and Recovery Act
RI/FS	-Remedial Investigation/Feasibility Study
ROD	-Record of Decision
RSO	-Remedial Site Operations
RTP	-Regulatory and Technology Programs
SOP	-Site Operating Procedure
TAP	-Training Accreditation Program
USEPA	-United States Environmental Protection Agency

4/28/93-DKT

ASBESTOS MANAGEMENT COMMITTEE

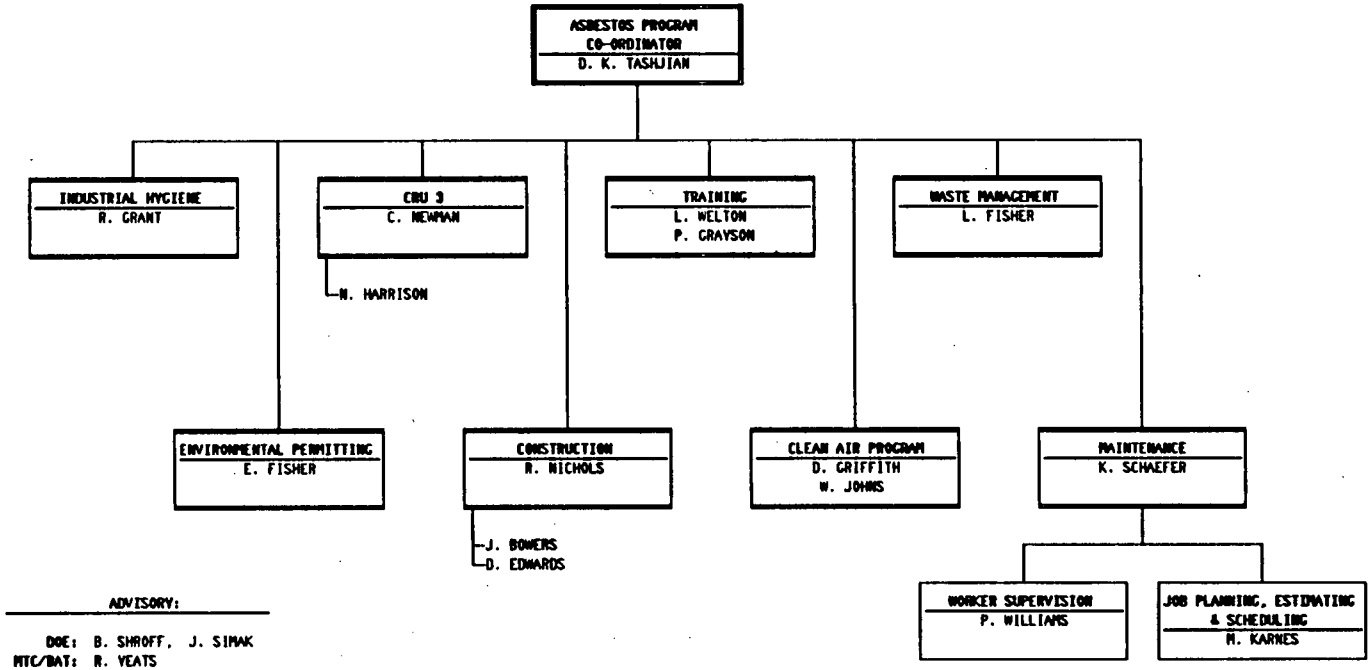
CHARTER

PREVIOUSLY SUBMITTED

6/23/93

ASBESTOS MANAGEMENT COMMITTEE

MATRIX ORGANIZATION CHART



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PARSONS: M. HILL, A. SHATZ
FAT & LC: R. TABOR

6/28/93
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0018

CONTROL NO. 4559-26

POLICY
DOCUMENT NO. PO-1003
REVISION NO. 0

ASBESTOS CONTROL POLICY

PO-1003

Effective Date: 08-20-92

AUTHORIZED BY: _____ 8/11/92
H. F. Daugherty, President Date

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Westinghouse Environmental Management Company of Ohio
P. O. Box 398704
Cincinnati, Ohio 45239-8704

1.0 OBJECTIVE

It is Westinghouse Environmental Management Company of Ohio (WEMCO) policy that all Fernald Environmental Management Project (FEMP) activities, involved with direct or indirect contact with asbestos containing material (ACM), be performed in a manner which will protect employees from exposure, protect the public and environment from ACM emissions, and ensure compliance with regulations and legal agreements addressing such activities.

2.0 SCOPE

This policy covers any on-site FEMP activities that involve ACM, or any work conducted in areas where ACM is located.

3.0 ELEMENTS

3.1 In support of the policy statement, the following elements describe the fundamental principles upon which the Asbestos Management Plan, PL-FMPC-3002, and the program organization have been established:

3.1.1 A committee of the most knowledgeable individuals, representing each of the principal WEMCO organizations involved in abatement activities, shall be established to:

- Develop/update asbestos policies and procedures,
- Set specific site goals,
- Periodically evaluate progress,
- Communicate information to their respective organizations,
- and perform self-assessment of the Asbestos Program.

3.1.2 Adequate training shall be provided to ensure all employees understand the hazards of ACM in their work area and that abatement workers can demonstrate the procedures designed to accomplish their work, while protecting employee and public health and the environment.

3.1.3 Asbestos abatement activities shall be communicated to Southwest Ohio Air Pollution Control Agency (SWOAPCA) and performed according to the site-specific procedures incorporating worker protection standards (OSHA 1926.58 and DOE 5483.1A), Environmental standards (40 CFR 61, subpart M) and the other requirements detailed in the Asbestos Management Plan, PL-FMPC-3002, as verified by self-assessments and internal surveillance audits.

3.0 **ELEMENTS** (cont.)

3.1.4 ACM will be identified and initial hazard assessments used to plan short-term (less than 5 years) abatement activities within an evolving program. Since asbestos abatement is part of a long term cleanup plan for the FEMP, and the scope of the project involving hazard abatement extends beyond asbestos, management is continually changing to reflect the changing regulations and the overall site activities regarding hazard abatement. The Asbestos Program will be planned, budgeted, and scheduled, consistent with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) requirements for FEMP remediation. Activities between and within departments will be coordinated by the Asbestos Clean Air Program (CAP), Asbestos Program Coordinator.

3.1.5 Long-term removal plans will be developed in 5-year increments for the life of the FEMP as part of the Asbestos Management Plan (AMP). The AMP will be updated annually to reflect the changing scope of the CERCLA remedial effort and the relative hazard of the ACM.

3.1.6 Storage and disposal of ACM will be managed as part of the comprehensive Waste Management Program at the FEMP.

3.1.7 A compendium of the procedures used to control ACM will be forwarded to the U.S. Environmental Protection Agency (U.S. EPA) for information purposes only and will be annually updated or reissued in an effort to integrate asbestos abatement work with the CERCLA cleanup of the FEMP.

4.0 **IMPLEMENTATION**

Environmental Management shall be responsible for implementing the Asbestos Control Policy.

5.0 **APPLICABLE DOCUMENTS**

5.1 Drivers

5.1.1 AM-90-11-16-B, "1990 ES&H and QA Functional Appraisal Deficiency Finding"

5.1.2 Clean Air Act, 40CFR.61, Subpart M

5.1.3 Consent Agreement Removal Action No. 26

5.1.4 OSHA 1926.58

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5.0 **APPLICABLE DOCUMENTS** (cont.)

- Ohio Administrative Code, OAC 3745.20

5.2 Reference Documents

- PL-FMPC-3002, "Asbestos Management Plan"

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
08-20-92	0	Document stating the policy for asbestos control at the FEMP per Request No. S92-091, initiated by P. Beirne.

DRAFT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT ASBESTOS MANAGEMENT PLAN

PL-3018

Effective Date: Draft

AUTHORIZED BY: _____ _____
N. C. Kaufman, President Date

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Fernald Environmental Restoration Management Corp.
P.O. Box 398704
Cincinnati, Ohio 45239-8704

LIST OF EFFECTIVE PAGES

CHAPTER	PAGES	REV. NO	EFFECTIVE DATE
	i through iv	1	Draft
1	1-1	1	Draft
2	2-1 through 2-4	1	Draft
3	3-1 through 3-2	1	Draft
4	4-1	1	Draft
Attachment	A-1	1	Draft

0020

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
09-30-92	0	Document describing the Asbestos Management Plan per request S92-193, initiated by Robert McCullough. This Plan supersedes PL-FMPC-3002.
Draft	1	Document describing the Asbestos Management Plan per request No. S93-152 initiated by Wayne Johns. This document replaces PL-3018, Rev. 0, dated 09-30-92.

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DRAFT

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of the Fernald Environmental Restoration Management Corporation (FERMCO) Asbestos Management Plan is to inform interested persons of the intended actions to be taken during the next year (July 1993 through June 1994) and beyond, regarding asbestos issues at the Fernald Environmental Management Project (FEMP).

This plan is prepared for the use of members of the Asbestos Management Committee, Department of Energy (DOE), auditing agencies, consultants, or anyone else who desires to know the future direction of the Asbestos Program.

1.2 HISTORY

The original Asbestos Management Plan, PL-FMPC-3002, Rev. 0, issued 9/28/90, dealt almost exclusively with the anticipated Asbestos Site Survey, which was completed on 2/28/92.

1.3 FORMAT

A "rolling" format will be used so that the Plan will be updated and re-issued every six months. The Plan will be developed by the Asbestos Program Coordinator, and will be reviewed by members of the Asbestos Management Committee prior to issue.

It is important to note that this document is intended purely to be a plan; that is, when intended asbestos policies or procedures are issued, they will no longer be considered as a part of the Plan.

Section 2.0 discusses the requirements and implementation strategies for current asbestos abatement activities.

Section 3.0 describes anticipated changes to the asbestos program between April 1, 1993, through September, 1993.

Section 4.0 outlines long range plans.

2.0 CURRENT STATUS (cont.)

2.1 SUMMARY

To understand where the Asbestos Program at the FEMP is heading, it is important to know the current status, who is responsible for what in the program and how the different parts of the program fit together.

This Section describes any asbestos concerns and asbestos related documentation that exists. It is not an attempt to explain asbestos procedures in great detail, but rather to describe where these procedures exist, and how they relate to each other.

2.2 ADMINISTRATION

The Asbestos Program is administered by the Asbestos Program Coordinator (APC) who is in the Clean Air Unit of the Environmental Protection Department. The APC coordinates asbestos related activities at the FEMP through representatives from other departments, who are members of the Asbestos Management Committee (AMC).

Duties of the APC include developing general asbestos policies and procedures, updating the Asbestos Management Plan monitoring efforts of other groups and individuals to ensure that the Plan is properly implemented, and chairing the Asbestos Management Committee.

2.3 ASBESTOS SITE SURVEY

The Asbestos Site Survey was completed in February of 1992. The entire FEMP was inspected for asbestos-containing materials (ACM). The condition and hazard assessment of all ACM was determined, and all ACM was properly labeled.

2.4 REINSPECTION

To ensure that the condition of the ACM is not damaged or degraded over time, every facility with ACM is reinspected each year. Every facility at the FEMP has been reinspected as of 03-23-93. The reinspections were completed by a person who is a certified Asbestos Hazard Evaluation Specialist in the State of Ohio, and is also assigned to the Clean Air Unit.

2.5 ASBESTOS WORK ORDERS

If ACM must be abated, an Asbestos Work Order (AWO) is written by Facility Owners or others, and submitted to Maintenance. The Maintenance Scheduler reviews these AWOs, and determines how they will be accomplished.

2.0 CURRENT STATUS (cont.)

2.6 ASBESTOS TEAM

The Asbestos Team consists of 7 pipefitters, who are certified in the State of Ohio as Asbestos Hazard Abatement Specialists, and who are dedicated to asbestos abatement work only. By the nature of their job classification, they cannot perform any work larger than the Davis-Bacon Act limits.

During the calendar year of 1992, the Asbestos Team removed 2,742 linear feet of asbestos material and wet wrapped 5,982 linear feet of damaged asbestos.

2.7 ASBESTOS MANAGEMENT COMMITTEE

The AMC is composed of representatives from various functional areas as well as DOE, Fernald Atomic Trade and Labor Council (FAT/LC), and consultants. The AMC performs the following functions:

a. Establishes asbestos management goals.

b. Evaluates progress toward goals.

c. Identifies the need for any asbestos policies and procedures and ensures their development, approval, and implementation.

d. Advises the Clean Air Program Manager of effective asbestos program administration.

e. Assesses compliance with asbestos related site policies and procedures as well as federal and state laws and regulations.

f. Monitors and aids in the correction of any asbestos related audit items or deficiencies.

g. Serves as a "sounding board" in reviewing new and anticipated regulatory changes, new products and procedures, and ways in which Government Owned, Contractor Operated (GOCO) sites could profit from the FEMP asbestos experience.

2.8 TRANSITE

Because of the above controls, and others that are incorporated into the documents listed in Section 3.5, asbestos shall be properly abated or managed in place.

However, an area of current concern involves the possible migration of asbestos fibers from transite panels that comprise the siding and roofing of many buildings at the FEMP. An Asbestos Fiber Migration Study from Transite Panels was completed on 02-28-92, and indicates that asbestos fibers are eroding from the aging transite panels into storm water, soil, and surrounding concrete surfaces.

2.0 CURRENT STATUS (cont.)

2.8 TRANSITE (cont.)

To initiate corrective action, a Transite Fiber Stabilization Study was authorized and completed on 09-02-92. This study recommends products that can be used to "fuse" asbestos fibers to the transite panels, to prevent their migration.

Research is currently being done to determine the friability of transite surfaces. Some approaches being studied are:

"Test Box" - A glove box which sits having an open end which fits flush with the roof. The roof is uniformly agitated while an air sample is taken inside the box.

"Stripcoat TLC"- This removable coating is applied to the transite and allowed to dry. The Stripcoat is then removed and sampled for asbestos.

"Test Kit for Asbestos" An adhesive tape is applied to the surface of the transite and allowed to set. The tape is then lifted off and sent for analysis for asbestos.

Two products, Surtreat and Serpiflex, are being evaluated for its potential to prevent the migration of asbestos fibers from the transite surfaces.

Transite panels weakened by nitric acid in Plants 2/3 and 6 are both health and safety concerns. Abatement of these areas has been held up by CRU3 for several months, pending CERCLA evaluation.

2.9 CERCLA

All asbestos activities that are not controlled by a separate Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) removal action, are being implemented under Removal Action (RA) number 26. RA number 26 is a compilation of all existing documents that relate to asbestos abatement at the FEMP; it is updated each year, and sent to the USEPA and Ohio Environmental Protection Agency (OEPA) for their review and approval.

2.10 DOCUMENTATION

The following documents describe in detail how the asbestos program is to be implemented.

1. Asbestos Control Policy, PO-1003

   This is a very short document that describes the FEMP policy on all activities involving ACM.

2. Asbestos Management Committee Charter, CH-2005

   Formalizes the mission and composition of the Committee.

3. Control of Asbestos and Asbestos Work Permits, ES&H-1-1000 (SPR 5-2)

   Issued by Industrial Hygiene, this document replaces IH-03 and describes the asbestos program.

4. Asbestos Operations and Maintenance Work practices, OM-0005

   This document describes, in detail, the manner in which the Asbestos Team shall abate ACM.

5. Asbestos Survey and Assessment

   This subject is discussed in Section 2.3 of this document.

6. Large Project Asbestos Work Practices, SR-0002

   This document provides asbestos abatement instructions for contractors.

3.0 SHORT TERM PLANS (7/01/93 THROUGH 6/30/94)

3.1 ORGANIZATION

There are no known organizational changes planned during the time period indicated above.

3.2 ABATEMENT

For small scale jobs, the FEMP Asbestos Team will continue to abate ACM per Asbestos Work Orders originated by the Clean Air Program or by Facility Owners.

Larger projects involving asbestos abatement during this time period include the Plant 6 Scrap Pickling Area, the West end of the Plant 2/3 Extraction Area, and the possibility of removing internal ACM from Plant 7. These are currently on hold so that CRU3 may evaluate CERCLA concerns.

3.3 REINSPECTIONS

No change; the Asbestos Program Coordinator will continue to be responsible for reinspection of facilities per the published schedule.

3.4 TRANSITE

We will continue to study the friability of transite surfaces, and surface treatments to minimize asbestos fiber migration.

The Scrap Pickling and 2/3 Extraction Area projects mentioned in 3.2 above are safety and health concerns, and should be addressed during this time period.

3.5 DOCUMENTATION

1. Asbestos Control Policy, PO-1003

   No changes needed.

2. Asbestos Management Committee Charter, CH-2005

   No changes needed.

3. Control of Work Involving Asbestos, ES&H-1-1000 (SPR 5-2)

   No changes needed.

3.0 SHORT TERM PLANS (7/01/93 THROUGH 6/30/94) (cont.)

3.5 DOCUMENTATION (cont.)

4. Asbestos Operations and Maintenance Work Practices, OM-0005

   Regulatory changes, improved work methods, and new equipment and materials can quickly render portions of this document obsolete. Therefore, this document will be reviewed every six months and revised if needed.

   Accordingly, the document will be reviewed by the Asbestos Program Coordinator prior to 4/01/94 and a revised (if necessary) document will be issued prior to 6/30/94.

5. Large Project Asbestos Work Projects

   The final document will be peer reviewed, and should be issued prior to July 1, 1993.

3.6 COMMITMENTS

The revised Compilation for RA #26 will be delivered to the DOE prior to 04/30/94, in order to ensure that it is delivered to the USEPA and OEPA prior to 6/30/94.

4.0 LONG TERM PLANS (AFTER 6/30/94)

4.1 ORGANIZATION

There are no planned long range organizational changes for the asbestos program at this time.

4.2 ABATEMENT

The FEMP Asbestos Team will continue to abate small scale jobs as determined by the Site Survey, reinspection data, accident reports, and any other input that would indicate a need for small scale abatement.

Large scale abatement will be done through projects such as damaged transite panel abatement in Plant 2/3 digestion, Plant 6 pickling area, the Metal Dissolver building, and the Hot Raffinate building.

4.3 REINSPECTIONS

All facilities will be reinspected at least once each year, per the present schedule and procedures.

4.4 TRANSITE

The surfaces of all transite panels should be stabilized, to prevent asbestos fiber migration from the panels. See Section 3.4.

4.5 DOCUMENTATION

1. Documentation Review

   Each asbestos related document will be reviewed every six months, and will be revised as necessary.

2. Future Documents

   At this time there is no need for additional documents.

3. Compilation Update

   The Compilation will be updated annually, and will be submitted to the EPA prior to June 30th of each year.

ACRONYMS

ACM	Asbestos Containing Materials
APC	Asbestos Program Coordinator
CAP	Clean Air Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CRU3	CERCLA RCRA Unit #3
EPA	Environmental Protection Agency
FEMP	Fernald Environmental Management Corporation
FERMCO	Fernald Environmental Restoration Management Corporation
IH	Industrial Hygiene
OEPA	Ohio Environmental Protection Agency
USEPA	United States Environmental Protection Agency

ASBESTOS SURVEY & ASSESSMENT

FOR THE FEMP

AVAILABLE UPON REQUEST

6/23/93

SITE REQUIREMENT
DOCUMENT NO. SR-0002
REVISION NO. 0

LARGE PROJECT ASBESTOS

WORK PRACTICES

SR-0002

Effective Date: 6-28-93

AUTHORIZED BY: _____ 6/28/93
N. C. Kaufman, President Date

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Fernald Environmental Restoration Management Corporation
P. O. Box 398704
Cincinnati, Ohio 45239-8704

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APPENDIX

Pre-Abatement Checklist A-1
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SECTION	PAGES	REV. NO.	EFFECTIVE DATE
	i through iv	0	Draft
1	1 through 228	0	Draft

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
Draft	0	New document required to describe the site requirements for handling asbestos per request No. S92-236, initiated by M. McCullough.

1.0 INTRODUCTION

1.1 General

The **LARGE PROJECT ASBESTOS WORK PRACTICES** is a resource for persons interested in developing specifications for large scale asbestos abatement projects at the FEMP. This document provides advice and guidance in the design and execution of abatement of asbestos-containing materials (ACM) for large scale projects. Small scale abatement jobs are described in the Asbestos Operations and Maintenance Work Practices document (OM-0005).

1.2 Users

A number of user groups are expected to benefit from the direct use of this information. Of primary interest to project designers, consultants, facility owners, and abatement contractors, this document provides important information on specifying abatement of ACM in facilities at the FEMP.

1.3 Usage

In the text of the technical section (Sections 11.0 and 12.0), notes are included to provide additional guidance to the user. These notes must be deleted after a project specification is prepared using this guidance document. The following is an example of the format and style of the notes:

NOTE: NOTES ARE ALWAYS PRINTED IN CAPITAL LETTERS AND ARE INDENTED JUST AS THIS PARAGRAPH IS PRINTED. ALWAYS DELETE THESE NOTES WHEN PRINTING A SET OF PROJECT SPECIFICATIONS.

In writing project specifications, the **LARGE PROJECT ASBESTOS WORK PRACTICES** is used by selecting the sections appropriate for the project requirements and editing them as necessary. Some sections are necessary for any type of abatement project. Other sections contain specific requirements and will be appropriate only for specific types of abatement projects.

It is important to understand that this document refers primarily to the technical aspect of asbestos abatement. Other contract Sections referring to methods of payment, insurance requirements, etc. would be developed by others.

2.0 BACKGROUND

2.1 Asbestos Information - General

Various health effects have been linked with industrial exposure to airborne asbestos. The presence of asbestos in a building, if not airborne, does not mean that the health of building occupants is necessarily endangered. As long as ACM remains in good condition and is not disturbed, exposure is unlikely.

2.0 **BACKGROUND** (cont.)

2.1 Asbestos Information - General (cont.)

In general, ACM is of greatest concern if it is friable, particularly if it is damaged or deteriorated. Friable means material that can be crumbled, pulverized, or reduced to powder by hand pressure when dry.

2.2 FEMP Information - General

The Fernald Environmental Management Project (FEMP) is owned by the Department of Energy (DOE), and Fernald Environmental Restoration Management Company (FERMCO) is the prime contractor to manage the site for the DOE. The FEMP is located in a rural area of southwestern Ohio on a 1,050 acre site near Fernald, about 20 miles northwest of Cincinnati and 8 miles southwest of Hamilton. The plant facility occupies about 136 acres in the center of the property. The site is bounded on the south by Willey Road, on the west by Paddy's Run Road, on the north by farmland and State Route 126, and on the east by a dairy farm.

The FEMP became operational in 1954 and consists of nine separate production plants and numerous support buildings and facilities including utilities and administrative areas. The primary mission of the FEMP was the production of purified uranium metal and uranium compounds for use at other DOE facilities. A small amount of thorium processing also was conducted. Site remediation including the processing, management, storage and shipping of accumulated site wastes is the current principal activity at the FEMP.

The majority of the facilities were constructed prior to 1970 and asbestos-containing materials were utilized in various buildings. Insulation materials containing asbestos were used for pipelines, ductwork and vessels requiring thermal insulation. Transite (asbestos-cement board) was widely used for inner and outer building sheathing for process buildings, warehouses, and support buildings. Floor coverings containing asbestos were used in many office, laboratory and service areas. Asbestos was also used in miscellaneous materials such as gaskets, brake and clutch linings, lab oven linings, electrical conduit, and plant oven linings/seals.

2.3 Inspection and Assessment

An Asbestos Site Survey was completed in February, 1992. This Survey identified the location of ACM at the FEMP, assessed the hazardous nature of its condition, and recommended certain response actions. The protocol for the survey was AHERA, the Asbestos Hazard Emergency Response Act.

Per the Survey, most ACM at the site is in the form of pipe insulation (approximately 65,000 linear feet), and transite panels (approximately 2,400,000 square feet).

Asbestos Work Orders have been written to abate the worst problem areas that were identified by the Survey, and a periodic re-inspection program helps to ensure that all necessary abatement is performed.

The updated results of the Survey are contained in Facility Owner Reports, which are maintained by the Clean Air Program unit of the Environmental Protection Department.

3.0 DEFINITIONS

3.1 General

Department of Energy (DOE): Owner of the FEMP site.

FERMCO: The Fernald Environmental Remediation Management Company. This Company manages the FEMP operations for the DOE.

Project Manager: The Project Manager is a full time representative of FERMCO at the job site with authority to stop the work upon verbal order if requirements of the Contract Documents are not met, or if in the sole judgement of the FERMCO Project Manager, FERMCO, the interests of FERMCO, safety of any person or FERMCO's property are jeopardized by the work.

Project Site is the space available to the Contractor for performance of the work, either exclusively or in conjunction with others performing other construction as part of the project. The extent of the project site is shown on the Drawings, and may or may not be identical with the description of the land upon which the project is to be built.

Regulation: The term "Regulations" includes laws, statutes, ordinances and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the Work, whether they are lawfully imposed by authorities having jurisdiction or not.

3.2 Asbestos Abatement Related

The following definitions are related to asbestos abatement activities.

Adequately Wet: To sufficiently mix or penetrate or coat with liquid to prevent dust emissions.

Air Monitoring: The process of measuring the fiber content of a specific volume of air.

Asbestos: The asbestiform varieties of amosite, serpentinite (chrysotile), riebeckite (crodiodolite), cummintonite-grunerite, anthophyllite, and actinolite-tremolite.

Asbestos-Containing Material (ACM): Includes asbestos or any material containing asbestos. See RACM.

Asbestos-Containing Waste Material (ACWM): Any waste that contains asbestos. This includes, but is not limited to: waste from control devices, filters from control devices, friable asbestos-containing material and bags or containers that previously contained asbestos. As applied to demolition and renovation operations, this term includes regulated asbestos waste and materials contaminated with asbestos including equipment and clothing.

3.0 **DEFINITIONS** (cont.)

3.2 Asbestos Abatement Related (cont.)

Asbestos Hazard Abatement Contractor: A business entity or public entity that engages in or intends to engage in asbestos hazard abatement activities and that employs or supervises one or more asbestos hazard abatement specialists for asbestos hazard abatement activities. "Asbestos Hazard Abatement Contractor" does not mean an employee of an asbestos hazard abatement contractor, nor a general contractor who subcontracts to an asbestos hazard abatement contractor.

Asbestos Hazard Abatement Specialist: A person with responsibility for the oversight or supervision of asbestos hazard abatement activities, including Asbestos Hazard Abatement Project Managers, hazard abatement project supervisors and foremen, and employees who coordinate or directly supervise or oversee asbestos hazard abatement activities performed by employees in public buildings.

Asbestos Hazard Abatement Worker: A person responsible in a non-supervisory capacity for the performance of an asbestos hazard abatement activity.

Asbestos Hazard Air Monitoring Technician: The person who is responsible for environmental monitoring or work area clearance air sampling, including air monitoring performed to determine compliance of response actions under the rules set forth in 40 CFR 763 Subpart E.

Asbestos Hazard Evaluation Specialist: A person responsible for the identification, detection, and assessment of ACM, the determination of appropriate response actions, or the preparation of asbestos management plans for the purpose of protecting the public health from the hazards associated with exposure to asbestos, including the performance of air and bulk sampling.

Asbestos Hazard Abatement Project Designer: The person responsible for the workscope, work sequence, or performance standards for an asbestos hazard abatement activity, including preparation of specifications, plans, and contract documents.

Asbestos Removal Notification Form (ARNF): Form utilized within the FEMP to initiate submissions of Notice of Intent (NOI) to demolish or renovations involving asbestos. These forms are submitted to EC by project engineers or any person responsible for the anticipated removal.

Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 9 to 12 inches.

Category I non-friable asbestos-containing material: Any asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than one percent asbestos.

Category II non-friable asbestos-containing material: Any asbestos material other than Category I nonfriable ACM containing more than one percent asbestos that when dry cannot be crumbled, pulverized, or reduced to powder by hand pressure.

3.0 **DEFINITIONS** (cont.)

3.2 Asbestos Abatement Related (cont.)

Certificate: A document issued by the Ohio Department of Health to an individual affirming that the individual has successfully completed the training and other requirements as set forth in Chapter 3701-34 of the Ohio Administrative Code. This document qualifies a person as an Asbestos Hazard Abatement Specialist, an Asbestos Hazard Abatement Project Designer, an Asbestos Hazard Abatement Air-Monitoring Technician, an Asbestos Hazard Evaluation Specialist, Asbestos Hazard Abatement Worker or Asbestos Hazard Abatement Contractor.

Clean Air Program: The section/group responsible for defining asbestos program activities, and monitoring program results.

Clearance Air Sampling: An air sampling performed after the completion of any asbestos hazard abatement activity and prior to the reoccupation of the contained work area by the public, and conducted for the purpose of protecting the public from the health hazards associated with exposure to friable asbestos-containing materials.

Demolition: The wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations.

Disposal Bag: A properly labeled 6-mil thick leak-tight plastic bag used for transporting asbestos waste from the work site to ultimate disposal.

Emergency Demolition: Any demolition conducted under a written order issued by a state or local government agency because a facility is structurally unsound and in danger of imminent collapse.

Emergency Renovation: A renovation operation that was not planned but results from a sudden, unexpected event that creates an unsafe condition. Includes operations necessitated by non-routine failures of equipment.

Encapsulate: To coat, bind or resurface walls, ceilings, pipes or other structures or ACM with suitable products to prevent friable asbestos from becoming airborne.

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

Facility: Any building or designated structure at the FEMP.

Facility component: Any pipe, duct, boiler, tank, reactor, turbine or furnace at or in a facility; any structural member of a facility.

Friable Asbestos Material: Any material containing more than one percent asbestos by area, that hand pressure can break, crumble, pulverize, or reduce to powder when dry. **Note:** This could include normally non-friable materials such as transite and vinyl floor tile if it is in a deteriorated and friable condition or is converted to friable asbestos material during removal. Friability determinations are made by the Industrial Hygiene Department.

3.0 **DEFINITIONS** (cont.)

3.2 Asbestos Abatement Related (cont.)

Glove bag: A sealed compartment with attached inner gloves used for the handling of ACM. When properly installed and used it provides a small work area enclosure typically used for small-scale asbestos stripping operations.

HEPA FILTER: A High Energy Particulate Air filter certified by the manufacturers to have a collection efficiency of not less than 99.97 percent as determined by ASTM Method D-2986-71.

Industrial Hygiene: The department/group responsible for issuing asbestos work permits and for ensuring compliance with OSHA worker protection regulations.

License: A document issued by the Ohio Department of Health to a business entity or public entity affirming that the entity has met the requirements set forth in Chapter 3701-34 of the Ohio Administrative Code, to engage in asbestos hazard abatement activities as an Asbestos Hazard Abatement Contractor.

NESHAP: National Emission Standards for Hazardous Air Pollutants, 40 CFR Part 61, Subpart M: National Emission Standard for Asbestos.

Notice of Intent (NOI) to remove asbestos: The NOI is the written notification provided to the Ohio EPA (HCDOES) of the intent to renovate or demolish.

Ohio EPA (OEPA): The Ohio Environmental Protection Agency. For the purpose of notifications and other asbestos related matters the Hamilton County - Department of Environmental Services (HCDOES) is the Ohio EPA agent for Hamilton County and is the FEMP's contact point.

Owner or Operator: Any person or entity who owns, leases, operates, controls, or supervises a facility, or any waste disposal, demolition or renovation operation. For the FEMP the DOE is "Owner". For removal operations that are done by an outside contractor the contractor is considered to be the "Operator".

Personal Monitoring: Sampling of the asbestos fiber concentrations within the breathing zone of an employee.

Planned renovation operation: Any renovation operation, or number of operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Incidental removals (individual nonscheduled operations) are included if a number of such operations can be predicted to occur during a given period of time, not to exceed one year, based on operating experience.

Planner: FERMCO employee responsible for planning jobs/projects involving work with asbestos or demolition projects (e.g., job planner - estimator, project engineer, maintenance supervisor).

Regulated Asbestos-Containing Material (RACM): Means (a) any friable asbestos material, (b) any Category I non-friable asbestos which has become friable or that will be subject to sanding, grinding, cutting or abrading, or (c) Category II non-friable asbestos that can be expected to break, crumble, be pulverized, or reduce to powder during expected renovation or demolition activities.

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3.0 **DEFINITIONS** (cont.)

3.2 Asbestos Abatement Related (cont.)

Renovation: The altering in any way of one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are specifically excluded; these operations are defined as demolitions.

Structural member: Any load-supporting member of a facility, such as beams and load supporting walls; or any nonload-supporting member such as ceilings and nonload-supporting walls.

Waste Shipment Record: The shipping document required to be originated and signed by FEMP that will be used to track and substantiate the disposition of ACWM.

Work Area: The area where asbestos-related work or removal operations are performed which is defined and/or isolated to prevent the spread of asbestos dust, fibers or debris, and entry by unauthorized personnel. Work area is a Regulated Area as defined by 29 CFR 1926.

4.0 STANDARDS

ALWAYS INCLUDE THE FOLLOWING SECTION ON STANDARDS:

4.1 General

Regarding the general applicability of standards, except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable standards have the same force and effect (and are made a part of the Contract Documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.

4.2 Contractor Responsibility

The Contractor shall assume full responsibility and liability for the compliance with all standards pertaining to all required certifications, permits, licenses, notifications, documentation, work practices, protection of workers, visitors to the site, persons occupying areas adjacent to the site and the removal and packaging of ACM to a storage container. The Contractor shall hold FERMCO and the FERMCO Project Manager harmless for failure to comply with any applicable standard on the part of himself, his employees, or his subcontractors.

4.3 Specific Standards

Those standards which apply to asbestos abatement work include but are not limited to the following:

1. Air Filtration Devices

   NOTE: ALWAYS INCLUDE THE FOLLOWING AS THESE SET FORTH THE STANDARDS FOR AIR FILTRATION DEVICES (SOMETIMES REFERRED TO AS NEGATIVE AIR MACHINES OR HEPA FILTERED FAN UNITS), HEPA VACUUMS AND RESPIRATORY PROTECTION.

   American National Standards Institute (ANSI) 1430 Broadway New York, New York 10018 (212)354-3300

   Fundamentals Governing the Design and Operation of Local Exhaust Systems Publication Z9.2-79, 1979

   Practices for Respiratory Protection Publication Z88.2-80, 1980

   American Society for Testing and Materials (ASTM) 1916 Race Street Philadelphia, PA 19103 (215)299-5400

   Safety and Health Requirements Relating to Occupational Exposure to Asbestos F 849-82

2. Encapsulants

   DELETE THE FOLLOWING IF THERE IS NO ENCAPSULATION IN THE WORK.

   Specification for Encapsulants for Friable Asbestos Containing Building Materials Proposal P-189

5.0 FORMAT

5.1 General

The **LARGE PROJECT ASBESTOS WORK PRACTICES** is a compilation of specification sections compatible with the American Institute of Architects (AIA) "Masterspec", that can be used to assemble a technical specification for asbestos abatement involving removal, encapsulation, enclosure, and repair.

"Masterspec" is a series of specification sections written in a uniform format which can be used to develop a project specification by selecting the appropriate sections from over 130 sections available. Because this service is widely used by architects and engineers, the **LARGE PROJECT ASBESTOS WORK PRACTICES** can be made compatible with "Masterspec" assuring that they can easily be used and are well coordinated with the standard contract document forms published by the AIA.

Section 8.0 ties in the sections of this document to Masterspec, by relating each section of this document to the proper Masterspec sections. Masterspec sections are always indicated by five successive digits (i.e., 01013).

5.2 Imperative Language

Imperative language is used generally in the Specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities which must be fulfilled indirectly by the Contractor, or by others when so noted.

NOTE: USUALLY RETAIN THE NEXT PARAGRAPH, EVEN WHEN OFFICE POLICY IS TO MINIMIZE SUCH REQUIREMENTS OR IMPLICATIONS.

5.3 Assignment of Specialists

The Specification requires that certain specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and the assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

This requirement should not be interpreted to conflict with enforcement of building codes or regulations governing the work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

NOTE: THE PARAGRAPH BELOW IS HELPFUL IN AVOIDING UNREASONABLE CLAIMS.

5.0 **FORMAT** (cont.)

5.4 Industry Standards

NOTE: RETAIN THE NEXT PARAGRAPH AS A BASIC REQUIREMENT, THEN WITH ADVICE OF THE FERMCO'S COUNSEL, DECIDE HOW TO EDIT, MODIFY OR REPLACE THE THREE PARAGRAPHS THAT FOLLOW.

1. Applicability of Standards

   Except where Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into Contract Documents. Such standards are made a part of the Contract Documents by reference. Individual Sections indicate which codes and standards the Contractor must keep available at the Project Site for reference.

2. Referenced Industry Standards

   Referenced industry standards take precedence over standards that are not referenced but recognized in the construction industry as applicable.

3. Unreferenced Industry Standards

   Unreferenced industry standards are not directly applicable to the work, except as a general requirement of whether the work complies with recognized construction industry standards.

4. Publication Dates

   Where compliance with an industry standard is required, comply with standard in effect as of date of Contract Documents.

   NOTE: REVISE THE NEXT PARAGRAPH AS NECESSARY.

5. Updated Standards

   At the request of the FERMCO Project Manager, Contractor or authority having jurisdiction, submit a Change Order proposal where applicable code or standard has been revised and reissued after the date of the Contract Documents and before performance of Work affected. The FERMCO Project Manager will decide whether to issue a Change Order to proceed with the updated standard.

NOTE: THE NEXT TWO PARAGRAPHS MAY HELP TO RESOLVE PROBLEMS THAT SOMETIMES ARISE WITH USE OF REFERENCE STANDARDS.

5.0 **FORMAT** (cont.)

5.5 Conflicting Requirements

Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the FERMCO Project Manager for a decision before proceeding.

5.6 Minimum Quantities or Quality Levels

In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual abatement may comply exactly, within specified tolerances, with the minimum quantity or quality specified, or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements. Refer instances of uncertainty to the FERMCO Project Manager for decision before proceeding.

5.7 Copies of Standards

Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.

Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

Although copies of standards needed for enforcement of requirements may be part of required submittals, the FERMCO Project Manager reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

5.8 Abbreviations and Names

Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the Specifications or other Contract Documents they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

5.0 **FORMAT** (cont.)

5.8 Abbreviations and Names (cont.)

NOTE: DELETE THE PARAGRAPH EITHER ABOVE OR BELOW. IF THE PARAGRAPH BELOW IS DELETED, DELETE THE LIST OF ACRONYMS THAT FOLLOWS ALSO. THE TEXT OF THE SPECIFICATION SECTIONS ASSUMES THE LISTING IS RETAINED.

Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations as referenced in Contract Documents are defined to mean the associated names. Names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up-to-date as of date of Contract Documents:

AIHA American Industrial Hygiene Association
475 Wolf Ledges Parkway
Akron, OH 44311
216/762-7294

AIA American Institute of Architects
1735 New York Ave. NW
Washington, DC 20006
202/626-7474

ANSI American National Standards Institute
1430 Broadway
New York, NY 10018
212/354-3300

ASHRAE American Society for Heating, Refrigerating, and Air Conditioning Engineers
1791 Tullie Circle NE
Atlanta, GA 30329
404/636-8400

ASME American Society of Mechanical Engineers
345 East 47th Street
New York, NY 10017
212/705-7722

ASTM American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103
215/299-5400

AWCI Association of the Wall and Ceiling Industries - International
25 K Street, NW
Washington, DC 20002
202/783-2924

CFR Code of Federal Regulations
Available from Government Printing Office;
Washington, DC 20402 (usually first published in Federal Register)
202/783-3238

5.0 **FORMAT** (cont.)

5.8 Abbreviations and Names (cont.)

DOT Department of Transportation
400 Seventh St., SW
Washington, DC 20590

202/426-4000

EPA Environmental Protection Agency
401 M St.,SW
Washington, DC 20460
202/382-3949

FS Federal Specification (General Services Admin.)
Obtain from your Regional GSA
Office, or purchase from GSA
Specifications Unit (WFSIS)
7th and D Streets, S.W.
Washington, DC 20406
202/472-2205 or 2140

NEC National Electrical Code (by NFPA)

NFPA National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
617/770-3000

OSHA Occupational Safety & Health Administration
(U.S. Dept. of Labor)
Government Printing Office
Washington, DC 20402
202/783-3238

UL Underwriters Laboratories
333 Pfingsten Rd.
Northbrook, IL 60062
312/272-8800

NOTE: REVIEW THE FOLLOWING PARAGRAPH WITH FERMCO'S COUNSEL AND DELETE OR MODIFY AS APPROPRIATE FOR BOTH THE PROJECT AND THE LOCATION. THIS PARAGRAPH IS BELIEVED TO BE THE BARE INDUSTRY CONSENSUS ON THE "PROCEDURAL" GENERAL REQUIREMENTS FOR THIS SUBJECT.

5.9 Trade Union Jurisdictions

The Contractor shall maintain, and require subcontractors to maintain, complete current information on jurisdictional matters, regulations and pending actions, as applicable to construction activities. The manner in which Contract Documents have been organized and subdivided is not intended to indicate trade union or jurisdictional agreements.

Discuss new developments at project meetings at the earliest feasible dates. Record relevant information and actions agreed upon.

Assign and subcontract construction activities, and employ tradesmen and laborers in a manner that will not unduly risk jurisdictional disputes that could result in conflicts, delays, claims and losses.

5.0 **FORMAT** (cont.)

5.10 Submittals

NOTE: USUALLY RETAIN THE GENERAL REQUIREMENTS IN THE FOLLOWING PARAGRAPH, ALTHOUGH SEVERAL SPECIFIC SUBMITTALS IN THIS CATEGORY MAY BE INDIVIDUALLY SPECIFIED IN OTHER SECTIONS.

Permits, Licenses and Certificates: For FERMCO's records, submit copies of permits, licenses, certifications, inspection reports, insurance certificates, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

6.0 RESPONSIBILITIES

6.1 Asbestos Program Coordinator

1. Maintains the Inventory of ACM at the FEMP.

2. Identifies and documents any changes to the condition of ACM. This is accomplished by:

   a. Ensuring that all ACM is inspected and re-assessed at least once each year.

   b. Monitoring the completion of Asbestos Maintenance Work Orders.

   c. Reviewing results of abatement projects completed by outside contractors.

3. Reviews and revises the **LARGE PROJECT ASBESTOS WORK PRACTICES** as necessary.

6.2 Industrial Hygiene (IH)

1. Verifies through contact with Environmental Permitting for each asbestos project that regulatory notification has been completed and that approval to begin work has been granted.

2. Authorizes and identifies special precautions and work practices for each asbestos project by completing and returning the Asbestos Work Permit when approved by Environmental Permitting.

3. Identifies the type of personal protective equipment required for each asbestos project.

4. Ensures adequate monitoring by sampling selected project operations based on duration and degree of potential exposure and provides notification of air sampling results as required. This helps to ensure that all OSHA worker protection and work practice regulations are observed.

5. Evaluates effectiveness of control measures and/or engineering controls in maintaining the required asbestos Threshold Limit Value.

6. Performs periodic inspections of asbestos work-sites to ensure compliance with work permit requirements and acceptable asbestos work practices.

6.3 Environmental Permitting

1. Receives, reviews, and processes the Asbestos Removal Notification Forms.

2. Completes and submits a Notice of Intent and appropriate transmittal letter to the Ohio Environmental Protection Agency.

3. Provides notification to Industrial Hygiene when regulatory approval has been granted for an asbestos demolition or renovation project to commence.

7.0 CODES AND REGULATIONS

7.1 Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and apply to this section.

7.2 Summary

This section sets forth governmental regulations and industry standards which are included and incorporated herein by reference and made a part of the specification. This section also sets forth those notices and permits which are known to FERMCO and which either must be applied for and received, or which must be given to governmental agencies before start of work.

Requirements include adherence to work practices and procedures set forth in applicable codes, regulations and standards.

Requirements include obtaining applicable permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with codes, regulations, and standards.

7.3 General

1. General Applicability of Codes, Regulations, and Standards

   Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

2. Contractor Responsibility

   The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations. The Contractor shall hold FERMCO and the FERMCO Project Manager harmless for failure to comply with any applicable work, safety, health or other regulation on the part of himself, his employees, or his subcontractors.

   NOTE: ALWAYS INCLUDE THE FOLLOWING SECTION ON FEDERAL REGULATIONS

7.0 **CODES AND REGULATIONS** (cont.)

7.4 Federal Requirements

Federal requirements which govern asbestos abatement work include but are not limited to the following:

1. OSHA

U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:

Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules Title 29, Part 1910, Section 1001 and Part 1926, Section 58 of the Code of Federal Regulations

Respiratory Protection Title 29, Part 1910, Section 134 of the Code of Federal Regulations

Construction Industry - Title 29, Part 1926, of the Code of Federal Regulations

Access to Employee Exposure and Medical Records Title 29, Part 1910, Section 2 of the Code of Federal Regulations

Hazard Communication Title 29, Part 1910, Section 1200 of the Code of Federal Regulations

Specifications for Accident Prevention Signs and Tags Title 29, Part 1910, Section 145 of the Code of Federal Regulations

2. EPA

U. S. Environmental Protection Agency (EPA), including but not limited to:

NOTE: AHERA REGULATES ONLY SCHOOLS BUT CAN BE USED AS A STANDARD OF CARE FOR OTHER STRUCTURES. IF THE FOLLOWING IS RETAINED THE REQUIREMENTS OF THE AHERA REGULATION WILL APPLY TO THE CONTRACT. IN ANY CASE, THE AHERA REGULATIONS SHOULD BE REVIEWED TO DETERMINE IF ANY EXCEPTIONS SHOULD BE MADE.

Asbestos Hazard Emergency Response Act (AHERA) Regulation Asbestos Containing Materials in Schools Final Rule & Notice Title 40, Part 763, Sub-part E of the Code of Federal Regulations.

National Emission Standard for Hazardous Air Pollutants (NESHAPS) National Emission Standard for Asbestos Title 40, Part 61, Sub-part A, and Sub-part M (Revised Sub-part B) of the Code of Federal Regulations

3. National Priority Listing (NPL)

Since the FEMP is on the NPL, all sitewide activities must conform with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Per CERCLA, Removal Actions describe the ways in which facilities will either be cleaned up, or dismantled and removed.

Any asbestos abatement that is not included in facility specific Removal Actions is implemented through Removal Action #26, which allows for asbestos abatement that currently poses a safety or health hazard.

7.0 **CODES AND REGULATIONS** (cont.)

7.5 State of Ohio

State Requirements which govern asbestos abatement work include but are not limited to the following:

1. Ohio Administrative Code Chapter 3701-34, "Ohio Department of Health: Asbestos Hazard Abatement Rules."

2. Ohio Administrative Code Chapter 3745-20, "Asbestos Emission Control from Renovation, Demolition and Disposal Operations."

3. There is no Ohio State OSHA organization, so the Federal OSHA provisions apply.

7.6 Local Requirements

Abide by all local requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials.

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8.0 MASTER LIST

This list contains all sections of technical specifications that are included in this document. The corresponding Masterspec section is listed in brackets - e.g., [01013].

GENERAL REQUIREMENTS

Sect.	Description	M/S Sect.
11.1	Cutting & Patching	[01046]
3.0	Definitions	[01091]
4.0	Standards	[01091]
7.0	Codes & Regulations	[01092]
11.2	Air Monitoring	[01410]
11.3	Temporary Facilities	[01503]
11.4	Temporary Pressure Differential	[01513]
11.5	Temporary Enclosures	[01526]
11.6	Regulated Areas	[01527]
11.7	Entry Into Controlled Areas	[01528]
11.8	Small-Scale Short-Duration Work	[01529]
11.9	Worker Protection - Asbestos Abatement	[01560]
11.10	Worker Protection - Repair	[01561]
11.11	Respiratory Protection	[01562]
11.12	Decontamination Units	[01563]
11.13	Materials and Equipment	[01601]
11.14	Product Substitutions	[01632]
11.17	Project Decontamination -Poly Removal	[01711]
11.18	Cleaning & Decontamination Procedures	[01712]
11.19	Project Decontamination - Microfibers	[01713]
11.21	Work Area Clearance	[01714]

SITE WORK

12.0	Site Work	[01701]

9.0 Summary of General Specifications

The following outlines the specification sections needed to describe the different types of work required for asbestos removal projects. Where applicable, the sections are presented in a chronological order according to typical sequencing of the work:

9.1 Administrative Requirements

1. Summary of Work - Section 10.1

   Identifies the scope of the project; primary conditions of the contract; lists the specification sections applicable; identifies the asbestos containing materials subject to the contract work; and sets forth the procedures related to Contractor's use of the premises, site, existing buildings, and equipment such as elevators.

2. Project Coordination - Section 10.6

   Sets the responsibilities for notifications and other special reports, supervisory personnel, contingency plans, and related submittals. Details the required qualifications of supervisory personnel. Describes coordination meetings.

3. Definitions - Section 3.0

   Defines important general and technical terms and positions related to the work.

4. Submittals - Section 10.2

   Sets forth the requirements and procedures for coordinating, scheduling, and submitting shop drawings, product data, samples, mock-ups, and other information. Issues addressed include review times, action to be taken, subsequent submissions, distribution of copies, and record keeping.

5. Product Substitutions - Section 11.14

   Describes procedures to be used and basis for determining if the contractor will be allowed to substitute alternative products or procedures. Includes definitions of key terms, procedures, quality assurance, submittals, product delivery, storage and handling, product compliance, general product requirements, and installation.

6. Project Closeout - Section 12.0

   Details administrative closeout procedures for the project once abatement work is complete.

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9.0 Summary of General Specifications (cont.)

9.2 Removal Work

Requirements are set forth in the following sections:

1. Codes and Regulations - Section 7.0

   Sets forth many governmental regulations and industry standards which are adopted by reference and made a part of the contract (specifications). Notices and permits which must be made to or obtained from governmental authorities before start of work are also to be identified in this section. Some guidance documents developed by public and private organizations to assist asbestos abatement are also listed in this section.

   This section requires the addition of requirements (criteria such as codes, regulations, and referenced standards) specific to the project location. In order to assure all such governmental requirements are noted, all parties involved (including consultants) must identify and understand the requirements to assure inclusion of all pertinent provisions and to assure coordination of the technical specification requirements with applicable laws and regulations.

2. Air Monitoring - Section 11.2

   Describes air monitoring performed to insure that the building beyond the work area remains uncontaminated. Also sets forth action levels that may result in a stop work order or other action. Air monitoring to determine required respiratory protection is the responsibility of the Contractor.

3. Temporary Facilities - Section 11.3

   Sets forth the support facilities needed such as electrical and plumbing connections for the decontamination unit, storage and staging areas, and office space for the Project Administrator.

4. Temporary Pressure Differential and Air Circulation System - Section 11.4

   Sets forth the procedures to set up the Air Filtration Devices and ventilation of the work area.

5. Temporary Enclosures - Section 11.5

   Details the requirements for the sheet plastic barriers isolating the work area and decontamination areas from the balance of the building.

6. Worker Protection, Asbestos Abatement - Section 11.9

   Describes the equipment and procedures for protecting workers against asbestos contamination and other asbestos-related work place hazards except for respiratory protection.

9.0 **Summary of General Specifications** (cont.)

9.2 Removal Work (cont.)

7. Respiratory Protection - Section 11.11

Establishes procedures and equipment and sets minimum requirements for protection against inhalation of airborne asbestos fibers.

8. Decontamination Units - Section 11.12

Explains the setup and operation of the personnel and material decontamination units.

9. Materials and Equipment - Section 11.13

Sets forth general requirements for material & equipment to be incorporated in the project.

9.3 Asbestos Removal Work Procedures

These are described in the following specification sections:

1. Cutting and Patching - Section 11.1

Sets basic requirements for cutting, drilling, abrading, or otherwise penetrating ACM and related requirements for local exhaust, wetting, and sealing edges of ACM.

2. Removal of ACM - Section 11.15

Addresses submissions and regulatory requirements, product material and equipment quality requirements, and related execution of the work.

3. Removal of Asbestos-Contaminated Soil - Section 11.16

Covers procedures for wet and dry soils.

4. Disposal of Asbestos-Containing Waste Material - Section 11.20

Addresses requirements for notices and submissions, physical requirements for vehicles (enclosed trucks, etc.), and handling of bagged waste and boxes at the disposal site that is non-radiologically and radiologically contaminated waste.

5. Decontamination of the Work Area

After completion of abatement work, this is described in the following sections:

a. Cleaning and Decontamination Procedures - Section 11.18

Set forth procedures to be used on contaminated objects and rooms which are not part of an abatement work area.

9.0 **Summary of General Specifications** (cont.)

9.3 Asbestos Removal Work Procedures (cont.)

5. Decontamination of the Work Area (cont.)

b. Project Decontamination - Poly Removal - Section 11.17

Describes the sequence of cleaning and decontamination procedures during removal of the sheet plastic barriers isolating a work area.

c. Project Decontamination - Microfibers - Section 11.19

Describes the special procedures required to clean an area of contamination by asbestos fibers too small to seen with an optical microscope.

d. Work Area Clearance - Section 11.21

Describes the analytical methods used to determine if the work area has been successfully cleaned of contamination.

10.0 GENERAL SPECIFICATIONS

10.1 Summary of Work

The summary of work can be developed from Sections 9.1, 9.2, or 9.3.

10.2 Administrative Submittals

Before the start of work, submit the following to the FERMCO Project Manager for review. No work shall begin until these submittals are returned with the FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

NOTE: GENERAL SUBMITTALS ARE DETERMINED BY FERMCO PROCUREMENT. THE FOLLOWING ARE SUBMITTALS TO BE CONSIDERED FOR ASBESTOS RELATED PURPOSES.

1. Inspection

   Report on inspection carried out as required by this section. Include copies of all photographs, video tapes, etc. Submit in the same manner as product data.

2. Contingency Plans

   Include telephone numbers and location of emergency services.

3. Notifications

   Include those to be sent to other entities at the work site, and those sent to emergency service agencies.

4. Resume

   Needed for general superintendent.

5. Permits, Licenses, and Certificates

   For FERMCO's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

6. Accreditation

   Contractor is to submit evidence in form of certification of the General Superintendent as an Asbestos Hazard Abatement Specialist, as approved by the Department of Health of the State of Ohio.

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.2 Administrative Submittals (cont.)

7. Staff Names

Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers. Post copies of the list in the project meeting room, the temporary field office, and each temporary telephones.

8. Asbestos Work Plan

Submit a detailed plan of the procedures proposed for use in complying with the requirements of this specification. The Work Plan should be based on Appendix F of 29 CFR-1926.58 including the location and layout of decontamination areas, the sequencing of asbestos work, the project schedule, the interface of trades involved in the performance of work, methods to be used to assure the safety of building occupants and visitors to the site, disposal plan including location of approved disposal site, and a detailed description of the methods to be employed to control pollution. Expand upon the use of portable HEPA ventilation system, closing out of the building's HVAC system, method of removal to prohibit visible emissions in work area, and packaging of removed asbestos debris. The plan must be approved by the FERMCO Project Manager prior to commencement of work.

10.3 Project Submittals

Submit the following to the FERMCO Project Manager for review. No work shall begin until these submittals are returned with FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

The submittals required from the Contractor include, but are not limited to the following:

NOTE: ITEMS NOT APPLICABLE TO THIS PROJECT SHOULD BE DELETED OR LABELED NOT APPLICABLE (N/A).

1. Project Coordination

Before Start of Work:
See Section 10.2

Periodically During Work:
Daily Logs
Event Reports
Accident Reports
Discovered Condition Reports
Progress Photographs
Record Documents

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.3 Project Submittals (cont.)

2. Cutting & Patching

Before Start of Work:
Tools
Periodically During Work:
None

3. Codes and Regulations

Before Start of Work:
State Regulations
Local Regulations
Licenses
Notifications
Permits
Periodically During Work:
None

4. Temporary Facilities

Before Start of Work:
Scaffolding
Hot water heater
Decontamination Unit
Ground Fault Circuit Interrupters (GFCI)
Lamps and Light Fixtures
Temporary Heating Units
Temporary Cooling Units
Self Contained Toilet Units:
Product Data, Sub-contractor
First Aid Supplies
Fire Extinguishers:
Product Data, location schedule
Periodically During Work:
None

5. Pressure Differential & Air Flow

Before Start of Work:
Pressure Differential System Design
HEPA Filtered Fan Units: Product data
Monitoring Equipment: Product data
Auxiliary Generator: Product data
Power Switch: Product data
Auxiliary Power System: Shop Drawing
Periodically During Work:
Pressure Differential Monitoring Results

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.3 Project Submittals (cont.)

6. Temporary Enclosures

Before Start of Work:
- Strippable Coatings:
  - Product data
  - Test report on ASTM E84 test
  - Manufacturer's installation instructions.
  - Material Safety Data Sheet
- Spray Cement:
  - Product data.
  - Manufacturer's installation instructions.
  - Material Safety Data Sheet.
- Sheet Plastic: Test reports on NFPA 701 test.
- Signs: Samples

Periodically During Work:
- Inspection report prior to applying strippable coating.
- Photograph of existing damage prior to applying coatings.
- Test Patches of strippable coating.

7. Regulated Areas

Before Start of Work:
- HEPA Filtered Vacuum Cleaners: product data.
- Signs: samples.
- Warning Tape: samples.

Periodically During Work:
- None

8. Worker Protection

Before Start of Work:
- Asbestos Worker Certification from the Ohio Department of Health

Historic Airborne Fiber Data
- Certificate Worker Acknowledgement: for each worker
- Training Program: course outline
- Report from Medical Examination: of each worker
- Notarized Certifications

Periodically During Work:
- None

9. Respiratory Protection

Before Start of Work:
- Product Data
- NIOSH and MSHA Certifications
- Type "C": System Diagram
- Type "C": Operating Instruction
- Respiratory Protection Program: written manual
- Historic Airborne Fiber Data
- Respirator Medical Certifications
- Respirator Training Records
- Quantitative Fit Test Records

Periodically During Work:
- None

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.3 Project Submittals (cont.)

10. Decontamination Units

Before Start of Work:
Personnel Decontamination Unit: shop drawing
Equipment Decontamination Unit: shop drawing
Shower Head and Controls: product data
Filters: product data
Sump Pump: product data
Signs: samples
Periodically During Work:
None

11. Materials and Equipment

Before Start of Work:
Product List Schedule
Periodically During Work:
Any items not previously submitted.

12. Product Substitutions

Before Start of Work:
Refer to section 11.1, Item 4
Periodically During Work:
Refer to section 11.1, Item 4

13. Project Closeout

Periodically During Work:
Refer to Section 12.0

10.4 <u>Contractor Responsibilities</u>

1. License

The Contracting Company shall be licensed in the State of Ohio as an Asbestos Abatement Contractor in accordance with the Ohio Department of Health Regulation 3701-34-04.

2. General Superintendent

Provide a full-time General Superintendent who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is the Contractor's Representative responsible for compliance with all applicable federal, state and local regulations, particularly those relating to asbestos-containing materials.

The General Superintendent must have completed a course at an EPA Training Center or equivalent certificate course in asbestos abatement procedures, and have had a minimum of two (2) years on-the-job training in asbestos abatement procedures.

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.4 Contractor Responsibilities (cont.)

2. General Superintendent

The General Superintendent is to be a Competent Person as required by OSHA in 29 CFR 1926, and shall be on the jobsite any time asbestos removal is in progress.
The General Superintendent is to be accredited as an Asbestos Hazard Abatement Specialist in accordance with the Ohio Department of Health Regulation 3701-34-05.

3. Inspection

Prior to commencement of work, inspect areas in which work will be performed. Prepare a listing of damage to structure, surfaces, equipment or of surrounding properties which could be misconstrued as damage resulting from the work. Photograph or videotape existing conditions as necessary to document conditions. Submit to FERMCO prior to starting work.

4. Potential Asbestos Hazard

The disturbance or dislocation of ACM may cause asbestos fibers to be released into the building's atmosphere, thereby creating a potential health hazard to workmen and building occupants. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the hazard and of proper work procedures which must be followed.

Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified ACM, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

5. Stop Work

If a FERMCO representative or the FERMCO Project Manager issues either a verbal or a written stop work order, immediately and automatically stop all work. If a verbal order is issued, it will be followed by a written stop work order as soon as possible. Do not recommence work until authorized in writing by the FERMCO Project Manager.

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.4 Contractor Responsibilities (cont.)

6. Asbestos-Containing Materials (ACM)

The following ACM are known to be present at the worksite. If any other materials are found, which are suspected of containing asbestos, notify the FERMCO Project Manager immediately.

NOTE: INSERT A LISTING OF ALL ACM EXPECTED TO BE ENCOUNTERED AT EACH WORK LOCATION. INCLUDE THE TYPE AND PERCENT OF ASBESTOS CONTENT FOR EACH SPECIFIC BUILDING MATERIAL TO BE ABATED. THE "OTHER" COMPONENTS MAY BECOME IMPORTANT IN BUILDING CLEARANCE. THIS INFORMATION CAN HELP A LABORATORY IN ITS ANALYSIS OF AIR SAMPLES.

NOTE: IT WOULD BE HELPFUL IF A COPY OF ANY SURVEY REPORTS COULD BE MADE AVAILABLE FOR REVIEW BY THE CONTRACTOR AT THE SAME LOCATION AS THE CONTRACT DOCUMENTS.

NOTE: THE FOLLOWING IS AN EXAMPLE OF THE PRESENTATION OF INFORMATION NEEDED. REVISE AS REQUIRED TO SUIT PROJECT.

BOILER INSULATION	Asbestos Content	Other Components
Boiler:		
Surface Coat	95% to 100% Chrysotile	Rock Wool, Refractory Binders
Base Coat	60% to 65% Chrysotile	Refractory Binders
Boiler Breeching:		
Surface Coat	75% to 80% Chrysotile Plaster	Gypsum
Base Coat	75% to 80% Chrysotile	Refractory Binders
Water Storage Tank:		
Surface Coat	60% to 65% Chrysotile	Refractory Binders
Base Coat	60% to 65% Chrysotile	Refractory Binders

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.4 Contractor Responsibilities (cont.)

7. Contractor Use of Premises

NOTE: THE FOLLOWING ARTICLE IS AN EXAMPLE OF SPECIFIC REQUIREMENTS FOR THE CONTRACTOR'S USE OF THE PREMISES. PROVISIONS SIMILAR TO THESE ARE NECESSARY WHEN THE PROJECT INVOLVES WORK ON AN EXISTING OCCUPIED BUILDING OR SITE.

a. General

Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project abatement.

NOTE: THE FOLLOWING PARAGRAPHS ARE EXAMPLES OF SPECIAL PROJECT REQUIREMENTS. MODIFY AS NECESSARY TO SUIT PROJECT OR DELETE IF UNNECESSARY.

Keep existing driveways and entrances serving the premises clear and available to FERMCO and other employees at all times. Do not use these areas for parking or storage of materials.

Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional sto is necessary obtain and pay for such storage off site.

Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place or accessible to unauthorized persons.

NOTE: RETAIN AND MODIFY THE FOLLOWING PARAGRAPHS WHEN THE WORK INVOLVES AN EXISTING OCCUPIED BUILDING. DELETE THIS PARAGRAPH IN OTHER CASES.

b. Contractor's Use of the Existing Building:

Maintain existing building in a safe and weather tight condition throughout the abatement period. Repair damage caused by abatement operations. Take all precautions necessary to protect the building and its occupants during the abatement period.

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.4 Contractor Responsibilities (cont.)

7. Contractor Use of Premises (cont.)

b. Contractor's Use of the Existing Building (cont.)

NOTE: THE FOLLOWING PARAGRAPHS ARE EXAMPLES OF TYPICAL PROVISIONS THAT MIGHT BE ENCOUNTERED WHEN WORK IS PERFORMED ON AN EXISTING OCCUPIED BUILDING. THEY PLACE SPECIAL RESTRICTIONS ON THE CONTRACTOR'S USE OF THE PREMISES. DELETE UNNECESSARY PROVISIONS. ADD NEW PROVISIONS OR AMPLIFY THE FOLLOWING PARAGRAPHS TO SUIT PROJECT REQUIREMENTS.

Keep public areas such as hallways, stairs, elevator lobbies and toilet rooms free from accumulation of waste, rubbish or construction debris.

Smoking or open fires will not be permitted within the building enclosure or on the premises.

Except for Toilet Room ____ on the ___ floor designated for use by the Contractor's personnel, use of existing toilets within the building, by the Contractor and his personnel, will not be permitted.

c. Use of Existing Elevators: Except for the Freight Elevator (Elevator No.___), use of elevators by the Contractor will not be permitted. The Contractor will be permitted to use the freight elevator for temporary freight service and the transportation of construction personnel during the construction period. This elevator must also be available to FERMCO personnel at all times; coordinate freight elevator usage with the FERMCO Project Manager. Provide protective pads for the elevator car and other appropriate protective measures for the car and entrance doors and frames. During asbestos abatement activities the car is to be protected as set forth in the Section 11.5, Temporary Enclosures.

8. Posting and Filing of Regulations

Posting and Filing of Regulations: Post all notices requires by applicable federal, state and local regulations. Maintain two (2) copies of applicable federal, state and local regulations and standard. Maintain one copy of each at job site. Keep on file in Contractor's office one copy of each.

10.5 Occupancy by Others

NOTE: THE FOLLOWING ARTICLE CONTAINS SAMPLE PARAGRAPHS THAT DESCRIBE REQUIREMENTS NECESSARY FOR OCCUPANCY OF THE PREMISES BY OTHERS DURING THE ENTIRE PERIOD OF ABATEMENT, OR PARTIAL OCCUPANCY OF COMPLETED ABATEMENT PRIOR TO SUBSTANTIAL COMPLETION.

NOTE: RETAIN THE FOLLOWING PARAGRAPH WHEN OTHER PERSONNEL WILL OCCUPY THE ENTIRE PREMISES DURING ABATEMENT. MODIFY AS NECESSARY TO SUIT PROJECT REQUIREMENTS.

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.5 Occupancy by Others (cont.)

1. Full FERMCO Occupancy

FERMCO will occupy the site and the existing building during the entire period of abatement. Cooperate fully with FERMCO or its representative during abatement operations to minimize conflicts and to facilitate FERMCO usage. Perform the work so as not to interfere with FERMCO's operation.

NOTE: RETAIN THE FOLLOWING PARAGRAPH WHEN OTHER PERSONNEL WILL OCCUPY COMPLETED PORTIONS OF THE BUILDING PRIOR TO SUBSTANTIAL COMPLETION. MODIFY AS NECESSARY TO SUIT PROJECT REQUIREMENTS.

2. Partial FERMCO Occupancy

FERMCO reserves the right to place and install equipment as necessary in areas of the building in which all asbestos abatement and project decontamination procedures have been completed, and to occupy such completed areas prior to substantial completion, provided that such occupancy does not substantially interfere with completion of the work. Such placing of equipment and partial occupancy shall not constitute acceptance of the work or any part of the work.

10.6 Project Coordination

1. Summary

This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

NOTE: DELETE REQUIREMENTS FROM THE LISTING BELOW THAT ARE NOT RETAINED IN THE SECTION TEXT. INSERT ADDITIONAL SPECIAL REQUIREMENTS, BUT DO NOT CONFLICT WITH THE GENERAL CONDITIONS.

Pre-Construction Conference
Progress Meetings
Daily Log
Special reports
Contingency Plans
Notifications to other entities at job site

NOTE: REVISE THE FOLLOWING IF A MORE INVOLVED CONSTRUCTION SCHEDULE IS USED. COORDINATE WITH SECTIONS DEALING WITH SCHEDULES AND REPORTS.

Requirements for the Contractor's Construction Schedule are included in Section 10.2.8, "Asbestos Work Plan".

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.6 Project Coordination (cont.)

2. Pre-Construction Conference

An initial progress meeting, recognized as "Pre-Construction Conference" will be convened by the FERMCO Project Manager prior to start of any work. Meet at project site, or as otherwise directed with General Superintendent, FERMCO Project Manager, Project Administrator, and other entities concerned with the asbestos abatement work.

72 hours advance notice will be provided to all participants prior to convening Pre-Construction Conference.

This is an organizational meeting, in order to review responsibilities and personnel assignments and to locate the containment and decontamination areas and temporary facilities including power, light, water, etc.

3. Progress Meetings

NOTE: THE FOLLOWING PLACES CONTROL OF PROGRESS MEETINGS WITH FERMCO'S REPRESENTATIVE.

In addition to specific coordination and pre-installation meetings for each element of work, and other regular project meetings held for other purposes, the FERMCO Project Manager will hold general progress meetings as required. These meeting will be scheduled, where possible, at time of preparation of payment request. Require each entity then involved in planning, coordination or performance of work to be properly represented at each meeting.

4. Daily Log

Maintain within the Asbestos Abatement Project Site, a daily log documenting the dates and time of but not limited to, the following items:

Meetings; purpose, attendees, brief discussion

Visitations by personnel authorized and unauthorized, entering and leaving the work area, by name, date and time.

Special or unusual events, i.e. barrier breeching, equipment failures, accidents

Air monitoring tests and test results

Documentation of Contractor's completion of the following:

Inspection of work area preparation prior to start of removal and daily thereafter.

Removal of any sheet plastic barriers

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.6 Project Coordination (cont.)

4. Daily Log (cont.)

Contractor's inspections prior to spray back, lock back, encapsulation, enclosure or any other operation that will conceal the condition of ACM or the substrate from which such materials have been removed.

Removal of waste materials from work area

Decontamination of equipment (list items)

Contractors final inspection/final air test analysis.

Provide two (2) copies of this log to Project Manager on a daily basis.

Submit copies of this log at final closeout of project as a project closeout submittal.

5. Special Reports

NOTE: ALWAYS INCLUDE FOLLOWING AS A MINIMUM REQUIREMENT.

a. General

Except as otherwise indicated, submit special reports directly to FERMCO within one day of an occurrence requiring a special report, with a copy to the FERMCO Project Manager and others affected by occurrence.

b. Reporting Unusual Events

When an event of unusual and significant nature occurs at site (examples: failure of pressure differential system, rupture of temporary enclosures), prepare and submit a special report listing chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise FERMCO in advance at earliest possible date.

NOTE: ABOVE AND BELOW ARE TYPICAL EXAMPLES. USUALLY RETAIN ABOVE FOR PUBLIC RELATIONS PURPOSES; OTHERWISE, SUCH EVENTS MAY GET LOST IN REGULAR DAILY REPORTS.

c. Reporting Accidents

Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.6 Project Coordination (cont.)

5. Special Reports (cont.)

d. Report Discovered Conditions

When an unusual condition of the building is discovered during the work (e.g., leaks, termites, corrosion) prepare and submit a special report indicating condition discovered.

6. Contingency Plan

Prepare a contingency plan for emergencies including fire, accident, power failure, pressure differential system failure, supplied air system failure, or any other event that may require modification or abridgement of decontamination or work area isolation procedures. Include in plan specific procedures for decontamination or work area isolation. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency. Contractor shall use FERMCO EMERGENCY SERVICES.

Post in clean room of Personnel Decontamination Unit telephone numbers and locations of emergency services including, but not limited to, fire, ambulance, doctor, hospital, police, power company, telephone company.

7. Notifications

a. Environmental Protection Agency

NOTE: NOTIFICATION TO THE EPA IS MANDATED BY THE NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS) ASBESTOS REGULATIONS (40 CFR 61, SUBPART M) FOR ANY PROJECT WHICH INVOLVES THE REMOVAL OF ASBESTOS-CONTAINING MATERIALS.

FERMCO Environmental Permitting Department is responsible for providing proper NESHAPS notification to the Southwest Ohio Air Pollution Control Agency. A copy of this notification will be provided to the Contractor.

b. Ohio Department of Health

The Contractor will be responsible for providing proper notification to the Ohio Department of Health, per the ODOH Asbestos Hazard Abatement Rules, Chapter 3701-34, Ohio Administrative Code. A copy of this notification shall be provided to the FERMCO Project Manager.

c. Other Entities

Notify other entities at the job site of the nature of the asbestos abatement activities, location of ACM, requirements relative to asbestos set forth in these specifications and applicable regulations.

10.0 **GENERAL SPECIFICATIONS** (cont.)

7. Notifications (cont.)

d. Emergency

Notify emergency service agencies including fire, ambulance, police or other agency that may service the abatement work site in case of an emergency. Notification is to include methods of entering work area, emergency entry and exit locations, modifications to fire notification or fire fighting equipment, and other information needed by agencies providing emergency services.

Any individual at the job site may notify emergency service agencies if necessary without effect on this Contract or the Contract Sum.

10.7 Specific FERMCO Concerns

NOTE: THE FOLLOWING SECTIONS ARE OF SPECIFIC CONCERN TO FERMCO, AND AS SUCH, THIS INFORMATION SHOULD BE PRESENTED IN PRE-BID DOCUMENTS TO THE PROPOSED BIDDERS.

1. FEMP Safety and Health Policy Statement

The following statement emphasizes the importance of safety to FERMCO. The Contractor shall communicate this Policy to all its employees, and shall ensure that safety is of paramount importance throughout the duration of the Project.

"No aspect of the FEMP mission shall be considered so important or urgent that employees endanger themselves or others or jeopardize the environment in the performance of their duties. All tasks undertaken at the FEMP shall incorporate methods which minimize the potential for accidents, exposure to hazardous materials, or unplanned releases to the environment. To achieve these objectives, all employees shall utilize proper procedures, methods, and protective equipment in the performance of their duties. Management shall ensure that proper procedures, training, and equipment are provided and shall regularly inspect work areas to assure compliance and identify and correct deficient work practices, unsafe conditions, or defective equipment. The safety and health of every individual and the protection of the environment are the cornerstones on which the environmental restoration mission of the FEMP is based."

2. Training

Before the employees of the Contractor can perform any work at the FEMP, they must have proof of receiving the 29 CFR 1910.120 (OSHA) training. This consists of 40 hours of both classwork and some hands-on experience.

10.0 **GENERAL SPECIFICATIONS** (cont.)

10.7 Specific FERMCO Concerns (cont.)

2. Training (cont.)

In addition to the above, the following training is provided by FERMCO, and must also be received before the employees can perform any work at the FEMP:

Portable Fire Extinguisher
You and OSHA
Radiation Safety Training
Radiation Personnel Monitoring
Radiation Worker Hands-on Training
Nuclear Criticality Safety
Energy Control - Lock and Tag
Energy Control Awareness
Respirator Training and Fit Testing

3. Checklists

The Contractor is advised that before, during, and after the Project, the following checklists will be used by FERMCO personnel (See Appendix A for Checklists and Instructions):

Pre-Abatement: All applicable sections of this checklist must be approved by the indicated personnel before the Project can begin.

Daily Inspection: This checklist is completed daily by the Industrial Hygiene Technician. Any deficiencies should be immediately corrected; if the deficiencies are serious, and are not corrected promptly, the Project may be shut down in accordance with Section 10.4.5.

Final Inspection: A satisfactory final inspection, per this checklist, is needed to comply with Section 12.4, "Final Acceptance".

4. Waste Minimization

If the asbestos generated waste is considered to be radioactively contaminated, it is vital that the volume of this waste be reduced to the most practicable extent. This is due to the large costs involved with disposal of radioactive waste.

Therefore, the Contractor shall make all reasonable efforts to minimize the volume of waste, in accordance with Section 11.20, "Disposal of Asbestos-Containing Waste Material".

NOTE: THIS SECTION DESCRIBES THE SPECIFIC PROCEDURES THAT ARE NECESSARY TO ABATE ASBESTOS-CONTAINING MATERIALS AT THE FEMP.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT

11.1 Cutting and Patching

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 1 Specification Sections, apply to work of this section.

2. Tools

Tools shall be equipped with HEPA vacuum dust collection attachments.

PART 2 - PRODUCTS

3. Products

Provide local exhaust ventilation systems that comply with ANSI 29.2-1971.

PART 3 - EXECUTION

4. Preparation

Before beginning work of this section, comply with:

Section 11.6 - Regulated Areas
Section 11.10 - Worker Protection - Repair
Section 11.11 - Respiratory Protection

5. General

Perform cutting, drilling, abrading, or otherwise penetrating any asbestos-containing material in a manner that will minimize the dispersal of asbestos fibers into the air.

6. Filtered Exhaust

Provide adequate local exhaust to capture fibers produced by cutting, drilling, or abrading by means of an approved High Efficiency Particulate Air (HEPA) filter vacuum. Use specialized equipment such as drills or saws having integral ventilation hoods which are connected to a HEPA vacuum with a flexible hose. Handle and dispose of HEPA filters as contaminated material. See Section 11.20.

7. Procedure

Thoroughly saturate absorbent surfaces of asbestos-containing material to be penetrated with a penetrating type encapsulant. Allow encapsulant to penetrate to substrate before working on materials.

Seal edges of asbestos-containing material exposed by cutting, drilling, or abrading, etc. with two (2) coats of an approved penetrating encapsulant applied in accordance with manufacturers' printed instruction for use of the encapsulant as an asbestos coating.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.2 Air Monitoring

NOTE: THIS SECTION IS BASED ON THE PRESUMPTION THAT FERMCO WILL HAVE ENGAGED THE SERVICES OF A COMPETENT PROJECT ADMINISTRATOR AND AIR MONITORING TECHNICIAN WHO WILL BE AT THE JOB SITE. THIS MAY BE ONE PERSON OR SEVERAL DEPENDING ON PROJECT ORGANIZATION AND COMPLEXITY.

NOTE: THE PURPOSE OF THIS SECTION IS TO EXPLAIN TO THE CONTRACTOR HOW AIR MONITORING IS TO BE DONE BY FERMCO RATHER THAN TO SPECIFY METHODS TO BE USED BY THE AIR MONITORING FIRM. THIS ENTIRE SECTION SHOULD BE EDITED WITH THE ASSISTANCE OF THE ENVIRONMENTAL CONSULTING FIRM THAT IS TO BE PERFORMING AIR SAMPLING FOR FERMCO.

NOTE: IT MAY BE POSSIBLE TO REDUCE THE DETAIL IN THIS SECTION AND STILL ADEQUATELY ADVISE THE CONTRACTOR.

NOTE: THIS SECTION SETS ACTION LEVELS THAT MAY REQUIRE THAT THE CONTRACTOR STOP WORK OR EXTEND WORK TO AREAS OUTSIDE THE WORK AREA UNDER SPECIFIC CIRCUMSTANCES. THESE ACTION LEVELS ARE GENERALLY THE LEVELS FOUND IN WELL RUN ABATEMENT PROJECTS. EXCEEDING SUCH A LEVEL IS AN EARLY WARNING THAT SOMETHING IS GOING WRONG AND NEEDS TO BE CORRECTED.

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 1 Specification Sections, apply to work of this section.

Air Monitoring: during work area clearance is described in Section 11.21, Work Area Clearance.

2. Description of the Work

This section describes work being performed by FERMCO. This work is not in the Contract Sum.

This section describes air monitoring carried out by FERMCO to verify that the building beyond the work area and the outside environment remains uncontaminated. This section also sets forth airborne fiber levels both inside and outside the work area as action levels, and describes the action required by the Contractor if an action level is met or exceeded.

Air monitoring required by OSHA is work of the Contractor and is not covered in this section.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.2 Air Monitoring (cont.)

3. Work Area Isolation

The purpose of FERMCO's air monitoring is to detect faults in the work area isolation such as:

Contamination of the building outside of the work area with airborne asbestos fibers,

Failure of filtration or rupture in the differential pressure system, and

Contamination of air outside the building envelope with airborne asbestos fibers.

Should any of the above occur, immediately cease asbestos abatement activities until the fault is corrected. Do not recommence work until authorized by the FERMCO Project Manager.

4. Work Area Airborne Fiber Count

FERMCO will monitor airborne fiber counts in the Work Area. The purpose of this air monitoring will be to detect airborne asbestos concentrations which may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.

5. Work area clearance

To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to an acceptable level, FERMCO will sample and analyze air per Section 11.21, Work Area Clearance.

6. Timing

FERMCO will be conducting air monitoring throughout the course of the project.

7. Stop Action Levels

NOTE: CHOOSE ONE OF THE TWO ARTICLES ON "INSIDE WORK AREA" BELOW AND DELETE THE OTHER. THE FIRST IS BASED ON A SINGLE STOP ACTION LEVEL. THE SECOND IS BASED ON THE RESPIRATORY PROTECTION BEING PROVIDED. BACKGROUND LEVELS SHOULD BE CONSIDERED IN SETTING STOP ACTION LEVELS. IN SOME INDUSTRIAL SETTINGS THE FOLLOWING COULD BE REQUIRING A CLEANER ENVIRONMENT THAN IS GENERALLY AVAILABLE OUTSIDE THE WORK AREA.

NOTE: BELOW IS AN EXAMPLE. EDIT TO SUIT SPECIFIC PROJECT REQUIREMENTS. A SIMPLE STOP ACTION LEVEL OF 0.5 F/CC IS NOT REQUIRED BY ANY STANDARD OR CODE, BUT IS PRACTICAL TO MAINTAIN DURING THE COURSE OF A NORMAL REMOVAL, OR ENCAPSULATION, OR ENCLOSURE PROJECT. IF THIS LEVEL IS EXCEEDED IT MAY INDICATE THAT SOMETHING IS GOING WRONG.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

7. Stop Action Levels (cont.)

a. Inside Work Area

Maintain an average airborne count in the Work Area of less than 0.5 fibers per cubic centimeter. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8 hour period exceeds 0.5 fibers per cubic centimeter, stop all work, leave Pressure Differential System in operation and notify FERMCO Project Manager. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by FERMCO Project Manager.

If airborne fiber counts exceed 2.0 fibers per cubic centimeter for any period of time, cease all work except corrective action until fiber counts fall below 0.5 fibers per cubic centimeter and notify FERMCO Project Manager. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by FERMCO Project Manager.

NOTE: IF THE RESPIRATORY PROTECTION IS BASED ON A PARTICULAR TYPE OF RESPIRATOR RATHER THAN A STIPULATED PERMISSIBLE EXPOSURE LIMIT (PEL) THE STOP ACTION LEVELS BELOW SHOULD BE RELATED TO THE RESPIRATORY PROTECTION. THE STOP ACTION LEVELS GIVEN BELOW ARE BASED ON A PEL OF 0.1 F/CC.

b. Inside Work Area

Maintain an average airborne count in the work area of less than the Stop Action Level given below for the type of respiratory protection in use. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8 hour period exceeds the Stop Action Level, stop all work except corrective action, leave pressure differential and air circulation system in operation and notify FERMCO Project Manager. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by the FERMCO Project Manager.

STOP ACTION LEVEL (f/cc)	IMMEDIATE STOP LEVEL (f/cc)	MINIMUM RESPIRATOR REQUIRED	MINIMUM PROTECTION FACTOR
0.1	1.0	Half face	10
0.5	5.0	PAPR	50
1.0	10.0	Type C	100

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

7. Stop Action Levels (cont.)

If airborne fiber counts exceed Immediate Stop Level given above for type of respiratory protection in use for any period of time cease all work except corrective action. Notify FERMCO Project Manager. Do not recommence work until fiber counts fall below Stop Action Level given above for the type of respiratory protection in use. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by the FERMCO Project Manager.

NOTE: EDIT THE FOLLOWING FOR PROJECT SPECIFICS. IT IS CRITICAL THAT THE ACTION LEVEL REQUIRING REMEDIAL ACTION BE AT A MINIMUM LOWER THAN THE 0.1 FIBERS PER CUBIC CENTIMETER ACTION LEVEL SET BY OSHA TO REQUIRE MEDICAL MONITORING OF EMPLOYEES.

c. Outside Work Area

If any air sample taken outside of the Work Area exceeds 0.01 fibers per cubic centimeter, immediately and automatically stop all work except corrective action. The FERMCO Project Manager will determine the source of the high reading and so notify the Contractor in writing.

If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:

Immediately erect new critical barriers as set forth in Section 11.5 Temporary Enclosures to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved space (e.g., wall, ceiling, floor).

Decontaminate the affected area in accordance with Section 11.18, Cleaning & Decontamination Procedures.

Require that respiratory protection as set forth in Section 11.11, Respiratory Protection, be worn in affected area until area is cleared for re-occupancy in accordance with Section 11.21, Work Area Clearance.

Leave Critical Barriers in place until completion of work and insure that the operation of the pressure differential system in the Work Area results in a flow of air from the balance of the building into the affected area.

If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a decontamination facility consisting of a Shower Room and Changing Room as set forth in Section 11.12, Decontamination Units, at entry point to affected area.

After Certification of Visual Inspection in the Work Area, remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in Section 11.21, Work Area Clearance.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

7. Stop Action Levels (cont.)

If the high reading was the result of other causes, initiate corrective action as determined by the FERMCO Project Manager.

NOTE: THE FOLLOWING RESTATES IN MORE SPECIFIC FORM PROVISIONS OF THE GENERAL CONDITIONS.

d. Effect on Contract Sum

Complete corrective work with no change in the Contract Sum if high airborne fiber counts were caused by Contractor's activities. The Contract Sum and schedule will be adjusted for additional work caused by high airborne fiber counts beyond the Contractor's control.

NOTE: THE FOLLOWING ESTABLISHES THE GROUND RULES WHICH WILL BE USED TO DETERMINE WHICH ANALYTICAL METHODS WILL BE USED AND WHAT DEFINITION OF "FIBER" WILL BE USED IN ENFORCING THE SPECIFICATION. THE FOLLOWING MAKES THE OPTICAL MICROSCOPE, WHICH MAY BE AT THE JOB SITE, THE FIRST METHOD TO BE USED TO DETERMINE AIRBORNE FIBER COUNTS. IF THERE IS A CONSISTENT PROBLEM WITH HIGH FIBER COUNTS OR IF EXTREMELY SMALL FIBERS ARE ANTICIPATED THEN ELECTRON MICROSCOPY (PREFERABLY TEM) IS USED TO DETERMINE AIRBORNE FIBER COUNTS. THE FOLLOWING SHOULD BE REVIEWED WITH THE CONSULTANT PROVIDING ON-SITE AIR MONITORING FOR FERMCO AND REVISED AS APPROPRIATE.

e. Fibers Counted

NOTE: THE FOLLOWING LANGUAGE SETS OUT THE METHOD OF RESOLVING SITUATIONS WHERE THERE ARE NON-ASBESTOS FIBERS IN THE AIR CAUSING HIGH PCM FIBER COUNTS. IN SITUATIONS WHERE THIS IS EXPECTED TO BE A PROBLEM, THE BACKGROUND SAMPLING SHOULD INCLUDE ELECTRON MICROSCOPY. THE INFORMATION ON THIS ANALYSIS SHOULD BE INCLUDED IN THE CONTRACT DOCUMENTS.

The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts.

"Airborne Fibers" referred to above include all fibers regardless of composition as counted by phase contrast microscopy (PCM), unless additional analysis by transmission or scanning electron microscopy demonstrates to the satisfaction of FERMCO's Representative that non-asbestos fibers are being counted.

"Airborne Fibers" counted in samples analyzed by scanning or transmission electron microscopy shall be asbestos fibers, greater than 5 microns in length and greater that 0.25 microns in diameter. For purposes of stop action levels, subsequent to analysis by electron microscopy, the number of "Airborne Fibers" shall be determined by multiplying the number of fibers, regardless of composition, counted by PCM by a number equal to asbestos fibers counted divided by all fibers counted in the electron microscopy analysis.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

8. Analytical Methods

NOTE: THIS ARTICLE SETS OUT THE "RULES" IN TERMS OF THE ANALYSIS THAT IS GOING TO BE PERFORMED BY FERMCO. BASED ON THIS ANALYSIS, FERMCO MAY FOR CAUSE STOP WORK OR OTHERWISE DELAY THE CONTRACTOR. IT IS NECESSARY TO CLEARLY SET OUT THE RULES TO AVOID DISPUTES.

The following methods will be used by FERMCO in analyzing filters used to collect air samples. Sampling rates may be varied from printed standards to allow for high volume sampling.

NOTE: THERE ARE TWO METHODS OF ANALYZING AIR SAMPLES BY PHASE CONTRAST MICROSCOPY. THE "OSHA REFERENCE METHOD" IS REQUIRED BY THE CURRENT OSHA RESPIRATORY PROTECTION STANDARDS.

NOTE: THE "NIOSH 7400" METHOD IS USED FOR WORK AREA CLEARANCE TESTING.

NOTE: FERMCO AND THE CONTRACTOR WILL BE TAKING AIR SAMPLES DURING THE WORK FOR DIFFERENT PURPOSES, FREQUENTLY USING DIFFERENT METHODS. GENERALLY, FERMCO IS USING AIR SAMPLING AS A QUALITY ASSURANCE TOOL AND DIAGNOSTIC TO RESOLVE PROBLEMS IN A TIMELY FASHION TO PREVENT THE SPREAD OF CONTAMINATION BEYOND THE WORK AREA. THIS IS BEST ACCOMPLISHED WITH AN ANALYTICAL METHOD WHICH PERMITS ONSITE ANALYSIS WITH A RAPID TURNAROUND OF SAMPLES. THE CONTRACTOR WILL BE SAMPLING THE AIR IN WORKER BREATHING ZONES IN STRICT CONFORMANCE WITH THE SAMPLING AND ANALYTICAL METHODOLOGY REQUIRED BY OSHA. TYPICALLY, THESE SAMPLES WILL BE SECURED FOR ANALYSIS AT AN OFF-SITE LABORATORY.

NOTE: AIR MONITORING REQUIRED FOR COMPLIANCE WITH OSHA RESPIRATORY PROTECTION REGULATIONS INVOLVES SAMPLING IN THE BREATHING ZONE OF WORKERS (PERSONNEL SAMPLES). GENERALLY FERMCO WILL BE SAMPLING IN THE WORK AREA BUT NOT ON WORKERS. FREQUENTLY, THESE AREA SAMPLES WILL BE SECURED AT A HIGHER PUMPING RATE THAN OSHA ALLOWS FOR PERSONNEL SAMPLES. FOR THESE REASONS FERMCO'S AIR MONITORING CANNOT BE USED BY CONTRACTOR. THIS PREVENTS FERMCO FROM BEING INVOLVED IN CONTRACTOR'S RESPONSIBILITY FOR WORKER PROTECTION.

NOTE: THE FOLLOWING PARAGRAPH CALLS FOR ANALYSIS BY NIOSH 7400 AS THIS IS THE METHOD MOST COMMONLY USED BY COMMERCIAL LABORATORIES FOR FIELD MICROSCOPY. THIS REQUIRES THE USE OF A SLIDE PREPARATION DEVICE.

a. PCM - NIOSH 7400

Phase Contrast Microscopy (PCM) will be performed using the NIOSH 7400 method. This analysis will be carried out at the job site.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

8. Analytical Methods (cont.)

b. PCM - ORM

Phase Contrast Microscopy (PCM) will be performed using the OSHA Reference Method (ORM). This analysis will be carried out at a laboratory located off the job site.

NOTE: CHOOSE ONE OF THE FOLLOWING TEM METHODOLOGIES AND DELETE THE OTHER.

NOTE: FOLLOWING STATES THAT ANALYSIS WILL BE PERFORMED USING THE ANALYTICAL PROTOCOLS SET FORTH IN THE AHERA REGULATION. THIS IS THE TYPE OF TEM AIR SAMPLE ANALYSIS MOST COMMONLY AVAILABLE.

c. TEM

Transmission Electron Microscopy will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 Appendix A.

NOTE: FOLLOWING IS THE ANALYTICAL PROTOCOL RECOMMENDED BY THE 1985 REVISION OF EPA PUBLICATION "GUIDANCE FOR CONTROLLING ASBESTOS-CONTAINING MATERIALS IN BUILDINGS" (PURPLE BOOK).

Transmission Electron Microscopy will be performed using the Level 1 analysis per EPA Provisional Method and Update (USEPA 1977, Yamate 1984), with either polycarbonate or mixed cellulose ester filters.

9. Sample Volumes

The number and volume of air samples taken by FERMCO will be in accordance with the project schedule. Sample volumes given may vary depending upon the analytical method used.

10. Schedule of Air Samples

NOTE: AIR MONITORING DURING THE ABATEMENT WORK IS GENERALLY CONDUCTED WITH PCM TO PROVIDE A RAPID TURNAROUND TIME ON SAMPLES. THIS SECTION SETS FORTH A METHOD OF ESTABLISHING A BACKGROUND LEVEL AS AN ACTION LEVEL.

NOTE: THERE IS NO UNIVERSAL AGREEMENT ON THE NUMBER OR SIZE OF SAMPLES COLLECTED.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

10. Schedule of Air Samples (cont.)

NOTE: IDEALLY THE LOCATIONS FOR SAMPLING OR AT LEAST THE SAMPLING SCHEME SHOULD BE A PART OF THE PROJECT DESIGN. SAMPLING LOCATIONS CAN EVEN BE SHOWN ON INFORMATIONAL DRAWINGS. THE SAMPLING SCHEME SHOULD BE WELL EXPLAINED. THIS GIVES THE CONTRACTOR MORE COMPLETE INFORMATION ABOUT HOW HIS PERFORMANCE IS TO BE EVALUATED AND MAY HELP AVOID DISPUTES IF THERE IS A STOP WORK. HOWEVER, IT CAN ALSO LIMIT THE FLEXIBILITY THAT CAN BE EXERCISED IN PERFORMANCE OF THE WORK AND IN PARTICULAR THE ARRANGEMENT OF WORK AREAS. CAUTION SHOULD BE EXERCISED TO INSURE THAT THIS DOES NOT RESULT IN A LOSS OF FLEXIBILITY FOR THE CONTRACTOR AND DOES NOT LIMIT FERMCO'S RIGHT TO ENFORCE THE CONTRACT.

NOTE: HOLD TEM SAMPLES FOR LATER ANALYSIS IF PROBLEMS DEVELOP DURING THE WORK OR DECONTAMINATION OF WORK AREA.

NOTE: IF PRIOR AIR SAMPLING HAS ESTABLISHED THE BASE LINE FIBER LEVEL OUTSIDE THE WORK AREA, REVISE THE FOLLOWING TO SET FORTH THE BASE LINE RATHER THAN THE METHOD OF ARRIVING AT IT.

a. Preliminary

Before the start of work, FERMCO will secure the following Air Samples to establish a base line.

NOTE: THE FOLLOWING CASSETTE AND FILTER ARRANGEMENTS ARE THOSE LIKELY TO BE FOUND AT A JOB SITE. THE PCM FILTER IS THE SAME AS IS USED FOR OSHA SAMPLING. THE TEM FILTER ARRANGEMENT IS THE TYPICAL ONE USED FOR AHERA CLEARANCE SAMPLING.

NOTE: THE SAMPLE VOLUME GIVEN FOR PCM IS THAT NEEDED FOR A DETECTION LIMIT OF 0.01 FIBERS/CC ACCORDING TO THE NIOSH 7400 METHOD. THE TEM VOLUME IS THE LOWEST VOLUME ALLOWED BY THE AHERA CLEARANCE METHOD FOR 10 GRID OPENINGS TO GIVE AN ANALYTICAL SENSITIVITY OF 0.005 STRUCTURES/CC. TEN GRID OPENINGS ON A 200 MESH GRID, OR EQUIVALENT AREA, IS THE NUMBER GENERALLY PREFERRED BY LABORATORIES PERFORMING THIS TYPE OF ANALYSIS. ADHERENCE TO THIS VOLUME MAY GIVE RISE TO GREATER REPRODUCIBILITY OF RESULTS.

b. Sample cassettes

Samples will be collected on 25 mm. cassettes as follows:

PCM: 0.8 micrometer mixed cellulose ester.

TEM: 0.45 micrometer mixed cellulose ester or 0.40 micrometer polycarbonate, with 5.0 micron mixed cellulose ester backing filter.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

10. Schedule of Air Samples (cont.)

c. Sampling Sensitivity

Sampling sensitivity in the table below refers to:

Detection Limit for PCM analysis as set forth in the analytical method used

Analytical Sensitivity for TEM analysis as set forth in the analytical method used or the AHERA regulation

Location Sampled	Number of Samples	Analysis Method	Sampling Sensitivity Fibers/cc	Minimum Volume (Liters)	Rate LPM
Each Work Area	1	PCM	0.01	1,200	1-10
Each Work Area	1	hold for TEM	0.005	1,300	1-10
Outside Each Work Area	5	PCM	0.01	1,200	1-10
Outside Each	1	hold for TEM	0.005	1,300	1-10
Outside Building	5	PCM	0.01	1,200	1-10
Outside Building	1	hold for TEM	0.005	1,300	1-10

d. Base Line

Base line is an action level expressed in fibers per cubic centimeter which is twenty-five percent greater than the largest of the following:

Average of the PCM samples collected outside each Work Area

Average of the PCM samples collected outside the building

0.01 fibers per cubic centimeter

Samples collected for TEM analysis will be held without analysis. These samples will be analyzed under the conditions and terms set forth in "Fibers Counted" and "Effect On Contract Sum".

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

10. Schedule of Air Samples (cont.)

e. Daily

From start of work of Section 11.5, Temporary Enclosures, through the work of Section 11.17, Project Decontamination - Poly Removal, FERMCO may be taking the following samples on a daily basis.

NOTE: THE FOLLOWING USES THE SAME SAMPLING CASSETTES USED FOR COLLECTION OF PERSONNEL SAMPLES. THE RESPIRATORY PROTECTION PROGRAM FOR THE AIR MONITORING TECHNICIAN SAMPLING FOR THE FERMCO WILL REQUIRE THIS TYPE OF CASSETTE. THE FOLLOWING WILL HELP AVOID UNNECESSARY DUPLICATION IN EQUIPMENT.

NOTE: FOLLOWING IS AN EXAMPLE AND SHOULD BE EDITED TO SUIT PROJECT SPECIFICS. SAMPLING REQUIREMENTS DEPEND ON SIZE AND GEOMETRY OF WORK AREA. NUMBER AND LOCATION OF SAMPLES SHOULD BE REVIEWED WITH THE ENTITY PROVIDING AIR MONITORING. IF THIN FIBERS ARE SUSPECTED OR NON-ASBESTOS FIBER ARE SUSPECTED THE FOLLOWING MAY HAVE TO BE AUGMENTED BY TEM OR SEM ANALYSIS.

f. Filter Media

Samples will be collected on 25 mm. cassettes with the following filter media:

PCM: 0.8 micrometer mixed cellulose ester.

Location Sampled	Number of Samples	Analysis Method	Detection Limit Fibers/cc.	Minimum Volume (Liters)	Rate LPM
Each Work Area	2	PCM	0.01	1,200	1-10
			OR AS REQUIRED BY CONDITIONS		
Outside Each Work Area at Critical Barrier	1	PCM	0.01	1,200	1-10
Clean Room	1	PCM	0.01	1,200	1-10
Equip Decon	1	PCM	0.01	1,200	1-10
Outside Building	1	PCM	0.01	1,200	1-10
Output Pressure Differential Sys.	1	PCM	0.01	1,200	1-10

Additional samples may be taken at FERMCO's or FERMCO Project Managers' discretion. If airborne fiber counts exceed allowed limits, additional samples will be taken as necessary to monitor fiber levels.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

11. Laboratory Testing

NOTE: IT IS IMPORTANT THAT A SECURE CHAIN OF CUSTODY FOR AIR SAMPLES BE ESTABLISHED BY THE CONSULTANT PROVIDING AIR MONITORING FOR FERMCO. THE FINAL DISPOSITION OF SAMPLES (WHETHER THEY SHOULD BE RETAINED OR DISPOSED OF AFTER ANALYSIS AND IF RETAINED WHO KEEPS THEM) SHOULD BE RESOLVED BEFORE THE START OF WORK.

NOTE: CHOOSE THE APPROPRIATE PARAGRAPH FROM THE THREE BELOW AND DELETE THE OTHER TWO. IT IS IMPORTANT TO THE CONTRACTOR TO KNOW HOW IMMEDIATELY AIR SAMPLE RESULTS WILL BE AVAILABLE.

NOTE: THE FOLLOWING PARAGRAPH REPRESENTS THE IDEAL SITUATION FOR BOTH THE CONTRACTOR AND FERMCO. IF THERE IS A PROBLEM WITH MAINTAINING LOW FIBER COUNTS THE ABILITY TO READ AN AIR SAMPLE IMMEDIATELY WILL BE AN IMPORTANT DIAGNOSTIC TOOL.

The services of a testing laboratory may be employed by FERMCO to perform laboratory analyses of the air samples. A microscope and technician will be set up at the job site, so that verbal reports on air samples can be obtained immediately.

NOTE: THE FOLLOWING PARAGRAPH SHOULD BE USED IF THERE WILL BE NO MICROSCOPE AT THE JOB SITE.

NOTE: EDIT THE FOLLOWING TO INDICATE HOW SAMPLES WILL BE TRANSMITTED AND HANDLED.

The services of a testing laboratory may be employed by FERMCO to perform laboratory analyses of the air samples. A technician will be at the job site, and samples will be sent daily by carrier for next day delivery, so that verbal reports on air samples can be obtained within 24 hours.

NOTE: THE FOLLOWING PARAGRAPH IS A CATCH-ALL AND DOES NOT PROVIDE THE CONTRACTOR WITH DETAILED INFORMATION ON HOW FERMCO INTENDS TO ANALYZE AIR SAMPLES.

The services of a testing laboratory may be employed by FERMCO to perform laboratory analyses of the air samples. A microscope and technician will be set up at the job site, or samples will be sent overnight on a daily basis, so that verbal reports on air samples can be obtained within 24 hours. The Contractor will have access to all air monitoring tests and results.

NOTE: CHOOSE ONE OF THE TWO PARAGRAPHS BELOW AND DELETE THE OTHER.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.2 Air Monitoring (cont.)

11. Laboratory Testing (cont.)

NOTE: THE FOLLOWING PARAGRAPH ASSURES A HIGH LEVEL OF COMMUNICATION BETWEEN THE CONTRACTOR AND FERMCO'S AIR MONITORING FIRM. THIS FREE FLOW OF INFORMATION INSURES THAT THE CONTRACTOR WILL HAVE THE INFORMATION HE NEEDS TO DETERMINE THE SUCCESS OF CONTROL MEASURES BEING IMPLEMENTED. HOWEVER, THIS DOES BIND FERMCO TO PROVIDING THIS INFORMATION.

A complete record of all air monitoring and results will be furnished to the FERMCO Project Manager, FERMCO's Industrial Hygiene Representative, and the Contractor.

NOTE: THE FOLLOWING LANGUAGE PROTECTS FERMCO FROM ABROGATION OF CONTRACT IF FOR SOME REASON HE FAILS TO PROVIDE TEST DATA.

The Contractor will have access to all air monitoring tests and results.

NOTE: FOLLOWING IS AN EXAMPLE. REVISE AFTER CONSULTATION WITH THE FIRM WHO WILL BE PROVIDING AIR MONITORING. POSTING OF RESULTS IS IDEAL FROM THE BOTH FERMCO'S AND CONTRACTOR'S POINT OF VIEW. HOWEVER, THIS DOES BIND FERMCO TO PROVIDE THIS INFORMATION.

Written reports of all air monitoring tests will be posted at the job site on a daily basis.

NOTE: IT IS NOT GOOD PRACTICE TO HAVE THE CONTRACTOR PROVIDE ANY OF THE TESTING DESCRIBED IN THIS SECTION. THESE ANALYSES ARE USED TO DETERMINE PERFORMANCE. THE FOLLOWING ADDRESSES THE TOPIC OF TESTING WHICH THE CONTRACTOR MAY WISH TO PERFORM FOR HIS OWN PURPOSES. GENERALLY THIS WILL BE AIR SAMPLING PERFORMED FOR OSHA COMPLIANCE.

12. Additional Testing

NOTE: IT IS GOOD PRACTICE TO REQUIRE THE CONTRACTOR TO ENGAGE THE SERVICES OF AN INDEPENDENT LABORATORY RATHER THAN USING THE ENTITY PROVIDING SERVICES FOR FERMCO.

The Contractor may conduct his own air monitoring and laboratory testing. If he elects to do this the cost of such air monitoring and laboratory testing shall be at no additional cost to FERMCO.

13. Personal Monitoring

FERMCO will not be performing air monitoring to meet Contractor's OSHA requirements for personnel sampling or any other purpose.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.3 Temporary Facilities

PART 1 - GENERAL

1. Related Documents

   Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

2. Description of Requirements

   Provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work.

3. Submittals

   Before the start of work, submit the following to the FERMCO Project Manager for review. Begin no work until these submittals are returned with FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

   a. Scaffolding

      Submit list of rolling and fixed scaffolding intended for use on the project. Submit sufficient detail to indicate compliance with applicable worker safety regulations or other requirements.

   b. Hot water heater

      Submit manufacturers name, model number, size in gallons, heating capacity, power requirements.

   c. Decontamination Unit Sub-panel

      Submit product data.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.3 Temporary Facilities (cont.)

3. Submittals (cont.)

d. Ground Fault Circuit Interrupters (GFCI)

Submit product data.

e. Temporary Heating Units

Provide product data.

f. Temporary Cooling Units

Provide product data and installation instructions.

g. Self Contained Toilet Units

Provide product data and name of subcontractor to be used for servicing self contained toilets. Submit method to used for servicing.

h. First Aid Supplies

Provide list of contents of first aid kit. Submit in form of check list.

i. Fire Extinguishers

Provide product data. Submit schedule indicating location at job site.

PART 2 - PRODUCTS

4. Materials and Equipment

Provide either new or used materials and equipment that are undamaged and in serviceable condition. Provide only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards.

5. Scaffolding

Provide all scaffolding, ladders and/or staging, etc., as necessary to accomplish the work of this contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA provisions.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.3 Temporary Facilities (cont.)

5. Scaffolding (cont.)

Equip rungs of all metal ladders, etc. with an abrasive non-slip surface.

Provide a nonskid surface on all scaffold surfaces subject to foot traffic.

6. Water service

a. Temporary Water Service Connection

All connections to FERMCO's water system shall include backflow protection. Valves shall be temperature and pressure rated for operation at the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.

b. Water Hoses

Employ heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each work area and to each Decontamination Unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shutoff nozzles and equipment.

NOTE: DELETE FOLLOWING WHERE HOT WATER WILL BE SUPPLIED FROM EXISTING BUILDING HOT WATER SYSTEM.

c. Hot Water Heater

Provide UL rated 40-gallon electric hot water heater to supply hot water for the Decontamination Unit shower. Activate from 30 amp circuit breaker located within the Decontamination Unit subpanel. Provide with relief valve compatible with water heater operation; pipe relief valve down to drip pan on floor with type L copper. Drip pans shall consist of a 12" X 12" X 6" deep pan, made of 19 gauge galvanized steel, with handles. A 3-quart kitchen saucepan may be substituted for this purpose. Drip pan shall be securely fastened to the hot water heater with baling wire or similar material. Wiring of the hot water heater shall be in compliance with NEMA, NECA, and UL standards.

NOTE: DELETE FOLLOWING WHEN BUILDING HOT WATER SYSTEM WILL BE SHUT DOWN OR OTHERWISE UNAVAILABLE FOR USE.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.3 Temporary Facilities (cont.)

6. Water service (cont.)

d. Hot Water

Hot water may be secured from the building hot water system, provided backflow protection is installed at point of connection as described in this section under Temporary Water Service connection, and if authorized in writing by the FERMCO Project Manager.

7. Electrical Service

a. General

Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service.

b. Temporary Power

Provide service to Decontamination Unit subpanel with minimum 60 amp, 2 pole circuit breaker or fused disconnect connected to the buildings main distribution panel. Subpanel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work.

c. Voltage Differences

Provide identification warning signs at power outlets which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.

NOTE: DELETE THE NEXT PARAGRAPH IF THE CONTRACTOR IS TO HAVE OTHER OPTIONS.

d. Ground Fault Protection

Equip all circuits for any purpose entering Work Area with ground fault circuit interrupters (GFCI). Locate GFCI's exterior to Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for all circuits to be used for any purpose in work area, decontamination units, exterior, or as otherwise required by national electrical code, OSHA or other authority. Locate in panel exterior to Work Area.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.3 Temporary Facilities (cont.)

7. Electrical Service (cont.)

e. Electrical Power Cords

Use only grounded extension cords; use "hard service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.

NOTE: MODIFY THE PARAGRAPH BELOW TO COORDINATE REQUIREMENTS WITH THE METHOD OF SUPPLYING ILLUMINATION, OR TO PERMIT OR REQUIRE OTHER TYPES OF LIGHTING.

f. Lamps and Light Fixtures

Provide general service incandescent lamps or fluorescent lamps of wattage indicated or required for adequate illumination as required by the work or this section. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide vapor tight fixtures in work area and decontamination units. Provide exterior fixtures where fixtures are exposed to the weather or moisture.

NOTE: INSERT OTHER INDUSTRY-SPONSORED PRODUCT SELECTION STANDARDS AS DESIRED, WHETHER LOCAL OR NATIONAL.

8. Temporary Heat

Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the fuel being consumed. Use steam or hot water radiant heat where available, and where not available use electric resistant fin radiation supplied from a branch circuit with ground fault circuit interrupter.

NOTE: IT IS SOMETIMES NECESSARY TO COOL AND DEHUMIDIFY WORK AREAS. THIS IS PARTICULARLY TRUE WHEN A PRESSURE DIFFERENTIAL SYSTEM IS USED THAT DOES NOT EXHAUST ALL HEPA FILTERED FAN UNITS TO THE EXTERIOR. THE AMOUNT OF COOLING REQUIRED CAN BE DETERMINED USING NORMAL MECHANICAL ENGINEERING CALCULATIONS. FOLLOWING IS EXTREMELY GENERAL AND SHOULD BE REVISED TO FIT PROJECT REQUIREMENTS.

NOTE: WINDOW AIR CONDITIONING UNITS ARE SOMETIMES USED FOR THIS PURPOSE. THE SEAL BETWEEN THE INSIDE AND OUTSIDE OF THESE UNITS CAN BE PROBLEMATIC AND SHOULD BE FREQUENTLY CHECKED.

NOTE: DELETE FOLLOWING IF NO COOLING IS REQUIRED.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.3 Temporary Facilities (cont.)

9. Temporary Cooling

Provide temporary cooling units consisting of a fan coil unit inside the work area with a compressor and heat rejection coil outside.

NOTE: THE FOLLOWING DESCRIBES CHEMICAL TOILETS TO BE USED IN THE WORK AREA IF NO EXISTING FACILITIES ARE AVAILABLE. DELETE THIS PARAGRAPH WHEN EXISTING FIXTURES ARE AVAILABLE IN THE WORK AREA. IF THIS SECTION IS DELETED THEN ALSO DELETE THE PARAGRAPH IN PART 3 OF THIS SECTION THAT DESCRIBES WHERE SUCH UNITS ARE TO BE LOCATED.

10. Self-contained Toilets

Provide single-occupant self-contained toilet units of the chemical type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar non-absorbent material.

NOTE: THE NEXT PARAGRAPH COULD BE MADE MORE SPECIFIC, EVEN FOR SMALL PROJECTS.

11. First Aid

Comply with governing regulations and recognized recommendations within the construction industry.

12. Fire Extinguishers

Provide type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.

PART 3 - EXECUTION

13. Scaffolding

During the erection and/or moving of scaffolding, care must be exercised so that the polyethylene floor covering is not damaged.

Clean as necessary debris from non-slip surfaces.

At the completion of abatement work clean all construction aids within the work area, wrap in one layer of 6-mil polyethylene sheet and seal before removal from the Work Area.

14. Installation, General

Use qualified tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the Work.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.3 Temporary Facilities (cont.)

14. Installation, General (cont.)

Require that tradesmen accomplishing this work be licensed as required by local authority for the work performed.

Relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.

15. Water Service

NOTE: EDIT BELOW IF HOT WATER IS NOT AVAILABLE FROM EXISTING BUILDING SYSTEMS.

Water connection (without charge) to FERMCO's existing potable water system is limited to one 3/4" pipe-size connection, and a maximum flow of 10 gpm each to hot and cold water supply. Install using vacuum breakers or other backflow preventer as required by local authority. Hot water shall be supplied at a minimum temperature of 100 F. Supply hot and cold water to the Decontamination Unit. In addition, water shall be supplied for the following uses:

Maintain hose connections and outlet valves in leakproof condition. Where finish work below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from pans as it accumulates.

16. Electrical Service

a. General

Provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period. Install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work.

b. Lockout

Lock out all existing power to or through the work area as described below. Unless specifically noted otherwise existing power and lighting circuits to the Work Area are not to be used. All power and lighting to the Work Area and Decontamination facilities are to be provided from temporary electrical panel described below.

Lock out power to Work Area by switching off all breakers serving power or lighting circuits in work area. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of Contractor's Superintendent or FERMCO's designated Representative.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.3 Temporary Facilities (cont.)

16. Electrical Service (cont.)

Lock out power to circuits running through Work Area wherever possible by switching off all breakers serving these circuits. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Sign and date danger tag. Lock panel and supply keys to Contractor FERMCO Project Manager. If circuits cannot be shut down for any reason, label at intervals 4'-0" on center with tags reading, "DANGER live electric circuit. Electrocution hazard."

c. Temporary Electrical Panel

Provide temporary electrical panel sized and equipped to accommodate all electrical equipment and lighting required by the work. Connect temporary panel to existing building electrical system. Protect with circuit breaker or fused disconnect. Locate temporary panel as directed by FERMCO Project Manager.

d. Power Distribution System

Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead, and rise vertically where wiring will be least exposed to damage from construction operations.

e. Circuit Protection

Protect each circuit with a ground fault circuit interrupter (GFCI) of proper size located in the temporary panel. Do not use outlet type GFCI devices.

NOTE: MODIFY THE PARAGRAPH BELOW TO SUIT PROJECT REQUIREMENTS.

f. Temporary Wiring

Temporary wiring in the Work Area shall be type UF nonmetallic sheathed cable located overhead and exposed for surveillance. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors. Provide liquid tight enclosures or boxes for wiring devices.

g. Number of Branch Circuits

Provide sufficient branch circuits as required by the work. All branch circuits are to originate at temporary electrical panel. At minimum provide the following:

One Circuit for each HEPA filtered fan unit

For power tools and task lighting, provide one temporary 4-gang outlet in the following locations. Provide a separate 110-120 Volt, 20-amp circuit for each 4-gang outlet (4 outlets per circuit)

One outlet in the work area for each 2500 square feet of work area

One outlet at each decontamination unit, located in equipment room

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.3 Temporary Facilities (cont.)

16. Electrical Service (cont.)

110-120 volt, 20-amp branch circuits with 4-gang outlet for FERMCO's exclusive use while conducting air sampling during the work as follows:

One in each work area

One at clean side of each Decontamination Unit.

One at each exhaust location for HEPA filtered fan units

110-120 volt, 20-amp branch circuits with 4-gang outlet for FERMCO's exclusive use for conducting final air sampling as set forth in Section 11.21 Work Area Clearance as follows:

Five inside work area

Two outside work area in location designated by FERMCO Project Manager

17. Temporary Lighting

a. Lockout

Lock out all existing power to lighting circuits in Work Area as described in section 11.5, Temporary Enclosures. Unless specifically noted otherwise, existing lighting circuits to the Work Area are not to be used. All lighting to the Work Area and Decontamination facilities is to be provided from temporary electrical panel described above.

NOTE: REQUIREMENTS IN THE NEXT PARAGRAPH COULD BE EXPRESSED AS WATTS PER SQUARE FOOT OR FOOT-CANDLES AT TABLE HEIGHT AND COULD BE SPECIFIED AS EITHER MINIMUM OR MAXIMUM REQUIREMENTS. REDUCE WATTAGE REQUIREMENTS TO CONSERVE ENERGY.

Provide the following, or equivalent, where natural lighting or existing building lighting does not meet the required light level:

One 200-watt incandescent lamp per 1000 square feet of floor area, uniformly distributed, for general construction lighting, or equivalent illumination of a similar nature. In corridors and similar traffic areas provide one 100-watt incandescent lamp every 50 feet. In stair-ways and at ladder runs, provide one lamp minimum per story, located to illuminate each landing and flight. Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting.

Provide lighting in areas where work is being preformed as required to supply a 100 foot-candle minimum light level.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.3 Temporary Facilities (cont.)

17. Temporary Lighting (cont.)

Provide lighting in any area being subjected to a visual inspection as required to supply a 100 foot candle minimum light level.

Provide lighting in the Decontamination Unit as required to supply a 50 foot-candle minimum light level.

b. Number of Lighting Circuits

Provide sufficient lighting circuits as required by the work. All lighting circuits are to originate at temporary electrical panel.

c. Circuit Protection

Protect each circuit with a ground fault circuit interrupter (GFCI) of proper size located in the temporary panel.

18. Temporary Heat

Provide temporary heat where indicated or needed for performance of the Work.

NOTE: EXCEPTIONS TO THE MINIMUM TEMPERATURE SPECIFIED IN THE FOLLOWING PARAGRAPHS SHOULD BE SPECIFIED IN INDIVIDUAL WORK SECTIONS.

a. Finished Work Area

Maintain a minimum temperature of 70 degrees F where finished work has been installed.

NOTE: FOLLOWING INSURES A COMFORTABLE ENVIRONMENT FOR WORKER DECONTAMINATION.

b. Shower

Maintain a minimum temperature of 75 degrees F in the shower of the decontamination unit.

NOTE: FOLLOWING PROVIDES A COMFORTABLE WORK ENVIRONMENT FOR WORKERS LIGHTLY CLAD IN ONLY PAPER SUITS.

c. General Work Area

Maintain a minimum temperature of 70 degrees F in the Work Area at all times that work is going on. At all other times and at completion of removal work, but before start of reconstruction work, maintain a minimum temperature of 50 degrees F.

NOTE: DELETE THE ABOVE AND USE THE FOLLOWING IF WORKERS ARE GOING TO BE PROVIDED WITH WARM CLOTHING WHICH WILL BE KEPT IN THE WORK AREA AND DISCARDED AT THE END OF THE WORK.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.3 Temporary Facilities (cont.)

18. Temporary Heat (cont.)

d. Removal Area

Maintain a minimum temperature of 50 degrees F in the Work Area at all times during and after removal work.

19. Temporary Cooling

NOTE: FOLLOWING IS AN EXAMPLE ONLY. THE AMOUNT OF COOLING REQUIRED IS DEPENDENT UPON MANY THINGS (OUTSIDE TEMPERATURE, HUMIDITY, EXPOSURE TO SUN, AMOUNT OF VENTILATION). AS A GENERAL RULE IT IS PREFERABLE TO SUPPLY TOO LITTLE RATHER THAN TOO MUCH COOLING AS THIS WILL CONTROL HUMIDITY BETTER. IF THE WORK AREA IS OVER-COOLED A FOG CAN DEVELOP IN THE SPACE. DETERMINE THE AMOUNT OF COOLING REQUIRED AND REVISE AS APPROPRIATE.

Provide units sufficient to supply 20,000 BTU's of cooling per 8,000 cubic feet of work area.

20. Project Administrator's Field Office

Provide air conditioned, heated office space near the Work Area for professional person, suitably finished, furnished, equipped, locked, heated, naturally ventilated, lighted and wired with electrical power, not less than 250 sq. ft. floor area. Equip office with one telephone line and one telephone, and not less than two duplex convenience power outlets. In addition to one desk, four drawer file cabinet and three chairs, furnish office with one 36" X 96" plan table, and one 24" X 48" work table near electrical power outlet. Provide portable office or use a suitable room as designated by FERMCO and relocate or add equipment as required to meet the above requirements.

21. Sanitary Facilities

a. Toilets

Use of FERMCO's existing toilet facilities, as indicated, will be permitted, so long as these facilities are properly cleaned and maintained in a condition acceptable to FERMCO. At substantial completion, restore these facilities to the condition prevalent at the time of initial use. Written permission from the owner must be obtained, and all provisions of these specifications regarding leaving the work area are met.

NOTE: DELETE THE FOLLOWING PARAGRAPH IF EXISTING TOILET FACILITIES ARE AVAILABLE WITHIN THE WORK AREA. THIS PARAGRAPH DESCRIBES THE LOCATION AND REQUIRED NUMBER OF THE CHEMICAL TOILET UNITS DESCRIBED IN PART 2 OF THIS SECTION. THIS HELPS TO AVOID EXCESSIVE TRAVEL IN AND OUT OF THE WORK AREA.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.3 Temporary Facilities (cont.)

21. Sanitary Facilities (cont.)

b. Toilets

Provide one self-contained chemical toilet unit in the Work Area for each 30 workers. Facilities shall be maintained throughout the Work. At the end of the job, facilities shall be decontaminated in accordance with these specifications.

22. Fire Extinguishers

NOTE: THE NEXT PARAGRAPH SPECIFIES CURRENTLY ACCEPTED REQUIREMENTS. THEY COULD BE MODIFIED AS NECESSARY TO SUIT LOCAL CONDITIONS.

Comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers". Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each Work Area in Equipment Room and One outside Work Area in Clean Room.

11.4 Pressure Differential And Air Flow

PART 1 - GENERAL

NOTE: THE PRESSURE DIFFERENTIAL ARRANGEMENT CALLED "NEGATIVE AIR SYSTEM" BY ANTHONY NATALE, A CONTRACTOR IN NEW JERSEY, WAS GRANTED A PATENT (NUMBER 4,604,111) THAT APPLIED TO THAT SPECIFIC SCHEME OF VENTILATING AN ASBESTOS WORK AREA AND ISOLATING IT WITH AN AIR PRESSURE DIFFERENTIAL. THIS METHOD OF WORK AREA VENTILATION AND ISOLATION WAS AND CONTINUES TO BE IN WIDESPREAD USE. BASED ON THIS PATENT, LICENSES TO USE THE SYSTEM WERE SOLD AND PROSECUTION OF UNLICENSED USERS WAS PURSUED. THE U.S. PATENT OFFICE RE-EXAMINED THE PATENT AT THE REQUEST OF A COMPETING MANUFACTURER OF HEPA FILTERED FAN UNITS, GLOBAL CONSUMER PRODUCTS. BASED ON THIS RE-EXAMINATION, THE PATENT OFFICE REJECTED THE CLAIMS SUPPORTING THE PATENT. IT IS UNDERSTOOD THAT THIS ACTION BY THE PATENT OFFICE IS UNDER APPEAL.

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

NOTE: DELETE THE FOLLOWING IF THERE ARE NO REQUIREMENTS SET FORTH IN SECTION 11.3

Heating and cooling requirements are set forth in Section 11.3 Temporary Facilities - Asbestos Abatement

NOTE: BELOW MAY BE MORE APPROPRIATE IN SECTION 11.2, AIR MONITORING. THE EQUIPMENT NECESSARY FOR THIS IS GENERALLY AVAILABLE FROM ASBESTOS ABATEMENT EQUIPMENT SUPPLIERS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

2. Monitoring

Continuously monitor and record the pressure differential between the Work Area and the building outside of the Work Area with a monitoring device incorporating a continuous recorder (e.g., strip chart).

3. Submittals

a. Before Start of Work

Submit design of pressure differential system to the FERMCO Project Manager for review. Do not begin work until submittal is returned with the FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use. Include in the submittal at a minimum:

Number of HEPA filtered fan units required and the calculations necessary to determine the number of machines.

Description of projected air flow within Work Area and methods required to provide adequate air flow in all portions of the work area.

Anticipated pressure differential across Work Area enclosures.

Description of methods of testing for correct air flow and pressure differentials.

Manufacturer's product data on the HEPA filtered fan units to be used.

Location of the machines in the Work Area.

Method of supplying adequate power to the machines and designation of building electrical panel(s) which will be supplying the power.

Description of work practices to insure that airborne fibers travel away from workers.

Manufacturer's product data on equipment used to monitor pressure differential between inside and outside of Work Area.

NOTE: INCLUDE THE NEXT THREE PARAGRAPHS IF AN AUXILIARY POWER SUPPLY FOR THE HEPA FILTERED FAN UNITS IS TO BE PROVIDED.

Manufacturer's product data on auxiliary generator to be used.

Manufacturer's product data on auxiliary power switch to be used.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

3. Submittals (cont.)

Schematic diagram of power and auxiliary power supply to HEPA filtered fan units.

b. On a weekly basis

Submit printout from pressure differential monitoring equipment. Mark printout with date and start of time for each day. Use printout paper that indicates elapsed time in intervals no greater than hours. Indicate on each days record times of starting and stopping abatement work, type of work in progress, breaks for lunch or other purposes, periods of stop work, and filter changes. Cut printout into segments by day, attach to 8-1/2" by 11" paper. Label with project name, contractors name and date.

4. Quality assurance

NOTE: ADD ADDITIONAL MONITORING POSITIONS SUCH AS AT CRITICAL OCCUPIED ADJACENT AREAS.

Monitor pressure differential at Personnel and Equipment Decontamination Units with a differential pressure meter equipped with a continuous recorder. Meter shall be equipped with a warning buzzer which will sound if pressure differential drops below 0.01" of water.

PART 2 - PRODUCTS

5. HEPA Filtered Fan Units

Supply the required number of HEPA filtered fan units to the site in accordance with these specifications. Use units that meet the following requirements.

a. Cabinet

Constructed of durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches to fit through standard-size doorways. Provide units whose cabinets are:

Factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance

Arranged to provide access to and replacement of all air filters from intake end

Mounted on casters or wheels

b. Fans

Rate capacity of fan according to usable air-moving capacity under actual operating conditions.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

5. HEPA Filtered Fan Units (cont.)

c. HEPA Filters

Provide units whose final filter is the HEPA type with the filter media (folded into closely pleated panels) completely sealed on all edges with a structurally rigid frame.

Provide units with a continuous rubber gasket located between the filter and the filter housing to form a tight seal.

Provide HEPA filters that are individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 um dioctylphthalate (DOP) particles when tested in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A.

Provide filters that bear a UL586 label to indicate ability to perform under specified conditions.

Provide filters that are marked with: the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.

NOTE: ULTRA HIGH EFFICIENCY AIR (ULPA) FILTERS WITH 99.99% EFFICIENCY ARE AVAILABLE. DEPENDING UPON AVAILABILITY, REVISE THE ABOVE TO THIS MORE STRINGENT STANDARD FOR CRITICAL AREAS.

d. Prefilters

Prefilters which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of prefiltration are required. Provide units with the following prefilters:

First-stage prefilter: low-efficiency type (e.g., for particles 100 um and larger)

Second-stage (or intermediate) filter: medium efficiency (e.g., effective for particles down to 5 um)

Provide units with prefilters and intermediate filters installed either on or in the intake grid of the unit and held in place with special housings or clamps.

e. Instrumentation

Provide units equipped with:

Magnehelic gauge or manometer to measure the pressure drop across filters and indicate when filters have become loaded and need to be changed

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

5. HEPA Filtered Fan Units (cont.)

A table indicating the usable air-handling capacity for various static pressure readings on the Magnehelic gauge affixed near the gauge for reference, or the Magnehelic reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) air delivery at that point

Elapsed time meter to show the total accumulated hours of operation

f. Safety and Warning Devices

Provide units with the following safety and warning devices:

Electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter

Automatic shutdown system to stop fan in the event of a rupture in the HEPA filter or blocked air discharge

Warning lights to indicate normal operation (green), too high a pressure drop across the filters (i.e., filter overloading) (yellow), and too low a pressure drop (i.e., rupture in HEPA filter or obstructed discharge) (red)

Audible alarm if unit shuts down due to operation of safety systems

g. Electrical components

Provide units with electrical components approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit is to be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet are to be grounded.

h. Manufacturers

Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

NOTE: RETAIN ABOVE OR BELOW, FOR NONPROPRIETARY OR SEMIPROPRIETARY SPECIFICATION. ABOVE IS THE CURRENT REPLACEMENT FOR THE FORMER "OR EQUAL" CLAUSE.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

5. HEPA Filtered Fan Units (cont.)

i. Manufacturer

Subject to compliance with requirements, provide products of the following:

NOTE: THE FOLLOWING IS A LIST OF FIRMS KNOWN TO MANUFACTURE HEPA FILTERED FAN UNITS. NO MANUFACTURERS HAVE BEEN KNOWINGLY EXCLUDED AND NO ATTEMPT HAS BEEN MADE TO EVALUATE THESE PRODUCTS. ADDITIONAL SUPPLIERS MAY EXIST. PRODUCT LITERATURE SHOULD BE USED TO EVALUATE THESE MACHINES TO VERIFY THAT LISTED PRODUCTS COMPLY WITH THE SPECIFICATIONS. VERIFY THAT PRODUCTS INDICATED ARE STILL BEING MANUFACTURED. EDIT OR ADD TO THE LIST AS APPROPRIATE TO THE PROJECT REQUIREMENTS.

Aerospace America, Inc. 900 Truman Parkway P.O. Box 189 Bay City, Michigan 48707	"Aero-Clean 2000"
Asbestos Control Technology, Inc. P.O. Box 183 Maple Shade, NJ 08052	"Micro-Trap"
Control Resource Systems, Inc. 670 Mariner Drive Michigan City, Indiana 46360	"Hog" 2000
Global Consumer Services, Inc. 1721 N. Highland Avenue Los Angeles, CA 90028	"Red Baron"
Tri-Dim Filter Corporation 1431 West Lake Street Chicago, Illinois 60607	"ACCU-2M"

NOTE: INCLUDE THE FOLLOWING TWO PARAGRAPHS IF AN AUXILIARY POWER SUPPLY FOR THE HEPA FILTERED FAN UNITS IS TO BE PROVIDED.

NOTE: DELETE IF NO AUXILIARY GENERATOR IS TO BE USED.

6. Auxiliary Generator

Provide a gasoline-powered, self-starting generator with a capacity adequate to power a minimum of 50% of the HEPA filtered fan units in operation at any time during the work.

7. Auxiliary Power Switch

Provide a switching relay which will automatically start auxiliary generator and switch over power supplied to HEPA filtered fan units to auxiliary generator.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

PART 3 - EXECUTION

NOTE: THERE IS NO SUCH THING IN THE REAL WORLD AS A PHYSICAL BARRIER THAT WILL PREVENT THE SPREAD OF AIRBORNE CONTAMINATION TO SPACES ADJACENT TO A WORK AREA. IT DOES NOT MATTER HOW MUCH SHEET PLASTIC, PLYWOOD AND CAULKING COMPOUND IS USED. NO BARRIER WILL BE COMPLETELY EFFECTIVE IN CONTAINING AIRBORNE ASBESTOS FIBERS.

NOTE: AUGMENTING THE PHYSICAL BARRIER BY MAINTAINING THE WORK AREA AT AN AIR PRESSURE LOWER THAN SURROUNDING SPACES IS THE ONLY EFFECTIVE METHOD OF INSURING ISOLATION. ACCOMPLISHING THIS REQUIRES MORE THAN MERELY INSTALLING SOME PORTABLE HEPA FILTERED FAN UNITS.

NOTE: THE FIRST STEP IN A PRESSURE DIFFERENTIAL ISOLATION SYSTEM IS AN OVERALL REDUCTION OF PRESSURE IN THE WORK AREA. THIS IS ACCOMPLISHED BY EXHAUSTING AIR FROM THE SPACE THROUGH A HEPA FILTER TO THE BUILDING EXTERIOR. IN A ONE-STORY BUILDING, WITH NO DUCTWORK THIS ALONE MAY BE ADEQUATE. IN A MULTI-STORY BUILDING OR WHERE THERE ARE COMPLICATING FACTORS SUCH AS DUCTWORK SYSTEMS, THE INDIVIDUAL WEAK POINTS IN THE ISOLATION MUST BE IDENTIFIED AND SPECIFIC SOLUTIONS DESIGNED. IN MANY INSTANCES THIS WILL BECOME AN EXERCISE IN MECHANICAL ENGINEERING. SEVERAL REFERENCE SOURCES SUCH AS THE AMERICAN SOCIETY OF HEATING REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE) HANDBOOK OF FUNDAMENTALS ARE AVAILABLE FOR METHODS OF ANALYSIS.

NOTE: THE FOLLOWING PARAGRAPHS OFFER EXAMPLES OF LANGUAGE APPLICABLE TO A NUMBER OF SITUATIONS BUT ARE NOT A COMPLETE TREATMENT OF WHAT CAN BE A COMPLEX ENGINEERING PROBLEM.

NOTE: THE PRESSURE DIFFERENTIAL AND AIR CIRCULATION RATE ARE RELATED. GENERALLY THE HIGHER THE AIR FLOW THROUGH A FAN THE LOWER THE PRESSURE DIFFERENTIAL IT SUPPORTS. MINIMUM REQUIREMENTS FOR BOTH ARE SET IN THE FOLLOWING ARTICLES.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

8. Pressure Differential Isolation

Isolate the Work Area from all adjacent areas or systems of the building with a Pressure Differential that will cause a movement of air from outside to inside at any breach in the physical isolation of the Work Area.

a. Relative Pressure in Work Area

Continuously maintain the work area at an air pressure that is lower than that in any surrounding space in the building, or at any location in the immediate proximity outside of the building envelope. This pressure differential when measured across any physical or critical barrier must equal or exceed a static pressure of:

NOTE: CHOOSE ONE OF THE FOLLOWING AND DELETE THE REST.

NOTE: IN ONE TO FIVE STORY BUILDINGS THE PRESSURE DIFFERENTIALS ON THE BUILDING EXTERIOR THAT ARISE FROM WINDS WILL USUALLY BE THE PREDOMINANT COUNTER PRESSURE WHICH MUST BE EXCEEDED.

NOTE: FOLLOWING IS A MINIMUM REQUIREMENT THAT IS A PRESET ALARM POINT ON SOME MONITORING EQUIPMENT. THIS PRESSURE DIFFERENTIAL IS NOT LIKELY TO OVERCOME THE NATURAL FORCES OF INFILTRATION IN MANY BUILDINGS.

0.01 inches of water.

NOTE: FOLLOWING SHOULD BE ADEQUATE TO ISOLATE A WORK AREA IN A ONE-STORY BUILDING WHERE WIND VELOCITIES ARE NOT EXPECTED TO EXCEED 15 MILES PER HOUR.

NOTE: THIS IS A PRESSURE DIFFERENTIAL THAT CAN BE EASILY MAINTAINED WITH NORMAL PROCEDURES, AIR CIRCULATION RATES AND AVAILABLE EQUIPMENT.

0.02 inches of water.

NOTE: FOLLOWING IS THE MAXIMUM PRESSURE DIFFERENTIAL IT IS PRACTICAL TO MAINTAIN WITHOUT SPECIAL PRACTICES. SHEET PLASTIC BARRIERS MUST BE MECHANICALLY FASTENED TO RESIST THE SKIN STRESSES IMPOSED BY THIS PRESSURE DIFFERENCE. IN PRACTICE, THIS WILL REQUIRE DILIGENCE ON THE PART OF THE CONTRACTOR IN MAINTAINING CRITICAL AND PRIMARY BARRIERS IN PLACE.

0.03 inches of water.

NOTE: FOLLOWING SHOULD BE ADEQUATE TO ISOLATE A WORK AREA IN A ONE-STORY BUILDING WHERE WIND VELOCITIES ARE NOT EXPECTED TO EXCEED 25 MILES PER HOUR, OR A 5-STORY BUILDING WHERE WIND VELOCITIES ARE NOT EXPECTED TO EXCEED 15 MILES PER HOUR.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

8. Pressure Differential Isolation (cont.)

NOTE: TO ACHIEVE AND MAINTAIN CONTINUOUSLY THIS PRESSURE DIFFERENTIAL WILL REQUIRE SPECIAL PROCEDURES. MECHANICAL FASTENING OF SHEET PLASTIC IN A MANNER TO DISTRIBUTE LOADING AT FASTENERS (PLYWOOD PADS, DUCT TAPE EDGE REINFORCEMENT, ETC.) IS CRITICAL.

NOTE: THIS IS THE MAXIMUM PRESSURE DIFFERENTIAL THAT CAN BE MEASURED WITH MOST COMMERCIALLY AVAILABLE PRESSURE MONITORING EQUIPMENT DESIGNED FOR ABATEMENT WORK SITES.

0.04 inches of water.

NOTE: FOLLOWING IS AN UPPER LIMIT ON THE PRESSURE DIFFERENTIAL POSSIBLE TO DEVELOP. PRESSURES DIFFERENTIALS AT THIS LEVEL COULD DEVELOP LATERAL FORCES HIGH ENOUGH TO CAUSE DAMAGE TO WALLS OR OTHER BUILDING ELEMENTS. A PRESSURE OF 0.1 INCHES OF WATER IS EQUAL TO 0.52 POUNDS PER SQUARE FOOT OF SURFACE AREA. THIS PRESSURE IS HIGH ENOUGH THAT PARTITIONS AND OTHER SURFACES SURROUNDING THE WORK AREA SHOULD BE EVALUATED FOR STRUCTURAL ADEQUACY.

NOTE: ACHIEVING THIS LEVEL WILL REQUIRE SPECIFIC AND DETAILED DESIGN OF ENCLOSURES SYSTEMS. TYPICALLY REINFORCED SHEET PLASTIC AND STRUCTURAL REINFORCING OF BARRIERS, SUBDIVIDING OF A LARGE SURFACE AREAS, AND SCRUPULOUS DETAILING OF FASTENING SYSTEMS WILL BE REQUIRED.

NOTE: UNLESS THERE ARE EXTENUATING CIRCUMSTANCES IT IS GENERALLY PREFERABLE TO USE A MORE MODERATE PRESSURE DIFFERENTIAL AND LOCAL ISOLATION AS DESCRIBED BELOW.
0.10 inches of water.

NOTE: THE NUMBER OF UNITS THAT MUST BE EXHAUSTED IS DEPENDENT ON HOW LEAK-TIGHT THE WORK AREA IS. THE GREATER THE NUMBER OF LEAKS INTO THE WORK AREA, THE LARGER THE NUMBER OF FANS REQUIRED TO MAINTAIN THE PRESSURE DIFFERENTIAL. THE NUMBER OF LEAKS IN THE SHEET PLASTIC TEMPORARY ENCLOSURES THAT ENCLOSE THE WORK AREA IS DEPENDENT ON BUILDING CONFIGURATION, CONFLICTING PIPES, DUCTWORK, CONDUIT AND EQUIPMENT AS WELL AS WORKMANSHIP. THIS MAKES IT IMPOSSIBLE TO DETERMINE THE NUMBER OF UNITS REQUIRED BY ANY OTHER METHOD THAN EXPERIMENTATION. THE FOLLOWING SETS OUT THE GROUND RULES FOR THIS EMPIRICAL DETERMINATION OF THE REQUIRED NUMBER OF FANS.

Accomplish the pressure differential by exhausting a sufficient number of HEPA filtered fan units from the work area. The number of units required will depend on machine characteristics, the seal at barriers, and required air circulation. The number of units will increase with increased make-up air or leaks into the Work Area. Determine the number of units required for pressure isolation by the following procedure:

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

8. Pressure Differential Isolation (cont.)

a. Relative Pressure in Work Area (cont.)

Establish required air circulation in the work area, personnel, and equipment decontamination units.

Establish isolation by increased pressure in adjacent areas or as part of seals where required.

Exhaust a sufficient number of units from the work area to develop the required pressure differential.

The required number of units is the number determined above plus one additional unit.

NOTE: CHOOSE ONE OF THE TWO PARAGRAPHS BELOW. GENERALLY RETAIN FOLLOWING AS A PREFERABLE PROCEDURE.

b. Venting to outside

Vent HEPA filtered fan units to outside of building unless authorized in writing by FERMCO Project Manager.

NOTE: FOLLOWING SHOULD ONLY BE USED WHERE IT IS NOT FEASIBLE TO EXHAUST TO THE BUILDING EXTERIOR. EDIT FOR PROJECT SPECIFICS. THE CONTROLLED AREA SHOULD BE SPECIFICALLY LOCATED EITHER ON THE DRAWINGS OR BELOW. THE SECOND UNIT PROVIDES ADDITIONAL PROTECTION AGAINST A HEPA FILTER FAILURE. VERIFY WITH MANUFACTURERS OF EQUIPMENT TO BE USED THAT THIS ARRANGEMENT WILL NOT RESULT IN PREMATURE EQUIPMENT FAILURE OR OTHER PRACTICAL PROBLEM.

c. Venting to a Second Unit

Vent each HEPA filtered fan unit to inlet of second unit. Vent second unit to a controlled area in the building. Insure that controlled area is isolated from balance of building by critical barriers at all times that units are in operation.

NOTE: ALWAYS RETAIN FOLLOWING PARAGRAPHS DESCRIBING DUCTING.

Mount units to exhaust directly or through disposable ductwork.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT

11.4 Pressure Differential And Air Flow (cont.)

8. Pressure Differential Isolation (cont.)

c. Venting to a Second Unit (cont.)

NOTE: THE FOLLOWING INSURES THAT DUCTWORK USED PREVIOUSLY ON THE INTAKE (CONTAMINATED SIDE) WILL NOT BE USED.

Use only new ductwork except for sheet metal connections and elbows.

Use ductwork and fittings of same diameter or larger than discharge connection on fan unit.

Use inflatable, disposable plastic ductwork in lengths not greater than 100 feet.

Use spiral wire-reinforced flex duct in lengths not greater than 50 feet.

Arrange exhaust as required to inflate duct to a rigidity sufficient to prevent flapping.

If direction of discharge from fan unit is not aligned with duct use sheet metal elbow to change direction. Use six feet of spiral wire reinforced flex duct after direction change.

NOTE: THE PRESSURE DIFFERENTIALS ABOVE WILL BE INADEQUATE TO PREVENT THE SPREAD OF AIRBORNE CONTAMINATION TO ELEVATORS, STAIR TOWERS, AND CHASES, PARTICULARLY IN HIGH RISE BUILDINGS. THE PRESSURE DIFFERENTIALS DEVELOPED BY NATURAL FORCES (STACK EFFECT AND WIND PRESSURES) AND PISTON EFFECT OF ELEVATORS WILL ROUTINELY EXCEED THE SOMEWHAT SUBTLE PRESSURE REDUCTION IT IS POSSIBLE TO MAINTAIN IN A WORK AREA.

d. Isolation of chases and enclosed stairs

Pressurize chases and enclosed stairs with HEPA filtered air so that it is at a pressure greater than an adjacent work area.

Pressurize space with exhaust from HEPA filtered fan unit. Continuously maintain a pressure differential with this space a minimum of 0.02 inches of water higher in static pressure than any adjacent work area.

NOTE: THE FOLLOWING PARAGRAPH SHOULD BE USED WHERE PRESSURIZING AIR IS TAKEN FROM OUTSIDE OR FROM TEM CLEARED PORTIONS OF THE BUILDING. (USE ITEM d. or e. DEPENDING ON THE REQUIREMENTS.)

e. Isolation of chases and enclosed stairs

Pressurize chases and enclosed stairs so that they are at a pressure greater than any adjacent work area.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

8. Pressure Differential Isolation (cont.)

Pressurize space with centrifugal-type fans. Axial type fans are not to be used for this purpose. Continuously maintain a pressure differential in this space at a minimum of 0.02 inches of water higher in static pressure than any adjacent work area.

NOTE: AIR PRESSURES IN OPERATING RETURN DUCT WORK WILL TYPICALLY BE APPRECIABLY LOWER THAN NORMAL BUILDING SPACES (FREQUENTLY SEVERAL INCHES OF WATER STATIC PRESSURE). THIS PRESSURE DIFFERENTIAL WILL EASILY OVERCOME THE SUBTLE AIR PRESSURE DIFFERENCES ISOLATING THE WORK AREA.

NOTE: THE PREFERABLE METHOD OF ISOLATION IS TO ARRANGE THE WORK AREA SO THAT RETURN AIR DUCTWORK IS OUTSIDE AND NOT IMMEDIATELY ADJACENT TO THE WORK AREA. ANY DUCT RUNNING THROUGH THE WORK AREA THAT LEADS TO OPERATING HVAC EQUIPMENT SHOULD, IF POSSIBLE, BE PHYSICALLY CUT AT THE WORK AREA BARRIERS.

NOTE: IF A RETURN AIR DUCT IN THE WORK AREA MUST REMAIN IN OPERATION IT SHOULD BE ISOLATED AS DESCRIBED BELOW.

f. Isolation of return-air ductwork

Return-air duct work which must be kept operating is located in the Work Area. This duct work is to be isolated from the Work Area by an enclosure forming an annular space around the duct which is positively pressurized with HEPA filtered air.

Wrap the duct with 6-mil polyethylene. Seal all polyethylene seams with spray glue and duct tape.

Enclose wrapped duct with two layers of polyethylene. Fabricate inner layer from 6-mil polyethylene with all seams sealed with spray glue and duct tape. Arrange outer layer to support inner layer. Fabricate out of reinforced sheet plastic with seams sealed with spray glue and duct tape and reinforced with staples. Support outer layer with a frame work fabricated from 2" x 4"s at 24" on center. Enclosures less than 2'-6' in diameter may be reinforced with box strapping in lieu of wood framing.

NOTE: FOLLOWING SHOULD BE USED WHEREVER ABATEMENT WORK IS BEING CARRIED OUT IN AN OCCUPIED BUILDING.

NOTE: DELETE THE FOLLOWING IF AN AUXILIARY GENERATOR IS NOT TO BE USED.

9. Auxiliary Generator

Provide auxiliary gasoline-powered generator located outside of the building in a location protected from the weather. Arrange so that if a power failure occurs the generator automatically starts and supplies power to a minimum of 50% of the HEPA filtered fan units in operation.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

10. Air Circulation in the Work Area

a. Air Circulation

For purposes of this section air circulation refers to either the introduction of outside air to the Work Area or the circulation and cleaning of air within the Work Area.

Air circulation in the Work Area is a minimum requirement intended to help maintain airborne fiber counts at a level that does not significantly challenge the work area isolation measures. The Contractor may also use this air circulation as part of the engineering controls in his worker protection program.

b. Determining the Air circulation Requirements

Provide a fully operational air circulation system supplying a minimum of the following air circulation rate:

NOTE: THE NUMBER OF AIR CHANGES ROUTINELY MAINTAINED ON ASBESTOS ABATEMENT PROJECTS EXCEEDS THE FOUR DESCRIBED IN THE EPA PURPLE BOOK. THE FOLLOWING IS BASED ON FIELD EXPERIENCE OF A NUMBER OF CONSULTANTS WITH ACTUAL ABATEMENT PROJECTS. THE AIR CIRCULATION RATES GIVEN HAVE PROVEN TO BE BOTH EFFECTIVE AND PRACTICAL TO ACHIEVE. THESE RATES ARE IN GENERAL USE ON MANY ABATEMENT PROJECTS.

NOTE: FOLLOWING IS A MINIMUM REQUIREMENT ADEQUATE ONLY WHERE THE WORK IS EXPECTED TO GENERATE LOW AIRBORNE FIBER LEVELS. EXAMPLES OF THIS KIND OF WORK INCLUDE REMOVAL OF WET AIR CELL PIPE INSULATION OR NONFRIABLE MATERIALS, AND REMOVAL OF VINYL ASBESTOS FLOOR TILE.

four air changes per hour

NOTE: FOLLOWING IS USED WHERE ABATEMENT WORK IS EXPECTED TO RAISE HIGHER AIRBORNE FIBER LEVELS. REMOVAL OF CHRYSOTILE-CONTAINING SURFACE TREATMENTS IS A TYPICAL EXAMPLE OF THIS WORK.

twelve air changes per hour

NOTE: FOLLOWING IS APPROPRIATE WHERE HIGH AIRBORNE FIBER COUNTS ARE EXPECTED. DRY REMOVAL OF CHRYSOTILE-CONTAINING INSTALLATIONS, REMOVAL OF AMOSITE OR CROCIDOLITE-CONTAINING MATERIALS ARE EXAMPLES OF THIS TYPE OF WORK.

twenty air changes per hour

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

10. Air Circulation in the Work Area

c. Units Needed

Determine Number of Units needed to achieve required air circulation according to the following procedure:

Determine the volume in cubic feet of the work area by multiplying floor area by ceiling height. Determine total air circulation requirement in cubic feet per minute (CFM) for the work area by dividing this volume by the air change rate and multiplying by 60.

Air Circulation Required in Cubic Feet of Air per Minute (CFM) =

$$\frac{\text{Volume of work area (cu. ft.)}}{} \times \frac{\text{Number of air changes per hour}}{60 \text{ (minutes per hour)}}$$

Divide the air circulation requirement (CFM) above by capacity of HEPA filtered fan unit(s) used. Capacity of a unit for purposes of this section is the capacity in cubic feet per minute with fully loaded filters (pressure differential which causes loaded filter warning light to come on) in the machine's labeled operating characteristics.

Number of Units Needed =

$$\frac{\text{Air circulation Requirement (CFM)}}{\text{Capacity of Unit with Loaded Filters (CFM)}}$$

Add one additional unit as a backup in case of equipment failure or machine shutdown for filter changing.

NOTE: FOLLOWING LANGUAGE SHOULD BE USE IF AN EXHAUST SYSTEM IS TO BE USED. DELETE IF A RECIRCULATION SYSTEM IS TO BE USED. THE FOLLOWING SECTIONS COULD BE REVISED TO PERMIT THE CONTRACTOR THE OPTION OF EITHER SYSTEM

NOTE: FOLLOWING IS ESSENTIALLY THE ARRANGEMENT DESCRIBED AS A "NEGATIVE PRESSURE SYSTEM" PATENTED BY ANTHONY NATALE.

NOTE: THIS SYSTEM HAS THE ADVANTAGE OF BRINGING LARGE VOLUMES OF OUTSIDE AIR INTO THE WORK AREA. THIS REDUCES AIRBORNE ASBESTOS LEVELS, HEAT AND HUMIDITY. THIS IS MOST EFFECTIVE WHEN THE WEATHER IS TEMPERATE OR WHEN THE WORK IS ON HOT SURFACES SUCH AS OPERATING STEAM SYSTEMS.

NOTE: THE LARGE VOLUME OF OUTSIDE AIR INTRODUCED TO THE WORK AREA CAN BE A PROBLEM DURING COLD WEATHER. TYPICALLY, THIS AIR WILL HAVE TO BE HEATED EITHER BY MAKEUP AIR HEATERS OR BY DRAWING TEMPERED AIR FROM THE BALANCE OF THE BUILDING.

NOTE: THIS SYSTEM REQUIRES A DECONTAMINATION UNIT THAT PERMITS FREE PASSAGE OF AIR INTO THE WORK AREA BUT DOES NOT ALLOW A REVERSE FLOW IF THERE IS A FAN FAILURE. COORDINATE WITH SECTION 11.12 DECONTAMINATION UNITS.

00113

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

11. Exhaust System

Pressure differential isolation and air circulation in the Work Area are to be accomplished by an exhaust system as described below.

a. General

Exhaust all units from the Work Area to meet air circulation requirement of this section.

b. Location of HEPA Filtered Fan Units

Locate fan unit(s) so that makeup air enters work area primarily through decontamination facilities and traverses Work Area as much as possible. This may be accomplished by positioning the HEPA filtered fan unit(s) at a maximum distance from the worker access opening or other makeup air sources.

NOTE: PREFERABLY THE LOCATION OF FAN UNITS AND MAKEUP AIR SOURCES SHOULD BE SHOWN ON DRAWINGS. A MINIMUM PRACTICE IS TO LOCATE THESE ITEMS AT PRECONSTRUCTION MEETING.

c. Placement

Place at End of Unit an intake duct or its exhaust duct through an opening in the plastic barrier or wall covering. Seal plastic around the unit or duct with tape.

d. Venting

Vent to Outside of Building, unless authorized in writing by the FERMCO Project Manager.

NOTE: THIS MAY INVOLVE THE USE OF ADDITIONAL LENGTHS OF FLEXIBLE OR RIGID DUCT CONNECTED TO THE AIR OUTLET AND ROUTED TO THE NEAREST OUTSIDE OPENING. WINDOW PANES WHICH HAVE TO BE REMOVED TEMPORARILY SHALL BE REINSTALLED AT THE COMPLETION OF THE WORK.

e. Decontamination Units

Arrange Work Area and decontamination units so that the majority of make up air comes through the Decontamination Units. Use only personnel or equipment Decontamination Unit at any time and seal the other so that make-up air passes through unit in use.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.4 Pressure Differential And Air Flow (cont.)

11. Exhaust System (cont.)

f. Supplemental Make-up Air Inlets

Provide where required for proper air flow through the Work Area in location approved by the FERMCO Project Manager by making openings in the plastic sheeting that allow air from outside the building into the Work Area. Locate auxiliary makeup-air inlets as far as possible from the fan unit(s) (e.g., on an opposite wall), off the floor (preferably near the ceiling), and away from barriers that separate the Work Area from occupied clean areas. Cover with flaps to reseal automatically if the pressure differential system should shut down for any reason. Spray flap and around opening with spray adhesive so that if flap closes, meeting surfaces are both covered with adhesive. Use adhesive that forms contact bond when dry.

NOTE: IF MAKEUP AIR IS COMING FROM AN ASBESTOS-FIBER - CONTAMINATED SOURCE OR POTENTIALLY CONTAMINATED THEN IT SHOULD PASS THROUGH A HEPA FILTER BEFORE ENTERING WORK AREA. IF AIR IS CONTAMINATED WITH OTHER MATERIALS IT MAY ALSO REQUIRE FILTERING. IF THIS IS DONE, SUPPLY AIR FANS WILL BE NECESSARY TO OVERCOME THE RESISTANCE OF THE FILTERS. USE OF A HEPA FILTERED FAN UNIT, WITH OR WITHOUT THE HEPA FILTER, MAY BE A PRACTICAL MEANS OF ACCOMPLISHING THIS. CAUTION MUST BE USED TO INSURE THAT WORK AREA REMAINS UNDER A PRESSURE DIFFERENTIAL.

NOTE: FOLLOWING LANGUAGE SHOULD BE USE IF A RECIRCULATION SYSTEM IS TO BE USED. DELETE IF AN EXHAUST SYSTEM IS TO BE USED. THIS IS ESSENTIALLY THE ARRANGEMENT KNOWN AS THE PRESSURE DIFFERENTIAL CONTAINMENT SYSTEM DEVELOPED BY THE BRAND COMPANY, A LARGE ASBESTOS ABATEMENT CONTRACTING FIRM, AS AN ALTERNATIVE TO THE NEGATIVE AIR SYSTEM PATENTED BY ANTHONY NATALE.

NOTE: THIS SYSTEM HAS THE ADVANTAGE OF LIMITING THE AMOUNT OF POTENTIALLY CONTAMINATED AIR EXHAUSTED FROM THE WORK AREA. THIS MAKES IT THE PREFERABLE SYSTEM WHERE THE ABILITY TO EXHAUST TO THE BUILDING EXTERIOR IS PROBLEMATIC. IT INTRODUCES LESS OUTSIDE AIR MAKING IT MORE ECONOMICAL TO OPERATE IN COLD WEATHER. WORK AREA AIR CAN BE MECHANICALLY COOLED AND DEHUMIDIFIED MAKING IT USEFUL IN EXTREMELY HOT WEATHER. THE LIMITED INTRODUCTION OF OUTSIDE AIR MAY REDUCE THE PROBLEMS INTRODUCED IF THERE ARE OTHER FIBROUS MATERIALS IN THE BUILDING AIR. HUMIDITY AND TEMPERATURE LEVELS MAY BE HIGHER THAN WITH AN EXHAUST SYSTEM DURING MILD WEATHER. FOR WORK IN VERY HOT ENVIRONMENTS, SUCH AS OPERATING BOILER PLANTS, THIS SYSTEM WILL BE LESS EFFECTIVE IN CONTROLLING HIGH TEMPERATURES. TO WORK PROPERLY, A HIGH LEVEL OF WORKMANSHIP IS REQUIRED IN ERECTING AND MAINTAINING CRITICAL BARRIERS.

NOTE: THIS SYSTEM REQUIRES A DECONTAMINATION UNIT THAT IS TIGHTLY SEALED. THIS REQUIRES THAT AIR CIRCULATION IN THE DECONTAMINATION UNITS BE PROVIDED INDEPENDENTLY OF WORK AREA AIR CIRCULATION COORDINATE WITH SECTION 11.12 DECONTAMINATION UNITS.

0115

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

12. Recirculation System

Pressure differential isolation and air circulation in the Work Area are to be accomplished by a recirculation system as described below.

a. General

Recirculate air in the Work Area through HEPA filtered fan units to accomplish air circulation requirements of this section.

b. Location of Fan Units

Locate HEPA filtered fan units so that air is circulated through all parts of the Work Area, and so that required pressure is maintained at all parts of Work Area geometry. Move units as necessary so that in any location where asbestos-containing materials are being disturbed the discharge from one HEPA filtered fan unit is blowing contamination away from workers. Direct air flow in these locations so that it is predominantly toward workers' backs at the breathing zone elevation.

13. Air Circulation in Decontamination Units

NOTE: IT IS CRITICAL TO WORKER SAFETY THAT THERE BE A SENSIBLE MOVEMENT OF AIR THROUGH THE DECONTAMINATION UNIT FROM THE CLEAN SIDE OF THE SHOWER TOWARD THE WORK AREA. THIS MOVEMENT OF AIR MUST BE ADEQUATE TO CARRY AWAY AIRBORNE FIBERS THAT RESULT FROM THE DECONTAMINATION AND SHOWERING PROCESS SO THAT THE WORKER IS BREATHING CLEAN AIR WHEN THE RESPIRATOR IS REMOVED. THIS WILL TYPICALLY RESULT IN A DRAFTY SHOWER BUT A SAFE WORKER.

a. Pressure Differential Isolation

Continuously maintain the pressure differential required for the work area in the:

Personnel Decontamination Unit: across the Shower Room with the Equipment Room at a lower pressure than the Clean room.

Equipment Decontamination Unit: Across the Holding Room with the Wash Room at a lower pressure than the Clean Room.

b. Air Circulation

Continuously maintain air circulation in Decontamination units at same level as required for Work Area.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

13. Air Circulation in Decontamination Units

c. Air Movement

Arrange air circulation through the Personnel Decontamination Unit so that it produces a movement of air from the Clean Room through the Shower Room into the Equipment Room. Maintain continuous minimum velocities of Sixty feet per minute in the breathing zone area of the shower and thirty feet per minute in all other locations of the shower.

14. Use of the Pressure Differential and Air Flow System

NOTE: EDIT TO MATCH REQUIREMENTS OF SPECIFIC MACHINE SPECIFIED.

a. General

Each unit shall be serviced by a dedicated minimum 115V-20A circuit with ground fault circuit interrupter (GFCI) supplied from temporary power supply installed under requirements of Section 11.3 "Temporary Facilities." Do not use existing branch circuits to power fan units.

b. Testing the System

Test pressure differential system before any asbestos-containing material is wetted or removed. After the Work Area has been prepared, the decontamination facility set up, and the fan unit(s) installed, start the unit(s) (one at a time). Demonstrate operation and testing of pressure differential system to FERMCO Project Manager.

c. Inspection

Inspect condition of equipment for each HEPA filtered fan unit and pressure differential monitoring equipment including proper operation of the following:

Squareness of HEPA Filter

Condition of Seals

Proper operation of all lights

Proper operation of automatic shut down if exhaust is blocked

Proper operation of alarms

Proper operation of magnehelic gauge

Proper operation and calibration on pressure monitoring equipment

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

14. Use of the Pressure Differential and Air Flow System (cont.)

d. Demonstration

Demonstrate operation of the pressure differential system to the FERMCO Project Manager will include, but not be limited to, the following:

- Plastic barriers and sheeting move lightly in toward Work Area,
- Curtain of decontamination units move lightly in toward Work Area,
- There is a noticeable movement of air through the Decontamination Unit.
- Use smoke tube to demonstrate air movement from Clean Room through Shower Room to Equipment Room.
- Use smoke tubes to demonstrate a definite motion of air across all areas in which work is to be performed.

NOTE: IT MAY BE MORE PRACTICAL FOR THE PROJECT ADMINISTRATOR TO CONDUCT THE TEST BELOW.

Use a differential pressure meter or manometer to demonstrate the required pressure differential at every barrier separating the Work Area from the balance of the building, equipment, ductwork or outside.

e. Modification

Modify the Pressure Differential System as necessary to demonstrate successfully the above.

f. Use of System During Abatement Operations

Start fan units before beginning work (before any asbestos-containing material is disturbed). After abatement work has begun, run units continuously to maintain a constant pressure differential and air circulation until decontamination of the work area is complete. Do not turn off units at the end of the work shift or when abatement operations temporarily stop.

Do not shut down air pressure differential system during encapsulating procedures, unless authorized by the FERMCO Project Manager in writing. Supply sufficient pre-filters to allow frequent changes.

Start abatement work at a location farthest from the fan units and proceed toward them. If an electric power failure occurs, immediately stop all abatement work and do not resume until power is restored and fan units are operating again.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.4 Pressure Differential And Air Flow (cont.)

14. Use of the Pressure Differential and Air Flow System (cont.)

g. Use of System During Abatement Operations

At completion of abatement work, allow fan units to run as specified under section 11.17, to remove airborne fibers that may have been generated during abatement work and cleanup and to purge the Work Area with clean makeup air. The units may be required to run for a longer time after decontamination, if dry or only partially wetted asbestos material was encountered during any abatement work.

h. Dismantling the System

When a final inspection and the results of final air tests indicate that the area has been decontaminated, fan units may be removed from the Work Area. Before removal from the Work Area, remove and properly dispose of pre-filter, decontaminate exterior of machine and seal intake to the machine with 6 mil polyethylene to prevent environmental contamination from the filters.

11.5 Temporary Enclosures

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

2. Submittals

Before start of work, submit the following to the FERMCO Project Manager for review. Do not begin work until these submittals are returned with the FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use.

NOTE: DELETE FOLLOWING IF STRIPABLE COATINGS ARE NOT TO BE USED.

a. Stripable Coatings

Submit following:

Product description including major components and solvents.

Test report on ASTM E84 test of surface burning characteristics.

Manufacturer's installation instructions. Indicate portions applicable to the project and selected assemblies where the manufacturer offers alternatives.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

a. Stripable Coatings (cont.)

Submit the Material Safety Data Sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for stripable coating material proposed for use on the work. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

b. Spray Cement

Submit following:

Product description including major components and solvents.

Manufacturer's installation instructions. Indicate portions applicable to the project.

Submit the Material Safety Data Sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for spray cement material proposed for use on the work. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

c. Sheet Plastic

For fire retardant plastic submit test reports on NFPA 701 test.

d. Signs

Submit samples of signs to be used.

PART 2 - PRODUCTS

3. Sheet Plastic

NOTE: EDIT THE FOLLOWING LIST TO ELIMINATE THOSE TYPES OF PLASTIC NOT USED.

NOTE: FOLLOWING IS MOST LIKELY TO BE FOUND ON THE JOB IN THE ABSENCE OF A MORE SPECIFIC REQUIREMENT.

a. Polyethylene Sheet

A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil thick as indicated, clear, frosted, or black as indicated.

NOTE: FOLLOWING IS A GOOD GENERAL PRECAUTION AND SHOULD ALWAYS BE USED IN AREAS WHERE THERE COULD BE EXITING DIFFICULTIES IN CASE OF EMERGENCY (WORK AREAS ABOVE OR BELOW GRADE OR INTERIOR SPACES WITH LIMITED EXITS) OR THERE IS HOT EQUIPMENT OR A POTENTIAL FOR FIRE, SUCH AS IN A BOILER ROOM. FIRE RETARDANT SHEET PLASTIC IS CONSIDERABLY MORE EXPENSIVE THAN STANDARD PLASTIC.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

3. Sheet Plastic (cont.)

b. Polyethylene Sheet

Provide flame-resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-Resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mils thick as indicated, frosted or black as indicated.

NOTE: REINFORCED PLASTIC SHOULD BE USED IN EXTERIOR APPLICATIONS WHERE THE SHEET IS EXPECTED TO BE STRESSED BY WINDS OR IN ANY LOCATION WHERE HIGH SKIN STRENGTH IS REQUIRED. FOLLOWING IS AN EXAMPLE OF LANGUAGE WHICH CAN BE USED. EDIT TO SUIT PROJECT REQUIREMENTS.

c. Reinforced Polyethylene Sheet

Where plastic sheet constitutes the only barrier between the work area and the building exterior, provide translucent, nylon reinforced or woven polyethylene, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil thick as indicated, frosted or black as indicated.

4. Strippable Coatings

NOTE: DELETE THIS ENTIRE SUBSECTION IF STRIPPABLE COATING (SPRAY PLASTIC) IS NOT TO BE USED.

NOTE: STRIPPABLE COATINGS ARE RELATIVELY NEW MATERIALS WHICH ARE DESIGNED TO ADHERE TO SURFACES SUCH AS WALLS AND CEILINGS AND THEN BE REMOVE BY PEELING OFF. CARE MUST BE EXERCISED IN SELECTING FINISHES TO RECEIVE THIS TREATMENT. SUBSTRATES WITH A LOOSE FINISH CAN LOSE PART OF THE FINISH WHEN THE COATING IS PEELED OFF. THE MATERIAL MAY NOT PEEL CLEANLY FROM TEXTURED SURFACES, FABRICS OR CARPET.

NOTE: STRIPPABLE COATINGS PLASTIC ARE EFFECTIVE IN CLEANING MANY SURFACES AND MAY FACILITATE PROJECT DECONTAMINATION.

NOTE: IT IS A WISE PRECAUTION TO TEST THE STRIPPABLE COATING ON THE SUBSTRATES INVOLVED IN THE PROJECT DURING DESIGN.

a. Materials

Provide strippable coatings in aerosol cans or premixed for spray application formulated to adhere gently to surfaces and remove cleanly by peeling off at the completion of the work.

Provide only water-based latex materials.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

4. Strippable Coatings

Provide materials manufactured for the specific application required.

Wall coating: designed to be easy to remove.

Floor coating: designed to provide a tough film which resists spread of water beneath plastic layer.

Window coating: recommended by the manufacturer for use on windows. Supply materials that are designed to be stable on glass in sunlight and resist the transmission of ultraviolet radiation.

b. Fire Safety

Provide materials that meet the following requirements:

When wet or while being installed:

Do not create combustible vapors,

Have no flash point

Are not noxious

Department of Transportation category of non-flammable.

When dry, material must have a Class A rating as a building material and meet the following requirements when tested in accordance with ASTM E-84.

Flame Spread no greater than 20

Fuel Contributed 0

Smoke Developed no more than 110

Deliver materials to the job site in unopened, factory-labeled containers.

c. Available Manufacturers

Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

4. Strippable Coatings (cont.)

d. Manufacturer

Subject to compliance with requirements, provide products of one of the Following:

NOTE: THE FOLLOWING IS A LIST OF FIRMS BELIEVED TO MANUFACTURE THIS PRODUCT. NO MANUFACTURERS HAVE BEEN INTENTIONALLY EXCLUDED AND NO ATTEMPT HAS BEEN MADE TO EVALUATE THESE PRODUCTS. ADDITIONAL SUPPLIERS MAY EXIST. PRODUCT LITERATURE SHOULD BE USE TO EVALUATE THESE PRODUCTS AND TO VERIFY THAT LISTED PRODUCTS COMPLY WITH THE SPECIFICATIONS AND MEET PROJECT REQUIREMENTS. VERIFY THAT PRODUCTS INDICATED ARE STILL BEING MANUFACTURED. EDIT OR ADD TO THE LIST AS APPROPRIATE TO THE PROJECT REQUIREMENTS.

Isotek Corporation Spray Poly
P . O . Box 29799
New Orleans, LA 70189-0799
(504) 367-9856

5. Miscellaneous Materials

a. Duct Tape

Provide duct tape in 2" or 3" widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

b. Spray Cement

Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

PART 3 - EXECUTION

6. Sequence of Work

Carry out work of this section sequentially. Complete each activity before proceeding to the next.

7. General

a. Work Area

The Work Area is the location where asbestos-abatement work occurs. It is a variable of the extent of work of the Contract. It may be a portion of a room, a single room, or a complex of rooms. A "Work Area" is considered contaminated during the work, and must be isolated from the balance of the building, and decontaminated at the completion of the asbestos-control work.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

7. General (cont.)

b. Isolation

Completely isolate the Work Area from other parts of the building so as to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the Work Area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, clean those areas in accordance with the procedures indicated in Section 11.17. Perform all such required cleaning or decontamination at no additional cost to owner.

c. Tools and Equipment

Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to completion of Work Area isolation.

d. Furniture

Remove all removable furniture that has been designated uncontaminated by the Contract Documents or FERMCO Project Manager. Also remove uncontaminated equipment, and/or supplies from the Work Area before commencing work, or completely cover with two layers of polyethylene sheeting, at least 6 mil in thickness, securely taped in place with duct tape. Such furniture and equipment shall be considered outside the work area unless covering plastic or seal is breached.

e. Ventilation

Disable ventilating systems or any other system bringing air into or out of the Work Area. Disable system by disconnecting wires, removing circuit breakers, by lockable switch or other positive means that will prevent accidental premature restarting of equipment.

f. Lockout

Lockout power to Work Area by switching off all breakers serving power or lighting circuits in work area. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of Contractor's Superintendent of FERMCO's designated Representative.

Lockout power to circuits running through work area wherever possible by switching off all breakers or removing fuses serving these circuits. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of contractor's superintendent or owner's designated representative. If circuits cannot be shut down for any reason, label at intervals 4'-0" on center with tags reading, "DANGER live electric circuit. Electrocution hazard." Label circuits in hidden locations but which may be affected by the work in similar manner.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

7. General (cont.)

g. Inspection Windows

Install inspection windows in locations shown on the plans or as directed by the FERMCO Project Manager. Each inspection window is to have a 24" X 24" viewing area fabricated from 1/4" acrylic or polycarbonate sheet. Install window with top at 6'-6" above floor height in a manner that provides unobstructed vision from outside to inside of the Work Area. Protect window from damage from scratching, dirt or any coatings used during the work. A sufficient number of windows are to be installed to provide observation of all portions of the Work Area that can be made visible from adjacent areas. Inspection windows that open into uncontrolled area are to be covered with a removable plywood hatch secured by lock and key. Provide keys to FERMCO Project Manager for all such locks.

8. Emergency Exits

Provide emergency exits and emergency lighting as set forth below:

a. Emergency Exits

At each existing exit door from the Work Area provide the following means for emergency exiting:

Arrange exit door so that it is secure from outside the Work area but permits exiting from the Work Area.

Mark outline of door on Primary and Critical Barriers with luminescent paint at least 1" wide. Hang a razor knife on a string beside outline. Arrange Critical and Primary barriers so that they can be easily cut with one pass of razor knife. Paint words "EMERGENCY EXIT" inside outline with luminescent paint in letters at least one foot high and 2" thick.

NOTE: FOLLOWING ARE VERY GENERAL AND SHOULD BE REVISED FOR SPECIFIC PROJECT REQUIREMENTS. IT MAY BE POSSIBLE TO USE EXISTING BUILDING EXIT LIGHTS AND EMERGENCY LIGHTING. IF SO REVISE FOLLOWING TO REQUIRE CONTINUED OPERATION AND PROTECTION OF THIS EQUIPMENT.

b. Lighting

Provide lighted EXIT sign at each exit.

Provide battery-operated emergency lighting that switches on automatically in the event of a power failure.

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11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.5 Temporary Enclosures (cont.)

9. Control Access

NOTE: THE FIRST STEP IN AN ASBESTOS ABATEMENT PROJECT IS TO ISOLATE THE AREA SO THAT ONLY TRAINED WORKERS CAN ENTER AND LEAVE THROUGH A CONTROLLED ENTRANCE. THIS SUBSECTION DESCRIBES THE MEASURES NECESSARY TO ACCOMPLISH THIS ISOLATION. THE ISOLATION IS ACCOMPLISHED ONLY AT THE COST OF EASE OF ACCESS AND EXITING FROM THE BUILDING.

NOTE: IT IS VERY POSSIBLE THAT THE WORK AREA ISOLATION COULD AFFECT EMERGENCY EXITING FROM PORTIONS OF THE BUILDING BEYOND THE WORK AREA. IT MAY BE NECESSARY TO CLOSE DOWN THESE PORTIONS OF THE BUILDING TO AVOID A LIFE SAFETY HAZARD FOR OCCUPANTS OF THESE AREAS.

NOTE: THE FOLLOWING COULD AFFECT EXITING FROM THE BUILDING AND CERTAINLY AFFECTS EXITING FROM THE WORK AREA. THIS CHANGE IN EXITING SHOULD BE REVIEWED TO INSURE THAT IT DOES NOT VIOLATE LOCAL BUILDING CODES OR THE ANSI LIFE SAFETY CODE. IT MAY BE NECESSARY TO CONSTRUCT TEMPORARY EXITS. THERE MAY BE SPECIFIC BUILDING CODE REQUIREMENTS GOVERNING THE LAYOUT AND CONSTRUCTION OF THESE EXITS.

NOTE: ON INDUSTRIAL SITES WHERE THE ACTIVITIES OF ALL PERSONS IN THE AREA ARE CONTROLLED IT MAY BE UNNECESSARY TO CONTROL ACCESS BEYOND THE ERECTION OF WARNING SIGNS.

a. Preparation

Isolate the Work Area to prevent entry by building occupants into Work Area or surrounding controlled areas. Accomplish isolation by the following:

NOTE: FOLLOWING ARE EXAMPLES EDIT AS REQUIRED BY PROJECT SPECIFICS.

NOTE: CHAINING EXIT DOORS IS A CLEAR VIOLATION OF EXITING REQUIREMENTS OF ANY BUILDING OR LIFE SAFETY CODE. USE FOLLOWING ONLY IF ALTERNATIVE EXITING IS PROVIDED

NOTE: IF DOORS MUST BE CHAINED SHUT, SUCH DOORS SHOULD BE SPECIFICALLY CALLED OUT OR LABELED ON DRAWINGS.

b. Submittal

Submit to FERMCO Project Manager a list of doors and other openings that must be secured to isolate Work Area. Include on list notation if door or opening is in an indicated exit route.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

9. Control Access (cont.)

c. Limit Access

After receiving written authorization from the FERMCO Project Manager lock all doors into Work Area, or, if doors cannot be locked, chain shut. Cover any signs that direct emergency exiting, either outside or inside of Work Area, to locked doors. Do not obstruct doors required for emergency exits from Work Area or from building.

NOTE: FOLLOWING IS APPROPRIATE WHERE NON-COMBUSTIBLE CONSTRUCTION IS REQUIRED. IN SOME CIRCUMSTANCES, SUCH AS SMALL CLOSURES IN ONE STORY BUILDINGS, LESS EXPENSIVE WOOD CONSTRUCTION MIGHT BE SUBSTITUTED.

d. After receiving written authorization from the FERMCO Project Manager

Construct partitions or closures across any opening into Work Area. Partitions are to be a minimum of 8 feet high.

NOTE: CHOOSE ONE OF THE THREE BELOW AND DELETE THE OTHER TWO. MAKE SELECTION BASED ON LOCAL FIRE SAFETY AND BUILDING REGULATIONS.

Fabricate partitions from 3-5/8", 25 gage metal studs with 1/2" gypsum board on both faces. Brace at 4'-0" on center.

Fabricate partitions from 2 X 4 wood studs with 1/2" plywood on both faces. Brace at 4'-0" on center.

Fabricate partitions from 2 X 4 wood studs with 1/2" plywood on both faces. Brace at 4'-0" on center. Use only fire retardant treated wood.

NOTE: DELETE FOLLOWING IF NO FABRIC TYPE PARTITIONS.

e. Fabric-type folding partitions

Provide temporary partitions across fabric-type folding doors or partitions into Work Area.

NOTE: REVISE FOLLOWING AS REQUIRED TO PROVIDE SECURE LOCKING OF SPECIFIC PARTITION INVOLVED. DELETE IF NO RIGID FOLDING PARTITIONS ARE USED.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

9. Control Access (cont.)

f. Rigid-type folding partitions

Remove operating bar and latch on clean side of folding partitions. Fasten down operating lever with hook and chain or other secure device on Work Area side. At completion of all abatement work reinstall bar and latch and adjust for proper operation.

NOTE: DELETE THE FOLLOWING IF THERE ARE NO ELEVATORS. REVISE AS NECESSARY FOR PROJECT SPECIFICS. ELEVATOR LOCKOUT IN MANY INSTANCES IS ACCOMPLISHED BY THE FERMCO RATHER THAN THE CONTRACTOR. IN HIGH RISE BUILDINGS MORE DETAIL WILL FREQUENTLY BE REQUIRED. COORDINATE WITH SECTION 10.4 THAT DESCRIBES THE FERMCO'S AND CONTRACTOR'S USE OF ELEVATORS.

g. Elevators

Modify elevator controls to prevent elevators from stopping at doors in Work Areas. This work is to be performed by a qualified elevator technician.

NOTE: FOLLOWING IS EXAMPLE LANGUAGE TO USE WHERE DOORS THAT ARE NEEDED FOR EXITING MUST BE SECURED. REVISE AS APPROPRIATE OR DELETE IF THERE ARE NO DOORS INTO THE Work Area. A DETERMINATION SHOULD BE MADE ABOUT EXITING REQUIREMENTS FROM THE Work Area. THE FOLLOWING SHOULD BE EDITED AS APPROPRIATE TO PERMIT ADEQUATE EXITING AND MINIMIZE THE NEED FOR REPLACEMENT OF LOCKSETS.

h. Controlled Access

Replace passage sets on doors required for exiting from Work Area with temporary locksets for duration of the project. Use entry type locksets that are key lockable from one side and always operable from inside. Install locksets with key side in stair tower and escape side toward Work Area. Provide one key to FERMCO and maintain one key in clean room of decontamination unit. After meeting Contractor, release criteria set forth in Section 11.21 Work Area Clearance reinstall original passage sets and adjust for proper operation.

i. Locked Access

Arrange Work Area so that the only access into Work Area is through lockable doors to personnel and equipment decontamination units.

NOTE: CHOOSE ONE OR A COMBINATION OF THE FOLLOWING TWO PARAGRAPHS.

NOTE: USE FOLLOWING IF THERE ARE NO DOORS WHICH CAN BE USED FOR CONTROLLING ACCESS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

9. Control Access (cont.)

j. Temporary Doors

Install temporary doors with entrance type locksets that are key lockable from the outside and always unlocked and operable from the inside. Do not use deadbolts or padlocks.

NOTE: USE FOLLOWING IF THERE ARE EXISTING DOORS WHICH CAN BE USED TO CONTROL ACCESS.

Replace locksets or passage sets on doors leading to decontamination units with temporary locksets for duration of the project. Remove any deadbolts or padlocks. Use entry type locksets that are key lockable from outside and always unlocked and operable from inside. After meeting contractor release criteria set forth in Section 11.21, Work Area Clearance, reinstall original locks, passage sets and locksets and adjust for proper operation.

Provide one key for each door to FERMCO, and FERMCO Project Manager and maintain one key in clean room of decontamination unit (3 total).

k. Visual Barrier

Where the Work Area is immediately adjacent to or within view of occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil in thickness so that the work procedures are not visible to building occupants. Where this visual barrier would block natural light, substitute frosted or woven rip-stop sheet plastic in locations approved by the FERMCO Project Manager.

NOTE: CHOOSE ONE OF THE TWO SIGNAGE SCHEMES BELOW.

NOTE: FOLLOWING IS APPROPRIATE FOR INDUSTRIAL SETTINGS OR NORMALLY UNOCCUPIED AREAS SUCH AS CONTROLLED CONSTRUCTION SITES.

l. Warning Signs

Provide Warning Signs at each locked door leading to Work Area reading as follows:

Legend	Notation
KEEP OUT	3" Sans Serif Gothic or Block
BEYOND THIS POINT	1" Sans Serif Gothic or Block
ASBESTOS ABATEMENT WORK	1" Sans Serif Gothic or Block
IN PROGRESS	1" Sans Serif Gothic or Block
BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH	14 Point Gothic

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

9. Control Access (cont.)

NOTE: FOLLOWING IS MORE APPROPRIATE IN SENSITIVE LOCATIONS SUCH AS OCCUPIED BUILDINGS.

Provide Warning Signs at each locked door leading to Work Area reading as follows:

Legend	Notation
KEEP OUT	3" Sans Serif Gothic or Block
CONSTRUCTION	1" Sans Serif Gothic or Block
WORK AREA	1" Sans Serif Gothic or Block
PROTECTIVE CLOTHING REQUIRED BEYOND THIS POINT	14 Point Gothic

Immediately inside door and outside critical barriers post an approximately 20 inch by 14 inch manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

10. Legend

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED
IN THIS AREA

Provide spacing between respective lines at least equal to the height of the respective upper line.

11. Alternate Methods of Enclosure

EDIT FOLLOWING IF SECTION 11.14 ON PRODUCTS AND SUBSTITUTIONS IS OMITTED FROM THE SPECIFICATION.

Alternate methods of containing the Work Area may be submitted to the FERMCO Project Manager for approval in accordance with procedures set forth in Section 11.14 Product Substitution. Do not proceed with any such method(s) without prior written approval of the FERMCO Project Manager.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

12. Respiratory and Worker Protection

Before proceeding beyond this point in providing Temporary Enclosures:

Provide Worker Protection per Section 11.9

Provide Respiratory Protection per Section 11.11

Provide Personnel Decontamination Unit per Section 11.12

13. Critical Barriers

Clean housings and ducts of all overspray materials prior to erection of any Critical Barrier that will restrict access.

a. Plastic Sheeting and Duct Tape

Completely Separate the Work Area from other portions of the building, and the outside by closing all openings with sheet plastic barriers at least 6 mil in thickness, or by sealing cracks leading out of Work Area with duct tape.

Individually seal all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, connectors and speakers, and other openings into the Work Area with duct tape alone or with polyethylene sheeting at least 6 mil in thickness, taped securely in place with duct tape. Maintain seal until all work including Project Decontamination is completed. Take care in sealing of lighting fixtures to avoid melting or burning of sheeting.

Provide sheet plastic barriers at least 6 mil in thickness as required to seal openings completely from the Work Area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape or spray cement.

b. Support of Plastic Sheets

Mechanically support sheet plastic independently of duct tape or spray cement seals so that seals do not support the weight of the plastic. Following are acceptable methods of supporting sheet plastic barriers. Alternative support methods may be used if approved in writing by the FERMCO Project Manager.

NOTE: FOLLOWING ARE EXAMPLES. EDIT AND INDICATE SPECIFIC METHODS OF SUPPORT APPROPRIATE TO PROJECT REQUIREMENTS. METHOD USED SHOULD PREVENT THE WEIGHT OF PLASTIC FROM BEING CARRIED BY ONLY DUCT TAPE OR SPRAY CEMENT.

Plywood squares 6" x 6" x 3/8" held in place with one 6d smooth masonry nail or electro-galvanized common nail driven through center of the plywood and duct tape on plastic so that plywood clamps plastic to the wall. Locate plywood squares at each end, corner and at maximum 4 feet on centers.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

13. Critical Barriers (cont.)

Nylon or polypropylene rope or wire with a maximum unsupported span of 10 feet, minimum 1/4" in diameter suspended between supports securely fastened on either side of opening at maximum 1 foot below ceiling. Tighten rope so that it has 2" maximum dip. Drape plastic over rope from outside Work Area so that a two foot long flap of plastic extends over rope into Work Area. Staple or wire plastic to itself 1" below rope at maximum 6" on centers to form a sheath over rope. Lift flap and seal to ceiling with duct tape or spray cement. Seal loop at bottom of flap with duct tape. Erect entire assembly so that it hangs vertically without a "shelf" upon which debris could collect.

Provide Pressure Differential System per Section 11.4.

14. Prepare Area

a. Scaffolding

If fixed scaffolding is to be used to provide access HEPA vacuum and wet clean area prior to scaffolding installation.

b. Removal of Items

Remove all electrical and mechanical items, such as lighting fixtures, clocks, diffusers, registers, escutcheon plates, etc. which cover any part of the surface to be worked on with the work.

NOTE: THE LAST SENTENCE BELOW IS A FALL BACK WHICH SHOULD BE DELETED IF NEW FINISHES ARE TO BE PROVIDED.

Remove all general construction items such as cabinets, casework, door and window trim, moldings, ceilings, trim, etc., which cover the surface of the work as required to prevent interference with the work. Clean, decontaminate and reinstall all such materials, upon completion of all removal work with materials, finishes, and workmanship to match existing installations before start of work.

NOTE: BELOW IS A GOOD PRECAUTION. NOTE THAT THIS PARAGRAPH REQUIRES THE INCLUSION AND EDITING OF SECTION 11.18 IN THE SPECIFICATION.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

14. Prepare Area (cont.)

c. Cleaning

Clean all contaminated furniture, equipment, and or supplies with a HEPA filtered vacuum cleaner or by wet cleaning, as specified in Section 11.18 Cleaning and Decontamination Procedures, prior to being moved or covered. All equipment furniture, etc., is to be deemed contaminated unless specifically declared as uncontaminated on the drawings or in writing by the FERMCO Project Manager.

Clean all surfaces in Work Area with a HEPA filtered vacuum or by wet wiping prior to the installation of primary barrier.

15. Primary Barrier - Preparation

a. General

Protect building and other surfaces in the Work Area from damage from water and high humidity or from contamination from asbestos-containing debris, slurry or high airborne fiber levels by covering with a primary barrier as described below.

NOTE: THE MEASURES TAKEN TO PROTECT BUILDING SURFACES WILL ALSO DAMAGE THEM. STRIPPABLE COATINGS MAY REMOVE LOOSE PAINT. DUCT TAPE AND SPRAY GLUE LEAVE RESIDUES AND ALSO PULL OFF LOOSE PAINT. MECHANICAL FASTENING OF SHEET PLASTIC LEAVES HOLES. THE REPAIR OF THIS UNAVOIDABLE DAMAGE SHOULD BE DEALT WITH DURING PROJECT DESIGN. THE SCOPE OF WORK FOR THE CONTRACTOR SHOULD CLEARLY INDICATE WHETHER REPAIR WORK IS A PART OF THE ABATEMENT CONTRACT OR IS BEING DONE LATER AS A PART OF A RENOVATION PROJECT.

NOTE: AS A GENERAL RULE IT IS PRUDENT TO ASSUME THAT ALL PAINTED SURFACES (EXCEPT FOR HIGH PERFORMANCE COATING SUCH AS EPOXY OR COLD GLAZED CEMENTS) WILL HAVE TO BE REPAINTED. A DECISION ABOUT WHO WILL PROVIDE THIS REPAINTING SHOULD BE MADE DURING DESIGN.

NOTE: USE EITHER THE SECTION BELOW ON STRIPPABLE COATING OR THE ONE ON SHEET PLASTIC DEPENDING ON THE TYPE OF PRIMARY BARRIERS TO BE USED.DELETE THE FOLLOWING SECTION ON STRIPPABLE COATINGS IF THE PRIMARY BARRIERS ARE TO BE SHEET PLASTIC.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

15. Primary Barrier - Preparation (cont.)

b. Strippable Coating

Protect surfaces in the Work Area with a strippable coating. Perform all work in strict compliance with manufacturer's instructions. Carry out work in the following sequence:

Before start of coating work inspect all surfaces to be coated. Report on any surfaces that may be damaged by the material or any condition that may interfere with adhesion of the coating to a surface to the FERMCO Project Manager before application of coating.

Photograph or videotape existing damage to affected surfaces and submit documentation to FERMCO Project Manager.

NOTE: FOLLOWING IS A CATCHALL. IT IS FAR PREFERABLE TO TEST THE MATERIAL FIRST AND DESIGN THE PROJECT ACCORDINGLY. THE FOLLOWING PROCEDURE MAY SAVE A DISASTER, BUT IS LIKELY TO RESULT IN A COSTLY EXTRA IF SHEET PLASTIC IS REQUIRED.

c. Test Patches

Apply test patches as directed by FERMCO or FERMCO Project Manager. Apply a small area of strippable coating to a hidden or obscure area of each surface in the Work Area to be coated. Allow to dry and peal off. Demonstrate results to FERMCO Project Manager prior to coating entire area. Commence coating of area only after receiving written authorization from the FERMCO Project Manager.

NOTE: STRIPPABLE COATINGS CLEAN SMOOTH SURFACES BETTER THAN WET WIPING OR HEPA VACUUMING. DURING THIS PROCESS THEY MAY ALSO UNCOVER HIDDEN DEFECTS SUCH AS PROBLEMS WITH PAINT ADHESION. DURING PROJECT DESIGN THESE SURFACES SHOULD BE CHECKED TO DETERMINE IF ANY SUCH DEFECTS EXIST.

d. Cover Procedures

Cover surfaces and equipment in work are from which coating may not strip cleanly.

Cover shelving, clocks, light fixtures and other equipment with one layer of 6-mil sheet plastic.

Cover fabric, paper, cork wall coverings or unpainted gypsum board with one layer of 6 mil sheet plastic.

Tape over any cracks that are larger than 1/16".

Tape over electrical outlets, switches, door locks etc.

NOTE: THE FOLLOWING THREE PARAGRAPHS ADDRESS WOOD PANELING. REVISE AS APPROPRIATE FOR PROJECT SPECIFICS OR DELETE IF THERE IS NO WOOD PANELING IN THE WORK AREA.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.5 Temporary Enclosures (cont.)

15. Primary Barrier - Preparation

NOTE: PETROLEUM BASED WOOD FINISHES, PARTICULARLY WAXES MAY BE REMOVED FROM WOOD SURFACES ALONG WITH DIRT AND CONTAMINATION. WOOD SURFACES SHOULD BE TESTED DURING PROJECT DESIGN AND A DECISION MADE ABOUT WHETHER THEY SHOULD BE ISOLATED FROM THE CLEANING PROVIDED BY THE STRIPPABLE COATING. THE FOLLOWING PARAGRAPH ADDRESSES THE REFINISHING OF WOOD SURFACES. THIS PRESUMES THAT DESIGNER HAS DETERMINED WHAT IS APPROPRIATE.

e. Wood Paneling

Wood paneling in area may have the finish partially removed by the strippable coating. These surfaces are to be coated directly with strippable coating and are not to be covered with sheet plastic. Refinishing of the this paneling will be accomplished by the FERMCO and is not a part of the work of this contract.

NOTE: FOLLOWING IS APPROPRIATE IF VERY DELICATE WOOD PANELING WERE IN Work Area.

Cover wood paneling in Work Area with one layer of 6 mil sheet plastic.

NOTE: FOLLOWING IS A CATCH ALL AND SHOULD GENERALLY NOT BE USED. THE ISSUE OF FINISHES ON WOOD SURFACES SHOULD BE RESOLVED DURING DESIGN.

f. Testing

Apply small area of coating in concealed location to wood finishes in Work Area. If finish is removed when coating is stripped inform FERMCO Project Manager. Cover wood surface with one layer of 6-mil sheet plastic unless otherwise notified by Project Manager.

g. Carpeting

NOTE: GENERALLY CARPETING SHOULD BE REMOVED AND DISPOSED OF IN A SPACE WHICH CONTAINS FRIABLE ASBESTOS--CONTAINING MATERIALS. USE LANGUAGE BELOW IF CARPETING IS TO BE SAVED. IF THERE IS NO CARPET DELETE FOLLOWING.

Cover carpeting with three layers of polyethylene sheeting at least 6 mil in thickness. Place corrugated cardboard sheets between the top and middle layers.

Do not use strippable coating as an adhesive to hold sheet plastic in place.

h. Coat or cover windows into Work Area

NOTE: STRIPPABLE COATINGS DEGRADE IN ULTRAVIOLET LIGHT IN SUNLIGHT. THIS DEGRADATION CAN PREVENT THE MATERIAL FROM STRIPPING CLEANLY. USE ONE OF THE FOLLOWING THREE PARAGRAPHS DESCRIBING PROTECTION OF WINDOWS.

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NOTE: FOLLOWING IS PREFERABLE SOLUTION TO WINDOWS IF PROJECT DURATION IS TO BE LESS THAN 25 DAYS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

15. Primary Barrier - Preparation (cont.)

Coat windows with window coating applied in a minimum 10 mil thickness when wet.

NOTE: FOLLOWING IS PREFERABLE WHERE PROJECT DURATION IS LONGER THAN 25 DAYS.

Cover windows with one layer of 6-mil sheet plastic. Cover sheet plastic with a thin but continuous coat of window or wall coating.

NOTE: FOLLOWING SHOULD GENERALLY NOT BE USED AS IT COMPLETELY ELIMINATES NATURAL LIGHTING FROM THE Work Area.

Cover windows with one layer of black 6-mil plastic.

i. Protect critical barriers

Install strippable coating so that it will not remove critical barriers during stripping of coating. Cover critical barriers comprised of sheet plastic with a second layer of sheet plastic configured to be removed with strippable coating. Protect critical barriers made from tape with a protective layers of sheet plastic or duct tape.

16. Strippable Coating

a. Application

Coat all surfaces in Work Area with strippable coating in following order:

Walls: Coat seams, corners, and junctions vertically. Coat balance of walls horizontally lapping over vertical sprayed areas by 50%.

Floor: Coat floor lapping wall by 12". Start at point furthest from entrance to Work Area and work toward door.

Use straight edge to shield ACM from coating during spray application.

Apply to a minimum of the following thicknesses. Thickness is to be measured when material is wet using a wet film thickness gauge.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

16. Strippable Coating (cont.)

SURFACE TO BE COATED	MINIMUM THICKNESS WHEN WET	REQUIRED COATING TYPE
Critical Barriers Sheet Plastic Covers	Not Applicable	
Glass	10 mil	Window Coating
Plastic Over Glass	2 mil	Wall Coating
Paneling, Painted Walls, Wall Covering	12 mil	Wall Coating
Glazed Tile, Smoothly Painted Brick, Painted Concrete Block	15 mil	Wall Coating
Floors	15 mil	Floor Coating
Unpainted Brick, Unpainted Concrete Block, Rough Wood	20 mil	Wall Coating

Coat brick and concrete block with a sufficient thickness of coating to obscure color of substrate completely.

Do not apply over tacky or chalky adhesives remaining from carpet or other flooring covering removal.

b. Respiratory protection

Require that all workers in Work Area from start of spray operation until all surfaces are dry use as a minimum requirement a half-face negative pressure respirator equipped with combination ammonia and HEPA type filter cartridges as specified in Section 11.11 Respiratory Protection.

c. Worker protection

Equip all workers in Work Area during spray operation with eye protectors, disposable gloves, and disposable paper suits.

d. Ventilation

During spraying operation maintain a minimum of four air changes per hour in the entire Work Area. Operate one additional HEPA filtered fan unit per spray operator in area while spraying is taking place.

NOTE: DELETE ENTIRE SECTION BELOW ON SHEET PLASTIC IF STRIPPABLE COATING IS TO BE USED.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

17. Sheet Plastic

Protect surfaces in the Work Area with two (2) layers of plastic sheeting on floor and walls, or as otherwise directed on the Contract Drawings or in writing by the FERMCO Project Manager. Perform work as follows:

a. Floors

Cover Floor of Work Area with 2 individual layers of clear polyethylene sheeting, each at least 6 mil in thickness, turned up walls at least 12 inches. Form a sharp right angle bend at junction of floor and wall so that there is no radius which could be stepped on causing the wall attachment to be pulled loose. Both spray-glue and duct tape all seams in floor covering. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently of bottom layer.

NOTE: GENERALLY CARPETING SHOULD BE REMOVED AND DISPOSED OF IN A SPACE WHICH CONTAINS FRIABLE ASBESTOS--CONTAINING MATERIALS. USE LANGUAGE BELOW IF CARPETING IS TO BE SAVED. IF THERE IS NO CARPET DELETE FOLLOWING.

b. Carpeting

Cover Carpeting with three layers of polyethylene sheeting at least 6 mil in thickness. Place corrugated cardboard sheets between the top and middle layers.

NOTE: THE FOLLOWING LANGUAGE SHOULD BE USED IF CARPETING HAS A PAD OR IS OTHERWISE THICK ENOUGH TO PROVIDE QUESTIONABLE FOOTING FOR SCAFFOLDING.

Cover Sheet Plastic in areas where scaffolding is to be used with a single layer of 1/2" CDX plywood or 1/4" tempered hardboard. Wrap edges and corners of each sheet with duct tape. At completion of abatement work wrap plywood or hardboard with 2 layers of 6-mil polyethylene and move to next Work Area or dispose of as an asbestos-contaminated waste material in accordance with section 11.20 of this specification.

c. Walls

NOTE: THREE LAYERS OF 6-MIL PLASTIC SHOULD BE CONSIDERED IN AREAS WHERE PLASTIC MAY BE RIPPED, SUCH AS IN A REMOVAL WITH WIRE LATH OR WHERE ROOM FINISHES ARE DELICATE OR COSTLY.

Cover all walls in Work Area including "Critical Barrier" sheet plastic barriers with one layer of polyethylene sheeting, at least 6-mil in thickness, mechanically supported and sealed with duct tape or spray-glue in the same manner as "Critical Barrier" sheet plastic barriers. Tape all joints including the joining with the floor covering with duct tape or as otherwise indicated on the Contract Documents or in writing by the FERMCO Project Manager.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

17. Sheet Plastic

d. Stairs and Ramps

NOTE: SHEET POLYETHYLENE IS VERY SLIPPERY UNDERFOOT AND CAN PRESENT A CONSIDERABLE SLIPPING HAZARD. DELETE THE FOLLOWING IF THERE ARE NO STAIRS RAMPS OR LADDERS IN THE Work Area.

Do not cover stairs or ramps with unsecured sheet plastic. Where stairs or ramps are covered with plastic, provide 3/4" exterior grade plywood treads securely held in place, over plastic. Do not cover rungs or rails with any type of protective materials.

e. Repair of Damaged Polyethylene Sheeting

Remove and replace plastic sheeting which has been damaged by removal operations or where seal has failed allowing water to seep between layers. Remove affected sheeting and wipe down entire area. Install new sheet plastic only when area is completely dry.

NOTE: AN ISOLATION AREA PROVIDES A BUFFER IF THERE IS A FAILURE OF WORK AREA ISOLATION. AN ISOLATION AREA IS APPROPRIATE WHEN ADJACENT SPACES HAVE A CRITICAL OCCUPANCY WHICH CANNOT BE INTERRUPTED.

NOTE: THE LOCATION AND ARRANGEMENT OF ISOLATION AREAS SHOULD BE SHOWN ON THE PLANS.

18. Isolation Area

Maintain isolation areas between the Work Area and adjacent building area:

NOTE: FOLLOWING ARE EXAMPLES. EDIT TO SUIT PROJECT REQUIREMENTS.

In locations shown on the plans.

In unoccupied rooms located between Work Area and adjacent occupied portions of the building.

In locations where separation between Work Area and occupied portions of building is formed by sheet plastic and/or temporary barriers.

Floor below Work Area.

Form isolation area by controlling access to the space in the same manner as a Work Area. Physically isolate the space from the Work Area and adjacent areas. Accomplish physical isolation by:

NOTE: FOLLOWING ARE EXAMPLES. EDIT TO SUIT PROJECT REQUIREMENTS.

Installing critical barriers in unoccupied space.

Erecting a second Critical Barrier a minimum of 3'-0" away from Work Area.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.5 Temporary Enclosures (cont.)

19. Stop Work

If the Critical or Primary barrier falls or is breached in any manner stop work immediately. Do not start work until authorized in writing by the FERMCO Project Manager.

20. Extension of Work Area

If the Critical Barrier is breached in any manner that could allow the passage of asbestos debris or airborne fibers, then add affected area to the Work Area, enclose it as required by this Section of the specification and decontaminate it as described in Section 11.17, Project Decontamination - Poly Removal.

21. Secondary Barrier

A secondary layer of plastic as a drop cloth to protect the primary layer from debris generated by the asbestos abatement work is specified in the appropriate work sections.

NOTE: FOLLOWING IS A CATCH-ALL. IT IS PREFERABLE TO DESIGN THE STRUCTURE AND SHOW IT ON THE DRAWINGS.

22. Exterior Enclosures

Construct exterior enclosures as a Critical Barrier as necessary to completely enclose the work. Fabricate from reinforced polyethylene sheeting and 2" x wood framework. Attach to existing building components or brace as necessary for lateral stability. Construct walls to meet all state and local regulations for construction of temporary buildings. Construct to resist a wind of 30 MPH, slope ceiling to permit drainage of rain water.

11.6 Regulated Areas

NOTE: A REGULATED AREA IS REQUIRED WHENEVER AN OPERATION RESULTS IN AIRBORNE CONCENTRATIONS OF ASBESTOS THAT EXCEED OR CAN BE EXPECTED TO EXCEED THE PEL OF 0.2 F/CC.

NOTE: UNDER SOME INTERPRETATIONS OF THE OSHA STANDARD, THE POSSIBILITY OF THE PEL BEING EXCEEDED EXISTS ANYTIME ACM IS DISTURBED. THIS INTERPRETATION REQUIRES A REGULATED AREA REGARDLESS OF AIRBORNE FIBER LEVELS MEASURED DURING THE OPERATION. CAUTION MUST BE EXERCISED IN WRITING A SPECIFICATION TO DETERMINE WHAT INTERPRETATION WILL BE APPLIED BY GOVERNING REGULATORY BODIES.

NOTE: OSHA DISTINGUISHES THREE TYPES OF REGULATED AREAS AS BEING REQUIRED BY THE CONSTRUCTION WORK PLACE STANDARD 29 CFR 1926.58.

NOTE: FOR GENERAL CONSTRUCTION OPERATIONS THE REGULATED AREA REQUIRES: DEMARCATION; LIMITATIONS ON ACCESS; USE OF RESPIRATORY PROTECTION; AND PROHIBITION OF ACTIVITIES SUCH AS EATING, DRINKING, SMOKING, CHEWING TOBACCO OR GUM, OR APPLYING COSMETICS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.6 Regulated Areas (cont.)

NOTE: FOR ASBESTOS REMOVAL, DEMOLITION AND RENOVATION OPERATIONS A "NEGATIVE PRESSURE ENCLOSURE" IS REQUIRED. SECTION 11.5 TEMPORARY ENCLOSURES, SECTION 11.4 PRESSURE DIFFERENTIAL & AIR CIRCULATION SYSTEM, AND SECTION 11.12 DECONTAMINATION UNITS, TAKEN TOGETHER, DESCRIBE A "NEGATIVE PRESSURE ENCLOSURE."

NOTE: SMALL-SCALE SHORT-DURATION OPERATIONS INVOLVING MAINTENANCE ACTIVITIES THAT WILL OR MIGHT DISTURB ACM REQUIRE THE USE OF SPECIFIC WORK PRACTICES AND PROCEDURES IN LIEU OF A NEGATIVE PRESSURE ENCLOSURE.

NOTE: THIS SECTION PROVIDES LANGUAGE FOR SPECIFYING A CONTROLLED AREA WHICH CAN BE THE REGULATED AREA FOR A GENERAL CONSTRUCTION ACTIVITIES OR THE AREA IN WHICH SMALL-SCALE SHORT-DURATION WORK IS TO TAKE PLACE.

NOTE: SOME OFFICES OF OSHA INTERPRET THE CONSTRUCTION WORKPLACE REGULATION AS REQUIRING AN ENCLOSURE FOR ANY DISTURBANCE OF ACM REGARDLESS OF AIRBORNE FIBER LEVELS GENERATED.

NOTE: THE LOCAL OFFICE OF OSHA SHOULD BE CONTACTED FOR AN INTERPRETATION BEFORE WRITING ANY SPECIFICATION THAT MAY INCLUDE WORK AREA ISOLATION LESS THAN A "NEGATIVE PRESSURE ENCLOSURE. "

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

2. Related Work Specified Elsewhere

Required supervision and ODOH certified Competent Person is specified in Section 7.5.

Worker Protection - Asbestos Abatement is specified in Section 11.9.

NOTE: SELECT EITHER THE REFERENCE ABOVE OR BELOW AND DELETE THE OTHER

Worker Protection - Repair is specified in Section 11.10.

Respiratory Protection is specified in Section 11.11.

NOTE: INCLUDE THE FOLLOWING IF A REMOTE SHOWER IS REQUIRED BY THE WORK.

Wet Decontamination Facilities are described in Section 11.12

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.6 Regulated Areas (cont.)

3. Description of Work

NOTE: PROCEDURES SET OUT IN THIS AND ACCOMPANYING SECTIONS, 11.7, 11.10, 11.18, 11.163 AND 11.1 SHOULD BE USED TO SPECIFY PROCEDURES NEEDED TO SUPPORT REPAIR OR MAINTENANCE OF EXISTING BUILDING COMPONENTS. UNDER NO CIRCUMSTANCES SHOULD THESE SECTIONS BE USED TO SPECIFY DEDICATED PURPOSE REMOVAL OF ACM.

NOTE: SECTION 11.8 SMALL SCALE SHORT DURATION WORK INCLUDES MINI-ENCLOSURES AND GLOVE BAGS WHICH MAY BE USED ON DEDICATED ASBESTOS ABATEMENT ACTIVITIES.

Work of this section consists of preparing a Regulated Area for work of the following specification sections only. Do not use procedures set forth in this section in connection with any other work.

Section 11.7 Entry Into Controlled Areas
Section 11.8 Small-Scale Short-Duration Work
Section 11.18 Cleaning and Decontamination Procedures

4. Submittals

Submit the following to the FERMCO Project Manager for review. Begin no work until these submittals are returned with FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

a. HEPA Filtered Vacuum Cleaners

Submit product data.

b. Signs

Submit samples of each type of sign to be used.

c. Warning Tape

Submit samples.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.6 Regulated Areas

PART 2 - EQUIPMENT

5. HEPA Filter Vacuum Cleaners

a. Available Manufacturers

Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

NOTE: RETAIN ABOVE FOR NONPROPRIETARY OR BELOW FOR SEMI-PROPRIETARY SPECIFICATION. " ABOVE IS THE CURRENT LANGUAGE REPLACING FORMER "OR EQUAL" CLAUSES.

b. Manufacturer

Subject to compliance with requirements, provide products of one of the following:

NOTE: THE FOLLOWING IS A LIST OF FIRMS BELIEVED TO MANUFACTURE THIS PRODUCT. NO MANUFACTURERS HAVE BEEN KNOWINGLY EXCLUDED AND NO ATTEMPT HAS BEEN MADE TO EVALUATE THESE PRODUCTS. ADDITIONAL SUPPLIERS MAY EXIST. PRODUCT LITERATURE SHOULD BE USED TO EVALUATE THESE PRODUCTS AND TO VERIFY THAT LISTED PRODUCTS COMPLY WITH THE SPECIFICATIONS AND MEET PROJECT REQUIREMENTS. VERIFY THAT PRODUCTS INDICATED ARE STILL BEING MANUFACTURED. EDIT OR ADD TO THE LIST AS APPROPRIATE TO THE PROJECT REQUIREMENTS.

Nilfisk of America Inc. 225 Great Valley Parkway Malvern, PA 19355	HEPA Filtered Vacuums
Clayton Associates, Inc. P.O. Box 589 30 Southard Avenue Farmingdale, NJ 07727	Ace model HEPA Vacuum
Hako Minuteman 111 South Route 53 Addison, IL 60101	Hako Minuteman
Vactagon Pneumatic Systems,Inc. 18 Homestead Place Bergenfield, NJ 07621	Vaculoader Hepa Vacuum
Pullman-Holt (White) Corporation PO Box 277 Fultonville, New York 12072	HEPA Filtered Vacuums

PART 3 - EXECUTION

6. Securing Work Area

Secure work area from access by occupants, staff or users of the building. Accomplish this where possible, by locking doors, windows, or other means of access to the area, or by constructing temporary wood stud and plywood barriers.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.6 Regulated Areas (cont.)

7. Demarcation of Regulated Area

Demarcate each Regulated Area with a sheet plastic drop sheet as described below.

Post warning signs that carry the following legends:

a. First Sign

Provide warning signs at each locked door leading to the controlled area reading as follows:

Legend	Notation
KEEP OUT	3 inch Block

b. Second Sign

Immediately inside the locked door and outside the controlled area post an approximately 20 inch by 14 inch manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

Legend:

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD

RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

EDIT BELOW BASED UPON SPECIFIC WIDTH AND TEXT AVAILABLE.

Where the controlled area is in a large area such as on part of a boiler room or open office area, delineate area with 3 inch wide polyethylene ribbon with the printed warning, "CAUTION ASBESTOS REMOVAL". Install this ribbon at between 3 and 4 feet above the floor.

8. Scheduling

Work may be carried out during normal working hours in those areas which can be completely secured by lockable doors from access by building occupants and staff, and which have HVAC equipment that can be shut down and locked off. Otherwise, work is to be carried out after building occupants and cleaning staff have left.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.6 Regulated Areas (cont.)

9. General Procedures

The following precautions and procedures have application to work of this section. Workers must exercise caution to avoid release of asbestos fibers into the air:

a. Preparation

Setup and management of the controlled area is to be under the supervision of a OSHA Competent Person as described in Section 10.6 Project Coordination - Asbestos Abatement.

Before start of work comply with requirement for worker protection in section 11.10, and respiratory protection in section 11.11.

Shut down any air handling equipment bringing air into or out of the Regulated Area.

Clean any existing dust or debris from the floor and walls, and other surface in the immediate location of the work prior to commencing work by damp-mopping or by use of a High Efficiency Particulate Air (HEPA) filtered vacuum.

Cover floor in vicinity of Work Area and six feet beyond, with 6-mil polyethylene drop sheet. Where work is adjacent to wall, extend drop sheet up wall and secure at ceiling with duct tape. This drop sheet demarcates the boundary of the Regulated Area.

Seal all openings, supply and exhaust vents, and connectors within ten feet of the Work Area with 6 mil polyethylene sheeting secured and completely sealed with duct tape.

b. Controls

Do not allow eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics in the Regulated Area.

c. Work Procedures

Perform the work per the appropriate specification section while on plastic drop sheet.

Immediately remove any asbestos-containing debris which collects on the drop sheet either by using a HEPA vacuum or by spraying with amended water or removal encapsulant, collecting with wet paper towels, placing in a disposal bag while still wet, and cleaning surface of plastic sheet with wet paper towels.

Complete the following at completion of work in an area before stepping off drop sheet.

While standing on plastic sheet thoroughly HEPA vacuum ladder and any tools used and pass to worker standing off sheet.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.6 Regulated Areas (cont.)

9. General Procedures (cont.)

Worker standing off the sheet HEPA vacuum thoroughly the worker standing on the sheet.

Worker on the sheet thoroughly HEPA vacuum all surfaces of the plastic sheet, bags, and any other items on the sheet including his own feet.

d. Completion

If moving to the next Work Area in the same secured area: Worker on the drop sheet is to don clean foot covers, placing each foot, in turn, off the sheet as the foot cover is put on. Remove clean foot covers at the next Work Area while standing on the sheet. Dispose of the used foot covers along with the plastic sheet at completion of work in that area. Do not reuse foot covers to move off the sheet.

If work day is complete or if next Work Area is in another secured area: all workers remove paper suits turning them inside out while doing so. The person on the sheet step with each foot off the sheet as the foot covers are removed.

Fold sheet and all its contents toward the center.

Place the sheet in a properly labeled disposal bag.

Neck down the bag and collapse it with the HEPA vacuum.

Twist the bag shut, bend over and seal with duct tape by wrapping around bag neck at least three times.

Clean all surfaces of the Work Area by use of a HEPA filter vacuum until no visible residue remains.

NOTE: USE FOLLOWING TWO PARAGRAPHS IF WORK INVOLVED WILL NOT RESULT IN CONTAMINATION OF WORKERS CLOTHES OR AIRBORNE FIBER CONCENTRATIONS ABOVE BUILDING BACKGROUND LEVELS. IF A WORKER'S CLOTHING BECOMES CONTAMINATED OR AIRBORNE ASBESTOS CONCENTRATIONS ABOVE BUILDING BACKGROUND ARE EXPERIENCED DELETE THE FOLLOWING TWO PARAGRAPHS AND USE THE PARAGRAPH REQUIRING A WET DECONTAMINATION.

e. Decontamination - Dry

At completion of work require all workers to complete decontamination procedures in accordance with Section 11.10 Worker Protection - Repair & Maintenance.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.6 Regulated Areas (cont.)

9. General Procedures (cont.)

f. Respirators

Remove respirators using the procedure in Section 11.10 Worker Protection - Repair & Maintenance.

NOTE: IF OPERATION MAY RESULT IN CONTAMINATION OF WORKER CLOTHING OR AIRBORNE ASBESTOS CONCENTRATIONS ABOVE BUILDING BACKGROUND RETAIN THE PARAGRAPH BELOW, REQUIRING A WET DECONTAMINATION, AND DELETE THE TWO ABOVE.

g. Decontamination - Wet

At completion of work require all workers to complete wet decontamination procedures in accordance with Section 11.9 Worker Protection - Asbestos-Abatement.

11.7 Entry into Controlled Area

NOTE: OSHA REGULATIONS IN 29 CFR 1926 GENERALLY REQUIRE THAT ANY WORK WHICH DISTURBS ASBESTOS-CONTAINING MATERIALS TAKE PLACE IN AN ENCLOSURE.

NOTE: SOME INTERPRET THE OSHA STANDARD AS NOT APPLYING TO OPERATIONS THAT DO NOT DEVELOP AIRBORNE FIBER LEVELS AS HIGH AS THE OSHA PEL OF 0.2 F/CC.

NOTE: OTHERS INTERPRET THE STANDARD AS REQUIRING AN ENCLOSURE REGARDLESS OF THE FIBER COUNTS GENERATED. THIS INTERPRETATION HOLDS THAT ANY DISTURBANCE COULD, AT SOME TIME, GENERATE AIRBORNE FIBER LEVELS AT OR ABOVE THE PEL.

NOTE: THIS SECTION DEPENDS UPON THE PREVIOUS INTERPRETATION THAT ALLOWS OPEN WORK PROCEDURES.

NOTE: AN INTERPRETATION SHOULD BE SOUGHT FROM THE REGULATORY BODY ENFORCING OSHA REQUIREMENT ON THE PROJECT.

NOTE: USE OF OPEN WORK PROCEDURES COULD RESULT IN A CITATION FOR VIOLATION OF OSHA REQUIREMENTS.

NOTE: WORK OF THIS SECTION SHOULD GENERALLY BE PERFORMED INSIDE A REGULATED AREA AS DESCRIBED IN SECTION 11.6.

NOTE: THIS SECTION DESCRIBES OPEN WORK PROCEDURES THAT SHOULD ONLY BE USED IF AIRBORNE FIBER LEVELS HAVE BEEN MEASURED IN THE PAST DURING WORK OF THE SAME TYPE. AIRBORNE FIBER COUNTS HAVE TO MEET TWO CRITERIA BEFORE AN OPEN WORK PROCEDURE CAN BE USED.

1) AIRBORNE FIBER COUNTS IN THE BREATHING ZONE OF THE WORKER MUST BE BELOW 0.2 AND PREFERABLY BELOW 0.1 FIBERS PER CUBIC CENTIMETER.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.7 Entry into Controlled Area (cont.)

2) WHERE CLEARANCE TESTING OR OTHER AREA MONITORING IS INVOLVED, SUCH AS UNDER AHERA, AIRBORNE FIBER COUNTS IN SPACE MUST BE AT OR BELOW SUCH ESTABLISHED CLEARANCE LEVELS.

NOTE: THESE LEVELS ARE ESTABLISHED BY INITIAL MONITORING DURING ACTUAL OR SIMULATED WORK. IN THE ABSENCE OF HISTORIC DATA THIS INITIAL MONITORING SHOULD BE CARRIED OUT IN AN ENCLOSED WORK AREA. AN ENVIRONMENTAL CONSULTANT DESIGNING A CONTROL PROGRAM WILL FREQUENTLY CALL UPON HISTORIC DATA FROM SIMILAR WORK IN SIMILAR STRUCTURES TO SUPPORT A DECISION TO INITIATE WORK WITH OPEN PROCEDURES. THIS INITIAL MONITORING SHOULD INCLUDE:

1) BREATHING ZONE SAMPLES SHOULD ALWAYS BE MEASURED USING PCM AND THE OSHA REFERENCE METHOD. IT IS PRUDENT TO CROSS ANALYZE A SUFFICIENT NUMBER OF THESE SAMPLES BY TEM TO ESTABLISH A STATISTICALLY RELIABLE DESCRIPTION OF CONDITIONS.

2) AREA SAMPLES SHOULD BE ANALYZED BY PCM. A SUFFICIENT NUMBER OF THESE SAMPLES SHOULD BE CROSS ANALYZED BY TEM TO ESTABLISH A STATISTICALLY RELIABLE DESCRIPTION OF CONDITIONS.

NOTE: AFTER COMPLETION OF THIS INITIAL MONITORING THESE PROCEDURES WILL FREQUENTLY NOT BE MONITORED. IN MANY INSTANCES THE WORK PERFORMED IS OF SUCH SHORT DURATION AND SUFFICIENTLY SPORADIC THAT REPRESENTATIVE MONITORING IS NOT POSSIBLE. IT IS PRUDENT TO PERFORM MONITORING SIMILAR TO THIS INITIAL MONITORING ON A PERIODIC BASIS. THE FREQUENCY OF THIS PERIODIC MONITORING WILL DEPEND ON THE LEVEL OF CONTROL IMPOSED ON PROPER EXECUTION OF THE PROCEDURES.

PART 1 GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 1 Specification Sections, apply to work of this section.

2. Description of Work

a. General

The provisions of this section apply when entry is required into an area where such entry could cause contamination of portions of the building and/or where respiratory or other worker protection measures are required.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.7 Entry into Controlled Area (cont.)

2. Description of Work (cont.)

Unless authorized in writing by the FERMCO Project Manager, the provisions of this section apply to only the following situations:

NOTE: THIS SECTION SHOULD BE USED AS A MEANS TO ALLOW ACCESS FOR REPAIR ONLY.

NOTE: THE FOLLOWING ARE EXAMPLES OF THE TYPES OF SITUATIONS COVERED BY THIS SECTION. EDIT FOR SPECIFIC PROJECT REQUIREMENTS.

Entry into the space above a suspended ceiling where there is visible asbestos-containing debris, or other friable asbestos-containing surfacing material when the ceiling tiles in an area no greater than 6 feet by 12 feet are to be removed.

b. Sealed Access

Entry through sealed access (access door, hatchway, locked door) into an area with friable asbestos-containing surfacing materials or visible debris.

NOTE: OSHA REGULATIONS IN 29 CFR 1926 GENERALLY REQUIRE THAT ANY WORK WHICH DISTURBS ASBESTOS-CONTAINING MATERIALS TAKE PLACE IN AN ENCLOSURE. DEPENDING UPON LOCAL INTERPRETATION OPEN WORK PROCEDURES MAY BE ALLOWABLE WHERE THE PERMISSIBLE EXPOSURE LIMIT (PEL) OF 0.2 FIBERS PER CUBIC CENTIMETER IS NOT REACHED. THE FOLLOWING PARAGRAPH REQUIRES THE SUBMISSION OF DATA DEMONSTRATING THE CONTRACTOR'S ABILITY TO PERFORM THE WORK WITHIN THESE LIMITS.

NOTE: THIS SECTION MAY BE BASED ON DATA FROM FERMCO RATHER THAN CONTRACTOR DATA. IF THIS IS THE CASE DELETE THE FOLLOWING.

c. Historic Airborne Fiber Data

Use procedures of this section only where historic airborne fiber data demonstrate that airborne fiber counts in the breathing zone of those performing the work can be continuously maintained at less than 0.2 fibers per cubic centimeter.

Use procedures of this section only where historic airborne fiber data demonstrate that airborne fiber counts in the work area can be continuously maintained at less than 0.01 fibers per cubic centimeter.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.7 Entry into Controlled Area (cont.)

3. Submittals

NOTE: THE PROCEDURES CONNECTED WITH THIS SECTION ARE PREDOMINANTLY OPEN WORK PROCEDURES THAT DO NOT ELEVATE AIRBORNE FIBER LEVELS. THIS CANNOT SIMPLY BE PRESUMED. AIRBORNE FIBER LEVELS GENERATED BY THE WORK MUST BE MEASURED AND FOUND TO BE WITHIN THE FOLLOWING BOUNDS.

a. Historic Airborne Fiber Data

Submit airborne asbestos fiber count data from an independent air monitoring firm to demonstrate:

NOTE: IF THE FOLLOWING IS EXCEEDED THEN THE WORK TRIGGERS THE OSHA REQUIREMENT FOR ENCLOSURE

The ability to perform work of this section while maintaining an airborne fiber count below 0.2 fibers per cubic centimeter in the breathing zone of the individual performing the work.

NOTE: IF THE FOLLOWING IS EXCEEDED THEN THERE EXISTS A POSSIBILITY THAT THE SPACE HAS BEEN CONTAMINATED. IF THIS WERE TO OCCUR THEN THE SPACE WOULD REQUIRE A DECONTAMINATION.

The ability to perform work of this section while maintaining an airborne fiber count below 0.01 fibers per cubic centimeter in the work area.

b. Project Specific Data

Include the following data for each procedure required by the work:

Date of measurements

Operations monitored

Sampling and analytical methods used and evidence of their accuracy

Number, duration, and results of samples taken

PART 2 - PRODUCTS(NOT APPLICABLE)

PART 3 - EXECUTION

4. Regulated Area

Prior to beginning work in this area establish a regulated area as described in Section 11.6, Regulated Areas.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.7 Entry into Controlled Area (cont.)

5. Access Through Suspended Ceiling

Remove acoustical panels from ceiling suspension system using the following sequence:

NOTE: REVISE THE FOLLOWING TO REQUIRE A WET DECONTAMINATION IF PERSONNEL SAMPLING DURING INITIAL MONITORING INDICATES THAT AIRBORNE FIBER LEVELS ARE ELEVATED DURING THE ACTIVITY.

Follow worker protection procedures including disposable coveralls and respirators required by Section 11.9, and Section 11.11.

Follow local area protection procedures of Section 11.7. Spread layer of 6 mil polyethylene sheet on floor 6 feet further in extent than the size of the ceiling opening to be made.

NOTE: THE ABOVE THREE SUBPARAGRAPHS REQUIRE AMPLIFICATION IF SECTION 11.10, 11.11, 11.6 ARE NOT INCLUDED IN SPECIFICATION.

HEPA vacuum around edges of all panels to be removed.

While holding nozzle of HEPA vacuum in vicinity slowly lift one edge of center ceiling panel. Immediately HEPA vacuum space at lifted edge. Lift entire panel straight up and HEPA vacuum all four sides.

Place panel on top of adjacent ceiling.

NOTE: THE FOLLOWING IS GOOD PRACTICE. IF A SMALL (UNDER 100C CFM) HEPA FILTERED FAN UNIT IS AVAILABLE.

Place intake duct to HEPA Filtered Fan Unit per Section 11.4 in space above ceiling and fasten in place. Operate machine continuously while ceiling is open.

Note that the operation of the HEPA vacuum is intended to clean the air in the location of the work. As such the nozzle should be kept above the ceiling as much as possible and the canister on the floor.

Climb to a position which permits access to the top of the ceiling adjacent to the removed panel.

Working in the space above the ceiling, HEPA vacuum both sides of the ceiling panel first removed and hand it down into a 6 mil polyethylene bag for storage.

Remove loose material hanging from the friable asbestos-containing material with the suction from the HEPA vacuum.

NOTE: REVISE ABOVE AS NECESSARY. PROCEDURES SHOULD ALWAYS WORK FROM HIGH TO LOW SO THAT SETTLING FIBERS ARE COLLECTED.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.7 Entry into Controlled Area (cont.)

5. Access Through Suspended Ceiling (cont.)

Pass wand of operating HEPA vacuum through air between ACM and top of ceiling.

HEPA vacuum the tops of all ceiling panels which are in reach.

Carefully HEPA vacuum the crack between the suspension system and ceiling panels from the top for all ceiling panels within reach.

Remove ceiling panels as required while constantly HEPA vacuuming all four edges of panel and suspension system.

Working in space above ceiling HEPA vacuum both sides on each panel removed and hand each down into a 6-mil polyethylene bag which is labeled as set forth is Section 11.20.

NOTE: NOTE THAT THE ABOVE LANGUAGE WILL REQUIRE EDITING IF SECTION 11.20 IS DELETED FROM THE SPECIFICATION.

Maintain HEPA vacuum in operation with nozzle above ceiling and exhaust at floor for the entire time that the ceiling is open and work is being done above the ceiling.

When above-ceiling work is complete replace ceiling panels.

HEPA vacuum worker's head, arm, and shoulders before climbing down from ceiling.

HEPA vacuum ladder while climbing down.

While standing on plastic sheet thoroughly HEPA vacuum ladder and pass it to person standing off sheet.

6. Entry into Controlled Areas

Use same procedure as above except that ceiling tiles do not need to be removed.

If access is through a wall hatch or door, duct tape floor sheet to wall or threshold.

If access is into large area such as crawl tunnel, comply with worker protection requirements but use HEPA vacuum only for work procedures in the area.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.7 Entry into Controlled Area (cont.)

7. Personnel Decontamination

NOTE: USE THE FOLLOWING LANGUAGE UNLESS INITIAL MONITORING DEMONSTRATES THAT THE WORK PROCEDURES USED DO NOT RESULT IN AIRBORNE ASBESTOS CONCENTRATIONS ABOVE BUILDING BACKGROUND.

At the end of all work change to a clean disposable coverall and leaving respirator in place proceed to a remote shower and decontaminate as required by Section 11.9, Worker Protection - Asbestos Abatement.

NOTE: USE THE PARAGRAPH BELOW AND DELETE THE ABOVE IF INITIAL MONITORING DEMONSTRATES THAT WORKERS WILL NOT EXPERIENCE EITHER AIRBORNE ASBESTOS CONCENTRATIONS ABOVE BUILDING BACKGROUND OR DIRECT CONTAMINATION OF CLOTHING.

Complete dry decontamination procedures set forth in Section 11.10.

11.8 Small Scale Short Duration Work

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

2. Description of the Work

a. Minor Work

Use provisions of this section when minor work is to be performed on ACM. Work is considered minor when:

Removal of less than two hundred sixty linear feet (260 linear ft.) of ACM is involved in the work.

Removal of no more than one hundred sixty square feet (160 sq. ft.) of pipe insulation no greater than six inches (6 in.) in diameter is involved in the work.

b. Temporary Enclosures

Comply with Section 11.5 - Temporary Enclosures if the quantities of ACM exceed the above, or if airborne fiber counts generated by the work exceed 0.2 fibers per cubic centimeter in the breathing zone of the person performing the work.

c. Disturbance of ACM

Use provisions of this section when the work involves disturbance of but not removal of small areas of ACM.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

3. Submittals

Before start of work, submit the following to the FERMCO Project Manager for review. Do not begin work until these submittals are returned with the FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use.

a. Surfactant

Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.

b. Removal Encapsulant

Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.

c. NESHAPS Certification

Submit certification from manufacturer of surfactant or removal encapsulant that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet asbestos-containing materials to which it is applied as required by the National Emission Standard for Hazardous Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M).

d. Material Safety Data Sheet

Submit Material Safety Data Sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for each surfactant and encapsulating material proposed for use. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

e. Historic Airborne Fiber Data

Submit airborne asbestos fiber count data from an independent air monitoring firm to demonstrate the ability to perform work of this section while maintaining an airborne fiber count below 0.2 fibers per cubic centimeter in the breathing zone of the individual performing the work. Include the following data for each procedure required by the work:

Date of measurements

Operations monitored

Sampling and analytical methods used and evidence of their accuracy

Number, duration, and results of samples taken

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

3. Submittals

f. Spray Cement

Submit following:

Product description including major components and solvents

Manufacturer's installation instructions

Indicate portions applicable to the project.

Submit the Material Safety Data Sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for spray cement material proposed for use on the work. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

g. Sheet Plastic

For fire retardant plastic submit test reports on NFPA 701 test.

h. Glovebags

Submit product data.

i. Signs

Submit samples of signs to be used.

j. Mini-enclosure

Provide shop drawing of mini-enclosure arrangement to used.

PART 2 - PRODUCTS

4. Sheet Plastic

NOTE: EDIT THE FOLLOWING LIST TO ELIMINATE THOSE TYPES OF PLASTIC NOT USED.

NOTE: FOLLOWING IS MOST LIKELY TO BE FOUND ON THE JOB IN THE ABSENCE OF A MORE SPECIFIC REQUIREMENT.

a. Polyethylene Sheet

A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil thick as indicated, clear, frosted, or black as indicated.

NOTE: FOLLOWING IS A GOOD GENERAL PRECAUTION AND SHOULD ALWAYS BE USED IN AREAS WHERE THERE COULD BE EXITING DIFFICULTIES IN CASE OF EMERGENCY (WORK AREAS ABOVE OR BELOW GRADE OR INTERIOR SPACES WITH LIMITED EXITS) OR THERE IS HOT EQUIPMENT OR A POTENTIAL FOR FIRE, SUCH AS IN A BOILER ROOM. FIRE RETARDANT SHEET PLASTIC IS CONSIDERABLY MORE EXPENSIVE THAN STANDARD PLASTIC.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

4. Sheet Plastic (cont.)

b. Polyethylene Sheet

Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil thick as indicated, frosted or black as indicated.

NOTE: REINFORCED PLASTIC SHOULD BE USED IN EXTERIOR APPLICATIONS WHERE THE SHEET IS EXPECTED TO BE STRESSED BY WINDS OR IN ANY LOCATION WHERE HIGH SKIN STRENGTH IS REQUIRED. FOLLOWING IS AN EXAMPLE OF LANGUAGE WHICH CAN BE USED. EDIT TO SUIT REQUIREMENTS.

c. Reinforced Polyethylene Sheet

Where plastic sheet constitutes the only barrier between the Work Area and the building exterior, provide translucent, nylon reinforced or woven polyethylene, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil thick as indicated, frosted or black as indicated.

5. Miscellaneous Materials

a. Duct Tape

Provide duct tape in 2" or 3" widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

b. Spray Cement

Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

NOTE: FOLLOWING ALLOWS THE CONTRACTOR TO USE EITHER A SURFACTANT IN WATER OR A REMOVAL ENCAPSULANT, PROVIDING THAT IT IS ABLE TO PERFORM AS WELL AS THE GENERIC MIXTURE OF 50% POLYOXYETHYLENE ESTER AND 50% POLYOXYETHYLENE ETHER.

c. Wetting Materials

For wetting prior to disturbance of asbestoscontaining materials use one of the following:

Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a solution of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

5. Miscellaneous Materials (cont.)

c. Wetting Materials (cont.)

Removal Encapsulant: Provide a penetrating type encapsulant designed specifically for removal of asbestos-containing material. Use a material which results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a solution of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

d. Encapsulants

Encapsulants are specified in OM-0005, Asbestos Operations and Maintenance Work Practices.

e. Glove bag

Provide minimum 6 mil polyethylene, polyvinylchloride or equivalent plastic sack, with two sealed inward projecting longsleeved gloves or mittens, preprinted with same warning notice as a disposal bag, equipped with a pouch for storage of tools, with designated location for wand or HEPA vacuum wand, and sufficient capacity to hold removed materials and permit sealing as specified.

f. Garden Sprayer

Provide a hand pump type pressure-can garden sprayer fabricated out of either metal or plastic, equipped with a metal wand at the end of a hose that can deliver a stream or spray of liquid under pressure.

PART 3 - EXECUTION

6. General

Complete the following before start of work of this section:

Regulated Areas (Section 11.6)

Respiratory Protection (Section 11.11)

Worker Protection - Asbestos Abatement (Section 11.9)

NOTE: RETAIN ABOVE AND DELETE BELOW IF MINI-ENCLOSURES ARE TO BE USED OR IF WET DECONTAMINATION IS REQUIRED, AND GLOVE BAGS ARE NOT TO BE USED. RETAIN BELOW AND DELETE ABOVE IF WORK INVOLVES GLOVE BAGS ONLY. RETAIN ABOVE AND BELOW IF BOTH GLOVE BAGS AND MINI-ENCLOSURES AND/OR WET DECONTAMINATION ARE INVOLVED.

Worker Protection - Repair (Section 11.10)

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

7. Worker Protection

Before beginning work with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

When Glove-Bagging, all lock-out, tag-out procedures shall be followed to ensure safe working conditions for the area being abated.

8. Glove Bag

Remove ACM inside a glove bag according to the following procedure:

a. Check pipe where the work will be performed. Wrap damaged (broken lagging, hanging, etc.), pipe in 6 mil plastic and "candy-stripe" with duct tape. Place one layer of duct tape around undamaged pipe at each end where the glove bag will be attached.

b. Slit top of the glove bag open (if necessary) and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe diameter).

   NOTE: ONE BRAND OF GLOVE BAG HAS A ZIPPER TOP AND STRAPS AT EACH END FACILITATING INSTALLATION OF THE BAG ON THE PIPES.

c. Place necessary tools into pouch located inside glove bag. This will usually include: bone saw, utility knife, rags, scrub brush, wire cutters, tin snips and pre-wetted cloth.

d. Place one strip of duct tape along the edge of the open top slit of glove bag for reinforcement.

e. Place the glove bag around section of pipe to be worked on and staple top together through reinforcing duct tape. Next, duct tape the ends of glove bag to pipe itself, where previously covered with plastic or duct tape.

f. Use smoke tube and aspirator bulb to test seal. Place tube into water sleeve (two-inch opening to glove bag) squeezing bulb and filling bag with visible smoke. Remove smoke tube and twist water sleeve closed. While holding the water sleeve tightly, gently squeeze glove bag and look for smoke leaking out, (especially at the top and ends of the glove bag). If leaks are found, tape closed using duct tape and re-test.

g. Insert wand from garden sprayer through water sleeve. Duct tape water sleeve tightly around the wand to prevent leakage.

h. Thoroughly wet material to be worked on with amended water or removal encapsulant and allow to soak in. Wet adequately to penetrate and soak material through to substrate.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

8. Glove Bag (cont.)

i. One person places his hands into the long-sleeved gloves while the second person directs garden sprayer at the work.

j. Use bone saw, if required, to cut insulation at each end of the section to be removed. A bone saw is a serrated heavy gauge wire with ring-type handles at each end. Throughout this process, spray amended water or removal encapsulant on the cutting area to keep dust to a minimum.

k. Remove insulation using putty knives or other tools. Place pieces in bottom of bag without dropping.

l. Rinse all tools with water inside the bag and place back into pouch.

m. Using scrub brush, rags and water, scrub and wipe down the exposed pipe.

n. Remove water wand from water sleeve and attach the small nozzle from HEPA-filtered vacuum. Turn on the vacuum only briefly to collapse the bag.

o. Remove the vacuum nozzle, twist water sleeve closed and seal with duct tape.

p. From outside the bag, pull the tool pouch away from the bag. Place duct tape over twisted portion and then cut the tool bag from the glove bag, cutting through the twisted/taped section. Contaminated tools may then be placed directly into next glove bag without cleaning. Alternatively, tool pouch with the tools can be placed in a bucket of water, opened underwater, and tools cleaned and dried. Discard rags and scrub brush with asbestos waste. If more than one adjacent section of pipe is to be removed, glove bag may be loosened at each end and slid along the pipe to the next section. In this case, the tools may remain in the bag for continued use.

q. With removed insulation in the bottom of the bag, twist the bag several times and tape it to keep the material in the bottom during removal of the glove bag from the pipe.

r. Slip a 6-mil disposal bag over the glove bag (still attached to the pipe). Remove tape or cut bag and open the top of the glove bag and fold it down into disposal bag.

s. Clean all surfaces in the Work Area using disposable cloths wetted with water with surfactant or removal encapsulant added. When these surfaces have dried, clean with a HEPA filtered vacuum. Material adhered to a surface with removal encapsulant may require the application of additional removal encapsulant to facilitate cleaning.

NOTE: IF A REMOVAL ENCAPSULANT IS USED, TEST TO INSURE IT WILL NEITHER LEAVE A RESIDUE THAT WILL IMPEDE VISUAL INSPECTION NOR BECOME GUMMY DURING CLEANING.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

8. Glove Bag (cont.)

t. Seal exposed ends of remaining pipe insulation in accordance with Section 11.1.

u. Remove disposable suits and place these into bag with waste.

v. Collapse the bag with a HEPA vacuum twist top of bag, seal with at least three wraps of duct tape, bend over and seal again with at least three wraps of duct tape.

9. Mini-enclosures

NOTE: LOCATION OF REMOTE DECONTAMINATION UNIT SHOULD BE DESIGNATED

A Mini-Enclosure consists of a small Work Room with an attached separate Change Room. Worker decontamination requires a remote personnel decontamination unit.

a. Sequence of Work

Before beginning work of this sub-section complete the following:

- Isolation of area in accordance with Section 11.6, Regulated Areas.
- Construction of a personnel decontamination unit in accordance with Section 11.12, Decontamination Units.

b. Work Room

Construct Work Room in the same manner as a Primary Barrier fabricated from 6 mil sheet plastic. Arrange so that Primary Barrier provides both a Critical and Primary Barrier. Line walls and floor of Work Room with a continuous Secondary Barrier.

c. Change Room

Provide an approximately 3' by 3' Change Room, with additional space as required for storage, attached to each Work Room. Fabricate Change Room from 6 mil sheet plastic in the same manner as a Primary Barrier. Locate so that access to Work Area is through Change Room.

d. Step Off Area

Cover floor in front of entry to Change Room with one layer of 6 mil sheet plastic. Securely anchor sheet plastic to prevent slipping.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

9. Mini-enclosures (cont.)

e. Flapped Door Construction

Provide flapped door as entry to Change Room and entry from Change Room to Work Room. Fabricate each flapped door from overlapping contacting layers of sheet plastic. Fasten each layer on the top and one side . Each flap is to be 3" longer than door opening . Reinforce free side and bottom of each sheet with duct tape. Alternate sides that are fastened on each layer. Form arrows pointing to entry side from duct tape on inside and outside of door.

f. Signage

At entry to Change Room post an approximately 20-inch by 14-inch manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

LEGEND

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED
IN THIS AREA

Provide spacing between respective lines at least equal to the height of the respective upper line.

g. Complete Requirements

Complete requirements of the following:

Section 11.9, Worker Protection - Asbestos Abatement

Section 11.11, Respiratory Protection

Section 11.4, Temporary Pressure Differential & Air Circulation System: HEPA filtered vacuum cleaner with vacuum in space outside Mini-Enclosure may be used for compliance with this section. Provide a minimum of eight air changes per hour in the Work Room

h. Entry to Work Room

Require that any time a worker enter the Work Room the following procedure is followed.

Outside of Change Room remove all street clothes and don clean coveralls and respirator. A swim suit or second disposable suit may be worn beneath outer coveralls.

Enter Change Room, be sure that entry is completely closed.

Enter Work Room, be sure that entry is completely closed.

0161

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

9. Mini-enclosures (cont.)

i. Worker Decontamination

Require that any time a worker leaves the mini-enclosure the following procedure be followed.

Maintain a bucket of clean potable water in the Work Area. Do not amend with a wetting agent.

Remove contaminated suit inside the Work Area. Leave respirator in place.

Wash hands, face and surface of respirator with water and wet paper towels. Use caution to avoid breaking seal between respirator facepiece and face.

Proceed with respirator in place to Change Room.

Be sure that entry to Work Area is completely closed.

In Change Room don clean disposable suit leaving respirator in place.

Exit change room be sure that entry to Change Room is completely closed. Proceed to next Mini-Enclosure, or a remote shower.

At end of work day decontaminate fully in accordance with procedures in appropriate specification section describing Worker Protection.

j. Material Decontamination

Require that the following procedure be used in removing equipment and bagged debris from the Work Room.

Three workers are required. One in the Work Room, one in the Change Room, and one on Step Off Area.

Equipment and bagged debris are to be removed from the Mini-Enclosure in separate operations.

Worker in Work Room cleans equipment and bagged debris and hands one piece of equipment or one bag of debris at a time to worker in Change Room.

Worker in Change Room wet cleans each piece of equipment or bag and stores them in Change Room. Equipment is sealed completely in 6-mil sheet plastic in the Change Room.

When the amount of stored material in the Change Room becomes large enough that the worker cannot clean incoming material without contacting previously cleaned material, the door between the Work and Clean Room is closed.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

9. Mini-enclosures (cont.)

j. Material Decontamination (cont.)

The worker in the Changing Room then passes each item into a new disposal bag held open in the doorway between the Changing Room and Step Off Area by the worker on the Step Off Area. The Worker on the Step Off Area places each bag in a sealed cart for transport to the load out area. No bags are to be stored outside of the Mini-Enclosure.

All bags are to be transported through the building in clean sealed containers that have never been in a asbestos Work Area, Mini-Enclosure or decontamination unit.

k. Mini-Enclosure Decontamination

At completion of all work, decontaminate the Work and Changing Rooms as set forth in Section 11.17, Project Decontamination - Poly Removal, for non-friable materials.

10. Work Procedures

NOTE: THE FOLLOWING ARE EXAMPLES OF TYPICAL WORK PRACTICES. REVISE TO SUIT SPECIFIC PROJECT REQUIREMENTS.

a. Preformed Pipe Insulation

Remove preformed pipe insulation either air cell (corrugated paper), plaster, or millboard (layered cardboard) using the following procedures:

HEPA vacuum the work site.

Wet surface with amended water or removal encapsulant.

Air Cell (corrugated paper type): Use a hand pump garden sprayer to inject amended water or removal encapsulant into the corrugations of the insulation. Push the nozzle half way through the insulation and inject amended water or removal encapsulant until it begins to run out the joints on either end of the section of insulation.

Plaster and Mill board: Inject amended water in lateral and annular joints until water runs out both ends of section.

Allow the amended water or removal encapsulant to soak in. If the insulation is the consistency of moist putty it may be removed, otherwise inject more amended water or removal encapsulant and wait for it to soak in.

Slit jacket of the insulation at both lateral and annular joints, cut metal bands and lower into an asbestos disposal bag held open below the pipe.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.8 Small Scale Short Duration Work (cont.)

10. Work Procedures (cont.)

Clean the exposed pipe with wet decontamination procedures specified in section 11.18. Dispose of the rags or paper towels in the disposal bag used above.

Collapse the bag with a HEPA vacuum, twist top of bag, seal with at least three wraps of duct tape, bend over and seal again with at least three wraps of duct tape.

Seal exposed ends of remaining pipe insulation in accordance with Section 11.1.

b. Job Molded Plaster Fitting Insulation

Thoroughly wet with amended water or removal encapsulant and allow to soak in. Wet adequately to penetrate and soak material through to substrate.

NOTE: FOLLOWING ARE EXAMPLES OF TYPICAL PROCEDURES WHICH INVOLVE THE DISTURBANCE OF BUT NOT REMOVAL OF ASBESTOS CONTAINING MATERIALS. EDIT TO SUIT PROJECT REQUIREMENTS.

c. Removal of Small Areas of ACM

Thoroughly wet affected area and 6" beyond with a penetrating encapsulant. Allow to soak in.

Begin work when material is thoroughly saturated with a consistency similar to oatmeal.

Using wand of HEPA vacuum as a tool, remove material using a cookie-cutter motion so that all material is sucked up by HEPA vacuum.

11.9 Worker Protection - Asbestos Abatement

NOTE: THIS SECTION IS INTENDED FOR LARGE SCALE ASBESTOS ABATEMENT PROJECTS INVOLVING REMOVAL. WHEN THERE IS CONSIDERABLE DISRUPTION OF THE MATERIAL BEING ENCLOSED. FOR MAINTENANCE AND REPAIR WORK AND FOR ENCLOSURE PROJECTS THAT LEAVE THE ACM RELATIVELY UNDISTURBED USE SECTION 11.10. ANY REVISION OF THIS SECTION SHOULD BE CARRIED OUT WITH THE ASSISTANCE OF A CERTIFIED INDUSTRIAL HYGIENIST OR OTHER QUALIFIED OCCUPATIONAL HEALTH SPECIALIST.

NOTE: THIS SECTION DOES NOT ADDRESS THE SUBJECT OF HEAT STRESS. THIS IS A COMMON PROBLEM ON ABATEMENT PROJECTS IN HOT ENVIRONMENTS. WHERE REQUIRED SPECIFIC PROVISION FOR PROTECTION AGAINST HEAT STRESS SHOULD BE DEVELOPED FOR THE SPECIFIC PROJECT AND INCLUDED IN THIS SECTION.

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement (cont.)

2. Description of Work

This section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

3. Related Work Specified Elsewhere

Respiratory Protection is specified in Section 11.11.

4. Worker Training

a. AHERA Accreditation

All workers are to be accredited as Abatement Workers as required by the AHERA regulation 40 CFR 763 Appendix C to Subpart E, April 30, 1987.

b. State Requirement

All workers are to be trained in accordance with the Ohio Administrative Code 3701-34-07, sections (F) and (G).

c. OSHA Requirement

All workers are to be trained in accordance with OSHA 1926 CFR 1926.58(k)(3).

d. Training Summary

The Worker Training shall consist of the above, and shall also include but not be limited to the following topics:

Methods of recognizing asbestos

Health effects associated with asbestos

Relationship between smoking and asbestos in producing lung cancer

Nature of operations that could result in exposure to asbestos

Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:

Engineering controls
Work Practices
Respirators
Housekeeping procedures
Hygiene facilities
Protective clothing
Decontamination procedures
Emergency procedures
Waste disposal procedures

Purpose, proper use, fitting, instructions, and limitations of respirators as required by 29 CFR 1910.134

Appropriate work practices for the work

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement (cont.)

4. Training Summary (cont.)

Requirements of medical surveillance program

Review of 29 CFR 1926

Pressure Differential Systems

Work practices including hands on or on-job training

Personal Decontamination procedures

Air monitoring, personal and area

5. Medical Examinations

NOTE: FOLLOWING IS INTENDED FOR ABATEMENT PROJECTS. THIS SECTION MAY REQUIRE REVISION IF USED IN SPECIFYING WORK FOR OTHER TRADES (E.G., ROOFING, FLOORING). SOME INDUSTRIES ARE NOT FAMILIAR WITH OSHA REQUIREMENTS FOR ASBESTOS. SOME INDUSTRY GROUPS MAY HAVE DEVELOPED OBJECTIVE DATA SATISFACTORY TO OSHA THAT OBVIATES THE NEED FOR MEDICAL EXAMINATIONS.

Provide medical examinations for all workers who may encounter an airborne fiber level of 0.1 f/cc or greater for an 8-hour Time Weighted Average. In the absence of specific airborne fiber data provide medical examinations for all workers who will enter the Work Area for any reason. Examination shall as a minimum meet OSHA requirements as set forth in 29 CFR 1926 In addition, provide an evaluation of the individuals ability to work in environments capable of producing heat stress in the worker.

6. Submittals

Submit the following to the FERMCO Project Manager for review. Do not start work until these submittals are returned with FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use.

a. AHERA Accreditation

Submit copies of certificates from an EPA-approved AHERA Abatement Workers course for each worker as evidence that each asbestos Abatement Worker is accredited as required by the AHERA Regulation 40 CFR 763 Appendix C to Subpart E, April 30, 1987.

b. State Requirement

Submit evidence that all workers have been trained in accordance with the Ohio Administrative Code 3701-34-07, Sections (F) and (G).

c. OSHA Requirement

Submit evidence that all workers have been trained in accordance with 29 CFR 1926.58 (k)(3).

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement (cont.)

6. Submittals (cont.)

d. Certificate of Worker Acknowledgement

Submit an original signed copy of the Certificate of Worker's Acknowledgement found at the end of this section, for each worker who is to be at the job site or enter the Work Area.

e. Report from Medical Examination

Submit a report of a medical examination conducted within last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the Work Area. Submit, at a minimum, for each worker the following:

Name and Social Security Number
Physicians Written Opinion from examining physician including at a minimum the following:

Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos.

Any recommended limitations on the worker or on the use of personal protective equipment such as respirators.

Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.

Copy of information that was provided to physician in compliance with 29 CFR 1926.

Statement that worker is able to wear and use the type of respiratory protection proposed for the project, and is able to work safely in an environment capable of producing heat stress in the worker.

f. Notarized Certifications

Submit certification signed by an officer of the abatement contracting firm and notarized that exposure measurements, medical surveillance, and worker training records are being kept in conformance with 29 CFR 1926.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement (cont.)

PART 2 - EQUIPMENT

7. Protective Clothing

NOTE: REQUIREMENTS FOR SPECIAL CLOTHING SUCH AS COVERALLS OR SIMILAR WHOLE BODY CLOTHING, HEAD COVERINGS, GLOVES, AND FOOT COVERINGS AND OTHER PROTECTIVE CLOTHING ARE DELINEATED IN OSHA REGULATIONS. THE NEED FOR PROTECTIVE CLOTHING IN EXCESS OF THESE REQUIREMENTS SHOULD BE REVIEWED WITH A SAFETY CONSULTANT AND EDITED FOR THE SPECIFICS OF THE PROJECT.

a. Coveralls

Provide disposable full-body coveralls and disposable head covers, and require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes, for all workers in the Work Area.

NOTE: FOLLOWING IS MORE APPROPRIATE WORKER PROTECTION IN ENVIRONMENTS WITH HOT OR COLD HAZARD TO WORKER.

b. Coveralls

Provide cloth full-body coveralls and hats, require that they be worn by all workers in the Work Area. Require that workers change out of coverall in the Equipment Room of the Personnel Decontamination Unit. Dispose of coverall as asbestos waste at completion of all work.

NOTE: FOLLOWING IS APPROPRIATE IF WORKERS ARE TO BE WORKING IN UNHEATED ENVIRONMENTS DURING COLD WEATHER

c. Cold Weather Gear

Provide each worker with an insulated jacket, pants, gloves, and hat. Require that cold weather gear be removed in Equipment Room of Personnel Decontamination Unit. Dispose of cold weather gear as asbestos waste at completion of all work.

NOTE: MUCH OF THE FOLLOWING IS RUDIMENTARY WORKER PROTECTION REQUIREMENTS, BUT PROTECTION BEYOND RESPIRATORS AND PAPER SUITS IS FREQUENTLY NOT CONSIDERED FOR ABATEMENT PROJECTS. REVIEW THE FOLLOWING WITH A SAFETY CONSULTANT AND EDIT FOR THE SPECIFICS OF THE PROJECT.

d. Boots

Provide work boots with non-skid soles, and where required by OSHA, foot protectives, for all workers. Provide boots at no cost to workers. Paint uppers of all boots red with waterproof enamel. Do not allow boots to be removed from the Work Area for any reason, after being contaminated with asbestos-containing material. Dispose of boots as asbestos-contaminated waste at the end of the work.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement (cont.)

7. Protective Clothing (cont.)

e. Hard Hats

Provide head protectives (hard hats) as required by OSHA for all workers, and provide 4 spares for use by FERMCO Project Manager, and other FERMCO personnel. Label hats with same warning labels as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of type with plastic strap type suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from Work Area at the end of the work.

f. Goggles

Provide eye protectives (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Thoroughly clean, decontaminate and bag goggles before removing them from Work Area at the end of the work.

g. Gloves

Provide work gloves to all workers and require that they be worn at all times in the Work Area. Do not remove gloves from Work Area and dispose of as asbestos-contaminated waste at the end of the work.

Respirators, disposable coveralls, head covers, and footwear covers shall be provided by the Contractor for the FERMCO, FERMCO Project Manager, Project Administrator, and other authorized representatives who may inspect the job site. Provide two respirators and six complete coveralls and, where applicable, six respirator filter changes per day.

PART 3 - EXECUTION

8. General

Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. The following procedures are minimums to be adhered to regardless of fiber count in the Work Area.

Each time Work Area is entered remove all street clothes in the Changing Room of the Personnel Decontamination Unit and put on new disposable coverall, new head cover, and a clean respirator. Proceed through shower room to equipment room and put on work boots.

9. Decontamination procedures

a. General

Require all workers to adhere to the following personal decontamination procedures whenever they leave the Work Area.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement (cont.)

9. Decontamination procedures (cont.)

b. Type C Supplied Air or Powered Air-Purifying Respirtors

Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area:

- When exiting area, remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.

- Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing therespirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:

(1) Thoroughly wet body including hair and face. If using a Powered Air-Purifying Respirator (PAPR) hold blower unit above head to keep canisters dry.

(2) With respirator still in place, thoroughly wash body, hair, respirator face piece, and all parts of the respirator except the blower unit and battery pack on a PAPR. Pay particular attention to seal between face and respirator and under straps.

(3) Take a deep breath, hold it and/or exhale slowly, completely wet hair, face, and respirator. While still holding breath, remove respirator and hold it away from face before starting to breath.

(4) Carefully wash facepiece of respirator inside and out.

c. If using PAPR: shut down in the following sequence:

(1) Cap inlets to filter cartridges

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement (cont.)

9. Decontamination procedures (cont.)

c. If using PAPR: shut down in the following sequence: (cont.)

(2) Turn off blower unit (this sequence will help keep debris which has collected on the inlet side of filter from dislodging and contaminating the outside of the unit).

> **CAUTION:**
>
> **BE EXTREMELY CAUTIOUS OF GETTING WATER IN BATTERY PACK AS THIS WILL SHORT OUT AND DESTROY BATTERY.**

(3) Thoroughly wash blower unit and hoses. Carefully wash battery pack with wet rag.

(4) Shower completely with soap and water.

(5) Rinse thoroughly.

(6) Rinse shower room walls and floor prior to exit.

(7) Proceed from shower to Changing Room and change into street clothes or into new disposable work items.

d. Air Purifying-Negative Pressure Respirators require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area with a half or full face cartridge type respirator:

(1) When exiting the area, remove disposable coveralls, disposable headcovers, and disposable footwear covers or boots in the Equipment Room.

(2) Still wearing respirators, proceed to showers. Showering is mandatory.

e. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos fibers while showering. The following procedure is required as a minimum:

(1) Thoroughly wet body from neck down.

(2) Wet hair as thoroughly as possible without wetting the respirator filter if using an air purifying type respirator.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement (cont.)

9. Decontamination procedures (cont.)

(3) Take a deep breath, hold it and/or exhale slowly, complete wetting of hair, thoroughly wetting face, respirator and filter (air purifying respirator). While still holding breath, remove respirator and hold it away from face before starting to breath.

(4) Dispose of wet filters from air purifying respirator.

(5) Carefully wash facepiece of respirator inside and out.

(6) Shower completely with soap and water.

(7) Rinse thoroughly.

(8) Rinse shower room walls and floor prior to exit.

(9) Proceed from shower to Changing Room and change into street clothes or into new disposable work items.

NOTE: FOLLOWING DESCRIBES USE OF A DECONTAMINATION UNIT CONNECTED TO A WORK AREA AS A REMOTE SHOWER FOR MINI-ENCLOSURE WORK THAT MAY BE GOING ON ELSEWHERE IN THE BUILDING.

f. Remote Shower

The procedures above are to be used if the decontamination facility is used as a remote shower. If a worker cannot gain direct access to the Equipment Room require that he enter Decontamination Unit and proceed directly through Shower Room to Equipment Room. Decontamination procedure is then completed as required above.

NOTE: SHOWERING IS SOMETIMES NOT REQUIRED FOR CONTAINMENT PROJECTS. IN THIS CASE, USE DECONTAMINATION PROCEDURES OF SECTION 11.10.

g. Within Work Area

Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area. To eat, chew, drink or smoke, workers shall follow the procedure described above, then dress in street clothes before entering the non-Work Areas of the building.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.9 Worker Protection - Asbestos Abatement

10. Certificate of Worker's Acknowledgement (cont.)

Following this section is a Certificate of Worker Training. After each worker has been included in the Contractor's Respiratory Protection Program, completed the training program and medical examination, and secured a fully executed copy of this form.

PROJECT NAME DATE

PROJECT ADDRESS

CONTRACTOR'S NAME

NOTE: WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with FERMCO for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These things are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must have been trained in the dangers inherent in handling asbestos, breathing asbestos dust, and in proper work procedures and personal and area protective measures. Training must have included:

Physical characteristics of asbestos
Health hazards associated with asbestos
Respiratory protection
Use of protective equipment
Pressure Differential Systems
Work practices including hands on or on-job training
Personal decontamination procedures
Air monitoring, personal and area

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, pulmonary function tests and may have included an evaluation of a chest x-ray.

By signing this document you are acknowledging only that the FERMCO of the building you are about to work in has advised you of your rights to training and protection relative to your employer, the Contractor.

Signature Social Security No

Printed Name Witness

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair

NOTE: THIS SECTION IS INTENDED FOR MAINTENANCE AND REPAIR WORK AND FOR ENCLOSURE PROJECTS THAT LEAVE THE ACM RELATIVELY UNDISTURBED. USE SECTION 11.9 FOR ASBESTOS ABATEMENT PROJECTS INVOLVING REMOVAL.

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

2. Description of Work

This section describes the equipment and procedures for protecting workers against asbestos contamination and other workplace hazards, except for respiratory protection, where asbestos fibers are collected at the point of generation so that contamination of workers is unlikely.

This section applies only where the airborne fiber counts as measured in accordance with 29 CFR 1926 are below 0.2 fibers per cubic centimeter for an 8 hour Time Weighted Average (TWA).

3. Related Work Specified Elsewhere

a. Respiratory Protection

Respiratory protection is specified in Section 11.11.

NOTE: DELETE THE FOLLOWING IF SECTION 11.9 IS NOT INCLUDED IN THE SPECIFICATION.

b. Worker Protection

Worker protection for asbestos abatement work where workers will be in areas that contain or may contain airborne fiber counts measured in accordance with 29 CFR 1926 above 0.2 fibers per cubic centimeter for an 8 hour Time Weighted Average (TWA) is specified in Section 11.9.

4. Description of Requirements

Worker protection requirements of this section are appropriate for asbestos maintenance and repair work. This differs from asbestos abatement in that the work is not performed in an asbestos fiber contaminated area. As such, the worker decontamination procedures are carried out with a HEPA-filtered vacuum cleaner rather than a shower facility.

Requirements of this section apply only when work is being performed in accordance with the limitations and requirements of the following sections of this specification:

11.6, Regulated Areas
11.7, Entry Into Controlled Areas
11.8, Small-Scale Short-Duration Work
11.18, Cleaning and Decontamination Procedures

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

4. Description of Requirements (cont.)

When the work being performed is governed under any other specification section or required by any of the above sections the requirements of Section 11.9 Worker Protection - Asbestos Abatement apply.

5. Worker Training

a. AHERA Accreditation

All workers are to be accredited as Abatement Workers as required by the AHERA regulation 40 CFR 763 Appendix C to Subpart E, April 30, 1987.

b. State Requirement

All workers are to be trained in accordance with the Ohio Administrative Code 3701-34-07, sections (F) and (G).

c. OSHA Requirement

All workers are to be trained in accordance with OSHA 1926 CFR 1926.58(k)(3).

d. Training Summary

The Worker Training shall consist of the above, and shall also include but not be limited to the following topics:

- Methods of recognizing asbestos
- Health effects associated with asbestos
- Relationship between smoking and asbestos in producing lung cancer
- Nature of operations that could result in exposure to asbestos
- Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:

  Engineering controls
  Work Practices
  Respirators
  Housekeeping procedures
  Hygiene facilities
  Protective clothing
  Decontamination procedures
  Emergency procedures
  Waste disposal procedures

- Purpose, proper use, fitting, instructions, and limitations of respirators as required by 29 CFR 1910.134
- Appropriate work practices for the work
- Requirements of medical surveillance program
- Review of 29 CFR 1926
- Pressure Differential Systems

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

5. Worker Training (cont.)

- Work practices including hands on or on-job training
- Personal Decontamination procedures
- Air monitoring, personal and area

NOTE: FOLLOWING IS INTENDED FOR ABATEMENT PROJECTS. THIS SECTION MAY REQUIRE REVISION IF USED IN SPECIFYING WORK FOR OTHER TRADES (EG. ROOFING, FLOORING). SOME INDUSTRIES ARE NOT FAMILIAR WITH OSHA REQUIREMENTS FOR ASBESTOS. SOME INDUSTRY GROUPS MAY HAVE DEVELOPED OBJECTIVE DATA SATISFACTORY TO OSHA THAT OBVIATES THE NEED FOR MEDICAL EXAMINATIONS.

6. Medical Examinations

Provide medical examinations for all workers who may encounter an airborne fiber level of 0.1 f/cc or greater for an 8 hour Time Weighted Average. In the absence of specific airborne fiber data provide medical examination for all workers who will enter the Work Area for any reason. Examination shall as a minimum meet OSHA requirements as set forth in 29 CFR 1926. In addition, provide an evaluation of the individuals ability to work in environments capable of producing heat stress in the worker.

7. Submittals

Submit the following to the FERMCO Project Manager for review. Do not start work until these submittals are returned with FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use.

a. AHERA Accreditation

Submit copies of certificates from an EPA-approved AHERA Abatement Workers Course for each worker as evidence that each asbestos abatement worker is accredited as required by the AHERA Regulation 40 CFR 763 Appendix C to Subpart E, April 30, 1987.

b. Asbestos Abatement Contractor's License

Submit a copy of the Asbestos Abatement Contractor's License as issued by the Ohio Department of Health, per Ohio Administrative Code Chapter 3701-34. License must be current at the time the contract is awarded.

c. Historic Airborne Fiber Data

Submit airborne asbestos fiber count data from an independent air monitoring firm to verify that work procedures will result in an airborne fiber level as measured in accordance with 29 CFR 1926 below 0.2 fibers per cubic centimeter as an 8 hour Time Weighted Average (TWA). Include at least the following data for each procedure required by the work:

- Date of measurements
- Operation monitored

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

7. Submittals (cont.)

- Sampling and analytical methods used and evidence of their accuracy
- Number, duration, and results of samples taken

d. Certificate Worker Acknowledgement

Submit an original signed copy of the Certificate of Worker's Acknowledgement found at the end of this section, for each worker who is to be at the job site or enter the Work Area.

e. Training Program

Submit a course outline of the worker training course. Include date and time course was given, name and title of teacher, attendance sheet listing all attendees of the course. Submittal shall be in the form of a letter signed and dated by the course teacher.

f. Report from Medical Examination

Conducted within last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the Work Area. Submit, at a minimum, for each worker the following:

Name and Social Security Number

Physicians Written Opinion from examining physician including at a minimum the following:

Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos

Any recommended limitations on the worker or on the use of personal protective equipment such as respirators

Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure

Copy of information that was provided to physician in compliance with 29 CFR 1926

Statement that worker is able to wear and use the type of respiratory protection proposed for the project, and is able to work safely in an environment capable of producing heat stress in the worker

g. Notarized Certifications

Submit certification signed by an officer of the abatement contracting firm and notarized that exposure measurements, medical surveillance, and worker training records are being kept in conformance with 29 CFR 1926.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

PART 2 - EQUIPMENT

8. Protective Clothing

NOTE: REQUIREMENTS FOR SPECIAL CLOTHING SUCH AS COVERALLS OR SIMILAR WHOLE BODY CLOTHING, HEAD COVERINGS, GLOVES, AND FOOT COVERINGS AND OTHER PROTECTIVE CLOTHING ARE DELINEATED IN OSHA REGULATIONS. THE NEED FOR PROTECTIVE CLOTHING IN EXCESS OF THESE REQUIREMENTS SHOULD BE REVIEWED WITH A SAFETY CONSULTANT AND EDITED FOR THE SPECIFICS OF THE PROJECT.

a. Coveralls

Provide disposable full-body coveralls and disposable head covers, and require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes, for all workers in the Work Area.

NOTE: FOLLOWING IS MORE APPROPRIATE WORKER PROTECTION IN ENVIRONMENTS WITH HOT OR COLD HAZARD TO WORKER.

b. Coveralls

Provide cloth full-body coveralls and hats, require that they be worn by all workers in the Work Area. Require that workers change out of coverall in the Equipment Room of the Personnel Decontamination Unit. Dispose of coverall as asbestos waste at completion of all work.

NOTE: FOLLOWING IS APPROPRIATE IF WORKERS ARE TO BE WORKING IN UNHEATED ENVIRONMENTS DURING COLD WEATHER

c. Cold Weather Gear

Provide each worker with an insulated jacket, pants, gloves, and hat. Require that cold weather gear be removed in Equipment Room of Personnel Decontamination Unit. Dispose of cold weather gear as asbestos waste at completion of all work.

d. Boots Covers

Provide disposable latex boot covers with non-skid soles, and where required, OSHA approved foot protectives, for all workers. Boot covers shall not be worn out of the Work Area or off the sheet plastic drop layer for any reason. Boot covers may be decontaminated, bagged and carried from one Work Area to another.

e. Hard Hats

Provide head protectives (hard hats) as required by OSHA for all workers, and provide 4 spares for use by FERMCO Project Manager, and other FERMCO personnel. Label hats with same warning labels as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of type with plastic strap type suspension. Hats shall be thoroughly cleaned and decontaminated before being worn from one Work Area to another. At the end of the work, clean and decontaminate hats and bag for storage in a properly labeled asbestos disposal bag.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

8. Protective Clothing (cont.)

f. Goggles

Provide eye protectives (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Goggles shall be thoroughly cleaned and decontaminated before being worn from one Work Area to another. At the end of the work, clean and decontaminate goggles and bag for storage in a properly labeled asbestos disposal bag.

g. Gloves

Provide work gloves to all workers and require that they be worn at all times in the Work Area. Do not remove gloves from Work Area and dispose of as asbestos contaminated waste at the end of the work.

PART 3 - EXECUTION

9. General

Work and Decontamination procedures involve a person in the work area or the plastic sheet and one off the sheet. The person on the sheet carries out the work and never leaves the sheet until the work is complete and dry decontamination procedures are completed. The person off the sheet supplies materials to and accepts material from the on-sheet person. The off sheet person never enters the Work Area. If the work involves more than one person then the team shall consist of two (or more) on-sheet persons and one off-sheet person.

Do not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in the Work Area. To eat, drink, chew, or smoke, workers shall follow the procedures described below and leave the Work Area.

Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. The following procedures are minimums to be adhered to regardless of fiber count in the Work Area.

NOTE: MINIMUM REQUIREMENTS FOR AIR MONITORING ARE SET FORTH IN OSHA ASBESTOS REGULATIONS. REVISE THIS SECTION WITH THE ASSISTANCE OF THE TESTING LABORATORY WHO IS TO PROVIDE ANALYSIS. CONTRACTOR SHOULD BE GIVEN TRAINING AND PROVIDED WITH LOG SHEETS BY THE LABORATORY. IF A MORE STRINGENT STANDARD OF CARE IS REQUIRED USE AN INDEPENDENT TESTING LABORATORY TO COLLECT AS WELL AS ANALYZE SAMPLES. FOLLOWING MAKES EMERGENCY RESPONSE BY THE CONTRACTOR FOR PROBLEMS SUCH AS LEAKING PIPES WITH ASBESTOS INSULATION MORE FEASIBLE.

10. Air Monitoring

Monitor Air as follows at all times that the work is going on:

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

10. Air Monitoring (cont.)

a. Personal Air Samples

The Contractor will collect a personal air sample on the on-sheet person at all times that work is being carried out. Collect samples at 2 liters per minute for the entire time that work is being carried out. Use cellulose ester filters with 0.8 to 1.2 micron pore size to collect samples.

b. Area Samples

FERMCO will collect one area sample in each secure area during or at completion of the work. Collect a 3000 liter sample at a maximum pumping rate of 12 liters per minute. Use cellulose ester filters with 0.8 to 1.2 micron to collect samples.

c. Sample Report

FERMCO will provide a copy of all air monitoring data to the Contractor.

11. Respirators

Instruct and train each worker in proper respirator use and require that each worker always wear a respirator, properly fitted on the face, in the Work Area.

12. Coveralls

At the start of each work shift, put on new disposable coveralls, new head covers, new footwear covers over street clothes, and put on a clean respirator.

All workers shall wear disposable, full-body coveralls and disposable head and footwear covers in the Work Area.

Follow procedures under "Dry Decontamination" whenever leaving a Work Area.

13. Additional Protective Equipment

At the work site maintain 2 complete sets of protective equipment including respirators, disposable coveralls, head covers, and footwear covers for use by the Project Manager or other personnel.

14. Decontamination Procedures

a. General

Require all workers to adhere to the following personal decontamination procedures whenever they leave the Work Area or at end of work shift:

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

14. Decontamination Procedures (cont.)

NOTE: USE THE FOLLOWING PROCEDURE ONLY IN SITUATIONS WHERE THE WORKER HAS NOT BEEN IN AN ENVIRONMENT WHERE THERE ARE AIRBORNE CONCENTRATION OF ASBESTOS IN EXCESS OF BUILDING BACKGROUND, AND THE PROTECTIVE CLOTHING WORN BY THE WORKER HAS NOT BEEN VISIBLY CONTAMINATED. IF EITHER OF THESE CONDITION EXIST THE WORKER SHOULD USE THE WET DECONTAMINATION PROCEDURES FOUND IN SECTION 11.9, Item 10.

b. Dry Decontamination

Complete the following before leaving any Regulated Area:

(1) Each person HEPA vacuum thoroughly the other person. Use brush attachment on the HEPA vacuum.

(2) While still wearing respirator each person remove their paper suit, turning it inside out while removing it. Roll up suit and pack in hood.

(3) Place suits in a disposal bag.

(4) Suck air out of bag with HEPA vacuum.

(5) Twist the bag shut, fold over and seal with duct tape by wrapping around bag neck at least 3 times.

NOTE: IF THE WORK INVOLVES OPERATIONS (SUCH AS GLOVE BAG REMOVAL OR PROCEDURES OF SECTION 11.8) IN WHICH THE WORKER DOES NOT BECOME CONTAMINATED, THE FOLLOWING IS ADEQUATE. IF THERE IS ANY POSSIBILITY OF WORKER CONTAMINATION THE WET DECONTAMINATION PROCEDURES OF SECTION 11.9 SHOULD BE USED INSTEAD OF THE FOLLOWING.

c. End of Shift

Require that each worker decontaminate according to the following procedure at the end of the days work or before removing respiratory protection:

(1) Each person HEPA vacuum hands, hair, face, and respirator.

(2) Each person HEPA vacuum area of respirator seal to face on the other person.

(3) Remove respirator and, HEPA vacuum face at respirator seal and all surfaces of the respirator.

(4) HEPA vacuum any parts of hair or head covered by respirator straps.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

14. Decontamination Procedures (cont.)

c. End of Shift (cont.)

If using PAPR: shut down in the following sequence:

(5) First cap inlets to filter cartridges, then turn off blower unit (this sequence will help keep debris which has collected on the inlet side of filter from dislodging and contaminating the outside of the unit).

(6) Thoroughly wash blower unit and hoses.

CAUTION:

BE EXTREMELY CAUTIOUS OF GETTING WATER IN BATTERY PACK AS THIS WILL SHORT OUT AND DESTROY BATTERY.

(7) Carefully wash battery pack with wet rag.

(8) Wash respirator face piece inside and outside.

(9) At completion of above, thoroughly wash face and hands with soap and water.

NOTE: DELETE THE FOLLOWING IF NO WET DECONTAMINATION IS NECESSARY. THIS WILL GENERALLY OCCUR WHEN THE WORK INVOLVES ONLY OPERATIONS IN WHICH THE WORKER DOES NOT EXPERIENCE ELEVATED AIRBORNE FIBER LEVELS OR CONTAMINATION WITH DEBRIS (EG. WORK OF SECTION 11.8, GLOVE BAG WORK).

d. End of Day

Require that each worker follow the wet decontamination procedures set forth in Section 11.9 at the end of each days work before changing into street clothing.

15. Certificate of Worker's Acknowledgement

Following this section is a Certificate of Worker's Acknowledgement. After each worker has been included in the Contractor's Respiratory Protection Program and completed the training program and medical examination, secure a fully executed copy of this form.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.10 Worker Protection - Repair (cont.)

15. Certificate of Worker's Acknowledgement (cont.)

CERTIFICATE OF WORKER'S ACKNOWLEDGEMENT

PROJECT NAME DATE

PROJECT ADDRESS

CONTRACTOR'S NAME

NOTE: WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's Contract with FERMCO for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These things are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. The topics covered in the course must have included the following:

Physical characteristics of asbestos
Health hazards associated with asbestos
Respiratory protection
Use of protective equipment
Pressure Differential Systems
Work practices including hands on or on-job training
Personal Decontamination procedures
Air monitoring, personal and area

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history and pulmonary function tests and may have included an evaluation of a chest x-ray.

By signing this document you are acknowledging only that the FERMCO of the building you are about to work in has advised you of your rights to training and protection relative to your employer the Contractor.

Signature Social Security No

Printed Name Witness

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.11 Respiratory Protection

NOTE: THIS SECTION SHOULD BE EDITED WITH THE ASSISTANCE OF A CERTIFIED INDUSTRIAL HYGIENIST OR OTHER QUALIFIED HEALTH PROFESSIONAL.

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

2. Description of Work

Instruct and train each worker involved in asbestos abatement or maintenance and repair of friable asbestos-containing materials in proper respiratory use and require that each worker always wear a respirator, properly fitted on the face in the Work Area from the start of any operation which may cause airborne asbestos fibers until the Work Area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the work place or as required for other toxic or oxygen-deficient situations encountered.

3. Standards

Except to the extent that more stringent requirements are written directly into the Contract Documents, the following regulations and standards have the same force and effect (and are made a part of the Contract Documents by reference) as if copied directly into the Contract Documents, or as if published copies were bound herewith. Where there is a conflict in requirements set forth in these regulations and standards, meet the more stringent requirement.

NOTE: THE FOLLOWING STANDARDS SHOULD BE IN HAND AND REFERRED TO DURING EDITING OF THIS SECTION.

OSHA - U.S. Department of Labor Occupational Safety and Health Administration, Safety and Health Standards 29 CFR 1910, Section 1001 and Section 1910.134. 29 CFR 1926.58.

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

CSA - Canadian Standard Association, Rexdal, Ontario, Standard Z180.1-1978, "Compressed Breathing Air".

ANSI - American National Standard Practices for Respiratory Protection, ANSI Z88.2-1980.

NIOSH - National Institute for Occupational Safety and Health

MSHA - Mine Safety and Health Administration

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.11 Respiratory Protection (cont.)

4. Submittals

Submit the following to the FERMCO Project Manager for review. Do not begin work until these submittals are returned with the FERMCO Project Manager's action stamp indicating the submittal is returned for unrestricted use.

a. Product Data

Submit manufacturer's product information for each component used, including NIOSH and MSHA Certifications for each component in an assembly and/or for entire assembly.

b. System Diagram

When a Type "C" supplied air respiratory system is required by the work, submit drawing showing assembly of components into a complete supplied air respiratory system. Include diagram showing location of compressor, filter banks, backup air supply tanks, hose line connections in Work Area(s), routing of air lines to Work Area(s) from compressor.

c. Operating Instruction

Submit complete operating and maintenance instructions for all components and systems as a whole. Submittal is to be in bound manual form suitable for field use.

d. Respiratory Protection Program

Submit Contractor's written respiratory protection program manual as required by OSHA 1926.58.

Respiratory Protection Schedule: Submit level of respiratory protection intended for each operation required by the project. Submit this information on the "Respiratory Protection schedule" on the form included at the end of this Section.

e. Historic Airborne Fiber Data

Submit airborne asbestos fiber count data from an independent air monitoring firm to substantiate selection of respiratory protection proposed. Data submitted shall include at least the following for each procedure required by the work:

- Date of measurements
- Operation monitored
- Sampling and analytical methods used and evidence of their accuracy
- Number, duration, and results of samples taken

f. Resume information

Submit resume and information on training for individual monitoring the operation of supplied air respiratory systems. Submit training certifications where applicable.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.11 Respiratory Protection (cont.)

5. Air Quality for Supplied Air Respiratory Systems

   Provide air used for breathing in Type "C" supplied air respiratory systems that meets or exceeds standards set for C.G.A. type 1 (Gaseous Air) Grade H or CSA Z180.1 whichever presents the more stringent quality standard:

   NOTE: DELETE EITHER ABOVE OR BELOW. ABOVE IS A HIGHER STANDARD. BOTH OSHA AND ANSI REQUIRE CGA GRADE D AIR FOR BREATHING. INCLUDING THE CGA GRADE H AND CSA STANDARD SETS A LIMIT (UNDER "HALOGENATED SOLVENTS" AND "OTHER GASEOUS CONTAMINANTS") ON THE HALOGEN CONTAMINANTS THAT CAN RESULT FROM OVERHEATING OF OIL--LESS COMPRESSORS. THE GRADE D STANDARD IS SILENT ON THIS CONTAMINANT.

   NOTE: REQUIRING GRADE H OR CSA Z180.1 AIR IS CONSERVATIVE, BUT PRACTICAL WITH PRESENT DAY EQUIPMENT. THIS ALLOWS A LARGER MARGIN FOR ERROR IF SOMETHING GOES WRONG. WHILE MODERN EQUIPMENT CAN GENERALLY MEET THE STANDARDS CALLED FOR ABOVE, THERE MAY BE A PROBLEM WITH AVAILABILITY OF MEASURING DEVICES WITH WHICH TO MONITOR THIS QUALITY OF AIR.

   Provide air used for breathing in Type "C" supplied air respiratory systems that meets or exceeds standards set for C.G.A. type 1 (Gaseous Air) Grade.

6. Allowable Contaminants

   Supply air that has an asbestos concentration no greater than outside ambient conditions.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.11 Respiratory Protection (cont.)

6. Allowable Contaminants (cont.)

The following table sets forth the quantity of any given contaminant allowed according to the referenced standards:

CONTAMINANT	CGA Type 1 Grade D	CGA (Gaseous Grade E	CGA Air) Grade H	CSA Z180.1
Carbon Monoxide, PPM/v	20	10	5	
Carbon Dioxide, PPM/v	1000	500	50	500
Condensed Hydrocarbons, mg./cu. meter	5		1	
Gaseous Hydrocarbons - as methane, PPM/v			10	25
Water Vapor - PPM/v dewpoint	(1) -50F	(1) -50F	(1) -50F	27 -63F
Objectionable Odors	None			
Nitrogen Dioxide, PPM/v	-	-	0.5	0.2
Nitrous Oxide, PPM/v	-	-	-	5
Sulfur Dioxide, PPM/v	-	-	0.5	-
Halogenated solvents, PPM/v	-	-	1	-
Other gaseous contaminants	-	-	-	(2)
Inorganic particulates, mg./cu. meter	-	-	-	1

- Indicates that the standard shows no limiting characteristics

(1) The CGA standards do not call out a specific moisture limit when the ambient temperature is above freezing. However, since a moisture content no greater than a -50 Degrees Fahrenheit dewpoint (66 PPM/v) is necessary for carbon monoxide elimination, the CO limits could not be met unless the air were dried to a -50 Degrees Fahrenheit dewpoint or better.

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11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.11 Respiratory Protection (cont.)

6. Allowable Contaminants (cont.)

(2) Maximum allowable content of tricholotrifluorethane, dichlorodifluoromethane, and chlorodifluoromethane is 2 PPM/v for each. Unlisted contaminants shall not exceed one-tenth of the Threshold Limit Values (TLV's) for Chemical Substances in Workroom air adopted by the American Conference of Governmental Industrial Hygienists (ACGIH).

7. Delivery

Deliver replacement parts, etc., not otherwise labeled by NIOSH or MSHA to job site in manufacturer's containers.

PART 2 - EQUIPMENT

NOTE: OSHA REGULATIONS ALLOW RESPIRATORY PROTECTION TO BE SELECTED BASED UPON THE AIRBORNE FIBER COUNTS ENCOUNTERED IN THE WORK PLACE.

NOTE: EPA HAS NOT PROMULGATED ANY REGULATIONS MORE STRINGENT THAN THOSE OF OSHA BUT, EPA AND NIOSH HAVE ISSUED A RECOMMENDATION THAT FAR EXCEEDS THE OSHA REGULATION. EPA AND NIOSH RECOMMEND THAT AIR PURIFYING RESPIRATORS BE USED ONLY IN SITUATIONS WHERE MEASURABLE QUANTITIES OF AIRBORNE ASBESTOS ARE NOT DETECTABLE, AND THE USE OF THE RESPIRATOR IS A PRECAUTION AGAINST ACCIDENTAL DISTURBANCE OF ACM. SITUATIONS IDENTIFIED BY THE RECOMMENDATION ARE THOSE SUCH AS PRE-ABATEMENT INSPECTIONS, PREPARATION OF ABATEMENT AREAS, FINAL CLEANING, REMOVAL OF THE LAST LAYER OF PLASTIC, GLOVE BAG REMOVALS, ETC.

NOTE: STRICT ADHERENCE TO THIS RECOMMENDATION MAY IN MANY INSTANCES BE IMPRACTICAL AND EVEN UNSAFE FOR THE WORKER. SUPPLIED AIR RESPIRATORY PROTECTION SHOULD BE USED ONLY WHERE IT IS PROPERLY SETUP, MAINTAINED AND CONTINUOUSLY MONITORED BY TRAINED PERSONNEL. IF THIS IS NOT DONE WORKERS COULD BE SUBJECTED TO A VERY REAL LIFE HAZARD FROM THE SYSTEM THAT IS SUPPOSED TO BE PROTECTING THEM.

8. Air Purifying Respirators

a. Respirator Bodies

Provide half face or full face type respirators. Equip full face respirators with a nose cup or other anti-fogging device as would be appropriate for use in air temperatures less than 32 degrees fahrenheit.

b. Filter Cartridges

Provide, at a minimum, HEPA type filters labeled with NIOSH and MSHA Certification for "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Asbestos-Containing Dusts and Mists" and color coded in accordance with ANSI Z228.2 (1980). In addition, a chemical cartridge section may be added, if required, for solvents, etc., in use. In this case, provide cartridges that have each section of the combination canister labeled with the appropriate color code and NIOSH/MSHA Certification.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.11 Respiratory Protection

8. Air Purifying Respirators (cont.)

c. Non-permitted respirators

Do not use single use, disposable or quarter face respirators.

NOTE: EPA AND NIOSH RECOMMEND THE USE OF A SELF-CONTAINED BREATHING APPARATUS (SCBA) WITH A FULL FACEPIECE OPERATING IN PRESSURE-DEMAND MODE OR THE USE OF A TYPE C SUPPLIED AIR RESPIRATOR WITH A SCBA EMERGENCY BACKUP.

9. Supplied Air Respirator Systems

Provide equipment capable of producing air of the quality and volume required by the above reference standards applied to the job site conditions and crew size. Comply with provisions of this specification if more stringent than the governing standard.

a. Face Piece and Hose

Provide full face piece and hose by same manufacturer that has been certified by NIOSH/MSHA as an approved Type "C" respirator assembly operating in pressure demand mode with a positive pressure face-piece.

NOTE: THE FOLLOWING RESPIRATOR ASSEMBLY IS RECOMMENDED BY EPA AND NIOSH BUT IS CURRENTLY NOT AVAILABLE IN THE PRESSURE- DEMAND TYPE EQUIPMENT RECOMMENDED. SEVERAL MANUFACTURER'S HAVE INDICATED TO NIOSH THAT THIS EQUIPMENT COULD BE PROVIDED. VERIFY AVAILABILITY BEFORE INCLUDING THE FOLLOWING PARAGRAPH. IF THIS TYPE OF EQUIPMENT IS UNAVAILABLE THEN THE CONTRACTOR IS LEFT WITH NO ALTERNATIVE THAN TO USE THE MORE CUMBERSOME TYPE OF EQUIPMENT INDICATED FOR OXYGEN DEFICIENT ATMOSPHERES.

b. Auxiliary backup system

In atmospheres which contain sufficient oxygen (greater than or equal to 19.5% oxygen) provide a pressure-demand full face piece supplied air respirator equipped with an emergency back up HEPA filter.

c. Escape air supply

In atmospheres which are oxygen deficient (less than 19.5% oxygen) provide a pressure-demand full face piece supplied air respirator incorporating an auxiliary self-contained breathing apparatus (SCBA) which automatically maintains an uninterrupted air supply in pressure demand mode with a positive pressure face piece.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.11 Respiratory Protection (cont.)

9. Supplied Air Respirator Systems (cont.)

d. Backup air supply

Provide a reservoir of compressed air located outside the Work Area which will automatically maintain a continuous uninterruptable source of air automatically available to each connected face piece and hose assembly in the event of compressor shut-down, contamination of air delivered by compressor, power loss or other failure. Provide sufficient capacity in the back-up air supply to allow a minimum escape time of one-half hour times the number of connections available to the Work Area. Air requirement at each connection is the air requirement of the respirators in use plus the air requirement of an average-sized adult male engaged in moderately strenuous activity.

e. Warning device

Provide a warning device that will operate independently of the building's power supply. Locate so that alarm is clearly audible above the noise level produced by equipment and work procedures in use,in all parts of the Work Area and at the compressor. Connect alarm to warn of:

Compressor shut down or other fault requiring use of backup air supply

Carbon Monoxide (CO) levels in excess of 5 PPM/V

NOTE: A CARBON MONOXIDE MONITOR IS USUALLY NOT REQUIRED WHEN OIL-LESS COMPRESSORS ARE USED.

f. Carbon Monoxide (CO) Monitor

Continuously monitor and record on a strip chart recorder Carbon Monoxide (CO) levels. Place monitors in the air line between compressor and back-up air supply and between backup air supply and workers. Connect monitors so that they also sound an alarm as specified under "Warning Devices".

g. Compressor Shut Down: Interconnect monitors, alarms and compressor so that compressor is automatically shut down and the alarms sounded if any of the following occur:

Carbon Monoxide (CO) concentrations exceed 5 PPM/v in the air line between the filter bank and backup air supply

Compressor temperature exceeds normal operating range

NOTE: FOLLOWING HELPS ELIMINATE A SERIES OF POTENTIAL PROBLEMS ASSOCIATED WITH EXHAUST FROM ENGINES AND COMBUSTIBLE FUELS AT A BUILDING SITE. HOWEVER, ELECTRIC COMPRESSOR MOTORS ARE USUALLY LARGE AND FREQUENTLY REQUIRE 3 PHASE POWER AND AS SUCH MAY HAVE REQUIREMENTS BEYOND WHAT IS AVAILABLE AT THE BUILDING WHERE WORK IS BEING DONE. EDIT FOLLOWING BASED UPON LOCAL PRACTICES AND EXPERIENCE OF CONTRACTORS IN BIDDING POOL.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.11 Respiratory Protection (cont.)

9. Supplied Air Respirator Systems (cont.)

h. Compressor Motor

Provide a compressor driven by an electric motor. Do not use a gas or diesel engines to drive compressor. Insure that electrical supply available at the work site is adequate to energize motor.

NOTE: IF A GASOLINE OR DIESEL COMPRESSOR MOTOR IS MADE NECESSARY BY AN INADEQUATE BUILDING POWER SUPPLY OR OTHER FACTORS THE SAFEST LOCATION FOR THIS EQUIPMENT IS OUTSIDE OF THE BUILDING. FOSSIL-FUEL POWERED EQUIPMENT SHOULD NEVER BE SET UP INSIDE A BUILDING WITHOUT A SPECIFIC DESIGN BY SOMEONE KNOWLEDGEABLE IN THE FIRE SAFETY, VENTILATION AND EXHAUST REQUIREMENTS OF SUCH AN INSTALLATION. IF A FOSSIL-FUEL POWERED COMPRESSOR IS REQUIRED BY PROJECT REQUIREMENTS DELETE THE ABOVE AND USE BELOW, EDIT AS REQUIRED BY SPECIFIC PROJECT REQUIREMENTS.

i. Compressor Location

Locate compressor outside of building in location that will not impede access to the building, and that will not cause a nuisance by virtue of noise or fumes to occupied portions of the building.

Locate air intake remotely from any source of automobile exhaust or any exhaust from engines, motors, auxiliary generator or buildings.

j. After-Cooler

Provide an after-cooler at entry to filter system which is capable of reducing temperatures to outside ambient air temperatures.

k. Self Contained Breathing Apparatus (SCBA)

Configure system to permit the recharging of 1/2 hour 2260 PSI SCBA cylinders.

NOTE: THE ABOVE IS A MINIMUM. SCBA CYLINDERS RATED AT 1 HOUR AND 4520 PSI ARE IN COMMON USE IN SOME LOCALITIES. THIS PROVISION PERMITS PROJECT ADMINISTRATORS ACCESS TO WORK SITE WITH A SCBA AT ALL TIMES EVEN IF THE CONTRACTOR IS NOT WORKING AND SUPPLIED AIR SYSTEM IS SHUT DOWN OR UNMONITORED.

PART 3 - EXECUTION

10. General

Comply with ANSI Z88.2 - 1980 "Practices for Respiratory Protection" and OSHA 29 CFR 1910 and 1926.

Require that respiratory protection be used at all times that there is any possibility of disturbance of asbestos-containing materials whether intentional or accidental.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.11 Respiratory Protection (cont.)

10. General (cont.)

Require that a respirator be worn by anyone in a Work Area at all times, regardless of activity, during a period that starts with any operation which could cause airborne fibers until the area has been cleared for re-occupancy in accordance with Section 11.21.

Regardless of airborne fiber levels, require that the minimum level of respiratory protection used be half-face air-purifying respirators with high efficiency filters.

Do not allow the use of single-use, disposable, or quarter-face respirators for any purpose.

11. Fit Testing

NOTE: EPA AND NIOSH RECOMMEND THAT A QUANTITATIVE FIT TEST BE PROVIDED FOR ANY TYPE OF NEGATIVE PRESSURE RESPIRATOR INCLUDING SUPPLIED AIR RESPIRATORS THAT ARE EQUIPPED WITH A EMERGENCY BACKUP HEPA FILTER.

a. Initial Fitting

Provide initial fitting of respiratory protection during a respiratory protection course of training set up and administered by a Certified Industrial Hygienist. Fit types of respirator to be actually worn by each individual. Allow an individual to use only those respirators for which training and fit testing has been provided.

b. On a Weekly Basis

Check the fit of each worker's respirator by having irritant smoke blown onto the respirator from a smoke tube.

c. Upon Each Wearing

Require that each time an air-purifying respirator is put on it be checked for fit with a positive and negative pressure fit test in accordance with the manufacturer's instructions or ANSI Z88.2 (1980).

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.11 Respiratory Protection (cont.)

12. Type of Respiratory Protection Required

NOTE: THIS SECTION SETS FORTH THE LEVEL OF RESPIRATORY PROTECTION REQUIRED BY THE PROJECT. A CERTIFIED INDUSTRIAL HYGIENIST OR OTHER QUALIFIED OCCUPATIONAL HEALTH PROFESSIONAL SHOULD BE CONSULTED WHILE SELECTING THE TYPE OF RESPIRATORY PROTECTION TO BE REQUIRED.

NOTE: THERE HAS BEEN AN INCREASING TENDENCY TOWARD THE USE OF SUPPLIED AIR RESPIRATORY SYSTEMS FOR ABATEMENT PROJECTS, PARTICULARLY LARGE PROJECTS. WHILE THIS TYPE OF PROTECTION IS NOT REQUIRED BY OSHA IT HAS BEEN STRONGLY RECOMMENDED BY THE EPA AND NIOSH. IN THE FACE OF A RESPIRABLE HAZARD OF UNKNOWN DANGER IT IS DIFFICULT TO ARGUE WITH THE LOGIC OF SUPPLYING CLEAN AIR FROM A REMOTE SOURCE INSTEAD OF FILTERING AIR IN THE SPACE. THE DIFFICULTY ARISES IF THE AIR IS NOT CLEAN.

NOTE: AIR IN A SUPPLIED AIR SYSTEM IS PROCESSED BY MACHINERY AND FILTERED. IF ANYTHING GOES WRONG WITH THIS MACHINERY OR THE FILTERS FAIL THE WORKERS CAN BE SUBJECTED TO SERIOUS INJURY OR EVEN DEATH. SAFE OPERATION OF THIS TYPE OF SYSTEM DEPENDS ON PROPER INSTALLATION AND MONITORING OF EQUIPMENT OPERATION. THIS MEANS THAT SAFE USE OF A SUPPLIED AIR SYSTEM REQUIRES A SKILLED CONTRACTOR WITH THE PROPER EQUIPMENT. IF THE PROJECT IS TOO SMALL TO SUPPORT THE EQUIPMENT AND LABOR OVERHEAD OF SYSTEM OPERATION COMFORTABLY THERE MAY BE A TENDENCY TOWARD INADEQUATE MONITORING. LOCAL PRACTICE, EXPERIENCE OF THE CONTRACTOR, AND SIZE OF THE PROJECT MUST ALL BE TAKEN INTO CONSIDERATION IN DECIDING THE APPLICABILITY OF SUPPLIED AIR SYSTEMS.

a. General

Provide Respiratory Protection as indicated in paragraph below. Where paragraph below does not apply, determine the proper level of protection by dividing the expected or actual airborne fiber count in the Work Area by the "protection factors" given below. The level of respiratory protection which supplies an airborne fiber level inside the respirator, at the breathing zone of the wearer, at or below the permissible exposure limit (PEL) is the minimum level of protection allowed.

NOTE: OSHA DOES NOT REQUIRE THE USE OF SUPPLIED AIR RESPIRATORS, HOWEVER EPA AND NIOSH RECOMMEND THEIR USE IN SITUATIONS WHERE THERE IS EXPOSURE OR POTENTIAL EXPOSURE TO AIRBORNE ASBESTOS.

NOTE: TYPE "C" SUPPLIED AIR RESPIRATORS ARE FREQUENTLY USED ON LARGE ABATEMENT PROJECTS, PARTICULARLY DURING REMOVAL OF ASBESTOS-CONTAINING MATERIALS. ON SMALL PROJECTS OR DURING MAINTENANCE WORK IT IS FREQUENTLY MORE PRACTICAL TO BASE RESPIRATORY PROTECTION OF THE AIRBORNE FIBER COUNTS ENCOUNTERED DURING THE WORK. THIS IS THE METHOD OF DETERMINING RESPIRATORY PROTECTION SET FORTH IN THE CURRENT OSHA STANDARD (29 CFR 1926).

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.11 Respiratory Protection (cont.)

12. Type of Respiratory Protection Required (cont.)

a. General

NOTE: IF RESPIRATORY PROTECTION IS TO BE BASED ON AIRBORNE FIBER COUNTS, DELETE THE FOLLOWING PARAGRAPH.

b. Type "C" Supplied-air respirators

Full facepiece pressure demand supplied air respirators are to be used by all workers engaged in the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, or in the removal or demolition of asbestos insulation or coverings, or any other activity which results in or may result in airborne Asbestos fibers.

NOTE: TYPE C "SUPPLIED AIR" RESPIRATORS CAN PRESENT A HAZARD FOR WORKERS ON SCAFFOLDING DUE TO THE DIFFICULTY OF HANDLING THE ATTACHED HOSES. IF A SUPPLIED AIR SYSTEM IS IMPROPERLY SET UP OR IT IS NOT CONTINUOUSLY MONITORED IT CAN PRESENT A VERY REAL LIFE SAFETY HAZARD FOR WORKERS.

13. Permissible Exposure Limit (pel)

NOTE: 29 CFR 1926 REQUIRES THAT ENGINEERING CONTROLS AND WORK PRACTICES BE USED TO REDUCE AIRBORNE FIBER LEVELS TO THE LOWEST LEVELS ATTAINABLE BEFORE DETERMINING THE LEVEL OF RESPIRATORY PROTECTION REQUIRED. THIS CLEARLY MEANS THAT EVEN IF A VERY HIGH LEVEL OF RESPIRATORY PROTECTION IS PROVIDED (SUCH SUPPLIED AIR RESPIRATORS) CARE MUST BE TAKEN TO MAINTAIN WORK AREA FIBER COUNTS AT A LOW LEVEL.

a. TWA

8-Hour Time Weighted Average (TWA) of asbestos fibers to which any worker may be exposed shall not exceed the following.

NOTE: DELETE EITHER ABOVE OR BELOW. ABOVE IS CONSISTENT WITH THE CURRENT OSHA REGULATION WHICH DOES NOT STIPULATE A CEILING CONCENTRATION. BELOW SHOULD BE USED IF A CEILING CONCENTRATION IS INDICATED.

b. TWA

8-Hour Time Weighted Average (TWA) and Ceiling Concentration of asbestos fibers to which any worker may be exposed shall not exceed the following:

NOTE: FOLLOWING IS GENERAL PRACTICE AND MEETS OSHA REQUIREMENTS. ALWAYS RETAIN THIS PARAGRAPH. CURRENT OSHA STANDARDS ARE BASED ON THE OSHA REFERENCE METHOD "ORM" OF SAMPLING AND ANALYZING FOR THE PRESENCE OF AIRBORNE FIBERS. ANALYSIS BY OTHER METHODS IS ALLOWED IF THESE METHODS CAN DEMONSTRATE ANALYTICAL SENSITIVITY EQUIVALENT TO THAT OF "ORM" THE OSHA STANDARDS ARE SILENT ON ELECTRON MICROSCOPY.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.11 Respiratory Protection (cont.)

13. Permissible Exposure Limit (pel) (cont.)

c. Fibers

For purposes of this section, fibers are defined as all fibers regardless of composition as counted in the OSHA Reference Method (ORM), or NIOSH 7400 procedure.

NOTE: RETAIN THE FOLLOWING IF THIN FIBERS ARE A CONCERN. THE FOLLOWING ADDITION TO THE OSHA DEFINITION OF FIBERS IS NECESSARY TO DEFINE THE ANALYTICAL METHODS USED IN ENVIRONMENTS CONTAMINATED WITH MICROFIBERS (LESS THAN .25 MICRONS IN DIAMETER) WHICH ARE INVISIBLE TO AN OPTICAL MICROSCOPE. THIS LANGUAGE IS ALSO HELPFUL IN RESOLVING QUESTIONS ABOUT THE LEVEL OF RESPIRATORY PROTECTION REQUIRED IF AN AREA CONTAINS FIBERS OTHER THAN ASBESTOS.

d. Electron Microscopy

If Electron Microscopy is used to determine airborne fiber levels, only asbestos fibers will be enumerated, but fibers of any size detected by the testing of Section 11.21 Work Area Clearance will be counted.

NOTE: EDIT THE FOLLOWING WITH THE ADVICE OF THE FERMCO'S LEGAL COUNSEL AND A MEDICAL AND ENVIRONMENTAL CONSULTANT. PEL'S HAVE BEEN THE SUBJECT OF MUCH DISPUTE AND HAVE RECENTLY BEEN REVISED BY OSHA.

NOTE: FOLLOWING IS THE CURRENT OSHA STANDARD FOR THE CONSTRUCTION WORKPLACE AS SET FORTH IN 29 CFR 1926. NEITHER 29 CFR 1926 OR 1910 SET FORTH A CEILING CONCENTRATION BECAUSE OSHA FEELS THAT THE "TWA" RESULTS IN A DE FACTO CEILING OF 6.4 FIBERS/CC.

e. TWA

Time Weighted Average (TWA) - 0.2 fibers/cubic centimeter

NOTE: FOLLOWING IS THE ACTION LEVEL SET BY 29 CFR 1910 AND 1926 ESTABLISHING THE THRESHOLD FOR INITIATION OF MEDICAL MONITORING.

f. TWA

Time Weighted Average (TWA) - 0.1 fibers/cubic centimeter

NOTE: FOLLOWING IS THE MINIMUM FIBER LEVEL CONCENTRATION WHICH IS PRACTICAL TO MEASURE WITH A PHASE CONTRAST OPTICAL MICROSCOPE. SEVERAL OF THE EPA TRAINING CENTERS RECOMMEND THIS LEVEL TO ESTABLISH APPROPRIATE RESPIRATORY PROTECTION AS IT IS AN EPA RECOMMENDED CLEARANCE LEVEL FOR CONTRACTOR RELEASE AT THE END OF AN ABATEMENT PROJECT.

g. TWA

Time Weighted Average (TWA) - 0.01 fibers/cubic centimeter

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.11 Respiratory Protection (cont.)

14. Respiratory Protection Factor

NOTE: FOLLOWING ARE BASED ON CURRENT OSHA RESPIRATORY REQUIREMENTS. FOR MORE DETAIL ON PROTECTION FACTORS REFER TO ANSI Z88.2-1980. PROTECTION FACTORS ARE STRONGLY INFLUENCED BY RESPIRATOR FIT AND EASE WITH WHICH FACE SEAL IS BROKEN DURING NORMAL USE. THE FACE PIECE OF A NEGATIVE PRESSURE RESPIRATOR IS AT A LOWER PRESSURE THAN AMBIENT EACH TIME THE WEARER INHALES. THIS ALLOWS ASBESTOS FIBERS TO BE PULLED INTO THE FACE PIECE IF THE FACE SEAL IS BAD. ON THE OTHER HAND THE FACE PIECE OF A POSITIVE PRESSURE RESPIRATOR IS ALWAYS AT A HIGHER PRESSURE THAN AMBIENT SO THAT ANY LEAKAGE WILL BE OUTWARD. THUS, POSITIVE PRESSURE RESPIRATORS SUPPLY MUCH GREATER PROTECTION THAN NEGATIVE PRESSURE RESPIRATORS AND ARE AWARDED HIGHER PROTECTION FACTORS.

Respirator Type	Protection Factor
Air purifying: Negative pressure respirator High efficiency filter Half facepiece	10
Air purifying: Negative pressure respirator High efficiency filter Full facepiece	50
Powered Air Purifying (PAPR): Positive pressure respirator High efficiency filter Half or Full facepiece	100
Type C supplied air: Positive pressure respirator Pressure demand or other positive pressure mode Half facepiece	1,000
Type C supplied air: Positive pressure respirator Pressure demand or other positive pressure mode Full facepiece	2,000
Type C supplied air: Positive pressure respirator Pressure demand or other positive pressure mode Full facepiece Equipped with an auxiliary positive pressure Self-contained breathing apparatus (SCBA)	10,000
Self-contained breathing apparatus (SCBA): Positive Pressure respirator Pressure demand or other positive pressure mode Full facepiece	10,000

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.11 Respiratory Protection (cont.)

15. Air Purifying Respirators

a. Negative pressure - half or full face mask

Supply a sufficient quantity of respirator filters approved for asbestos, so that workers can change filters during the work day. Require that respirators be wet-rinsed, and filters discarded, each time a worker leaves the Work Area. Require that new filters be installed each time a worker re-enters the Work Area. Store respirators and filters at the job site in the changing room and protect totally from exposure to asbestos prior to their use.

b. Powered air purifying-half or full face mask

Supply a sufficient quantity of high efficiency respirator filters approved for asbestos so that workers can change filters at any time that flow through the face piece decreases to the level at which the manufacturer recommends filter replacement. Require that regardless of flow, filter cartridges be replaced after 40 hours of use. Require that HEPA elements in filter cartridges be protected from wetting during showering. Require entire exterior housing of respirator, including blower unit, filter cartridges, hoses, battery pack, face mask, belt, and cords, be washed each time a worker leaves the Work Area. Caution should be used to avoid shorting battery pack during washing. Provide an extra battery pack for each respirator so that one can be charging while one is in use.

16. Type "C" Respirator

Continuously monitor the air system operation including compressor operation, filter system operation, backup air capacity and all warning and monitoring devices at all times that system is in operation. Assign an individual, trained by manufacturer of the equipment in use or by a Certified Industrial Hygienist, in the operation and maintenance of the system to provide this monitoring. Assign no other duties to this individual which will take him away from monitoring the air system.

17. Respiratory Protection Schedule

Project Name

Location

Date

Based upon airborne asbestos-fiber counts encountered on previous projects of similar type working on materials similar to those found on the above referenced project. The following level of respiratory protection is proposed for the indicated operations to maintain an Airborne Fiber Count (as measured by P & CAM 239 Method) below the specified Permissible Exposure Limit (PEL) inside the respirator face-piece.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.11 Respiratory Protection (cont.)

17. Respiratory Protection Schedule (cont.)

Operation	Anticipated f/cc	Respiratory Protection	Protection Factor	f/cc in Mask
Installing sheet plastic				
Removing trim in contact with ACM				
Removal of pipe insulation				
Removal of fitting insulation				
Encapsulation of pipe & boiler insulation				
Gross debris removal				
Cleaning "primary" sheet plastic				
Cleaning "critical" barrier				
Removing Decontamination Unit				
Other				

The contractor certifies that to the best of his knowledge and belief the above represent a true and accurate representation of Airborne Fiber Counts to be expected for the operations indicated, and are based upon airborne fiber data from past projects with similar materials and operations.

Contractor

Signed by:

Signature Date

Print Name Title

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units

NOTE: THE DECONTAMINATION UNITS PROVIDE TWO FUNCTIONS. THEY ARE THE LOCATION WHERE PERSONNEL AND MATERIALS ARE DECONTAMINATED BEFORE LEAVING THE WORK AREA. THEY ALSO ARE THE ONLY ACCESS BETWEEN THE WORK AREA AND THE REST OF THE BUILDING. THIS ACCESS MUST BE CONTROLLED TO PREVENT SPREAD OF CONTAMINATION INTO THE BUILDING. THE MEANS OF ACCOMPLISHING BOTH FUNCTIONS IS THE SAME. A CONTAMINATED PERSON MOVES DOWN A CONTAMINATED PATH TO A POINT OF DECONTAMINATION (THE SHOWER). AT THIS POINT THE PERSON IS RENDERED CLEAN AND FREE OF CONTAMINATION AND FOLLOWS A SECOND, CLEAN PATH OUT OF THE DECONTAMINATION UNIT TO THE BUILDING. CONTAMINATED MATERIALS ARE TAKEN THROUGH A PROCESS OF BECOMING CLEANER AS THEY GO THROUGH THE DECONTAMINATION UNIT.

NOTE: THE PRACTICAL PROBLEM WITH THIS APPROACH IS THAT THE CONTAMINATED PATH CAN EASILY BECOME SO OVERBURDENED WITH CONTAMINATION THAT IT OVERWHELMS THE CAPABILITY OF THE DECONTAMINATION FACILITY. THE CONTAMINATED PATH MUST BE CLEANED PERIODICALLY TO PREVENT A BUILD-UP OF DEBRIS.

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

2. Description of Work

Provide separate Personnel and Equipment Decontamination facilities. Require that the Personnel Decontamination Unit be the only means of ingress and egress for the Work Area. Require that all materials exit the Work Area through the Equipment Decontamination Unit.

3. Related Work Specified Elsewhere

Refer to Section 11.3 Temporary Facilities - Asbestos Abatement for electrical requirements and requirements relative to connection of decontamination facilities to building systems such as water, sewer, and electrical.

PART 2 - PRODUCTS

4. Submittals

Submit the following to the FERMCO Project Manager for review. Do not begin work until these submittals are returned with FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

NOTE: EDIT THE FOLLOWING LIST. IN PARTICULAR, THE NUMBER OF SUBMITTALS MAY BE REDUCED IF EXISTING PRE-BUILT UNITS ARE TO BE USED BY THE CONTRACTOR.

a. Personnel Decontamination Unit

Provide shop drawing showing location and assembly of personnel decontamination units.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

4. Submittals (cont.)

b. Equipment Decontamination Unit

Provide shop drawing showing location and assembly of equipment decontamination units.

c. Filters

Provide product data and shop drawing of installation on decontamination unit.

d. Shower Stall

Needed for Wash Down Station. Provide product data and shop drawing showing and modifications.

NOTE: DELETE FOLLOWING IF NO ELASTOMERIC MEMBRANE IS TO BE USED.

e. Elastomeric membrane

Provide product data.

f. Sump Pump

Provide product data.

g. Signs

Submit samples of signs to be used.

NOTE: EDIT THE FOLLOWING LIST TO ELIMINATE THOSE TYPES OF PLASTIC NOT USED.

NOTE: FOLLOWING IS MOST LIKELY TO BE FOUND ON THE JOB IN THE ABSENCE OF A MORE SPECIFIC REQUIREMENT.

h. Polyethylene Sheet

A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil thick as indicated, clear, frosted, or black as indicated.

NOTE: FOLLOWING IS A GOOD GENERAL PRECAUTION AND SHOULD ALWAYS BE USED IN AREAS WHERE THERE IS HOT EQUIPMENT OR A POTENTIAL FOR FIRE, SUCH AS IN A BOILER ROOM. FIRE RETARDANT SHEET PLASTIC IS CONSIDERABLY MORE EXPENSIVE THAN STANDARD PLASTIC.

i. Polyethylene Sheet (Special Conditions)

Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil thick as indicated, frosted or black as indicated.

NOTE: REINFORCED PLASTIC SHOULD BE USED IN EXTERIOR APPLICATIONS WHERE THE SHEET IS EXPECTED TO BE STRESSED BY WINDS OR IN ANY LOCATION WHERE HIGH SKIN STRENGTH IS REQUIRED. FOLLOWING IS AN EXAMPLE OF LANGUAGE WHICH CAN BE USED. EDIT TO SUIT PROJECT REQUIREMENTS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

4. Submittals (cont.)

i. Polyethylene Sheet (Special Conditions) (cont.)

Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil thick as indicated, frosted or black as indicated.

j. Duct Tape

Provide duct tape in 2" or 3" widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

k. Spray Adhesive

Provide spray adhesive in aerosol cans which is formulated to stick tenaciously to sheet polyethylene.

l. Shower Pan

Provide one piece waterproof shower pan 4' x 8' by 6" deep. Fabricate from seamless fiberglass minimum 1/16" thick reinforced with wood, 18 ga. stainless or galvanized steel with welded seems, copper or lead with soldered seams, or a seamless liner of minimum 60 mil thick elastomeric membrane.

m. Shower Walls

Provide 8' long by approximately 7' high walls fabricated from rigid, impervious, waterproof material, either corrugated fiberglass roofing or equivalent. Structurally support as necessary for stability.

n. Shower Head and Controls

Provide a factory-made shower head producing a water spray which can be adjusted for spray size and intensity. Feed shower with water mixed from hot and cold supply lines. Arrange so that control of water temperature, flow rate, and shut off is from inside shower without outside aid.

o. Filters

Provide cascaded filter units on drain lines from showers or any other water source carrying asbestos-contaminated water from the Work Area. Provide units with disposable filter elements as indicated below. Connect so that discharged water passes primary filter and output of primary filter passes through secondary filter.

Primary Filter: Passes particles 20 microns and smaller
Secondary Filter: Passes particles 5 microns and smaller

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

4. Submittals (cont.)

p. Hose Bib

Provide heavy bronze angle type with wheel handle, vacuum breaker, and 3/4" National Standard male hose outlet.

q. Shower Stall

For Wash Down Station, provide leak tight shower enclosure with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3' x 3' square with minimum 6' high sides and back. Structurally support as necessary for stability. Equip with hose bib, as specified in this section, mounted at approximately 4'-0" above drain pan. Connect drain to a reservoir, pump water from reservoir through filters to a drain or store and use for amended water. Mount filters inside shower stall on back wall beneath hose bib.

NOTE: DELETE THE FOLLOWING IF ELASTOMERIC MEMBRANE IS NOT USED FOR SHOWER DOORS

r. Elastomeric membrane

Provide uniform flat sheets of flexible sheet roofing material fabricated from EPDM (ethylene propylene diene monomers) or Neoprene (polychloroprene), in a nominal 45 mil thickness.

s. Sump Pump

Provide totally submersible waterproof sump pump with integral float switch. Provide unit sized to pump 2 times the flow capacity of all showers or hoses supplying water to the sump, through the filters specified herein when they are loaded to the extent that replacement is required. Provide unit capable of pumping debris, sand, plaster or other materials washed off during decontamination procedures without damage to mechanism of pump. Adjust float switch so that a minimum of 3" remains between top of liquid and top of sump pan.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

PART 3 - EXECUTION

5. Personnel Decontamination Unit

NOTE: THE PERSONNEL DECONTAMINATION UNIT IS HISTORICALLY THE MOST COMMON LOCATION OF FAILURE OF THE WORK AREA ISOLATION MEASURES. THIS TYPICALLY OCCURS BY A GRADUAL MIGRATION OF ASBESTOS LADEN DEBRIS THROUGH THE FACILITY. THE FOLLOWING ATTEMPTS TO OVERCOME THIS BY TWO MEANS. THE ENTIRE FACILITY IS CLEANED AFTER EACH SHIFT CHANGE TO PREVENT A BUILD-UP OF DEBRIS. UNDER THE BEST OF CIRCUMSTANCES THE PATH FROM THE WORK AREA TO THE SHOWER WILL BE CONTAMINATED. THE SHOWER BECOMES CONTAMINATED BY THE ENTRY OF A CONTAMINATED WORKER. THIS CONTAMINATION IS BY NO MEANS THEORETICAL. NORMALLY, IT TAKES THE FORM OF SPLATTERED DEBRIS ON ALL INTERIOR SURFACES OF THE SHOWER. THE PATH FROM THE SHOWER TO THE BUILDING MUST BE CLEAN. FOR THIS REASON THE SHOWER FACILITY DESCRIBED BELOW IS COMPLETELY WASHED DOWN AND HENCE DECONTAMINATED AS EACH WORKER SHOWERS. THIS STOPS THE SPREAD OF CONTAMINATION AT THE SHOWER.

NOTE: THE FOLLOWING MAY HAVE TO BE REVISED TO COMPLY WITH LOCAL REGULATION. THERE IS GREAT VARIATION IN THE REQUIREMENTS FOR DECONTAMINATION FACILITIES FOUND IN STATE AND LOCAL REGULATIONS.

a. General

Provide a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, Changing Room, Drying Room, Shower Room, Equipment Room. Require all persons without exception to pass through this Decontamination Unit for entry into and exiting from the Work Area for any purpose. Do not allow parallel routes for entry or exit. Do not remove equipment or materials through Personnel Decontamination Unit. Provide temporary lighting within Decontamination Units as necessary to reach a lighting level of 100 foot candles.

b. Changing Room (clean room)

Provide a room that is physically and visually separated from the rest of the building for the purpose of changing into protective clothing.

Construct using polyethylene sheeting, at least 6 mil in thickness, to provide an airtight seal between the Changing Room and the rest of the building.

Locate so that access to Work Area from Changing Room is through Shower Room.

Separate Changing Room from the building by a sheet plastic flapped doorway.

Require workers to remove all street clothes in this room, dress in clean, disposable coveralls, and don respiratory protection equipment. Do not allow asbestos-contaminated items to enter this room. Require Workers to enter this room either from outside the structure dressed in street clothes, or naked from the showers.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

5. Personnel Decontamination Unit (cont.)

b. Changing Room (clean room) (cont.)

An existing room may be utilized as the Changing Room if it is suitably located and of a configuration whereby workers may enter the Changing Room directly from the Shower Room. Protect all surfaces of room with sheet plastic as set forth in Section 11.5 Temporary Enclosures. Authorization for this must be obtained from the FERMCO Project Manager in writing prior to start of construction. Submit written request in accordance with Section 11.14 "Product Substitutions" detailing layout and protective measures proposed.

Maintain floor of changing room dry and clean at all times. Do not allow overflow water from shower to wet floor in changing room.

Damp wipe all surfaces twice after each shift change with a disinfectant solution.

Provide posted information for all emergency phone numbers and procedures.

Provide 1 storage locker per employee.

NOTE: DELETE BELOW IF NO ADDITIONAL COMPONENTS ARE SHOWN ON THE DRAWINGS.

Provide all other components indicated on the contract drawings.

NOTE: DELETE THE FOLLOWING IF AN AIRLOCK IS NOT REQUIRED AT THIS POINT. NORMALLY THE DRYING ROOM WILL BE ADEQUATE AS AN AIRLOCK. CONFER WITH LOCAL AUTHORITIES HAVING JURISDICTION OVER THE PROJECT.

c. Airlock

Provide an airlock between Drying Room and Changing Room. This is a transit area for workers.

Separate this room from Drying Room and Changing Room by sheet plastic flapped doorways.

Separate this room from the rest of the building with airtight walls fabricated of 6 mil polyethylene.

Separate this room from the Drying and Changing Rooms with airtight walls fabricated of 6 mil polyethylene.

d. Drying Room

Provide a drying room as an airlock and a place for workers to dry after showering.

Construct room by providing a pan continuous with or draining to Shower Room pan. Install a freely draining wooden or non-skid metal floor in pan at elevation of top of pan.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

5. Personnel Decontamination Unit (cont.)

d. Drying Room (cont.)

Separate this room from the rest of the building with airtight walls fabricated of 6 mil polyethylene.

Separate this room from the Changing Room and Shower Room with airtight walls fabricated of 6 mil polyethylene.

Separate from Changing Room by a sheet plastic flapped doorway.

Provide a continuously adequate supply of disposable bath towels.

NOTE: SOME DECONTAMINATION UNITS INCLUDE THE FOLLOWING. DELETE IF THE MORE COMMON ARRANGEMENT OF FLAPPED DOORS IS TO BE USED.

Provide a rigid, tight-sealing hinged door between Drying Room and Clean Room. Arrange so that there is a sensible movement of air from clean room through breathing zone of worker in Shower and Drying Room toward Equipment Room.

e. Shower Room

Provide a completely watertight operational shower to be used for transit by cleanly dressed workers heading for the Work Area from the Changing Room, or for showering by workers headed out of the Work Area after undressing in the Equipment Room.

Construct room by providing a shower pan and 2 shower walls in a configuration that will cause water running down walls to drip into pan. Install a freely draining wooden floor in shower pan at elevation of top of pan.

Separate this room from the rest of the building with airtight walls fabricated of 6 mil polyethylene.

Separate this room from the Drying Room and Airlock with airtight walls fabricated of 6 mil polyethylene.

Provide splashproof entrances to Drying Room and Airlock with doors arranged in the following configuration:

NOTE: 6 MIL SHEET PLASTIC IS COMMONLY USED FOR FLAPS. REVISE FOLLOWING IF SHEET PLASTIC IS TO BE USED INSTEAD OF ELASTOMERIC MEMBRANE MATERIAL.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

5. Personnel Decontamination Unit (cont.)

e. Shower Room (cont.)

At each entrance to the Shower Room construct a door frame out of 2" x 4" lumber with 1-1/2" jambs (sides) and 1-1/2" head (top) and sill (bottom). Attach to this door frame two overlapping flaps of elastomeric membrane material, fastened at the head (top) and jambs (sides) (by clamping between a 1-1/2" x 3/4" batten and frame). Overlap the flaps a minimum of 6" in a direction that presents a shingle-like configuration to the water stream from the shower. Overlap sill (bottom) by 1-1/2" minimum. Arrange so that any air movement out of the Work Area will cause the flaps to seal against the door frame.

Provide shower head and controls.

Provide temporary extensions of existing hot and cold water and drainage, as necessary for a complete and operable shower.

Provide a soap dish and a continuously adequate supply of soap and maintain in sanitary condition.

Arrange so that water from showering does not splash into the Changing or Equipment Rooms.

Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the Work Area.

Provide flexible hose shower head.

Pump waste water to drain or to storage for use in amended water. If pumped to drain, provide 20 micron and 5 micron waste water filters in line to drain or waste water storage. Change filters daily or more often if necessary. Locate filters inside shower unit so that water lost during filter changes is caught by shower pan.

Provide hose bib.

NOTE: DELETE BELOW IF NO DECONTAMINATION DRAWING.

Provide all other items indicated on contract drawings.

NOTE: A PERMANENT SHOWER FACILITY WITHIN THE BUILDING CAN BE UTILIZED IF IT IS SUITABLY LOCATED AND OF A CONFIGURATION WHEREBY WORKERS MAY EXIT THE WORK AREA DIRECTLY TO THE SHOWER AND THEN BY A DIFFERENT PASSAGEWAY INTO THE CHANGING AREA. CONSTRUCTION OF A PLASTIC TUNNEL FROM THE WORK AREA TO THE SHOWER MAY BE NECESSARY. THIS TUNNEL IS PART OF THE WORK AREA AND CONSEQUENTLY MUST BE TREATED AS CONTAMINATED. DRAIN WATER FROM THE SHOWER MUST BE FILTERED IN THE SAME MANNER AS CALLED FOR IN THIS SPECIFICATION.

4559-

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

5. Personnel Decontamination Unit (cont.)

f. Airlock

Provide an airlock between Shower Room and Equipment Room. This is a transit area for workers. Separate this room from Equipment Room by a sheet plastic flap doorway.

Separate this room from the rest of the building with airtight walls fabricated of 6 mil polyethylene.

Separate this room from the Equipment Room and Shower Room with airtight walls fabricated of 6 mil polyethylene.

Separate from Equipment Room by a sheet plastic flapped doorway.

g. Equipment Room (contaminated area)

Require work equipment, footwear and additional contaminated work clothing to be left here. This is a change and transit area for workers.

Separate this room from the Work Area by a 6 mil polyethylene flapped doorway.

Separate this room from the rest of the building with airtight walls fabricated of 6 mil polyethylene.

Separate this room from the Shower Room and Work Area with airtight walls fabricated of 6 mil polyethylene.

NOTE: ABATEMENT WORKERS, PARTICULARLY ON A REMOVAL PROJECT, BECOME COMPLETELY COVERED WITH DEBRIS CAUSING THE PATH FROM THE WORK AREA TO THE SHOWER TO BECOME OVERBURDENED WITH DEBRIS. THE FOLLOWING CALLS FOR A FLOOR LAYER OF PLASTIC TO BE REMOVED AFTER EACH SHIFT CHANGE.

Provide a drop cloth layer of sheet plastic on floor in the Equipment Room for every shift change expected. Roll drop cloth layer of plastic from Equipment Room into Work Area after each shift change. Replace before next shift change. Provide a minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.

NOTE: DELETE THE FOLLOWING IF AN AIRLOCK IS NOT DESIRED AND IS NOT REQUIRED BY LOCAL REGULATION.

h. Airlock

Provide an airlock between Equipment Room and Work Area. This is a transit area for workers.

Separate this room from Equipment Room and Work Area by a sheet plastic flapped doorways.

Separate this room from the rest of the building with airtight walls fabricated of 6 mil polyethylene.

Separate this room from the Equipment Room and Work Area with airtight walls fabricated of 6 mil polyethylene.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

5. Personnel Decontamination Unit (cont.)

i. Work Area

Separate Work Area from the Equipment Room by polyethylene barriers. If the airborne asbestos level in the Work Area is expected to be high, as in dry removal, add an intermediate cleaning space between the Equipment Room and the Work Area. Damp wipe clean all surfaces after each shift change. Provide one additional floor layer of 6 mil polyethylene per shift change and remove contaminated layer after each shift.

j. Decontamination Sequence

Require that all workers adhere to the following sequence when entering or leaving the Work Area.

k. Entering Work Area

Worker enters Changing Room and removes street clothing, puts on clean disposable overalls and respirator, and passes through the Shower Room into the Equipment Room.

Any additional clothing and equipment left in Equipment Room needed by the worker are put on in the Equipment Room.

Worker proceeds to Work Area.

l. Exiting Work Area

Before leaving the Work Area, require the worker to remove all gross contamination and debris from overalls and feet.

The worker then proceeds to the Equipment Room and removes all clothing except respiratory protection equipment.

Extra work clothing such as boots, hard hats, goggles, gloves are to be stored in contaminated end of the Equipment Room.

Disposable coveralls are placed in a bag for disposal with other material

Require that Decontamination procedures found in Section 11.9, Item 10 be followed by all individuals leaving the Work Area.

After showering, the worker moves to the Changing Room and dresses in either new coveralls for another entry or street clothes if leaving.

6. Equipment Decontamination Unit

Provide an Equipment Decontamination Unit consisting of a serial arrangement of rooms, Clean Room, Holding Room, Wash Room for removal of equipment and material from Work Area. Do not allow personnel to enter or exit Work Area through Equipment Decontamination Unit.

Arrange with airlocks between rooms as required below.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

6. Equipment Decontamination Unit (cont.)

a. Wash Down Station

Provide an enclosed Shower Unit located in Work Area just outside Wash Room as an equipment, bag and container cleaning station.

NOTE: CONSIDER EXTENDING WATERPROOF FLOOR IN DIRECTION OF TRAVEL

Fabricate waterproof floor extending 6' - 0" beyond Wash Down station in all directions. Install seamless waterproof membrane over area and extend over curbs on all four sides. Form curbs from 2" x 4" lumber laid on the flat.

Waterproof membrane is to fabricated from elastomeric membrane.

NOTE: DELETE EITHER ABOVE OR BELOW DEPENDING UPON CONSTRUCTION TO BE USED.

Waterproof membrane is to fabricated from minimum 10 mil polyethylene.

Do not allow water to collect on waterproof membrane. Remove continuously with a wet vacuum or mops.

b. Wash Room

Provide wash room for cleaning of bagged or containerized asbestos-containing waste materials passed from the Work Area.

Construct wash room of nominal 2" x 4" wood framing and polyethylene sheeting, at least 6 mil in thickness and located so that packaged materials, after being wiped clean, can be passed to the Holding Room.

Separate this room from the Work Area by a single flapped door of 6 mil polyethylene sheeting.

Provide a drop cloth layer of plastic on floor in the Wash Room for every load-out operation. Roll this drop cloth layer of plastic from Wash Room into Work Area after each load-out. Provide a minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.

NOTE: DELETE IF NO AIRLOCK IS TO BE REQUIRED AT THIS POINT.

c. Airlock

Provide an airlock between Wash Room and Holding Room. This is a transit area.

Separate this room from adjacent spaces by a sheet plastic flapped doorway.

Separate this room from the rest of the building and adjacent spaces with airtight walls fabricated of 6 mil polyethylene.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

6. Equipment Decontamination Unit (cont.)

d. Holding Room

Provide Holding Room as a drop location for bagged asbestos-containing materials passed from the Wash Room. Construct Holding Room of nominal 2" X 4" wood framing and polyethylene sheeting, at least 6 mil in thickness and located so that bagged materials cannot be passed from the Wash Room through the Holding Room to the Clean Room.

Separate this room from the adjacent rooms by flapped doors fabricated from 1/16" +/- thick single ply elastomeric membrane material either EPDM or Neoprene.

NOTE: DELETE EITHER ABOVE OR BELOW DEPENDING UPON CONSTRUCTION TO BE USED.

Separate this room from the adjacent rooms by flap doors fabricated from 6 mil sheet plastic.

NOTE: DELETE IF NO AIRLOCK IS TO BE REQUIRED AT THIS POINT.

e. Airlock

Provide an airlock between Holding Room and Clean Room. This is a transit area.

Separate this room from adjacent spaces by a sheet plastic flap doorway.

Separate this room from the rest of the building and adjacent spaces with airtight walls fabricated of 6 mil polyethylene.

f. Clean Room

Provide Clean Room to isolate the Holding Room from the building exterior. If possible locate to provide direct access to the Holding Room from the building exterior.

Erect Critical and Primary Barriers as described in Section 11.5 "Temporary Enclosures" in an existing space. If no space exists construct Clean Room of 2" X 4" wood framing and polyethylene sheeting, at least 6 mil in thickness.

Separate this room from the exterior by a single flap door of 6 mil polyethylene sheeting.

g. Load-out Area

This area is the transfer area from the building to a truck or dumpster. It may be the Clean Room of the Equipment Decontamination unit, a separate room or loading dock area. Erect Critical and Primary barriers as described in Section 11.5 "Temporary Enclosures" in load-out area.

During transfer of material from load-out area erect primary barriers as described in Section 11.5 "Temporary Enclosures" as necessary to seal path from load-out area to truck or dumpster.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

6. Equipment Decontamination Unit (cont.)

h. Decontamination Sequence

Take all equipment or material from the Work Area through the Equipment Decontamination Unit according to the following procedure:

(1) At washdown station, thoroughly wet-clean contaminated equipment or sealed polyethylene bags and pass into Wash Room.

(2) When passing equipment or containers into the Wash Room, close all doorways of the Equipment Decontamination Unit, other than the doorway between the Washdown Station and the Wash Room. Keep all outside personnel clear of the Equipment Decontamination Unit.

(3) Once inside the washroom, wet-clean the bags and/or equipment.

(4) When cleaning is complete pass items into Holding Room. Close all doorways except the doorway between the Holding room and the Clean Room.

(5) Workers from the building exterior enter Holding Area and remove decontaminated equipment and/or containers for disposal.

(6) Require these workers to wear full protective clothing and appropriate respiratory protection.

(7) At no time is a worker from an uncontaminated area to enter the enclosure when a removal worker is inside.

7. Construction of the Decontamination Units

a. Walls and Ceiling

Construct airtight walls and ceiling using polyethylene sheeting, at least 6 mil in thickness. Attach to existing building components or a temporary framework.

b. Floors

Use 2 layers (minimum) of 6 mil polyethylene sheeting to cover floors in all areas of the Decontamination Units. Use only clear plastic to cover floors.

c. Flap Doors

Fabricated from three (3) overlapping sheets with openings a minimum of three feet (3') wide. Configure so that sheeting overlaps adjacent surfaces. Weigh sheets at bottoms as required so that they quickly close after being released. Put arrows on sheets to indicate direction of overlap and/or travel. Provide a minimum of six feet (6') between entrance and exit of any room. Provide a minimum of three feet (3') between doors to airlocks.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

7. Construction of the Decontamination Units (cont.)

c. Flap Doors (cont.)

If the Decontamination area is located within an area containing friable asbestos on overhead ceilings, ducts, piping, etc., provide the area with a minimum 1/4 inch hardboard or 1/2 inch plywood "ceiling" with polyethylene sheeting, at least 6 mil in thickness covering the top of the "ceiling".

Visual Barrier: Where the Decontamination area is immediately adjacent to and within view of occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil in thickness so that worker privacy is maintained and work procedures are not visible to building occupants. Where the area adjacent to the Decontamination area is accessible to the public, construct a solid barrier on the public side of the sheeting to protect the sheeting. Construct barrier with wood or metal studs covered with minimum 1/4 inch thick hardboard or 1/2 inch plywood. Where the solid barrier is provided, sheeting need not be opaque.

Alternate methods of providing Decontamination facilities may be submitted to the FERMCO Project Manager for approval. Do not proceed with any such method(s) without written authorization of the FERMCO Project Manager.

d. Electrical

Provide subpanel at Changing Room to accommodate all removal equipment. Power subpanel directly from a building electrical panel. Connect all electrical branch circuits in Decontamination unit and particularly any pumps in shower room to a ground-fault circuit protection device.

8. Cleaning of Decontamination Units

Clean debris and residue from inside of Decontamination Units on a daily basis or as otherwise indicated on Contract Drawings. Damp wipe or hose down all surfaces after each shift change. Clean debris from shower pans on a daily basis.

NOTE: IF THE CLEAN ROOM BECOMES CONTAMINATED, THERE IS NO PLACE FOR THE PEOPLE CLEANING IT TO DECONTAMINATE. THE FOLLOWING SPECIFIES A PROCEDURE.

If the Changing Room of the Personnel Decontamination Unit becomes contaminated with asbestos-containing debris, abandon the entire Decontamination Unit and erect a new Decontamination Unit. Use the former Changing Room as an inner section of the new Equipment Room.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.12 Decontamination Units (cont.)

9. Signs

Post an approximately 20 inch by 14 inch manufactured caution sign at each entrance to the Work Area displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

LEGEND

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED
IN THIS AREA

Provide spacing between respective lines at least equal to the height of the respective upper line.

NOTE: FOLLOWING IS NOT REQUIRED BY OSHA BUT IS USEFUL ADVICE.

Post an approximately 10 inch by 14 inch manufactured sign at each entrance to each Work Area displaying the following legend with letter sizes and styles of a visibility at least equal to the following:

LEGEND	NOTATION
NO FOOD, BEVERAGES OR TOBACCO PERMITTED	3/4" Block
ALL PERSONS SHALL DON PROTECTIVE CLOTHING (COVERINGS) BEFORE ENTERING THE WORK AREA	3/4" Block
ALL PERSONS SHALL SHOWER IMMEDIATELY AFTER LEAVING WORK AREA AND BEFORE ENTERING THE CHANGING AREA	3/4" Block

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.13 Materials and Equipment - Asbestos Abatement

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

2. Summary

This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the project.

NOTE: REVISE THE NEXT PARAGRAPH IF A MORE DETAILED SCHEDULE IS REQUIRED.

The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals."

Refer to Section 4.0 "Standards" for applicability of industry standards to products specified.

Administrative procedures for handling requests for substitutions made after award of the Contract are included under Section 11.14, "Product Substitutions."

3. Definitions

NOTE: RETAIN THE FOLLOWING ARTICLE. THESE DEFINITIONS REFER SPECIFICALLY TO THE CONTENTS OF THIS SECTION AND ARE NOT REPEATED IN SECTION 3.0, "DEFINITIONS".

Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in the construction industry.

a. Products

"Products" are items purchased for use in performing the work or for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

b. Named Products

"Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

NOTE: DELETE THE NEXT PARAGRAPH UNLESS USE OF FOREIGN PRODUCTS IS LIMITED BY PROVISIONS INCLUDED IN SOME OTHER PART OF THE CONTRACT DOCUMENTS

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.13 Materials and Equipment - Asbestos Abatement (cont.)

3. Definitions (cont.)

c. Foreign Products

"Foreign Products", as distinguished from "domestic products," are items substantially manufactured (50 percent or more of the product's value) outside of the United States and its possessions, or produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of nor living within the United States and its possessions.

d. Materials

"Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work

NOTE: FOLLOWING IS MORE BROAD DEFINITION OF EQUIPMENT THAN IS NORMALLY FOUND IN DOCUMENTS DESCRIBING CONSTRUCTION. THE PROCESS IS IMPORTANT IN AN ABATEMENT PROJECT. THIS MAKES THE EQUIPMENT REQUIRED TO ACCOMPLISH THE PROCESS AN IMPORTANT PART OF THE DESIGN.

e. Equipment

"Equipment" are products that may be either operational or fixed.

"Operational Equipment" are products with operating parts, whether motorized or manually operated, that requires temporary or permanent service connections, such as wiring or piping.

"Fixed Equipment" are products necessary for accomplishing the work that are used as a temporary facility during the work and removed afterward.

4. Submittals

NOTE: USUALLY RETAIN THE PARAGRAPH BELOW. THIS SHOULD BE SUFFICIENT FOR MOST ASBESTOS ABATEMENT PROJECTS THAT DO NOT INVOLVE REPLACEMENT OF REMOVED MATERIALS.

a. Required submittals

A general listing of products requiring submittals is included in Section 10.3, "Submittals." This listing may not be complete. Submittal requirements are found in each specification section. Prepare a schedule in tabular form showing each product listed. Include the manufacturer's name and proprietary product names for each item listed.

b. Product List Schedule

Prepare a schedule showing products specified in tabular form acceptable to the FERMCO Project Manager. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.13 Materials and Equipment - Asbestos Abatement (cont.)

4. Submittals (cont.)

b. Product List Schedule (cont.)

Coordinate the product list schedule with the Contractor's Construction Schedule and the Schedule of Submittals.

NOTE: GENERALLY RETAIN THE NEXT PARAGRAPH. IT REQUIRES TECHNICAL DATA ON PRODUCTS TO BE USED TO ACCOMPLISH THE WORK.

c. Form

Prepare the product listing schedule with information on each item tabulated under the following column headings:

NOTE: DELETE HEADINGS THAT ARE NOT NECESSARY FOR THE PROJECT. ADD HEADINGS AS NECESSARY.

- Related Specification Section number.
- Generic name used in Contract Documents.
- Proprietary name, model number and similar designations.
- Manufacturer's name and address.
- Supplier's name and address.
- Installer's name and address.
- Projected delivery date, or time span of delivery period.

NOTE: USUALLY RETAIN THE NEXT PARAGRAPH. CHANGE THE REVIEW PERIOD TO SUIT SPECIAL PROJECT CONDITIONS.

d. FERMCO Project Manager's Action

The FERMCO Project Manager will respond in writing to the Contractor within 2 weeks of receipt of the completed product list schedule. No response within this time period constitutes no objection to listed manufacturers or products, but does not constitute a waiver of the requirement that products comply with Contract Documents. The FERMCO Project Manager's response will include the following:

NOTE: ADD OTHER ELEMENTS TO THE FOLLOWING LIST AS NECESSARY TO SUIT PROJECT CONDITIONS.

A list of unacceptable product selections, containing a brief explanation for this action.

5. Quality Assurance

NOTE: THE NEXT SECTION CONTAINS A REQUIREMENT THAT COULD BE CONSIDERED PART OF PROJECT COORDINATION.

a. Compatibility of Options

When the Contractor is given the option of selecting between two or more products for use on the project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.13 Materials and Equipment - Asbestos Abatement (cont.)

5. Quality Assurance (cont.)

NOTE: GENERALLY DELETE THE NEXT PARAGRAPH. IT CONTAINS A LIMITATION DESIRED BY SOME OWNERS, BUT DIFFICULT TO ENFORCE. REVIEW REQUIREMENTS WITH FERMCO'S COUNSEL.

b. Foreign Product Limitations

Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:

NOTE: ADD EXCEPTION AS NECESSARY TO SUIT PROJECT REQUIREMENTS.

No available domestic product complies with the Contract Documents.

Domestic products complying with Contract Documents are only available at prices or terms that are substantially higher than foreign products that also comply with the Contract Documents.

6. Product Delivery, Storage, and Handling

NOTE: THE ARTICLE BELOW ELIMINATES THE NEED TO INCLUDE THIS INFORMATION IN EACH SECTION IN DIVISION 2 THROUGH 16. LIMIT USE OF ARTICLE IN EACH SECTION TO UNUSUAL REQUIREMENTS.

Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

NOTE: DELETE PARAGRAPHS BELOW THAT ARE NOT NECESSARY. INSERT PARAGRAPHS NECESSARY FOR SPECIAL PROJECT REQUIREMENTS.

Schedule delivery to minimize long-term storage at the site and overcrowding of construction spaces.

Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.

Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity as required by manufacturer.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.13 Materials and Equipment - Asbestos Abatement (cont.)

PART 2 - PRODUCTS

7. Product Selection

NOTE: THE METHODS USED LIMIT THE OPTIONS AVAILABLE TO THE CONTRACTOR FOR PRODUCT SELECTION. THIS ARTICLE DEFINES PROCEDURES GOVERNING PRODUCT SELECTION.

NOTE: REVISE AND EXPAND THE NEXT PARAGRAPH AS NECESSARY TO SUIT PROJECT REQUIREMENTS.

a. General Product Requirements

Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

NOTE: AMPLIFY THE PARAGRAPH ABOVE BY INSERTING PARAGRAPHS SIMILAR TO THE EXAMPLES BELOW.

Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

b. Standard Products

Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

c. Product Selection Procedures

Product selection is governed by the

Contract Documents and governing regulations, not by previous project experience. Procedures governing product selection include the following:

NOTE: RETAIN THE PARAGRAPH BELOW WHEN THE SPECIFICATIONS CONTAIN EXAMPLES OF PROPRIETARY SPECIFICATIONS (CLOSED PROPRIETARY SINGLE PRODUCT SPECIFICATIONS AS DESCRIBED IN THE CSI "MANUAL OF PRACTICE"). REVISE IF PROJECT CONDITIONS PERMIT CONSIDERATION OF SUBSTITUTIONS.

d. Proprietary Specification Requirements

Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.

NOTE: RETAIN THE PARAGRAPH BELOW WHEN THE SPECIFICATIONS CONTAIN EXAMPLES OF SEMI-PROPRIETARY SPECIFICATIONS (CLOSED PROPRIETARY OPTIONAL PRODUCTS SPECIFICATION AS DESCRIBED IN THE CSI "MANUAL OF PRACTICE"). REVISE IF PROJECT CONDITION PERMIT CONSIDERATION OF SUBSTITUTIONS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.13 Materials and Equipment - Asbestos Abatement (cont.)

7. Product Selection (cont.)

e. Semi-proprietary Specification Requirements

Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.

NOTE: DELETE THE NEXT PARAGRAPH. RETAIN ONLY WHEN THE PROJECT REQUIRES USE OF A TERM SIMILAR TO "OR EQUAL" WHEN PRODUCTS ARE SPECIFIED BY NAME. THE NEXT PARAGRAPH PROVIDES THE MAXIMUM CONTROL POSSIBLE OVER THIS TYPE OF SPECIFICATION.

Term "or equal," or "or approved equal" comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

NOTE: RETAIN THE NEXT PARAGRAPH ONLY WHEN THE "AVAILABLE PRODUCTS" OF "AVAILABLE MANUFACTURER" PARAGRAPHS ARE USED.

NOTE: THIS IS NOT A METHOD OF SPECIFYING. IT SHOULD NOT BE USED UNLESS SPECIFICATIONS ALSO ESTABLISH PERFORMANCE REQUIREMENTS, REQUIRE COMPLIANCE WITH AN INDUSTRY STANDARD, OR USE SOME OTHER METHOD TO ESTABLISH PRODUCT REQUIREMENTS.

f. Non-Proprietary Specifications

When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

NOTE: RETAIN THE PARAGRAPH BELOW WHEN THE SPECIFICATIONS CONTAIN EXAMPLES OF DESCRIPTIVE SPECIFICATIONS.

g. Descriptive Specification Requirements

Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.

NOTE: RETAIN THE PARAGRAPH BELOW WHEN THE SPECIFICATIONS CONTAIN EXAMPLES OF PERFORMANCE SPECIFICATIONS.

h. Performance Specification Requirements

Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.13 Materials and Equipment - Asbestos Abatement (cont.)

7. Product Selection (cont.)

h. Performance Specification Requirements (cont.)

Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

NOTE: USUALLY RETAIN THE PARAGRAPH BELOW. MOST SPECIFICATIONS WILL CONTAIN EXAMPLES OF PRODUCTS THAT REQUIRE COMPLIANCE WITH SOME RECOGNIZED STANDARDS, CODES OR REGULATIONS

i. Compliance with Standards, Codes and Regulations

Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.

NOTE: DELETE THE NEXT PARAGRAPH IF ALLOWANCES ARE NOT INCLUDED OR DO NOT GOVERN PRODUCT SELECTION.

j. Allowances

Refer to individual Specification Sections and "Allowance" provisions in Division-1 for allowances that control product selection, and for procedures required for processing such selections.

PART 3 - EXECUTION

8. Installation of Products

Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work.

Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

NOTE: INSERT INSTALLATION REQUIREMENTS NECESSARY TO SUIT PROJECT REQUIREMENTS.

NOTE: IF REFERENCE TO AN INCLUDED "LIST OF PRODUCTS" WAS RETAINED, INCLUDE THIS LIST AT THIS POINT

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.14 Product Substitutions - Asbestos Abatement

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

2. Summary

a. General

This section specifies administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

NOTE: REVISE THE FOLLOWING IF A MORE DETAILED SCHEDULE IS TO BE USED.

The Contractor's Construction Schedule and the Schedule of Submittals are included under Sections 10.2 and 10.3 "Submittals."

b. Standards

Refer to Section 4.0, "Standards" for applicability of industry standards to products specified.

Procedural requirements governing the Contractor's selection of products and product options are included under Section "Materials and Equipment."

3. Definitions

NOTE: RETAIN THE ENTIRE ARTICLE BELOW. THESE DEFINITIONS REFER SPECIFICALLY TO THE CONTENTS OF THIS SECTION AND ARE NOT REPEATED IN SECTION 3.0, "DEFINITIONS".

a. General

Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.

NOTE: REVISE THE FOLLOWING PARAGRAPH AS APPROPRIATE FOR MULTIPLE PRIME CONTRACTS OF SPECIAL PROJECT REQUIREMENTS.

b. Substitutions

Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions." The following are not considered substitutions:

NOTE: DELETE THE NEXT PARAGRAPH IF SUBSTITUTION REQUESTS WILL NOT BE CONSIDERED DURING THE BIDDING PERIOD. REVISE IF REQUESTS MAY BE PROPOSED BY BIDDERS AND SUBMITTED WITH THE BID.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.14 Product Substitutions - Asbestos Abatement (cont.)

3. Definitions (cont.)

b. Substitutions (cont.)

Substitutions requested by Bidders during the bidding period and accepted prior to award of Contract are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitution.

Revisions to Contract Documents requested by FERMCO or FERMCO Project Manager.

Specified options of products and construction methods included in Contract Documents.

The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

4. Submittals

NOTE: REVISE THE TIME PERIOD IN THE PARAGRAPH BELOW TO SATISFY PROJECT REQUIREMENTS.

NOTE: ON PROJECTS OF VERY SHORT DURATION IT MAY BE NECESSARY TO ALLOW REQUESTS FOR SUBSTITUTION ONLY DURING THE BIDDING PHASE.

a. Substitution Request Submittal

Requests for substitution will be considered if received within 3 weeks prior to beginning work affected by the substitution. Requests received less than 3 weeks before commencement of affected Work may be considered or rejected at the discretion of the FERMCO Project Manager.

Submit 3 copies of each request for substitution for consideration. Submit requests in accordance with procedures required for Change Order proposals.

Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

NOTE: DELETE REQUIREMENTS BELOW THAT ARE UNNECESSARY OR INCLUDED IN SUPPLEMENTARY CONDITIONS. MODIFY RETAINED PARAGRAPHS TO SATISFY PROJECT CIRCUMSTANCES.

Product Data, including Drawings and descriptions of products, fabrication, installation procedures, and manufacturer's instructions for use.

Samples, where applicable or requested

A detailed comparison of significant qualities of the proposed substitution with those of the work specified; significant qualities may include elements such as size, weight, durability, performance and visual effect.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.14 Product Substitutions - Asbestos Abatement (cont.)

4. Submittals (cont.)

Coordination information, including a list of changes or modifications needed for other parts of the work and for construction performed by the FERMCO and separate contractors that will become necessary to accommodate the proposed substitution.

A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution, and an indication of the effect of the proposed substitution on overall Contract Time.

Cost information, including a proposal of the net change, if any in the Contract Sum.

Certification by the Contractor that the substitution proposed is in every significant respect equal to or better than that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

NOTE: REVISE THE TIME LIMITS IN THE PARAGRAPH BELOW TO ALLOW MORE TO PROCESS REQUESTS, IF DESIRED.

b. FERMCO Project Manager's Action

Within one week of receipt of the request for substitution, the FERMCO Project Manager will request additional information or documentation necessary to evaluate the request. Within 2 weeks of receipt of the request, or one week of receipt of the additional information or documentation, which ever is later, the Project Manager will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order.

PART 2 - PRODUCTS

5. Substitutions

NOTE: REVIEW THIS ARTICLE WITH FERMCO'S LEGAL COUNCIL.

a. Conditions

The Contractor's substitution request will be received and considered by the FERMCO Project Manager when one or more of the following conditions are satisfied, as determined by the FERMCO Project Manager; otherwise requests will be returned without action except to record noncompliance with these requirements.

NOTE: DELETE OR MODIFY CONDITIONS BELOW THAT ARE NOT ACCEPTABLE. IF DESIRED, INSERT MORE RESTRICTIVE CONDITIONS TO LIMIT CONSIDERATION OF PROPOSED SUBSTITUTIONS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.14 Product Substitutions - Asbestos Abatement (cont.)

5. Substitutions (cont.)

Extensive revisions to Contract Documents are not required.

Proposed changes are in keeping with the general intent of Contract Documents.

The request is timely, fully documented, and properly submitted.

NOTE: DELETE THE NEXT PARAGRAPH IF AN "OR-EQUAL" CLAUSE IS NOT INCLUDED.

The request is directly related to an "or equal" clause or similar language in the Contract Documents.

The specified equipment, product or method of construction cannot be provided within the Contract Time. The request will not be considered if the equipment, product or method cannot be provided as a result of failure to pursue the work promptly or coordinate activities properly.

The specified equipment, product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

A substantial advantage is offered the FERMCO, in terms of safety, cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities FERMCO may be required to bear. Additional responsibilities for FERMCO may include additional compensation to the FERMCO Project Manager for redesign and evaluation services, increased cost of other construction by the FERMCO or separate Contractors, and similar considerations.

The specified equipment, product or method of construction cannot be provided in a manner that is compatible with other materials, and the Contractor certifies that the substitution will overcome the incompatibility.

The specified equipment, product or method of construction cannot be coordinated with other materials, and the Contractor certifies that the proposed substitution can be coordinated.

The specified equipment, product or method of construction cannot provide a warranty required by the Contract Documents and the Contractor certifies that the proposed substitution provides the required warranty.

NOTE: USUALLY RETAIN THE NEXT PARAGRAPH.

Contractor submittal and Project Manager's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (Not Applicable).

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.15 Removal of Asbestos-Containing Materials

PART 1 - GENERAL

1. Related Documents

   Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to work of this section.

2. Related Work Specified Elsewhere

   Installation of Critical and Primary Barriers, and Work Area Isolation Procedures are set forth in Section 11.5 Temporary Enclosures.

   Project Decontamination procedures after removal of the Secondary Barrier are specified in Section 11.17, Project Decontamination - Poly Removal.

   Disposal of asbestos-containing waste is specified in Section 11.20 Disposal of Asbestos-Containing Waste Material.

3. Submittals

   Submit the following to the FERMCO Project Manager for review. Do not start work until these submittals are returned with FERMCO Project Manager's action stamp indicating that the submittal is returned for unrestricted use.

   a. Surfactant

      Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.

   b. Removal Encapsulant

      Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.

   c. NESHAP Certification

      Submit certification from manufacturer of surfactant or removal encapsulant that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet ACM to which it is applied as required by the National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).

   d. Material Safety Data Sheet

      Submit the Material Safety Data Sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for each surfactant , encapsulating material and solvent proposed for use on the work. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.15 Removal of Asbestos-Containing Materials (cont.)

PART 2 - PRODUCTS

4. General

NOTE: FOLLOWING ALLOWS THE CONTRACTOR TO USE EITHER A SURFACTANT IN WATER OR A REMOVAL ENCAPSULANT, PROVIDING THAT IT IS ABLE TO PERFORM AS WELL AS THE GENERIC MIXTURE OF ONE OUNCE OF A MIXTURE OF 50% POLYOXYETHYLENE ESTER AND 50% POLYOXYETHYLENE ETHER IN FIVE GALLONS OF WATER.

a. Wetting Materials

For wetting prior to disturbance of ACM, use either amended water or a removal encapsulant:

Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

Removal Encapsulant: Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a mixture of 50% polyoxyethylene ester and 50% polyoxyethylene ether in five gallons of water.

NOTE: FOLLOWING IS MOST LIKELY TO BE FOUND ON THE JOB IN THE ABSENCE OF A MORE SPECIFIC REQUIREMENT.

b. Polyethylene Sheet

A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil thick as indicated, clear, frosted, or black as indicated.

NOTE: FOLLOWING IS A GOOD PRECAUTION IN AREAS WHERE THERE IS HOT EQUIPMENT OR A POTENTIAL FOR FIRE, SUCH AS IN A BOILER ROOM. FIRE RETARDANT SHEET PLASTIC IS CONSIDERABLY MORE EXPENSIVE THAN STANDARD PLASTIC.

c. Polyethylene Sheet

Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil thick as indicated, frosted or black as indicated.

d. Duct Tape

Provide duct tape in 2" or 3" widths as indicated,with an adhesive which is formulated to stick aggressively to sheet polyethylene.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.15 Removal of Asbestos-Containing Materials (cont.)

4. General (cont.)

e. Spray Cement

Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

f. Disposal Bags

Provide 6 mil thick leak-tight polyethylene bags labeled as required by Section 11.20, Disposal of Asbestos Containing Waste Material.

g. Fiberboard Drums

Provide heavy duty leak tight fiberboard drums with tight sealing locking metal tops.

h. Paper board Boxes

Provide heavy duty corrugated paper board boxes coated with plastic or wax to retard deterioration from moisture. Provide in sizes that will easily fit in disposal bags.

i. Felt

Standard felt approximately 1/16" thick and 36" to 72" in width.

PART 3 - EXECUTION

5. Secondary Barrier

a. General

Over the Primary Barrier, install as a drop cloth a clear 6 mil sheet plastic in all areas where asbestos removal work is to be carried out. Completely cover floor with sheet plastic. Where the work is within 10'-0" of a wall extend the Secondary Barrier up wall to ceiling. Support sheet plastic on wall with duct tape, seal top of Secondary plastic to Primary Barrier with duct tape so that debris is unable to get behind it. Provide cross strips of duct tape at wall support as necessary to support sheet plastic and prevent its falling during removal operations.

b. Installation

Install Secondary Barrier at the beginning of each work shift. Install only sufficient plastic for work of that shift.

c. Removal

Remove Secondary Barrier at end of each work shift or as work in an area is completed. Fold plastic toward center of sheet and pack in disposal bags. Keep material on sheet continuously wet until bagged.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.15 Removal of Asbestos-Containing Materials

5. Secondary Barrier

d. Installation

Install Walkways of black 6 mil plastic between active removal areas and decontamination units to protect Primary Layer from tracked material. Install walkways at the beginning of, and remove at the end of, each work shift.

6. Worker Protection

Before beginning work with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

7. Wet Removal

a. General

Thoroughly wet to satisfaction of FERMCO Project Manager ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of amended water or removal encapsulant, or use injection equipment to wet material under the covering. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.

NOTE: SOME MATERIALS, PARTICULARLY THOSE CONTAINING AMOSITE ASBESTOS, DO NOT WET WELL WITH WATER AMENDED WITH THE GENERIC MIXTURE OF ONE OUNCE OF A MIXTURE OF 50% POLYOXYETHYLENE ESTER AND 50% POLYOXYETHYLENE ETHER IN FIVE GALLONS OF WATER. OTHER WETTING AGENTS AND REMOVAL ENCAPSULANTS SHOULD BE TESTED ON THE MATERIAL FOR ADSORPTION. THIS SECTION SHOULD THEN BE MODIFIED TO SPECIFY THE MATERIAL MOST APPROPRIATE TO THE PROJECT.

NOTE: FOLLOWING ARE GOOD PRACTICES FOR CONTROLLING AIRBORNE FIBER LEVELS IF THE MATERIAL DOES NOT WET WELL BECAUSE IT IS COATED, THICK, OR CONTAINS AMOSITE.

b. Misting

Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.15 Removal of Asbestos-Containing Materials (cont.)

7. Wet Removal (cont.)

c. Removal

Remove saturated Asbestos-Containing Material in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to Wash Down Station adjacent to Material Decontamination Unit.

NOTE: USE THE FOLLOWING IF THE MATERIAL REMOVED CONTAINS AMOSITE ASBESTOS. OTHERWISE DELETE.

Evacuate air from disposal bags with a HEPA filtered vacuum cleaner before sealing.

NOTE: THE FOLLOWING REFERS TO HIGH PRESSURE WASHERS. THESE DEVICES CAN BE EXTREMELY EFFECTIVE IN CLEANING BUT CAN ALSO CAUSE FLOODING, SPLATTERING, AND SPRAY THROUGH HOLES INTO ADJACENT AREAS. WORKER SKILL AND JUDGMENT IS NECESSARY TO ACHIEVE DESIRED RESULTS WITH THIS EQUIPMENT. USE EXTREME CAUTION IN SPECIFYING THIS TYPE OF EQUIPMENT.

d. Pipe Insulation

Spray with a mist of amended water or removal encapsulant. Allow amended water or removal encapsulant to saturate material to substrate. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions. Cut bands holding preformed pipe insulation, slit jackets at seams, remove and hand-place in a disposal bag. Remove job-molded fitting insulation in chunks and hand place in a disposal bag. Do not drop to floor. Remove any residue on pipe or fitting with stiff bristle nylon hand brush. In locations where pipe fitting insulation is removed from pipe with straight runs insulated with fibrous glass or other non-asbestos-containing fibrous material, remove fibrous material 6" from the point where it contacts the asbestos-containing insulation.

NOTE: DELETE FOLLOWING IF THERE IS TO BE NO DRY REMOVAL

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.15 Removal of Asbestos-Containing Materials

8. Dry Removal

NOTE: WET REMOVAL AS SPECIFIED HEREIN IS REQUIRED UNLESS DAMAGE TO EQUIPMENT RESULTING FROM THE WETTING WOULD BE UNAVOIDABLE. IN SUCH CASE, LOCAL EXHAUST VENTILATION IN PLACE OF WET REMOVAL MIGHT BE USED, BUT ONLY WITH THE WRITTEN APPROVAL OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY. FERMCO'S REPRESENTATIVE SHOULD HAVE A COPY OF EPA APPROVAL IN HAND BEFORE WORK COMMENCES. IF LOCAL VENTILATION (SECTION 11.4) IS TO BE USED IN ADDITION TO WET REMOVAL METHODS, EPA APPROVAL IS NOT REQUIRED.

a. General

Dry removal of ACM is required in the following areas where wetting may create a hazard for workers or damage equipment or finishes

NOTE: FOLLOWING ARE EXAMPLES. EDIT AS REQUIRED BY PROJECT SPECIFICS.

Electrical closet on each floor: this space contains the vertical electrical bus for the building. This bus operates at 480 volts and must be kept in operation at all times.

Transformer vault: This space contains four large transformers operating at 14,000 volts on the primary side. These transformers must be kept in operation at all times.

High pressure steam lines from the boiler header to Steam Turbine no. 2. These line are operating at 300 psi and 422 degrees Fahrenheit and cannot be shut down.

North Data Processing Center: This space contains operating computer equipment that must be maintained in operation throughout the work.

b. Isolation

Isolate dry removal area from balance of Work Area by a Critical Barrier as described in Section 11.5 Temporary Enclosures and a pressure differential between the dry removal area and Work Area as described in Section 11.4 Pressure Differential System.

c. EPA Authorization

Do not begin dry removal work until authorized in writing by the EPA NESHAP coordinator and both the FERMCO Permitting and Reporting Department and the FERMCO Project Manager.

NOTE: FOLLOWING IS GENERAL AND SHOULD BE REVISED WITH THE ADVICE OF A SAFETY PROFESSIONAL. THE QUALIFIED TRADESPERSON IN SOME JURISDICTIONS WILL BE A LICENSED ELECTRICIAN. IF THIS IS THE CASE REVISE THE FOLLOWING TO MAKE THE REQUIREMENT MORE SPECIFIC.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.15 Removal of Asbestos-Containing Materials (cont.)

8. Dry Removal (cont.)

d. Active Electrical Equipment

Do not wet materials in the vicinity of active electrical equipment. Dry remove any Asbestos-Containing Materials in the vicinity of active electrical equipment.

Restrict Access: Maintain existing access restrictions to areas with active electrical equipment. Allow access to area only to qualified tradespersons with prior experience in the installation and repair of involved equipment.

Warning Signs: Post warning signs at the entry point to active electrical equipment as required by OSHA or other applicable regulation.

Personnel: Work on active electrical equipment is to be performed by qualified tradespersons with prior experience in the installation or repair of the involved equipment. Restrict access to electrical equipment.

Electrical Isolation: Cover exposed conductors with a minimum 1/8" thick neoprene blanket draped over the conductor and surrounding area.

Protective Equipment: Provide workers working on or in the vicinity of active electrical with appropriate protective equipment including insulating gloves, boots, and non-conductive tools.

Work Procedures: Perform removal work using "Localized Control of Material Release" and "Local Ventilation and Collection System" procedures described below.

e. Hot Equipment

Do not wet materials on hot piping or equipment. Dry remove any ACM on hot equipment.

Restrict Access: Maintain any existing access restrictions to areas with hot equipment. Provide railing or other barriers to prevent accidental contact with hot equipment. Allow access to area only to qualified tradespersons with prior experience with the type of equipment involved.

Warning Signs: Post warning signs at hot equipment as required by OSHA or other applicable regulation.

Personnel: Work on hot equipment is to be performed by qualified tradespersons with prior experience with the type of equipment involved. Restrict access to electrical equipment.

Re-insulation: Re-insulate equipment immediately following visual inspection. Do not allow more than 8 linear feet of piping to be exposed at any time.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.15 Removal of Asbestos-Containing Materials (cont.)

8. Dry Removal (cont.)

Protective Equipment: Provide workers working on or in the vicinity of hot equipment with appropriate protective equipment including insulating gloves, boots, and coveralls.

Work Procedures: Perform removal work using "Localized Control of Material Release" and "Local Ventilation and Collection System" procedures described below.

9. Localized Control of Material Release From Pipe Insulation

NOTE: ALWAYS USE FOLLOWING FOR DRY REMOVAL PROJECTS.

NOTE: FOLLOWING ARE EXAMPLES OF EXTREMELY CAREFUL WORK PRACTICES WHICH WILL HELP TO KEEP FIBER LEVELS LOW ON A DRY REMOVAL OR AN AMOSITE JOB. REVISE AS REQUIRED BY JOB SPECIFICS.

HEPA vacuum surface of pipe insulation. Cut bands holding preformed pipe insulation, slit jackets at seams while holding HEPA vacuum under cut, remove and hand-place in a disposal bag. Remove jobmolded fitting insulation in chunks, using nozzle of HEPA vacuum to collect debris generated, and hand-place in a disposal bag. Do not drop to floor. Remove any residue on pipe or fitting with wire brush. Brushing toward the nozzle of a HEPA vacuum. In locations where pipe fitting insulation is removed from pipe with straight runs insulated with fibrous glass or other non-asbestos-containing fibrous material, remove fibrous material 6" from the point where it contacts the asbestos-containing insulation. Use a two worker crew for work, with one worker removing material and one worker holding the nozzle of a HEPA vacuum in the location of disturbance.

NOTE: ALWAYS USE FOLLOWING FOR DRY REMOVAL PROJECTS.

NOTE: FOLLOWING SECTION IS USEFUL IN CONTROLLING AIRBORNE FIBER COUNTS DURING DRY REMOVALS OR AMOSITE REMOVALS AND MAY PREVENT CLAIMS ARISING FROM SLOW WORK PROGRESS DURING THIS WORK.

10. Local Ventilation and Collection System

Provide local ventilation and collection systems as described below for each area where amosite or dry ACM is being removed or otherwise disturbed:

Provide HEPA filtered fan units in addition to those required by section 11.4, in the vicinity of the work. Arrange so that the units exhaust into the Work Area oriented in a direction away from the work. Extend a 12" diameter flexible non-collapsing duct from the intake end to a point no more than 4'-0" from any scraping or wire brushing activity.

Locate intake of duct so that air flow is horizontally and slightly downward into intake. Replace primary filters on HEPA filtered fan units at an interval of no greater that 30 minutes. Allow no more than one scraping or wire brushing activity per fan unit.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.16 Removal of Asbestos-Contaminated Soil

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

PART 2 - PRODUCTS (NOT APPLICABLE)

Amended water and removal encapsulant are specified in Section 11.15, Removal of ACM.

PART 3 - EXECUTION

2. Removal

a. Wet Soils

After removal of the Secondary Barrier and floor layer of Primary Barrier, remove the top one inch (1") of soils which are damp or wet and place in disposal bags. Start removal at the point of work farthest from the entrance to the soil floor area and proceed toward the entrance. Do not permit traffic into the fresh soil surface. Arrange Pressure Differential System so that air flow is the starting point of work toward the entrance. After the entire first layer of soil is removed completely change coveralls and at the entrance to the soil removal area don clean boot covers. Remove the second one inch (1") of soil in the same manner as the first. Carry out the decontamination procedures set forth in the "Project Decontamination" section of this specification at this time. At the end of project decontamination remove the third one inch (1") of soil in the same manner as the previous two inches (2").

b. Dry Soils

Use the same procedure for dry soils, except saturate soil with amended water or a removal encapsulant as specified in other Division 2 sections of the specification. If a removal encapsulant is used, use in accordance with manufacturer's instructions. Saturate soil beyond the inch of soil currently being removed. If amended water is used keep the surface of the soil continuously wet throughout removal and decontamination.

DECISION ON WHETHER OR NOT TO ALLOW USE OF A REMOVAL ENCAPSULANT SHOULD BE MADE AFTER TESTING INVOLVED SOIL.

11.17 Project Decontamination - Poly Removal

PART 1 - GENERAL

NOTE: THIS SECTION DETAILS THE DECONTAMINATION PROCEDURES TO BE FOLLOWED DURING THE REMOVAL OF SHEET PLASTIC ENCLOSURES ISOLATING A WORK AREA. THE PROCEDURES DIFFERENTIATE BETWEEN A SITUATION SUCH AS A DAMAGED FRIABLE ARCHITECTURAL FINISH, WHERE IT MUST BE PRESUMED THAT THE ROOM IS CONTAMINATED BEFORE ANY ABATEMENT WORK BEGINS, AND UNDAMAGED, INTACT MATERIALS SUCH AS INTACT PIPE INSULATION, THAT WILL NOT HAVE CONTAMINATED THE SPACE BEFORE ABATEMENT WORK DISTURBED THEM.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

1. Related Documents

   Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

2. Description of Requirements

   Decontamination of the Work Area after asbestos abatement.

   NOTE: FOLLOWING TWO PARAGRAPHS CALL FOR TWO CLEANINGS OF THE PLASTIC AS A PREFERABLE PROCEDURE TO SPRAYING THE SHEET WITH AN ENCAPSULANT PRIOR TO REMOVING IT. THIS IS PREFERABLE BECAUSE ENCAPSULANTS ADHERE POORLY TO SHEET PLASTIC AND THEY CAN BECOME BRITTLE WHEN DRY AND FLAKE OFF DURING MOVEMENT OF THE PLASTIC.

   NOTE: TO EDIT THE FOLLOWING PARAGRAPH THE PROJECT DESIGNER HAS TO MAKE A DETERMINATION ABOUT MATERIALS CONSIDERED "DAMAGED OR FRIABLE." UNLESS A SPECIFIC DESIGNATION IS MADE ON THE PLANS OR IN A SCOPE OF WORK SECTION ALL MATERIALS ARE CONSIDERED "DAMAGED OR FRIABLE" BY THE FOLLOWING.

   NOTE: DELETE THE FOLLOWING IF THE WORK IS ON ONLY NONFRIABLE UNDAMAGED MATERIALS SUCH AS UNDAMAGED PIPE INSULATION.

   If the asbestos abatement work is on damaged or friable materials the work is a four step procedure with two cleanings of the Primary Barrier plastic prior to its removal and two cleanings of the room surfaces to remove any new or existing contamination. Unless specifically indicated, otherwise all materials are considered damaged or friable for purposes of this section.

   NOTE: DELETE THE FOLLOWING IF THE WORK IS ON ONLY DAMAGED OR FRIABLE MATERIALS, PARTICULARLY ARCHITECTURAL FINISHES.

   If the asbestos abatement work is on undamaged and non-friable materials the decontamination procedure is a two step procedure with two cleanings of the Primary Barrier plastic to remove contamination, thus preventing contamination of the building when the Work Area isolation barriers are removed.

   NOTE: EDIT THE FOLLOWING IF EITHER OF THE ABOVE ARE DELETED.

   In both cases pressure differential system operation is used to remove airborne fibers generated by the abatement work.

3. Related Work Specified Elsewhere

   a. Gross Debris

      Removal of Gross Debris is integral with the performance of abatement work and as such is specified in the appropriate work section(s) of these specifications:

      EDIT FOLLOWING TO MATCH WORK SPECIFIED.

      Section 11.15 - Removal of ACM

      Section 11.16 - Removal of Asbestos-Contaminated Soil

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.17 Project Decontamination - Poly Removal

3. Related Work Specified Elsewhere (cont.)

b. Work Area Clearance

Air testing and other requirements which must be met before release of Contractor and re-occupancy of the work area are specified in Section 11.21 Work Area Clearance.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

4. General

Work of this section includes the decontamination of air in the Work Area which has been, or may have been, contaminated by the elevated airborne asbestos fiber levels generated during abatement activities, or which may previously have had elevated fiber levels due to friable ACM in the space.

Work of this section includes the cleaning, decontamination, and removal of temporary facilities installed prior to abatement work, including:

Primary and Critical Barriers erected by work of Section 11.5

Decontamination Unit erected by work of Section 11.12

Pressure Differential System installed by work of Section 11.4

NOTE: DELETE THE FOLLOWING PARAGRAPH IF THE WORK IS INVOLVED ONLY WITH NON-FRIABLE INTACT MATERIALS.

Work of this section includes the cleaning, and decontamination of all surfaces (ceiling, walls, floor) of the Work Area, and all furniture or equipment in the Work Area.

5. Start of Work

a. Previous Work

During completion of the asbestos abatement work specified in other sections, the Secondary Barrier of polyethylene sheeting will have been removed and disposed of along with any gross debris generated by the asbestos abatement work.

b. Start of Work

Work of this section begins with the cleaning of the Primary Barrier. At start of work the following will be in place:

NOTE: EDIT FOLLOWING AS NECESSARY TO MATCH SPECIFICS OF THE PROJECT.

Primary Barrier: Two layers of polyethylene sheeting on floor and one layer on walls.

Critical Barrier: An airtight barrier between the Work Area and other portions of the building or the outside.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

5. Start of Work (cont.)

Critical Barrier Sheeting: Over lighting fixtures and clocks, ventilation openings, doorways, connectors, speakers and other openings.

Decontamination Units: For personnel and equipment in operating condition.

Pressure Differential System: In operation.

6. First Cleaning

a. General

Carry out a first cleaning of all surfaces of the work area including items of remaining sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping, and/or a HEPA filtered vacuum. (Note: A HEPA vacuum may fail if used with wet material.) Do not perform dry dusting or dry sweeping. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces.

b. HEPA Filters

Remove all HEPA filters in air handling system(s) and dispose of as asbestoscontaining waste in accordance with requirements of Section 11.20 Disposal of Asbestos-Containing Waste Material.

c. Waiting Period

Wait 96 Air Changes to allow HEPA filtered fan units to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain Pressure Differential System in operation for the entire 96 air change period.

NOTE: IF ABATEMENT WORK IS ON "UNDAMAGED AND NON-FRIABLE" MATERIALS DELETE SECTION ON SECOND CLEANING.

7. Second Cleaning

a. General

Carry out a second cleaning of all surfaces in the work area in the same manner as the first cleaning.

NOTE: INCLUDE THE FOLLOWING IF THE PROJECT INCLUDES ENCAPSULATION (LOCKBACK) OF A SUBSTRATE TO PREVENT RESIDUAL FIBER RELEASE AFTER THE REMOVAL OF SURFACE-APPLIED ASBESTOS-CONTAINING MATERIAL. IF A SPRAYED ON FIREPROOFING OR ACOUSTICAL MATERIAL IS TO BE APPLIED AS A REPLACEMENT TREATMENT THESE MATERIALS OFTEN REQUIRE AN INITIAL COATING OF A SPRAYED-ON ADHESIVE TO INSURE BOND TO THE SUBSTRATE. THIS ADHESIVE CAN OFTEN BE USED FOR THE LOCKBACK. IT IS A WISE PRECAUTION TO INVESTIGATE THE FILTER-CLOGGING CHARACTERISTICS OF THE MATERIAL SPECIFIED FOR LOCKBACK.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

7. Second Cleaning (cont.)

NOTE: THE PRACTICE OF COVERING THE SURFACE IN THIS MANNER PRIOR TO FINAL CLEARANCE IS LOOSING FAVOR. A COATING AT THIS POINT IN THE DECONTAMINATION PROCESS ADVERSELY AFFECTS AGGRESSIVE CLEANING AND SAMPLING. MORE CURRENT PRACTICE IS TO COMPLETE DECONTAMINATION AND CLEARANCE TESTING BEFORE LOCKBACK OR SPRAYBACK.

b. Encapsulation of Substrate

Perform encapsulation of substrate, where required, at this time. Maintain Pressure Differential System in operation during encapsulation work. Perform work only after meeting the following requirements:

Surfaces to be covered have met the requirements for a visual inspection in this section.

NOTE: REVISE BELOW IF A DIFFERENT METHOD OF ANALYSIS IS TO RE USED.

Airborne fiber counts in the Work Area are at or below 0.01 fibers per cubic centimeter as measured by phase contrast microscopy.

c. Removal of Primary Barriers

Immediately following the second cleaning of the Primary plastic, remove all Primary Barrier sheeting and Material Decontamination Unit, if there is one, leaving only:

Critical Barrier: Which forms the sole barrier between the Work Area and other portions of the building or the outside.

Critical Barrier Sheeting: Over lighting fixtures and clocks, ventilation openings, doorways, connectors, speakers, and other openings.

Decontamination Unit: For personnel, in operating condition.

Pressure Differential System: Maintain in continuous operation.

NOTE: IF ABATEMENT WORK IS ON "UNDAMAGED AND NON-FRIABLE" MATERIALS DELETE SECTION ON THIRD CLEANING.

8. Third Cleaning

a. General

Carry out a third cleaning of all surfaces in the work area in the same manner as the first cleaning immediately after removal of Primary plastic. This cleaning is now being applied to existing room surfaces. Take care to avoid water marks or other damage to surfaces.

NOTE: THE FOLLOWING PROCEDURE HELPS TO LOCATE HIDDEN SOURCES OF DUST AND DEBRIS WELL BEFORE FINAL CLEANING STARTS. THE INTRODUCTION OF THESE TESTING PROCEDURES HELPS TO INSURE A CLEAN ENVIRONMENT AT THE END OF THE ABATEMENT PROCESS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

8. Third Cleaning (cont.)

b. Contractor's Testing

At the completion of the above cleaning visually inspect all surfaces. Reclean if any dust, debris, etc. is found. At completion of this inspection sweep entire Work Area including walls, ceilings, ledges, floors and other surfaces in the Work Area with exhaust from forced-air equipment (leaf blower with approximately 1 horsepower electric motor or equivalent). Do not direct forced-air equipment at any seal in any Critical Barrier. If any debris or dust is found repeat the cleaning. Continue this process until no debris dust or other material is found while sweeping of all surfaces with forced-air equipment.

NOTE: IF CARPETING IS CONTAMINATED IT IS UNLIKELY THAT CLEANING PROCEDURES SET FORTH IN THIS SECTION WILL REMOVE ALL ASBESTOS FIBERS. THE FOLLOWING IS AN EFFORT TO PROTECT CLEAN CARPETING FROM BECOMING CONTAMINATED DURING CLEANING OF OTHER SURFACES IN THE WORK AREA. AGGRESSIVE TESTING WILL NORMALLY FIND A SIGNIFICANT QUANTITY OF DUST AND DEBRIS AT THIS POINT IN THE CLEANING PROCEDURE.

Cover carpeting in the work area with 6-mil polyethylene during Contractor's testing procedures. Seal plastic to baseboards with duct tape.

NOTE: THERE IS NO METHOD THAT IS EFFECTIVE IN REMOVING ALL ASBESTOS FIBERS FROM CARPETING. THE FOLLOWING PROCEDURE SHOULD BE EFFECTIVE IN REMOVING THOSE FIBERS THAT MIGHT BE RE-ENTRAINED BY CLEANING WITH A NORMAL VACUUM CLEANER.

c. Cleaning Carpeting

At the completion of cleaning of all surfaces except carpeting, HEPA vacuum carpeting designated to remain in Work Areas using a floor cleaning attachment adjusted so that rubber skirting is in contact with carpet surface. Use a passive (non-power brush type) floor attachment with rubber floor seals and adjustable above-floor height. Completely clean carpeting in one direction with each pass of the floor attachment overlapping the previous pass by one-half the attachment width. At the completion of one such cleaning, vacuum clean in the same manner in a direction at right angles to the initial cleaning.

NOTE: WET CLEANING OR SO CALLED "STEAM CLEANING" ON CARPETS MAY ALSO BE EFFECTIVE PROVIDING THE CLEANING IS A CONTINUOUSLY WET ONE.

d. Waiting Period

Wait 96 air changes to allow HEPA filtered fan units to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain pressure differential system in operation for the entire 96 air change period.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

9. Final Cleaning

a. General

Carry out a final cleaning of all surfaces in the Work Area in the same manner as the previous cleaning.

NOTE: THE FOLLOWING PROCEDURE HELPS TO LOCATE ANY REMAINING HIDDEN SOURCES OF DUST AND DEBRIS WELL BEFORE WORK AREA CLEARANCE PROCEDURES START.

b. Contractor's Testing

At the completion of the above cleaning visually inspect all surfaces. Reclean if any dust, debris, etc. is found. At completion of this inspection sweep entire Work Area including walls, ceilings, ledges, floors and other surfaces in the Work Area with exhaust from forced air equipment (leaf blower with approximately 1 horsepower electric motor or equivalent). Do not direct forced air equipment at any seal in any critical barrier. If any debris or dust is found repeat the final cleaning. Continue this process until no debris dust or other material is found while sweeping of all surfaces with forced air equipment.

c. Waiting Period

Wait 96 air changes to allow HEPA filtered fan units to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of Work Areas during this period. Maintain Pressure Differential System in operation for the entire 96 air change period.

10. Visual Inspection

a. Waiting Period

96 air changes after final cleaning perform a complete visual inspection of the entire Work Area including: all surfaces, ceiling, walls, floor, decontamination unit, all plastic sheeting, seals over ventilation openings, doorways, windows, and other openings; look for debris from any sources, residue on surfaces, dust or other matter. During visual inspection sweep entire work area including walls, ceilings, ledges, floors, and other surfaces in the room with exhaust from forced air equipment (leaf blower with approximately 1 horsepower electric motor or equivalent). If any debris, residue, dust or other matter is found repeat final cleaning and continue decontamination procedure from that point. When the area is visually clean, and if after sweeping of all surfaces with leaf blower, no debris, residue, dust or other materia is found, complete the certification at the end of this section. Visual inspection is not complete until confirmed in writing, on the certification, by the FERMCO Project Manager.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

10. Visual Inspection (cont.)

b. Temporary lighting

Provide a minimum of 100 foot candles of lighting on all surfaces in the areas to be subjected to visual inspection. Provide hand held lights providing 150 foot candles at 4 feet capable of reaching all locations in work area.

c. Lifts

Provide ladders, scaffolding, and lifts as required to provide access to all surfaces in the area to be subjected to visual inspection. Access is to allow touching of all surfaces.

NOTE: FOLLOWING IS A WORK AREA CLEARANCE PROCEDURE USING TRANSMISSION ELECTRON MICROSCOPY (TEM) PRECEDED BY PHASE CONTRAST MICROSCOPY. THE TEM IS CURRENTLY BELIEVED TO BE THE MOST RIGOROUS ANALYTICAL TOOL AVAILABLE TO IDENTIFY ASBESTOS FIBERS IN AIR SAMPLES. IT CAN DISTINGUISH ASBESTOS FROM OTHER FIBERS AND CAN DETECT VERY THIN FIBERS WHICH WOULD BE INVISIBLE TO EITHER PCM OR SEM ANALYSIS. BEFORE SPECIFYING, THE AVAILABILITY OF SERVICE SHOULD BE VERIFIED AS THE TURN AROUND TIME FOR SAMPLE ANALYSIS CAN BECOME PROLONGED. DELETE THE FOLLOWING IF TEM ANALYSIS IS NOT GOING TO BE USED.

11. Final Air Sampling TEM

NOTE: ALWAYS PERFORM PCM ANALYSIS PRIOR TO TEM ANALYSIS. THIS WILL HELP TO REDUCE THE AMOUNT OF UNNECESSARY TEM ANALYSES.

a. Phase Contrast Microscopy (PCM)

After the Work Area is found to be visually clean, air samples will be taken and analyzed in accordance with the procedure for Phase Contrast Microscopy set forth in Section 11.21 Work Area Clearance:

If Release Criteria are not met, repeat Final Cleaning and continue decontamination procedure from that point.

NOTE: IN EFFECT THIS ALLOWS THE CONTRACTOR TO LEAVE THE JOB SITE AND RETURN WITH A SMALL CREW TO REMOVE THE CRITICAL BARRIERS AND PRESSURE DIFFERENTIAL SYSTEM AFTER TEM RESULTS ARE BACK.

If Release Criteria are met continue with the air testing by Transmission Electron microscopy.

b. Transmission Electron Microscopy (TEM)

After the work area is found to be visually clean and PCM air sampling completed, TEM air samples will be collected and analyzed in accordance with the procedure for Transmission Electron Microscopy set forth in Section 11.21 Work Area Clearance.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

11. Final Air Sampling TEM (cont.)

b. Transmission Electron Microscopy (TEM) (cont.)

If Release Criteria are not met, repeat Final Cleaning and continue Decontamination procedure from that point.

If Release Criteria are met, proceed to work of Article on removal of Work Area isolation.

NOTE: FOLLOWING IS A WORK AREA CLEARANCE PROCEDURE USING PHASE CONTRAST MICROSCOPY (PCM). PCM IS THE ANALYTICAL TOOL MOST WIDELY AVAILABLE FOR THE QUANTIFICATION OF FIBERS IN AIR SAMPLES. IT CANNOT DISTINGUISH ASBESTOS FROM OTHER FIBERS AND CANNOT DETECT EXTREMELY THIN FIBERS TYPICAL OF AIRBORNE ASBESTOS IN BUILDINGS. RECENT WORK HAS SHOWN THAT MANY AIRBORNE FIBERS GENERATED DURING ABATEMENT ACTIVITIES WILL BE TOO THIN TO BE SEEN BY AN OPTICAL MICROSCOPE (PARTICULARLY IF THE WORK INVOLVES HIGHLY REFINED CHRYSOTILE). PCM ANALYSIS ASSUMES THAT THESE THIN FIBERS WILL BE AIRBORNE IN APPROXIMATELY THE SAME CONCENTRATION AS THE LARGER FIBERS THE PCM CAN SEE. THE BIG ADVANTAGE OF THE PCM IS AVAILABILITY. A PCM CAN EASILY BE SET UP AT THE JOB SITE SO THAT AN ALMOST IMMEDIATE TURNAROUND TIME FOR SAMPLE ANALYSIS IS POSSIBLE. ALSO PCM HAS THE LONGEST HISTORY AS AN ANALYTICAL METHOD AND AS SUCH HAS THE BEST STATISTICAL BASE OF ANY OF THE AVAILABLE METHODS.

NOTE: THE AHERA REGULATION ALLOWS ONLY SMALL WORK AREAS TO BE CLEARED BY PCM ALONE.

DELETE THE FOLLOWING IF PCM IS NOT TO BE USED ALONE FOR WORK AREA CLEARANCE.

12. Final Air Sampling PCM

a. Work Area Size Limitation

PCM without TEM sampling will be used to clear Work Areas where the asbestos-containing materials involved in the work are below the following size limitations:

NOTE: CHOOSE ONE OF THE FOLLOWING AND DELETE THE OTHER TWO AS A SIZE LIMITATION FOR USE OF PCM WITHOUT TEM.

BELOW IS THE SIZE LIMITATION THE AHERA REGULATION IMPOSES:

Less than or equal to 160 square feet, or 260 linear feet.

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

12. Final Air Sampling PCM (cont.)

b. Phase Contrast Microscopy (PCM)

After the work area is found to be visually clean, air samples will be taken and analyzed in accordance with the procedure for Phase Contrast Microscopy set forth in Section 11.21 Work Area Clearance:

If Release Criteria are not met, repeat Final Cleaning and continue Decontamination Procedure from that point.

If Release Criteria are met, proceed to work of this Section on Removal of Work Area Isolation.

NOTE: DELETE THE FOLLOWING SUBSECTION ON LOCKBACK IF NOT REQUIRED FOR PROJECT. IF LOCKBACK OR SIMILAR PROCEDURES ARE USED, SUCH AS SPRAYBACK, EDIT TO SUIT PROJECT REQUIREMENTS.

13. Removal of Work Area Isolation

After all requirements of this section and Section 11.21 Work Area Clearance have been met:

Shut down and remove the Pressure Differential System. Seal HEPA filtered fan units, HEPA vacuums and similar equipment with 6-mil polyethylene sheet and duct tape to form a tight seal at intake end before being moved from Work Area.

Remove Personnel Decontamination Unit.

Remove the Critical Barriers separating the Work Area from the rest of the building. Remove any small quantities of residual material found upon removal of the plastic sheeting with wet wiping, HEPA filtered vacuum cleaners and local area protection. If significant quantities, as determined by the FERMCO Project Manager, are found then the entire area affected shall be decontaminated as specified in Section 11.18, Cleaning & Decontamination Procedures.

Remove all equipment, materials, debris from the work site.

Dispose of all asbestos-containing waste material as specified in Section 11.20 Disposal of Asbestos Containing Waste Material.

14. Substantial Completion of Abatement Work

Asbestos abatement work is substantially complete upon meeting the requirements of this section and Section 11.21 Work Area Clearance, including submission of:

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.17 Project Decontamination - Poly Removal (cont.)

14. Substantial Completion of Abatement Work (cont.)

Certificate of Visual Inspection

Receipts Documenting proper disposal as required by Section 11.20 Disposal of Asbestos-Containing Waste Material.

Punch list detailing repairs to be made and incomplete items.

15. Certificate of Visual Inspection - Discussion

Following this section is a "Certificate of Visual Inspection". This certification is to be completed by the Contractor and certified by the Project Administrator. Submit completed Certificate with Application for Final Payment. Final payment will not be made until this Certification is executed.

16. Certification of Visual Inspection

In accordance with Section 11.17 "Project Decontamination" the Contractor hereby certifies that he has visually inspected the Work Area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris or residue.

by: (Signature Date)

(Print Name)

(Print Title)

17. Project Administrator Certification

The Project Administrator hereby certifies that he has accompanied the contractor on his visual inspection and verifies that this inspection has been thorough and to the best of his knowledge and belief, the Contractor's Certification above is a true and honest one.

by: (Signature) Date

(Print Name)

(Print Title)

11.18 Cleaning and Decontamination Procedures

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.18 Cleaning and Decontamination Procedures (cont.)

2. Description of the Work

NOTE: THIS SECTION CAN BE USED TO SPECIFY CLEANUP OF SMALL AREAS OF MATERIAL WHICH HAVE FALLEN FROM THERMAL INSULATION SYSTEMS, OR IT CAN BE USED TO SPECIFY THE CLEANUP AND DECONTAMINATION OF AN AREA WHICH HAS BEEN SYSTEMATICALLY CONTAMINATED.

The extent of cleaning and decontamination work is shown on the drawings.

NOTE: USE THE ABOVE IF THERE ARE DRAWINGS DESCRIBING THE WORK. IF THERE ARE NO DRAWINGS PROVIDE A VERBAL DESCRIPTION OF THE WORK, SUCH AS IN THE EXAMPLE BELOW.

FOLLOWING IS AN EXAMPLE. REVISE TO SUIT PROJECT REQUIREMENTS.

The work includes the removal of asbestos-containing debris that has fallen from the ceiling in Room no. 115 "Main Reading Room" in the Anthophilite City Library, 239 Whitedust Drive, Anthophilite, Anystate. The work includes:

Removal and disposal of visible debris.

Decontamination of carpeting in the area of the debris and for 10 feet beyond any visible debris.

Removal, cleaning and reshelving of books within the above area.

NOTE: AS AN ALTERNATIVE TO THE ABOVE, A SCHEDULE COULD BE ATTACHED AND THE FOLLOWING LANGUAGE USED.

The work includes decontamination of the areas indicated in the "Schedule of Decontamination Work," found at the end of this section.

3. Related Work Specified Elsewhere

NOTE: DELETE THE FOLLOWING IF THIS SECTION IS BEING USED AS PART OF A REPAIR SPECIFICATION. SECTION 11.21 WORK AREA CLEARANCE AS WRITTEN IS APPLICABLE ONLY TO LARGE SCALE ABATEMENT PROJECTS.

Work Area Clearance: Specified in Section 11.21 Work Area Clearance

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

4. General

Complete the following before start of work of this section:

11.6 Regulated Areas

11.11 Respiratory Protection

11.10 Worker Protection - Repair

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.18 Cleaning and Decontamination Procedures (cont.)

5. Wet Cleaning

NOTE: DELETE FOLLOWING IF NO WET CLEANING IS REQUIRED. WHEREVER WET CLEANING IS REQUIRED, USE THE FOLLOWING PROCEDURES.

Accomplish wet cleaning during decontamination with paper towels or disposable rags:

Immerse paper towel or rag in container of water with surfactant, or diluted removal encapsulant.

NOTE: IF A REMOVAL ENCAPSULANT IS USED, TEST FIRST TO INSURE THAT IT WILL NOT EITHER LEAVE A RESIDUE THAT WILL IMPEDE VISUAL INSPECTION OR BECOME GUMMY DURING CLEANING.

Wring out, fold into quarters, wipe surface once and refold to a fresh face of cloth. Proceed in this manner until all available faces of paper towel or rag have been used.

Dispose of paper towel or rag,

Do not place rag back in container to rinse out or for any other purpose. If a used towel or rag comes in contact with water, empty container and refill.

Material adhered to a surface with removal encapsulant may require the application of additional removal encapsulant to facilitate cleaning.

6. Removal of Asbestos-Containing Debris

NOTE: FOLLOWING IS AN EXAMPLE OF A PROCEDURE USED TO CLEAN A SPACE AFTER FALLOUT OF A SMALL AMOUNT OF MATERIAL FROM CEILING, PIPE INSULATION OR OTHER SOURCE. IF A LARGE QUANTITY OF MATERIAL IS INVOLVED, THEN THIS SECTION SHOULD BE COMBINED WITH THE FOLLOWING SECTION ON ROOM DECONTAMINATION.

a. General

Work of this Section is limited to the cleanup of a small quantity of amassed debris which has fallen from an architectural finish, fireproofing, or thermal insulation on pipes boilers and other thermal equipment.

b. Removal

Remove asbestos-containing debris and decontaminate the area involved using the following sequence:

Shut down all ventilation into room.

NOTE: DELETE THE FOLLOWING IF A SMALL AMOUNT OF RELATIVELY INTACT MATERIAL IS INVOLVED.

Seal entry to work area with 6-mil polyethylene. Slit polyethylene for entry. Install a flap to cover the slit automatically; tape slit closed after entry.

NOTE: DELETE THE FOLLOWING TWO PARAGRAPHS IF THE AREA IS GOING TO BE SEALED OFF AND A DIFFERENTIAL PRESSURE SYSTEM INSTALLED.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.18 Cleaning and Decontamination Procedures (cont.)

6. Removal of Asbestos-Containing Debris (cont.)

b. Removal (cont.)

Start HEPA vacuum before entering the area.

Use the HEPA vacuum to clean a path at least 6 feet wide from the entry point of the work area to the site of the fallen material.

Remove all small debris with the HEPA vacuum.

HEPA vacuum surfaces of all pieces too large to be removed by the suction of the HEPA vacuum.

Pick up such pieces and place in the bottom of a 6 mil polyethylene disposal bag conforming to the requirements of Section 11.20 Disposal of Asbestos-Containing Waste Material. Place pieces in the bag without dropping and avoiding unnecessary disturbance and release of material.

Remove all remaining visible debris with HEPA vacuum.

HEPA vacuum an area 3 feet beyond the location in which any visible debris was found in two directions each at right angles to the other.

Place a 6-mil polyethylene drop cloth in accordance with Section 11.6, Local Area Protection, immediately on top of the HEPA vacuumed area before performing any repair work on site from which fall-out occurred.

HEPA vacuum the site from which material fell removing all loose material which can be removed by the vacuums suction.

Repair or remove remaining material.

HEPA vacuum ladder and/or any tools used and pass out of the work area.

NOTE: DELETE FOLLOWING TWO PARAGRAPHS IF A VERY SMALL AMOUNT OF RELATIVELY INTACT MATERIAL IS INVOLVED. SOME STATES SET FORTH MINIMUM LEVELS OF MATERIAL CLEAN UP BELOW WHICH RE-OCCUPANCY AIR-MONITORING IS NOT REQUIRED. CONSULT STATE AND LOCAL REGULATIONS.

HEPA vacuum all surfaces in the room starting at the top of wall and working downward to the floor. Then start at corner of floor farthest from Work Area entrance and work towards entrance.

HEPA vacuum the floor using a floor attachment with rubber floor seals and adjustable floor to attachment height. Adjust the height so that the rubber seals just touch the floor if carpeted and are within 1/16" of hard surface floors. Vacuum the floor in parallel passes with each pass overlapping the previous by one-half the width of the floor attachment. At the completion of one cleaning vacuum the floor a second time at right angles to the first.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.18 Cleaning and Decontamination Procedures (cont.)

6. Removal of Asbestos-Containing Debris (cont.)

b. Removal (cont.)

NOTE: DELETE THE FOLLOWING IF THE SEAL ON DOOR IS DELETED.

Secure area from occupancy until air monitoring results per Section 11.21 Project Decontamination indicate that area is safe for re-occupancy.

7. Cleaning and Decontaminating Objects

NOTE: FOLLOWING IS A PROCEDURE FOR CLEANING CONTAMINATED OBJECTS. EDIT FOR PROJECT SPECIFICS.

Perform all work of decontaminating objects wherever possible on a plastic drop sheet installed in conformance with Section 11.6.

HEPA vacuum all surfaces of object and immediate area before moving the object.

Pick-up object, if possible, and HEPA vacuum all surfaces.

Hand to off-sheet worker who will wet-clean object, if possible, and place in storage location.

Decontaminate area where object was located by HEPA vacuuming twice, in two perpendicular directions. Wet clean if necessary to remove any debris.

Return object to its original location.

8. Decontamination of Rooms

NOTE: FOLLOWING IS AN EXAMPLE OF PROCEDURES FOR CLEANING SPACES ADJACENT TO A WORK AREA WHICH HAVE BEEN CONTAMINATED BY FIBER MIGRATION, OR WHICH HAVE BEEN CONTAMINATED BY GROSS DEBRIS. AS WRITTEN THIS SECTION REQUIRES WORKER DECONTAMINATION BY SHOWERING. EDIT FOR PROJECT SPECIFICS.

Shut down all ventilation into space.

NOTE: USE THE FOLLOWING 3 PARAGRAPHS REFERRING TO SEALING THE ROOM AND INSTALLING A HEPA FILTERED FAN UNIT ONLY IF THE AIR IN THE ROOM MAY BE CONTAMINATED WITH AIRBORNE FIBERS WHICH MUST BE REMOVED BY DECONTAMINATION. IN THIS CASE WORKERS SHOULD UNDERGO A WET DECONTAMINATION PROCEDURE AT THE END OF THE WORK DAY.

NOTE: IF THE ROOM IS CONTAMINATED WITH VISIBLE DEBRIS (SUCH AS TRACKED MATERIAL), BUT IS NOT CONTAMINATED WITH AIRBORNE FIBERS DELETE THE NEXT THREE PARAGRAPHS. IN THIS CASE THE DRY DECONTAMINATION PROCEDURES OF SECTION 11.10 SHOULD BE USED.

Seal entry to Work Area with 6 mil polyethylene. Slit polyethylene for entry. Install a flap to cover the slit automatically; tape slit closed after entry.

Install Differential Pressure System in accordance with Section 11.4.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.18 Cleaning and Decontamination Procedures (cont.)

8. Decontamination of Rooms (cont.)

NOTE: IF IT IS NOT FEASIBLE TO EXHAUST THE HEPA FILTERED FAN UNITS FROM THE WORK AREA, DELETE THE ABOVE AND USE THE FOLLOWING PARAGRAPH.

Recirculate HEPA filtered fan units in space by operating them so that discharge from machine is back into room. Use one HEPA filtered fan unit for each 2,500 cubic feet of room volume.

HEPA vacuum all surfaces in the room starting at the ceiling, then top of wall and working downward to the floor.

HEPA vacuum the floor using a floor attachment with rubber floor seals and adjustable floor to attachment height. Adjust the height so that the rubber seals just touch the floor if carpeted and are within 1/16" of hard surface floors. Vacuum the floor in parallel passes with each pass overlapping the previous by one half the width of the floor attachment. At the completion of one cleaning, vacuum the floor a second time at right angles to the first.

Operate HEPA filtered fan unit in space for 24 hours minimum.

At completion of Decontamination Work workers decontaminate in accordance with Section 11.10 Worker Protection - Repair.

Secure area from occupancy until air monitoring results per Section 11.21 Work Area Clearance indicate area is safe for re-occupancy.

11.19 Project Decontamination - Microfibers

NOTE: THE FOLLOWING PROCEDURE HAS PROVEN EFFECTIVE IN DECONTAMINATING AREAS WITH HIGH AIRBORNE ASBESTOS MICRO-FIBER LEVELS (FIBERS TOO SMALL TO BE SEEN WITH AN OPTICAL MICROSCOPE). TYPICALLY THESE FIBERS ARE VISIBLE ONLY WITH A TRANSMISSION ELECTRON MICROSCOPE. THIS TYPE OF CONTAMINATION IS VERY UNUSUAL AND SHOULD NOT BE CONSIDERED AS PART OF A NORMAL ABATEMENT PROJECT. AN ENVIRONMENTAL CONSULTANT FAMILIAR WITH THIS TYPE OF SITUATION SHOULD BE CONSULTED IN ADOPTING THIS SECTION TO A SPECIFIC JOB SITE. IT SHOULD BE NOTED THAT NO CURRENT FEDERAL REGULATIONS COVER MICROFIBERS.

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

FOLLOWING IS AN EXAMPLE. EDIT TO DESCRIBE WORK OF PROJECT.

2. Description of the Work

Decontamination of the room and two adjacent rooms opening off Gymnastics Room. Work of this section is to decontaminate air and all surfaces in each room.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.19 Project Decontamination - Microfibers (cont.)

3. Airborne Asbestos Fiber Hazard (cont.)

NOTE: FOLLOWING IS AN EXAMPLE. EDIT FOR PROJECT SPECIFICS.

Area currently has airborne chrysotile levels between 0.6 and 0.9 fibers/cc. These fibers are invisible to the human eye. Type "C" Respiratory Protection is to be used at all times in the Work Area.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

4. General

Prior to starting work, complete requirements of:

Section 11.4 - Temporary Pressure Differential and Air Circulation System

Section 11.12 - Decontamination Units
(Personnel Decontamination Unit Only)

Section 11.5 - Temporary Enclosures
(Critical Barriers Only)

Section 11.9 - Worker Protection - Asbestos Abatement

Section 11.11 - Respiratory Protection

NOTE: EDIT SECTION 11.5 TO REQUIRE INSTALLATION OF ONLY CRITICAL BARRIERS, AND 11.12 TO REQUIRE PERSONNEL DECONTAMINATION UNIT ONLY.

5. Cleaning Area

a. First Cleaning

Carry out a first cleaning of all surfaces of the work area including Critical Barrier sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping, and/or a High Efficiency Particulate Absolute (HEPA) filtered vacuum. (Note: A HEPA vacuum will fail if used with wet material.) Do not dry dust or dry sweep. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue cleaning until there is no visible dust, debris or residue on plastic sheeting or other surfaces.

Perform a Complete Visual Inspection of the entire Work Area including decontamination unit, sole barrier sheeting, seals over ventilation openings, doorways and windows, etc.) for debris from any sources, residue on surfaces, etc. If any such debris or residue is found repeat the first cleaning and continue the decontamination procedure from that point. When the Work Area is visually clean, complete the Certification at the end of this section.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.19 Project Decontamination - Microfibers (cont.)

5. Cleaning Area (cont.)

a. First Cleaning (cont.)

Wait twenty-four (24) hours to allow HEPA filtered fan units to clean air of airborne asbestos fibers. Use 24" diameter floor fans as necessary to assure circulation of air in all parts of Work Areas during this period. Maintain the Differential Pressure System in operation for the entire 24 hour period.

b. Second Cleaning

Carry out a second cleaning of all surfaces in the work area in the same manner as the first cleaning.

NOTE: STEAM CLEANING OF CARPETS MAY ALSO BE EFFECTIVE PROVIDING THE CLEANING IS A CONTINUOUSLY WET ONE.

Wait 24 hours to allow HEPA filtered fan units to clean air of airborne asbestos fibers. Use 24" diameter oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain differential pressure system in operation for the entire 24 hour period.

c. Final Cleaning

Carry out a final cleaning of all surfaces in the Work Area in the same manner as the first cleaning.

6. Additional Cleaning

Work of the Base Bid is completed after the final cleaning. Work from this point will be carried on as additional to the Base Bid.

If airborne asbestos fiber levels within the Work Area exceed those in make-up air pursuant to Section 11.21, repeat final cleaning.

Air samples will be taken by FERMCO in each Work Area at the completion of final cleaning. See Section 11.21 for Work Area Clearance criteria.

NOTE: IF APPLICABLE, ADD: ALL FILTERS IN THE AIR HANDLING SYSTEM(S) SHALL BE CAREFULLY REMOVED, TREATING AS CONTAMINATED MATERIAL, BAGGED AND DISPOSED OF AS CONTAMINATED WASTE.

7. Shortcycling HEPA Filtered Fan Units

If airborne asbestos fibers in the Work Area still exceed those measured at the source of make up air for the HEPA filtered fan unit(s), operate HEPA filtered fan unit(s), within the Work Area with exhaust from units being returned to Work Area. Use number of units equal to twice the number called for in Section 11.4. Use an extension duct or move the units to various locations in the Work Area. Continue this procedure for 24 hours. At the end of that time final air samples will be secured. Continue this procedure until the Work Area meets clearance criteria of Section 11.21 Work Area Clearance.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.19 Project Decontamination - Microfibers (cont.)

8. Removal of Critical Barriers

After final air samples are found to meet Clearance Criteria remove critical barriers and completely dismantle and remove Decontamination Unit.

Seal HEPA filtered fan units with 6 mil polyethylene sheet and duct tape to form a tight seal at intake end before unit is moved from the Work Area.

9. Certificate of Visual Inspection

Following this section is a "Certificate of Visual Inspection". This Certification is to be completed by the Contractor and certified by the Project Administrator. Submit completed Certificate with Application for Final payment. Final payment will not be made until this Certification is executed.

In accordance with Section 11.19 "Project Decontamination - Microfibers" the contractor hereby certifies that he has visually inspected the work area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris or residue.

by: (Signature Date)

(Print Name)

(Print Title)

10. Project Administrator Certification

The Project Administrator hereby certifies that he has accompanied the Contractor on his visual inspection and verifies that this inspection has been thorough and to the best of his knowledge and belief, the Contractor's Certification above is a true and honest one.

by: (Signature) Date

(Print Name)

(Print Title)

11.20 Disposal of Asbestos-Containing Waste Material

PART 1 - GENERAL

1. Related documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

NOTE: THIS SECTION IS REQUIRED ONLY WHERE THERE WILL BE REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING MATERIALS.

Section 7.0 Codes and Regulations - Asbestos Abatement describes applicable federal, state and local regulations.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.20 Disposal of Asbestos-Containing Waste Material (cont.)

2. Description of the Work

This section describes the disposal of Asbestos-Containing Materials. Disposal includes packaging of asbestos-containing waste materials.

PART 2 - PRODUCTS:

3. Disposal Bags

Provide 6 mil thick leak-tight polyethylene bags labeled with three labels with text as follows:

NOTE: THE FIRST SIGN BELOW IS REQUIRED BY EPA NESHAPS REGULATIONS. THE SECOND SIGN IS REQUIRED BY OSHA 29 CFR 1926. THE THIRD SIGN IS REQUIRED BY THE U.S. DEPARTMENT OF TRANSPORTATION HAZARDOUS WASTE HAULING REGULATION. THERE IS SOME REGULATORY CONFUSION AS THE NESHAPS REGULATION ALLOWS THE SUBSTITUTION OF THE LABELING REQUIRED BY THE FORMER OSHA STANDARD. IF THE NESHAPS REGULATION IS UPDATED IT MAY BE POSSIBLE AT SOME FUTURE TIME TO REDUCE THE NUMBER OF REQUIRED LABELS TO TWO.

First Label:

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID OPENING OR BREAKING CONTAINER
BREATHING ASBESTOS IS HAZARDOUS TO YOUR HEALTH

Second Label: Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
BREATHING AIRBORNE ASBESTOS, TREMOLITE, ANTHOPHYLLITE, OR ACTINOLITE FIBERS IS HAZARDOUS TO YOUR HEALTH

Third Label: Provide in accordance with U. S. Department of Transportation regulation on hazardous waste marking. 49 CFR parts 171 and 172. Hazardous Substances: Final Rule. Published November 21, 1986 and revised February 17, 1987:

RQ HAZARDOUS
SUBSTANCE,
SOLID, NOS,
ORM-E, NA 9188
(ASBESTOS)

PART 3 - EXECUTION

Comply with the following sections during all phases of this work:

Section 11.9 Worker Protection - Asbestos Abatement
Section 11.11 Respiratory Protection

11.0 TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT (cont.)

11.20 Disposal of Asbestos-Containing Waste Material (cont.)

4. Radiologically Contaminated Asbestos-Containing Waste Material

   All asbestos-containing waste material shall be placed in disposal bags per Section 11.20.3. The material shall be wet, but free-standing water shall be avoided where possible. These disposal bags shall be placed in metal boxes provided by FERMCO in accordance with FERMCO Waste Management Procedures.

5. Non-Radiologically Contaminated Asbestos-Containing Waste Material

   All asbestos-containing waste material shall be placed in disposal bags per Section 11.20.3. The material shall be wet, but free-standing water shall be avoided where possible. All materials are to be contained in one of the following:

   Two 6-mil disposal bags or

   NOTE: FIBERBOARD AND STEEL DRUMS ARE NOT ACCEPTED AT SOME LANDFILLS

   Two 6-mil disposal bags and a fiberboard drum or

   Sealed steel drum with no bag

   Protect interior of truck or dumpster with Critical and Primary Barriers as described in Section 11.5 Temporary Enclosures.

   Carefully load containerized waste in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.

   Do not store containerized materials outside of the Work Area. Take containers from the Work Area directly to a sealed truck or dumpster.

   Do not transport disposal bagged materials on open trucks. Label drums with same warning labels as bags. Uncontaminated drums may be reused. Treat drums that have been contaminated as asbestos-containing waste and dispose of in accordance with this specification.

   NOTE: NOTIFICATION REQUIREMENTS MAY VARY FROM LOCALITY TO LOCALITY. COORDINATE WITH SECTION 7.0 CODES, REGULATIONS, AND STANDARDS. FOLLOWING IS BASED ON REQUIREMENT IN AHERA REGULATION.

   Advise the landfill operator or processor, at least ten days in advance of transport, of the quantity of material to be delivered.

   At disposal site unload containerized waste:

   At a disposal site, sealed plastic bags may be carefully unloaded from the truck. If bags are broken or damaged, return to work site for rebagging. Clean entire truck and contents using procedures set forth in section 11.17, Project Decontamination - Poly Removal.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.20 Disposal of Asbestos-Containing Waste Material (cont.)

5. Non-Radiologically Contaminated Asbestos-Containing Waste Material (cont.)

At a processing site truck and loading dock are arranged as a controlled work area and containerized waste is transferred to storage area by site personnel. All bags including broken ones will be transferred. Clean truck, using procedures set forth in Section 11.17, Project Decontamination - Poly Removal.

Retain receipts from landfill or processor for materials disposed of.

At completion of hauling and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to FERMCO's Representative.

11.21 Work Area Clearance

NOTE: THIS SECTION IS INTENDED TO SET FORTH CONTRACTOR RELEASE CRITERIA FOR ABATEMENT PROJECTS INVOLVING REMOVAL, ENCAPSULATION OR ENCLOSURE.

NOTE: SECTION 11.17, PROJECT DECONTAMINATION - POLY REMOVAL, MUST BE CLOSELY COORDINATED WITH THIS SECTION. THIS SECTION SETS FORTH ONLY THE ANALYTICAL PROCEDURES NECESSARY FOR PROJECT CLOSEOUT. OTHER PROCEDURES AND REQUIREMENTS LEADING TO SUBSTANTIAL COMPLETION OF THE ABATEMENT WORK ARE SET FORTH IN SECTION 11.17.

NOTE: THIS SECTION IS NOT APPROPRIATE TO CONTRACTOR RELEASE FOR REPAIR. SUCCESSFUL COMPLETION OF WORK PROCEDURES AND ONGOING PERSONNEL AND AREA MONITORING DURING THE WORK SHOULD BE USED AS THE BASIS FOR CONTRACTOR CLOSURE FOR THAT TYPE OF WORK.

PART 1 - GENERAL

1. Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 1 Specification Sections, apply to work of this section.

Visual Inspection: required as a prerequisite of air testing, is set forth in Section 11.17, Project Decontamination - Poly Removal.

Air Monitoring: performed by FERMCO during abatement work, is described in Section 11.2, Air Monitoring.

2. Summary

This section describes work being performed by FERMCO. This work is not in the Contract Sum.

This Section sets forth required post-abatement airborne asbestos concentrations in the Work Area and describes testing procedures FERMCO will use to measure these levels.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.21 Work Area Clearance (cont.)

3. Contractor Release Criteria

The Asbestos Abatement Work Area is cleared when the Work Area is visually clean and airborne asbestos structure concentrations have been reduced to the level specified below.

4. Visual Inspection

Work of this Section will not begin until the visual inspection described in Section 11.17, Project Decontamination - Poly Removal, is complete and has been certified by the FERMCO Project Manager.

5. Air Monitoring

To determine if the elevated airborne asbestos structure concentration encountered during abatement operations has been reduced to the specified level, FERMCO will secure samples and analyze them according to the following procedures.

NOTE: CHOOSE ONE OF THE FOLLOWING SEQUENCE OF PROCEDURES AND DELETE THE OTHER. THE FIRST IS BASED UPON SEQUENTIAL SAMPLING FIRST BY PCM FOLLOWED BY TEM. THE SECOND IS BASED UPON SIMULTANEOUS SAMPLING WITH CLEARANCE BY PCM REQUIRED BEFORE TEM SAMPLES ARE ANALYZED.

a. PCM Sampling Followed by TEM

Aggressive sampling procedures as described below will be followed.

PCM samples will be secured as indicated below. If the area meets the clearance criteria TEM sampling will proceed.

Aggressive sampling procedures will be repeated.

TEM samples will be secured and analyzed as indicated below.

Work Area Clearance: upon meeting the TEM Clearance requirements the work of Section 11.17, Project Decontamination - Poly Removal, can continue.

NOTE: FOLLOWING PROCEDURE IS BASED UPON PCM AND TEM SAMPLES BEING TAKEN SIMULTANEOUSLY

b. Simultaneous PCM and TEM Sampling

Aggressive sampling procedures as described below will be followed.

PCM and TEM samples will be secured as indicated below. PCM samples will be analyzed and TEM samples will be transmitted to the laboratory. If the area meets the clearance criteria by PCM the TEM analysis will proceed.

Work Area Clearance: upon meeting the TEM Clearance requirements the work of Section 11.17, Project Decontamination - Poly Removal, can continue.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.21 Work Area Clearance

5. Air Monitoring (cont.)

b. Simultaneous PCM and TEM Sampling (cont.)

NOTE: AGGRESSIVE SAMPLING IS APPROPRIATE ONLY FOR CLEARANCE OF ABATEMENT PROJECT AREAS THAT ARE ISOLATED FROM SURROUNDING AREAS BY BOTH PHYSICAL BARRIERS (CRITICAL BARRIER) AND A PRESSURE DIFFERENTIAL (DIFFERENTIAL PRESSURE SYSTEM). AGGRESSIVE SAMPLING SHOULD NEVER BE ATTEMPTED IN OCCUPIED OR UN-ISOLATED AREAS. THE FEW TIMES THIS HAS BEEN ATTEMPTED HAVE RESULTED IN SERIOUS CONTAMINATION PROBLEMS FOR THE INVOLVED SPACE AND SURROUNDING AREAS.

6. Aggressive Sampling

All air samples will be taken using aggressive sampling techniques as follows:

NOTE: THERE ARE NO STANDARDS AVAILABLE FOR FLOW RATE OF LEAF BLOWERS OR LARGE FANS. HOWEVER THIS INFORMATION IS NOT CRITICAL TO THE SUCCESS OF THE PROCEDURE.

Before sampling pumps are started the exhaust from forced-air equipment (leaf blower with an approximately 1 horsepower electric motor) will be swept against all walls, ceilings, floors, ledges and other surfaces in the room. This procedure will be continued for 5 minutes per 10,000 cubic feet of room volume.

One 20 inch diameter fan per 10,000 cubic feet of room volume will be mounted in a central location at approximately 2 meters above floor, directed toward ceiling and operated at low speed for the entire period of sample collection.

Air samples will be collected in areas subject to normal air circulation away from room corners, obstructed locations, and sites near windows, doors of vents.

After air sampling pumps have been shut off, fans will be shut off.

7. Schedule of Air Samples

NOTE: CONSULT WITH THE ENVIRONMENTAL CONSULTANT SUPPLYING PROJECT ADMINISTRATORS AND LABORATORY WORK ABOUT THE SPECIFIC EQUIPMENT AND ANALYTICAL METHODS AVAILABLE FOR THE PROJECT. EDIT THE FOLLOWING TO SUIT SPECIFIC PROJECT REQUIREMENTS AND AVAILABILITY OF ANALYTICAL TOOLS.

The number and volume of air samples taken and analytical methods used by the FERMCO will be in accordance with the following schedule. Sample volumes given may vary depending upon the analytical instruments used.

NOTE: IDEALLY, LOCATIONS FOR SAMPLING SHOULD BE SHOWN ON THE DRAWINGS.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.21 Work Area Clearance

8. Phase Contrast Microscopy

In each homogeneous Work Area after completion of all cleaning work, a minimum of 7 samples will be taken and analyzed as follows:

Samples will be collected on 25 mm. cassettes with the following filter media:

PCM: 0.8 mixed cellulose ester in a cassette with a conductive extension cowl.

Location Sampled	Number of Samples	Analysis Method	Detection Limit Fibers/cc.	Minimum Volume (Liters)	Rate LPM
Each Work Area	5	PCM	0.01	1,200	1-10
or					
Each Room of Work Area	1 (5 min.)	PCM	0.01	1,200	1-10
Work Area Blank	1	PCM	0.01	0	Open For 30 Seconds
Laboratory Blank	1	PCM	0.01	0	Do Not Open

NOTE: GENERALLY RETAIN THE FOLLOWING PARAGRAPH. THIS PARAGRAPH DESCRIBES THE ANALYTICAL METHOD REQUIRED BY THE AHERA REGULATION FOR PCM CLEARANCE IN SCHOOLS. OTHER ANALYTICAL METHODS COULD BE USED FOR NON-SCHOOL PROJECTS OR AS PRE-CLEARANCE LEADING TO TEM ANALYSIS. HOWEVER, THE AHERA REGULATION IS A VERY STRONG STATEMENT FROM THE EPA ON THE STANDARD OF CARE AND ACCEPTABLE METHODS OF ACHIEVING THAT STANDARD.

Analysis: Fibers on each filter will be measured using the NIOSH Method 7400 entitled "Fibers" published in the NIOSH Manual of Analytical Methods, 3rd Edition, Second Supplement, August 1987.

Fibers: referred to in this section include fibers regardless of composition as counted by the phase contrast microscopy method used.

Split Sample: One Work Area sample will be split and both halves analyzed separately for duplicate analysis.

Release Criteria: Decontamination of the work site is complete when every Work Area sample is at or below the Detection Limit above. If any sample is above the Detection Limit then the decontamination is incomplete and recleaning per section 11.17, Project Decontamination - Poly Removal, is required.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.21 Work Area Clearance

9. Transmission Electron Microscopy

NOTE: THE FOLLOWING DESCRIBES CLEARANCE TESTING AS REQUIRED BY THE AHERA REGULATION FOR SCHOOLS. THIS IS ALSO BECOMING A DE FACTO STANDARD FOR PUBLIC NON-SCHOOL BUILDINGS. WORK IN INDUSTRIAL SETTINGS MAY HAVE A DIFFERENT STANDARD THAN THAT FOR A PUBLICLY OCCUPIED BUILDING.

In each homogeneous Work Area after completion of all cleaning work, a minimum of 13 samples will be taken and analyzed as follows:

NOTE: THE SAMPLE VOLUME GIVEN BELOW IS NOT THE LOWEST REQUIRED BY THE AHERA REGULATION. IT IS THE LOWEST VOLUME ALLOWED FOR 10 GRID OPENINGS TO GIVE AN ANALYTICAL SENSITIVITY OF 0.005 STRUCTURES/CC. 10 GRID OPENINGS IS THE NUMBER GENERALLY PREFERRED BY LABORATORIES PERFORMING THIS TYPE OF ANALYSIS. ADHERENCE TO THIS VOLUME MAY GIVE RISE TO GREATER REPRODUCABILITY OF RESULTS. THE MINIMUM VOLUME NECESSARY TO AVOID COMPARISON OF INSIDE-TO-OUTSIDE SAMPLES IS 1,199 LITERS.

Location Sampled	Number of Samples	Analysis Method	Analytical Sensitivity Fibers/cc.	Recommended Volume (Liters)	Rate LPM
Each Work Area	5	TEM	0.005	1,300-1,800	1-10
Outside Each Work Area	5	TEM	0.005	1,300-1,800	1-10
Work Area Blank	1	TEM	0.005	0	Open for 30 Seconds
Outside Blank	1	TEM	0.005	0	Open for 30 Seconds
Laboratory Blank	1	TEM	0.005	0	Do Not Open

Analysis will be performed using the analysis method set forth in the AHERA Regulation 40 CFR Part 763 Appendix A.

Asbestos Structures referred to in this Section include asbestos fibers, bundles, clusters or matrices, as defined by method of analysis.

Release Criteria: Decontamination of the work site is complete if either of the following two sets of conditions are met:

Work Area Samples are below filter background levels

All Work Area sample volumes are greater than 1,199 liters for a 25 mm. sampling cassette.

The average concentration of asbestos on the five Work Area Samples does not exceed the filter background level of 70 structures per square millimeter of filter area.

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11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.21 Work Area Clearance (cont.)

9. Transmission Electron Microscopy (cont.)

Work Area Samples are not statistically different from Outside samples

All sample volumes except for blanks are greater than 560 liters for a 25 mm. sampling cassette.

The average asbestos concentration of the three blanks is below the filter background level of 70 structures per square millimeter of filter area.

Average asbestos concentrations in Work Area Samples are not statistically different from Outside samples, as determined by the Z-test calculation found in 40 CFR Part 763, Subpart E, Appendix A (Z is less that or equal to 1.65)

If these conditions are not met then the decontamination is incomplete and the cleaning procedures of Section 11.18 (Section 01710) shall be repeated.

Termination of Analysis: if the arithmetic mean (average) asbestos concentration on the blank filters exceed 70 structures per square millimeter of filter area the analysis will cease and new samples collected.

10. Laboratory Testing - Phase Contrast Microscopy

NOTE: CHOOSE THE APPROPRIATE PARAGRAPH FROM THE THREE BELOW AND DELETE THE OTHER TWO. IT IS IMPORTANT TO THE CONTRACTOR TO KNOW HOW IMMEDIATELY AIR SAMPLE RESULTS WILL BE AVAILABLE.

a. Microscope at Job Site

NOTE: THE FOLLOWING PARAGRAPH REPRESENTS THE TYPICAL LEVEL OF SERVICE AVAILABLE IF A MICROSCOPE IS TO BE SET UP AT THE JOB SITE. TYPICALLY THIS WILL BE DONE IF NIOSH 7400 ANALYSIS IS BEING USED FOR WORK SITE MONITORING USING A SPECIAL SLIDE PREPARATION DEVICE.

The services of a testing laboratory will be employed by FERMCO to perform laboratory analysis of the air samples. A microscope and technician will be set up at the job site, so that verbal reports on air samples can be obtained immediately. A complete record, certified by the testing laboratory, of all air monitoring tests and results will be furnished to the FERMCO Project Manager, the FERMCO Industrial Hygiene Representative, and the Contractor.

b. Samples Sent to Lab

NOTE: THE FOLLOWING PARAGRAPH SHOULD BE USED IF THERE WILL BE NO MICROSCOPE AT THE JOB SITE.

11.0 **TECHNICAL SPECIFICATIONS - ASBESTOS ABATEMENT** (cont.)

11.21 Work Area Clearance (cont.)

10. Laboratory Testing - Phase Contrast Microscopy (cont.)

b. Samples Sent to Lab (cont.)

The services of a testing laboratory will be used by FERMCO to perform laboratory analysis of the samples. A technician will be at the job site, and samples will be sent daily by overnight delivery, so that verbal reports on air samples can be obtained within 24 hours. A complete record, certified by the testing laboratory, of all air monitoring tests and results will be furnished to the FERMCO Project Manager, the FERMCO Industrial Hygiene Representative, and the Contractor.

NOTE: THE FOLLOWING PARAGRAPH IS A CATCH ALL AND DOES NOT PROVIDE THE CONTRACTOR WITH DETAILED INFORMATION ON HOW FERMCO INTENDS TO ANALYZE AIR SAMPLES.

c. General Statement

The services of a testing laboratory will be used by FERMCO to perform laboratory analysis of the samples. A microscope and technician will be set up at the job site or samples will be sent daily by overnight mail, so that verbal reports on air samples can be obtained within 24 hrs. A complete record, certified by the laboratory, of all air monitoring tests and results will be furnished to the FERMCO Project Manager, the FERMCO Industrial Hygiene Representative, and the Contractor.

11. Laboratory Testing: Transmission Electron Microscopy

NOTE: FOLLOWING IS NECESSARY INFORMATION FOR THE CONTRACTOR TO ESTIMATE THE LENGTH OF TIME HIS EQUIPMENT WILL BE TIED UP WAITING FOR TEM ANALYSIS. TYPICAL AVAILABILITY OF SERVICE FOR TEM LABS DURING OFF-PEAK TIMES OF THE YEAR IS 5 TO 10 DAYS FOR VERBAL RESULTS. REVISE THIS SECTION BASED UPON THE TURN AROUND TIME THE LABORATORY IS ABLE TO PROVIDE. MOST LABORATORIES CHARGE A PREMIUM FOR WEEKEND/HOLIDAY WORK AND FAST (24 TO 48 HOUR) TURNAROUND.

Samples will be sent by overnight courier for analysis by Transmission Electron Microscopy. Samples will not be carried on weekends, so that samples shipped on Friday will arrive on the following Monday. Verbal results will normally be available during the 5th working day after receipt of samples by the laboratory. The laboratory is capable of analyzing a maximum of 13 such samples from this project at any one time. All Transmission Electron Microscopy results will be available to the Contractor.

NOTE: FOLLOWING IS A FAIR METHOD OF DEALING WITH DELAYS IN ANALYSIS. THIS REQUIRES THE PROJECT DESIGNER TO SECURE UNIT COSTS DURING BIDDING.

Submit with bid unit cost for each day of waiting beyond that set forth in the paragraph above.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

12.0 PROJECT CLOSEOUT - ASBESTOS ABATEMENT

NOTE: THIS SECTION HAS BEEN COMPLETELY REVISED TO INCORPORATE CHANGES IN THE REVISED MASTERSPEC SECTION ON PROJECT CLOSEOUT.

PART 1 - GENERAL

12.1 Related Documents

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

12.2 Summary

This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

Inspection procedures.
Project record document submittal.
Submittal of warranties.
Final cleaning.

Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

12.3 Substantial Completion

1. Preliminary Procedures

Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

NOTE: DELETE ITEMS THAT ARE NOT APPLICABLE FROM THE LIST BELOW OR MODIFY ITEMS RETAINED TO SUIT PROJECT.

In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the work claimed as substantially complete. Include supporting documents for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the work is not complete.

Advise FERMCO of pending insurance change over requirements.

Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

Obtain and submit releases enabling FERMCO unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.

NOTE: USUALLY DELETE THE NEXT PARAGRAPH. HOLD THIS MATERIAL FOR FINAL ACCEPTANCE.

12.0 **PROJECT CLOSEOUT - ASBESTOS ABATEMENT** (cont.)

12.3 Substantial Completion (cont.)

1. Preliminary Procedures (cont.)

Submit record drawings, final project photographs, damage or settlement survey, and similar final record information.

Make final change over of permanent locks and transmit keys to FERMCO. Advise FERMCO of change over in security provisions.

Complete start up testing of systems. Discontinue or change over and remove temporary facilities from the site, along with construction tools, and similar elements.

NOTE: DELETE THE NEXT TWO PARAGRAPHS IF THESE ITEMS ARE NOT INCLUDED IN THE WORK OF ARE DELAYED UNTIL FINAL ACCEPTANCE

Complete final clean up requirements, including touch up painting. Touch up and otherwise repair and restore marred exposed finishes.

NOTE: MODIFY THE NEXT PARAGRAPH TO COMPLY WITH OFFICE POLICY AND PROJECT REQUIREMENTS.

2. Inspection Procedures

On receipt of a request for inspection, FERMCO's Project Manager will either proceed with inspection or advise the Contractor of unfilled requirements. FERMCO's Project Manager will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

FERMCO's Project Manager will repeat inspection when requested and assured that the work has been substantially completed.

Results of the completed inspection will form the basis of requirements for final acceptance.

12.4 Final Acceptance

1. Preliminary Procedures

Before requesting final inspection for Certification of Final Acceptance and Final Payment, complete the following. List exceptions in the request.

NOTE: REVISE PARAGRAPHS BELOW TO MATCH SUPPLEMENTARY CONDITIONS.

Submit the Final Payment Request with releases and supporting documentation not previously submitted and accepted. Include Certificates of Insurance for products and completed operations where required.

Submit an updated final statement, accounting for final additional changes to the Contract Sum.

Submit a certified copy of FERMCO's Project Manager's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by FERMCO's Project Manager.

12.0 **PROJECT CLOSEOUT - ASBESTOS ABATEMENT** (cont.)

12.4 Final Acceptance (cont.)

1. Preliminary Procedures (cont.)

Submit final meter readings for utilities, and similar data as of the date of Substantial Completion, or when FERMCO took possession of and responsibility for corresponding elements of the Work.

Submit consent of surety to Final Payment.

NOTE: INCLUDE FOLLOWING ONLY IF THERE IS A LIQUIDATED DAMAGES PROVISION IN THE CONTRACT.

Submit a final liquidated damages settlement statement.

NOTE: REVISE FOLLOWING WITH THE ADVICE OF FERMCO'S COUNSEL AND AN INSURANCE CONSULTANT.

Submit evidence of final, continuing insurance coverage complying with insurance requirements.

NOTE: MODIFY THE NEXT PARAGRAPH TO COMPLY WITH OFFICE POLICY AND PROJECT REQUIREMENTS.

2. Reinspection Procedure

FERMCO's Representative will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to FERMCO's Project Manager.

Upon completion of reinspection, FERMCO's Project Manager will prepare a Certificate of Final Acceptance, or advice the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for Final Acceptance.

If necessary, reinspection will be repeated.

NOTE: DELETE THE NEXT SECTION IF A DETAILED SECTION ON "PROJECT RECORD DOCUMENTS" IS USED.

12.5 Record Document Submittals

NOTE: GENERAL PROVISIONS FOR RECORD DOCUMENTS ARE INCLUDED IN ARTICLE 3.11 OF AIA DOCUMENT A 201. THE PARAGRAPHS IN THIS ARTICLE EXPAND UPON THOSE REQUIREMENTS.

NOTE: RECORD DOCUMENTS ARE EXTREMELY IMPORTANT AS THEY CONTAIN THE DETAILED INFORMATION ON THE LOCATION OF ANY ASBESTOS-CONTAINING MATERIALS THAT MAY REMAIN IN THE BUILDING. THIS IS CRITICAL INFORMATION NEEDED FOR MAINTENANCE WORKERS AND ULTIMATELY AT DEMOLITION OF THE BUILDING.

12.0 **PROJECT CLOSEOUT - ASBESTOS ABATEMENT** (cont.)

12.5 Record Document Submittals (cont.)

1. General

Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for FERMCO's Project Manager's reference during normal working hours.

NOTE: FOLLOWING IS A MINIMUM REQUIREMENT THAT SHOULD ALWAYS BE REQUIRED.

NOTE: A MORE DETAILED PROCEDURE INVOLVING CORRECTED, REPRODUCIBLE COPIES OF CONTRACT DRAWINGS IS MORE DESIRABLE. THIS IS USEFUL FOR ADMINISTRATION OF AN ASBESTOS MANAGEMENT PROGRAM. COPIES CAN BE MADE AVAILABLE TO MAINTENANCE CREWS FOR REFERENCE. THIS PARTICULARLY IMPORTANT IN ABATEMENT PROJECTS (EG. ENCAPSULATION OR REPAIR PROJECTS) THAT LEAVE ASBESTOS CONTAINING MATERIALS IN THE BUILDING. REVISE THE FOLLOWING IF THIS SORT OF REQUIREMENT IS TO BE INCLUDED.

2. Record Drawings

Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the work.

Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.

Note related Change Order numbers where applicable.

Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.

NOTE: ALWAYS INCLUDE THE FOLLOWING UNLESS THIS TASK IS TO BE ACCOMPLISHED BY FERMCO'S PROJECT MANAGER.

12.0 **PROJECT CLOSEOUT - ASBESTOS ABATEMENT** (cont.)

12.5 Record Document Submittals (cont.)

3. Record Specifications

Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.

Upon completion of the work, submit record Specifications to the FERMCO Project Manager for FERMCO's records.

NOTE: THE FOLLOWING IS OF LITTLE IMPORTANCE ON ABATEMENT PROJECTS THAT DO NOT INVOLVE REPLACEMENT OF REMOVED MATERIALS.

NOTE: CONSIDER DELETING THE NEXT PARAGRAPH ON SMALL PROJECTS. IF CHANGE ORDER PROPOSALS INCLUDE RESUBMITTAL OF UPDATED PRODUCT DATA THE NEED TO MARK UP THE PREVIOUS SUBMITTAL IS ELIMINATED.

4. Record Product Data

Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in the actual work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark up of record Drawings and Specifications.

Upon completion of mark up, submit complete set of record Product Data to FERMCO's Project Manager for FERMCO's records.

ALWAYS INCLUDE THE FOLLOWING AS IT APPLIES TO SUBMITTALS OF LOGS, ETC.

5. Miscellaneous Record Submittals

Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to FERMCO's Project Manager for FERMCO's records.

PART 2 - PRODUCTS (Not Applicable)

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12.0 **PROJECT CLOSEOUT - ASBESTOS ABATEMENT** (cont.)

PART 3 - EXECUTION

12.6 Final Cleaning

NOTE: DELETE THIS ARTICLE WHEN FERMCO PREFERS TO USE ITS OWN FORCES. CLEANING PROVISION IN GENERAL CONDITIONS ARE LIMITED TO RUBBISH REMOVAL AND SIMILAR ACTIVITIES.

NOTE: THE CLEANING SPECIFIED HERE IS IN ADDITION TO CLEANING WHICH IS PART OF DECONTAMINATION. THIS SECTION IS INTENDED TO RETURN THE BUILDING TO FERMCO IN PRESENTABLE CONDITION.

1. General

General cleaning during construction is required by the General Conditions and included in Section "Temporary Facilities".

2. Cleaning

Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

NOTE: IF FINAL CLEANING IS DELAYED UNTIL FINAL ACCEPTANCE, MODIFY THE NEXT PARAGRAPH.

Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

NOTE: THE FOLLOWING IS A SAMPLE LIST OF FINAL CLEANING REQUIREMENTS. MODIFY TO SUIT PROJECT.

Remove labels that are not permanent labels.

Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

Clean the site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

NOTE: THE NEXT TWO PARAGRAPHS REPRESENT THE END OF WORK SPECIFIED IN SECTIONS DESCRIBING TEMPORARY FACILITIES.

12.0 **PROJECT CLOSEOUT - ASBESTOS ABATEMENT** (cont.)

12.6 Final Cleaning (cont.)

3. Removal of Protection

   Remove temporary protection and facilities installed for protection of the work during construction.

4. Compliance

   Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

   Where extra materials of value remaining after completion of associated Work have become FERMCO's property, arrange for disposition of these materials as directed.

APPENDIX A

PRE-ABATEMENT CHECKLIST
DAILY INSPECTION CHECKLIST
FINAL INSPECTION CHECKLIST

LARGE PROJECT ASBESTOS
WORK PRACTICES

PRE-ABATEMENT CHECKLIST

BUILDING NUMBER:_____ **ROOM/AREA:**_____ **DATE:**_____

PROJECT DESCRIPTION:_____

CONTRACTOR:_____ **WORK PERMIT NUMBER:**_____

Pre-Abatement Checklist:	YES	INAD	NO	DNA
A. On-Site Copies Available of:				
1. Approved Asbestos Work Plan	___	___	___	___
2. Scope of Asbestos Work	___	___	___	___
3. Asbestos Removal Contractors License	___	___	___	___
4. Asbestos Removal Notification Form	___	___	___	___
5. Ohio DOH Removal Notification Form	___	___	___	___
6. MSDSs for materials to be used on project	___	___	___	___
B. Training Documentation (forwarded to Industrial Hygiene)				
1. Asbestos Worker Training (3 day/1 day refresher)	___	___	___	___
2. Asbestos Supervisor Training (4 day/1 day refresher)	___	___	___	___
3. Respirator Medical Evaluation	___	___	___	___
4. Respirator Training	___	___	___	___
5. Respirator Fit-Test (quantitative)	___	___	___	___
C. Work Site:				
1. Asbestos warning signs posted at entrances	___	___	___	___
2. Jobsite boundaries established	___	___	___	___
3. Entry curtains in place	___	___	___	___
4. Clean room established with locker/storage container for each worker	___	___	___	___
5. Equipment room established with labeled waste disposal containers present	___	___	___	___
6. Critical barriers in place	___	___	___	___
7. Floor covered with plastic	___	___	___	___
8. Walls covered with plastic	___	___	___	___
9. All edges/seams sealed with tape/spray glue	___	___	___	___
10. Small items cleaned and removed from work area	___	___	___	___
11. Fixed furnishings/equipment cleaned, covered and taped	___	___	___	___
12. HVAC and electrical systems shut down, locked and tagged, and sealed	___	___	___	___
13. Emergency exit established (labeled)	___	___	___	___
14. Fire extinguisher in shower or clean room	___	___	___	___
15. Temporary waste storage area established	___	___	___	___
D. Negative Air Pressure System:				
1. Estimated cubic feet of work area:_____				
2. Number of units required:_____				
3. Units located properly	___	___	___	___
4. Negative pressure achieved at >0.02"	___	___	___	___

Pre-Abatement Checklist (continued)	YES	INAD	NO	DNA
E. Shower established:				
1. Adjacent to work area	___	___	___	___
2. Functioning (hot & cold water available)	___	___	___	___
3. Soap and towels available	___	___	___	___
4. Waste water contained	___	___	___	___
5. 5 micron filter used	___	___	___	___
F. Protective Equipment On-Site:				
1. Disposable clothing available	___	___	___	___
A. Head covering	___	___	___	___
B. Foot covering	___	___	___	___
C. Gloves	___	___	___	___
2. NIOSH approved respirators available	___	___	___	___
A. Type of respirators available: _____				
3. Proper respirator cartridges available	___	___	___	___
G. Other:				
1. Proper labels for bags and drums/boxes	___	___	___	___
2. Ground fault units in place/use	___	___	___	___
3. Pre-job air sampling required	___	___	___	___
4. Building occupants notified of asbestos work	___	___	___	___

Comments:

Section	Number	
___	___	_____
___	___	_____
___	___	_____
___	___	_____
___	___	_____
___	___	_____
___	___	_____
___	___	_____
___	___	_____
___	___	_____

CONSTRUCTION COORDINATION: _____

ASBESTOS ABATEMENT SPECIALIST: _____

INSTRUCTIONS FOR COMPLETING ASBESTOS ABATEMENT CHECKLISTS

The Pre-Abatement Checklist is to be completed by Construction Coordination when large scale asbestos abatement work is performed by subcontractor personnel. Any questions or clarifications required for any item listed on this form shall be referred to Industrial Hygiene. To complete the checklist:

In the top section of the form: record the building number; which room or area in the building that asbestos work is being performed; the date on which the checklist is being completed; the project description (which project is the asbestos work related); name of the asbestos removal contractor; and the work permit number.

In section A, the following information is required at the jobsite:

1. A copy of the asbestos work plan (approved by FERMCO Industrial Hygiene);
2. The scope of the asbestos work to be performed as a part of this job (should be included in the asbestos work plan);
3. A copy of the asbestos removal contractor's certificate shall be a the jobsite (may be included in the asbestos work plan);
4. A copy of the asbestos removal notification form which was provided to FERMCO Environmental Compliance for this job (the start and stop dates on the form provide a window in which the asbestos removal is to be performed);
5. The asbestos removal contractor is required to provide a removal notification form to the State of Ohio Department of Health (DOH) informing them of the asbestos removal (this is a different form than the one provided to FERMCO Environmental Compliance and shall be posted at the jobsite);
6. The material safety data sheets (MSDSs) for any potentially hazardous materials used at the jobsite shall be at the jobsite (MSDSs shall be available for wetting agents, encapsulants, mastic removers, etc.).

In section B, the following information shall be provided to FERMCO Industrial Hygiene for review and approval prior to the start of any asbestos work:

1. Documentation that any worker planning to perform asbestos removal work has completed an asbestos worker training class approved by the State of Ohio DOH (3 days initial training with 1 day annual refresher);
2. Documentation that any worker planning to supervise asbestos removal activities has completed an asbestos supervisor training class approved by the State of Ohio DOH (4 days initial training and 1 day annual refresher);
3. The asbestos removal contractor shall provide documentation for each worker that they have been medically evaluated by a physician to be physically fit to wear a respirator;
4. Documentation that each worker has been respirator trained;
5. Documentation that each worker has been quantitatively fit-tested to wear a negative pressure respirator by successfully passing two out of three successive fit-tests (if positive pressure respirators are to be worn, quantitative fit-test records are not required).

In section C, the following work area preparations need to be in place prior to the start of asbestos removal work:

1. Asbestos warning signs shall be posted at all entrances (potential) to the asbestos work area;
2. Jobsite boundaries shall be established around the asbestos work area (this shall be accomplished through use of polyethylene sheeting);
3. Entry curtains shall be placed at the entrance to the asbestos work area (this is accomplished by using three overlapping layers of plastic sheeting across the doorway). Alternate methods for preparing the work area entrance may be acceptable but must be approved by Industrial Hygiene;
4. A clean room clothing change area shall be provided at the entrance to the asbestos work area. Each worker shall be provided with a locker or storage container in which to store his personal clothing;
5. An equipment room shall be established between the shower room (see section E) and the asbestos work area. An asbestos labeled container shall be provided within the equipment room for the disposal of asbestos contaminated clothing;
6. Critical barriers shall be installed throughout the asbestos work area. This means that any location where there is a possibility for the migration of asbestos fibers shall be sealed using plastic and tape or another method of sealing the openings. Some openings required to be sealed are - windows; doors (other than the work area entrance); ventilation system exhausts or intakes; pipe or conduit runs through walls, ceilings or floors; and any holes in walls, ceilings or floors;
7. The floor in the asbestos work area shall be covered with plastic (usually two layers) extending up the exterior walls 18 inches and sealed with tape;
8. The walls shall be covered with a minimum of one layer of plastic sealed with tape at the ceiling line. The plastic shall extend to the floor and shall cover the bottom layer of plastic which has been placed on the floor and sealed with tape;
9. All edges or seams in plastic shall be sealed (air/water tight with tape and/or spray glue;
10. All small items located within the asbestos work area shall be cleaned by HEPA vacuuming and/or wet wiping, and then removed form the work area;
11. Any fixed equipment or furniture which cannot be removed from the work area, shall be cleaned by HEPA vacuuming and/or wet wiping, then covered and sealed with plastic and tape;
12. HVAC and electrical systems located in the asbestos work area shall be shut down, locked and tagged, and sealed with plastic and tape;
13. An emergency exit should be established to provide an alternate exit from the asbestos work area in the event of an emergency occurring within the work area (the emergency exit shall be labeled so that it is easily identified: markings such as arrows can be used to locate the emergency exit). The exit does not have to be present (it can be through a solid sheet of plastic), but there needs to be a means to get through the exit (such as supplying a knife to cut through the plastic);
14. A fire extinguisher should be available in the shower area or clean room;
15. A temporary waste storage area (i.e., SeaLand, white boxes) shall be established. This should be a location where bags of asbestos waste which are removed from the work area can be taken. This storage container shall be labeled with the appropriate asbestos warning labels.

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In section D, the following work area preparations need to be in place prior to the start of asbestos removal work:

1. The supervisor in charge of the asbestos removal shall estimate the area (in cubic feet) of the asbestos work area;
2. Based on the estimated area of the work area, the supervisor shall determine the number of ventilation units required to maintain the work area under negative pressure (this requires a minimum of four complete air changes per hour). Each ventilation unit is rated to a move specified volume of air. In general, these units only move about 60 to 70% percent of the air which they are designed to move (this should be taken into account for this calculation). An additional ventilation unit shall be included (but not operated) in case one of the original ventilation units malfunctions;
3. The ventilation units should be located (as much as practical) as far from the entrance to the work area as possible. The idea is to have air pass through the decontamination unit into the work area to exhaust the asbestos contaminated air at the opposite end of the enclosure. The exhaust to the ventilation units should be positioned so the HEPA-filtered air is exhausted outside the building;
4. When the ventilation systems are operating, a negative pressure of 0.02 or greater shall be achieved within the work area. A manometer or other type of pressure gauge shall be installed to ensure the negative pressure of 0.02 or greater is maintained.

In section E, the following work area preparations need to be in addressed prior to the start of asbestos removal work:

1. A portable shower facility shall be provided at the work site. The shower area shall be located between the clean room and the equipment room;
2. The shower facility shall be provided with functioning/controllable hot and cold water;
3. Soap and clean, dry towels shall be available to any personnel requiring entry into the asbestos work area;
4. Waste water from the shower unit shall be contained. Waste water can either be collected in the bottom of the shower enclosure and pumped to a storage drum for disposal or it can be pumped through a filtration system before being sent to a building sump;
5. Waste water shall be filtered before going to a building sump. The final filter on the filtration system shall filter down to a 5 micron particle size.

In section F, the following protective equipment shall be available at the job site prior to the start of asbestos removal work:

1. Disposable protective clothing shall be available in the clean room in sufficient quantities and sizes for all the workers requiring entry into the work area. Many brands of disposable clothing have attached head and shoe coverings, if this is not the case, a sufficient quantity of disposable head and shoe coverings shall be available in the clean room;
2. A sufficient quantity of NIOSH approved respirators shall be available at the job site. The type of respirator used shall be the type specified in the approved asbestos work plan. The manufacturer and sizes available shall be the same as the workers are qualified to wear;
3. The respirator cartridges available shall provide protection against asbestos and any other contaminant which may be present within the asbestos work area. A sufficient quantity of respirator cartridges shall be available based on the number of workers on the job and the scheduled duration for the job.

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In section G, the following items need to be addressed prior to the start of asbestos removal work:

1. There shall be a sufficient quantity of warning labels for asbestos disposal bags and containers;
2. Ground fault protection shall be provided to all electrical equipment used within the asbestos removal area;
3. Prior to the start of any asbestos removal, general area air samples should be collected inside and outside the asbestos enclosure to establish a baseline level for airborne asbestos fibers present within the work area prior to any asbestos work occurring;
4. Prior to the start of any asbestos removal, building occupants shall be notified (preferably in writing) of the asbestos removal activity which is to occur in their building.

Discrepancies found or exemptions granted for any item identified in sections A through G, shall be listed in the section under **Comments**. Any discrepancies found shall be corrected prior to the start of asbestos removal. Exemptions to any items listed on this form may be approved by Industrial Hygiene.

After completion of the form, the construction coordinator and the asbestos abatement supervisor shall sign at the bottom of page 2.

After both signatures have been recorded at the bottom of the checklist, the original checklist shall be provided to the Industrial Hygiene Technician issuing the Asbestos Work Permit. The copy of this pre-abatement checklist shall be maintained with the Industrial Hygiene copy of the Asbestos Work Permit.

DAILY INSPECTION CHECKLIST

BUILDING NUMBER:_____ **ROOM/AREA:**_____ **DATE:**_____

PROJECT DESCRIPTION:_____

CONTRACTOR:_____ **WORK PERMIT NUMBER:**_____

Daily Inspection Checklist	YES	INAD	NO	DNA
A. Work Site:				
1. Removal work in progress today (if **NO - CONTACT EC&QA**)	___		___	
2. Asbestos warning signs at entrance to work area	___	___	___	___
3. Constant operation of air filtration devices	___	___	___	___
4. Negative pressure established	___	___	___	___
5. Manometer reading (>0.02"):_____				
6. Leaks in barriers	___	___	___	___
7. General area air monitoring outside work area	___	___	___	___
8. General area air monitoring inside work area	___	___	___	___
9. Personal air monitoring performed	___	___	___	___
10. Supervisor's log maintained (names, dates & time of entry/exit, incidents, etc.)	___	___	___	___
11. Estimated work area temperature:_____				
12. Number of personnel in work area:_____				
B. Protective Equipment:				
1. Disposable clothing used only once	___	___	___	___
A. Head covering	___	___	___	___
B. Foot covering	___	___	___	___
C. Gloves	___	___	___	___
2. NIOSH approved respirators in use	___	___	___	___
A. Type of respirators in use:_____				
3. Proper respirator cartridges in use	___	___	___	___
C. Showers:				
1. Functioning (hot & cold water available)	___	___	___	___
2. Soap and towels available	___	___	___	___
3. Used by all personnel	___	___	___	___
4. Waste water contained	___	___	___	___
5. 5 micron filter used	___	___	___	___
D. Work Practices:				
1. Amended water used	___	___	___	___
2. No visible dust emissions observed	___	___	___	___
3. Removed material kept wet until bagged	___	___	___	___
4. Removed material properly bagged and sealed	___	___	___	___
5. Bags properly labeled	___	___	___	___
6. HEPA vacuums used/available	___	___	___	___
7. Encapsulation used	___	___	___	___
8. No smoking, eating or drinking observed in work area	___	___	___	___
9. Glove bags in use	___	___	___	___
10. Disposal container sealed and properly labeled	___	___	___	___

Daily Inspection Checklist (continued)

Comments:

Section	Number	

INDUSTRIAL HYGIENE/
CONSTRUCTION COORDINATION: _____

ASBESTOS ABATEMENT SPECIALIST: _____

0276

The Daily Inspection Checklist is to be completed by Industrial Hygiene initially at the start of a large scale asbestos abatement project performed by subcontract personnel. Construction Coordination personnel may be requested to complete the Daily Inspection Checklist when Industrial Hygiene personnel are not available. Any questions or clarifications required for any item listed on this form shall be referred to Industrial Hygiene. To complete the checklist:

In the top section of the form: record the building number; which room or area in the building that asbestos work is being performed; the date on which the checklist is being completed; the project description (which project is the asbestos work related); name of the asbestos removal contractor; and the work permit number.

In section A, the following items shall be checked for compliance:

1. If removal work is scheduled for the day of inspection and work is not in progress, immediately contact Environmental Compliance at extension 6053. If work is scheduled and not in progress, the local/state regulatory agency must be contacted by Environmental Compliance.

2. Asbestos warning signs must be posted at each entrance to the work area.

3. If air filtration devices are set-up at the work site, they shall be in constant operation once removal work has begun. They shall remain in operation until final clean up of the work area has been completed.

4. If air filtration devices are in operation at the work site, is the enclosure being maintained under negative pressure. This can be verified by the inward motion of the plastic at the enclosure entrance or through the use of ventilation smoke tubes to verify the inward movement of air into the enclosure. If the enclosure is not under negative pressure, work shall stop until negative pressure has been achieved.

5. The negative pressure shall be greater than 0.02 inches of water. Pressure can be measured by either a U-tube manometer or a magnehelic /capsuhelic gauge which should be provided by the asbestos removal contractor. If the negative pressure is less than or equal to 0.02, all work inside the enclosure shall stop until the negative pressure inside the enclosure can be increased to greater than 0.02 inches of water.

6. If there are a visible leaks in the enclosure, they shall be immediately repaired.

7. When removal work is in progress inside the enclosure, general area air monitoring (by Industrial Hygiene) should be in progress at several locations outside the enclosure. If general area air samples are not in progress, make note of that fact on the checklist.

8. When removal work is in progress inside the enclosure, general area air monitoring (by Industrial Hygiene) should be performed inside the enclosure to ensure the subcontractor is observing proper work practices inside the enclosure. If general area air samples are not in progress, make note of that fact on the checklist.

Section A (continued)

9. When removal work is in progress inside the enclosure, the subcontractor shall be conducting personal air monitoring on at least two of their workers inside the enclosure (TWA and excursion samples are required each day). If samples are not being collected, make note on the checklist, and check with the job competent person why personal air samples are not being collected.

10. The supervisor should maintain a log of all personnel entering and exiting the enclosure. The log should also include any unusual occurrences/incidents which may have occurred inside the enclosure. If a log is not being maintained, or entry to the enclosure is not properly controlled, make note on the checklist.

11. Record the estimated work area temperature. If the work area temperature may exceed 80°F, temperature measurements need to be taken to determine the WBGT for the work area. Based on the WBGT, a work/rest regimen may need to be established.

12. Record the number of personnel working inside the enclosure at the time of inspection. Does the number of personnel working inside the enclosure agree with the number of personnel listed on the Asbestos Work Permit? If the number of personnel in the work area exceeds the number of personnel listed on the asbestos work permit, verify through the job competent person that all personnel in the enclosure meet the training requirements, and ensure additional names are added to the permit as appropriate.

In Section B, the following protective equipment shall be in use at the work site:

1. Disposable clothing shall be in use inside the enclosure. Head covering, foot covering, and gloves shall be in use, and taped to the disposable coveralls as necessary. Disposable clothing shall be used once, and disposed of as asbestos waste after each usage. Any discrepancies observed shall be noted on the checklist.

2. Respirators shall be in use inside the enclosure. If the proper respirators are not in use, the affected worker(s) shall leave the work area until corrective measures can be taken. In this section, list the type of respirator(s) in use inside the enclosure.

3. Ensure that the proper respirator cartridges are in use inside the enclosure. If the proper respirator cartridge is not in use, the affected worker(s) shall leave the work area until corrective measures can be taken.

In Section C, the following items shall by verified at the hygiene facility:

1. The shower shall have functioning hot and cold water available. If hot water is not available, corrective measures shall be taken to ensure hot water is available.

2. The subcontractor shall ensure that soap and clean/dry towels are supplied and available to all personnel requiring access to the enclosure.

3. The job competent person shall ensure that all personnel exiting the enclosure use the shower.

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Section C (continued)

4. Waste water from the shower shall be contained. It can either be contained in the bottom of the shower before being filtered, or it should be pumped to a drum/container for future disposition. If the water is not being contained, immediate action shall be taken to correct the situation.

5. If the waste water is being filtered, the final filter shall be a 5 micron filter.

In Section D, the following work practices shall be in use inside the work area:

1. Amended water shall be used to wet any asbestos containing material prior to removal. If wet methods are not being used inside the enclosure, the asbestos removal shall be suspended until corrective measures can be taken.

2. There shall be no visible emissions of dust observed inside the enclosure or no dust shall be observed being generated from the enclosure. If any visible dust is observed, all work inside the enclosure shall be suspended until corrective measures can be taken.

3. As material is being removed, it shall remain wetted until it is placed into disposal bags. Loose asbestos containing materials shall not be allowed to become dry.

4. As asbestos containing material is removed, efforts should be made to bag the material as soon as practical.

5. Asbestos waste bags shall be labeled with the proper asbestos warning label prior to being removed from the enclosure.

6. Only HEPA-filtered portable vacuums shall be used inside the enclosure. If other vacuums are in use, their use shall be discontinued immediately.

7. After all asbestos containing materials have been removed and the work area has been thoroughly cleaned and Industrial Hygiene has given final visual clearance, an encapsulating sealant shall be used on all surfaces to lockdown any remaining asbestos fibers which may be present.

8. No smoking, eating, drinking, chewing, or applying of cosmetics shall be allowed inside the work area. If any of these actions are observed inside the enclosure, the individual(s) observed shall immediately exit the enclosure and corrective measures taken.

9. If pipe insulation is being removed inside the enclosure, glove bags can be used to reduce the airborne concentration of asbestos fibers. The use of glove bags inside containment are not required, but their use should be noted.

10. The waste disposal container (located outside the enclosure) shall be properly labeled with the OSHA asbestos warning label and the DOT waste shipping label. If the container is not properly labeled, or the labels cannot be read, notify the job competent person so corrective measures can be taken.

Discrepancies found or exemptions granted for any item identified in sections A through [illegible], shall be listed in the section under **Comments**. Any discrepancies found shall be corrected as soon as practical, unless otherwise noted in these instructions. Exemptions to any items listed on this form may be approved by Industrial Hygiene.

After completion of the form, the Industrial Hygiene Technician/Construction Coordinator completing the checklist and the Asbestos Abatement Supervisor shall sign at the bottom of page 2.

After both signatures have been recorded at the bottom of the checklist, the original checklist shall be filed with the Asbestos Work Permit for the job being inspected. The copy of this daily inspection checklist shall be maintained with the Industrial Hygiene copy of the Asbestos Work Permit.

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FINAL INSPECTION CHECKLIST

BUILDING NUMBER:_____ **ROOM/AREA:**_____ **DATE:**_____

PROJECT DESCRIPTION:_____

CONTRACTOR:_____ **WORK PERMIT NUMBER:**_____

Final Inspection Checklist	YES	INAD	NO	DNA
A. Visual Inspection for Residual Dust (prior to encapsulation/lockdown)				
1. Floor	___	___	___	___
A. Floor tile mastic removed (whenever floor tile removed)	___	___	___	___
2. Horizontal surfaces	___	___	___	___
3. Pipes	___	___	___	___
4. Ventilation equipment	___	___	___	___
5. Ducts	___	___	___	___
6. Registers	___	___	___	___
7. Lights	___	___	___	___
B. Recleaning Required	___	___	___	___
C. Final (Clearance) Air Samples (after successful visual inspection)				
1. Air samples submitted for analysis	___	___	___	___

2. Final air sample results:

_____ _____

_____ _____

_____ _____

Comments:

Section	Number	
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____

INDUSTRIAL HYGIENE: _____

ASBESTOS ABATEMENT SPECIALIST/
CONSTRUCTION COORDINATION: _____

The Final Inspection Checklist is to be completed by Industrial Hygiene after clean up an asbestos work area has been completed.

In the top section of the form: record the building number; which room or area in the building that asbestos work was performed; the date on which the checklist is being completed; the project description (which project is the asbestos work related) or job description when the work is performed by FERMCO personnel; name of the asbestos removal contractor where appropriate; and the work permit number.

In Section A, the following items shall be visually inspected to ensure the work area has been successfully cleaned:

All surfaces listed in section A shall be inspected to ensure that there is not any visible dust present in the work area. The visual inspection should be performed prior to the application of any lockdown encapsulants. If any visible dust is present, the work area should be recleaned until the area is free of any visible dust.

Anytime floor tile has been removed, floor tile mastic shall also be removed unless it has been determined that the floor tile mastic is asbestos free. If any floor tile mastic is present, the work area shall not be cleared until all of the mastic has been removed.

In Section B, if any visible dust is observed during the visual inspection, recleaning is required. Once the area has been recleaned, an additional visual inspection shall be conducted of the work area.

In Section C, when final clearance air samples are required after completion of an enclosure job, clearance air samples shall not be collected until the work area has successfully passed a visual inspection (see Section A). For small enclosure jobs (less than or equal to 1000 square feet), a minimum of three aggressive air samples shall be collected inside the enclosure and one air sample collected outside the enclosure. Larger enclosure jobs (greater than 1000 square feet) shall require five aggressive air samples inside the enclosure and two air samples taken outside the enclosure. The air volume for all clearance air samples shall be greater than 1000 liters of air collected on a 25 mm filter cassette. All air sample results from inside the enclosure shall be less than 0.01 fibers per cubic centimeter. If sample results are greater than 0.01 f/cc, the work area shall be recleaned and additional clearance air samples collected after recleaning. If the air sample results outside the enclosure exceed the results of samples collected inside the enclosure, it may be possible to clear the area, contact the cognizant Industrial Hygiene Technologist for guidance.

Discrepancies found or exemptions granted for any item identified in sections A through C, shall be listed in the section under **Comments**. Any discrepancies found shall be corrected before the final sign off on the Asbestos Work Permit.

After completion of the form, the Industrial Hygiene Technician completing the checklist and the Asbestos Abatement Supervisor/Construction Coordinator shall sign at the bottom of page 2.

After both signatures have been recorded at the bottom of the checklist, the original checklist shall be filed with the Asbestos Work Permit for the job being inspected. The copy of this final inspection checklist shall be maintained with the Industrial Hygiene copy of the Asbestos Work Permit.

0282

ASBESTOS OPERATIONS AND MAINTENANCE

WORK PRACTICES

PREVIOUSLY SUBMITTED

4/28/93-DKT

CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

1.0 GENERAL

A. This policy provides guidance for the protection of personnel who work in buildings where asbestos is present or are engaged in operations where the handling of asbestos or asbestos-containing material is necessary. Strict compliance with 29 CFR 1926.58, OSHA Asbestos Standard, is required.

B. This policy also outlines the basic requirements for obtaining written authorization and instructions before any work begins which requires work with asbestos

2.0 RESPONSIBILITIES

2.1 Facility Owner

A. Ensures that the requirements of the General Precautions section of the FERMCO Work Permit have been completed to address the facility specific hazards for the proposed work task.

B. Ensures that the work site is provided in as safe a condition as practical.

2.2 Supervisor-In-Charge

A. Identifies and initiates the appropriate work permit(s) based on the work to be performed.

B. Ensures completion of the work permit(s) prior to start of work.

C. Ensures that personnel are qualified and adhere to all permit requirements.

D. Immediately reports any unwanted, unplanned event to the AEDO, ERT and/or the area supervisor as appropriate.

E. Ensures that Industrial Hygiene personnel are notified of any changes in work site conditions since permit issuance.

2.3 FERMCO Employees

A. Adheres to all requirements listed on each permit.

B. Ensures that they have signed section D of the permit stating that they understand all permit requirements.

C. Notifies personnel in the vicinity, the supervisor-in-charge, or the Communication Center when the supervisor is not present, if they recognize an emergency condition.

2.4 Industrial Hygiene Representative

A. Reviews the FERMCO Work Permit to ensure that it is complete.

B. Inspects the work site for compliance with the conditions listed on the Work Permit.

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C. Performs atmospheric testing as required to ensure the proper level of protective equipment is specified on the permit.

D. Completes the Confined Space and/or Chemical Hazardous Materials Work Permits required for the work to be performed.

3.0 REQUIREMENTS

3.1 Asbestos Hazard Control

A. All asbestos containing materials, particularly pipe insulation, shall be maintained in good condition.

B. All employees shall be alert to the presence of damaged asbestos containing materials and shall notify the Facility Owner when such materials are found in damaged condition.

C. The Facility Owner shall ensure that repairs are made and shall contact the Industrial Hygiene group, when necessary, for the posting of hazard warnings.

D. Where asbestos containing material is seriously damaged, creating a potential exposure to dust, the Assistant Emergency Duty Officer (AEDO) and Industrial Hygiene (IH) shall be contacted immediately for proper regulation of the area, clean-up, and repair.

3.2 Planning for Work that May Involve Asbestos

A. All construction/maintenance activities shall be evaluated as early as possible to determine the presence and potential for disturbance of suspect asbestos containing materials.

B. When suspect asbestos is to be disturbed as part of the work activity, and there is no time to sample the suspect materials, the materials shall be handled as asbestos.

C. An OSHA "competent person" shall supervise the asbestos work project and shall be present at the work site anytime workers are in the asbestos work area.

D. Specifications for all construction activities involving work with asbestos shall include requirements for:

- Compliance with all applicable asbestos work regulations; including, those of OSHA, EPA, and the State of Ohio.
- Submission of documentation of respirator training, quantitative respirator fit-test and medical certification to the IH Group for approval prior to the start of work.
- Submission of an Asbestos Abatement Work Plan after award of the contract.

E. Quantitative fit-testing shall conform with the requirements of 29 CFR 1926.58, Appendix C.

F. The Asbestos Abatement Work Plan shall contain all the information listed in 29 CFR 1926.58, Appendix F, Planning the Removal Project, and shall be provided to the OS&H Department for approval prior to the start of asbestos work.

CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

G. An Asbestos Abatement Work Plan shall not be required for construction activities involving minor asbestos work such as the drilling of holes in transite or floor tile.

H. The local area agency (EPA) must be notified by FERMCO before any asbestos removal.

3.3 Supervision of Asbestos Work

A. A supervisor of any asbestos removal shall qualify as an OSHA "competent person".

- A competent person is someone who has successfully completed a state or federally approved asbestos abatement supervisor's course and required annual refresher training or is a certified industrial hygienist knowledgeable in asbestos control.

- Competent person also means one who is capable of identifying existing asbestos hazards in the workplace and who has the authority to take prompt corrective measures to eliminate them.

C. A competent person shall supervise:

- Setting up the enclosure/work area.

- The integrity of the enclosure/work area.

- Entry to and exit from the enclosure/work area.

- All employee exposure monitoring.

- Ensuring that employees working within the enclosure/work area wear protective clothing and respirators.

- Ensuring that employees are trained in work practices, personal protective equipment and engineering controls.

- Ensuring the employees use the hygiene facilities.

- Ensuring that engineering controls are functioning properly.

3.4 Asbestos Work Permit

Prior to the start of any work which involves the clean-up, disturbance, removal, or repair of asbestos containing materials, the IH Group shall be contacted for issuance of an Asbestos Work Permit after all regulatory requirements are met. The permit shall be posted at the perimeter of the job site so that it can be seen without entering the area.

3.5 Initiation of FERMCO Asbestos Work Permit

Where FERMCO Asbestos Work Permit is required, a FERMCO Work Permit is also necessary (see SPR 2-13).

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CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

A. SUPERVISOR-IN-CHARGE

Contacts Industrial Hygiene for an IH Technician to perform the initial job site evaluation.

B. INDUSTRIAL HYGIENE TECHNICIAN

- Checks the completeness of the "FERMCO Work Permit" which is posted at the job site.
- Checks other permits which must be posted, and verifies that their expiration date has not passed.
- Completes the applicable portions of Sections "A", "B" and "C" of the permit, and signs in the appropriate block(s).

C. SUPERVISOR-IN-CHARGE

- Ensures that all employees on the job have read and understand the required precautions and required PPE.
- Ensures that all employees on the job have completed training required for the job.
- Ensures that all employees on the job have signed the permit in block "D".
- Notes permit expiration date(s).
- Signs the permit.
- Posts the original at the job site, and distributes the copies as indicated on the form.

3.6 Work Practice Controls

A. Establish negative pressure enclosures before commencing removal, demolition, and renovation operations involving asbestos.

B. Hygiene facilities shall be established adjacent to the work area for employees to remove asbestos from the face, hands, and any other part of the body not protected by clothing. Hygiene facilities shall consist of a clean room, shower area, and equipment room.

C. The requirement for establishing negative pressure enclosures and hygiene facilities does not apply to asbestos work which can be classified as a small-scale, short-duration operation.

D. For an activity to qualify as small-scale, short-duration, all of the following criteria must be met:

- A maintenance or renovation task, such as pipe insulation repair, valve replacement, drilling holes in transite to mount conduit, and/or installing conduit or piping through transite, where the removal of asbestos containing materials is not the primary goal of the work.

CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

- An activity where employee exposure to asbestos can be kept below the OSHA action level by work practices and worker isolation techniques; such as, glove bags, mini-enclosures, or the removal of an entire asbestos-covered pipe or structure.

- No large-scale asbestos project shall be reduced in size to create one or more small-scale, short-duration asbestos projects.

E. Respiratory protection is required based on the expected level of asbestos exposure.

F. Full body covering shall be used that will prevent contamination of the employee's skin or clothing.

G. Workers shall be provided a place to store and consume food, beverages, and tobacco products so that these items will not be contaminated by asbestos.

3.7 Engineering Controls and Work Practices

A. Before removal, all asbestos-containing materials shall be adequately wetted (thoroughly soaked) with a wetting agent applied by a gentle spray or mist.

B. The wetting shall continue until the material is bagged and sealed.

C. Friable asbestos containing materials shall not be handled in a dry condition.

D. If friable asbestos must be removed dry, then the dry removal must be approved by the local area agency (EPA).

E. Enclosures will be used when friable asbestos must be removed, and a HEPA-filtered exhaust system shall be established to remove fibers from the enclosure.

F. Removed asbestos shall be bagged, labeled, and stored or disposed of daily in a way which will prevent the release of fibers.

G. For work that will release fibers from non-friable asbestos (asbestos-cement, floor tile); such as, sawing, grinding, or drilling, the tools will be equipped with a local exhaust system or a water spray. If the tools are not equipped with these controls, HEPA filtration or a water spray will be provided at the point of operation.

H. Barricades and/or enclosures will be used to limit the number of employees exposed to asbestos.

I. Work areas which have been barricaded or enclosed shall have asbestos hazard warning signs posted at all entrances to the work area. The signs shall have the wording required by the OSHA asbestos standard.

J. Each enclosed or barricaded area shall be cleaned at the end of work each day with a HEPA vacuum cleaner, by wet cleaning, or any other effective means of fiber cleanup.

K. Insulation which contains greater than 1 percent shall not be installed or reinstalled.

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CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

L. ~~Asbestos waste containers shall be labeled with the waste label required by OSHA, and the hazardous substance shipping label required by DOT.~~

3.8 Air Monitoring Requirements for Asbestos Work Activities

A. Employee exposure to asbestos shall be determined from analysis of breathing zone air samples collected during asbestos work activities as required by OSHA.

B. The sampling shall be used to evaluate the effectiveness of control measures in maintaining exposure levels below the OSHA excursion and OSHA permissible exposure limits.

C. During each asbestos work activity, a 30-minute breathing zone air sample will be collected where the potential for releasing asbestos fibers is greatest.

- Worker exposure during this 30-minute period shall not exceed the OSHA excursion limit of 1.0 fibers per cubic centimeter (f/cc).
- When this limit may be exceeded, respirators and protective clothing shall be worn.
- Where there are several periods during an activity when the potential for releasing asbestos fibers may exceed the excursion limit, several 30-minute excursion samples must be collected.

D. Personal air samples shall be collected on workers for the entire period of time they are working with asbestos containing materials when the task they are performing requires more than 30 minutes to complete.

- This sampling shall be conducted during the entire work shift where possible to comply with the OSHA requirement for measuring the 8-hour, time-weighted-average (TWA) for exposure to asbestos.
- The result of TWA sampling shall not exceed the OSHA permissible exposure limit Of 0.2 f/cc. When this limit may be exceeded, respirators and protective clothing shall be worn.

E. Workers shall be notified of the results of all personal air samples collected on them.

F. General area air samples will be collected outside the asbestos work area to evaluate the effectiveness of control measures used during asbestos work activities.

G. When asbestos removal activities are performed inside an enclosure, general area clearance air samples shall be collected after final cleanup is completed.

- Results of this clearance air sampling must be less than 0.01 f/cc.
- When the results of this sampling exceed 0.01 f/cc, the result shall not be greater than the results of air sampling conducted outside the enclosure.
- When the results of clearance air sampling fail to meet this criteria, the area must be re-cleaned and re-sampled.

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CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

3.9 Training and Qualification of Workers

A. The following training requirements apply to subcontractor and vendor asbestos personnel only:

- Subcontractor/vendor asbestos workers and supervisors shall be trained in accordance with the requirements of the State of Ohio, Department of Health, unless performing minor asbestos work such as drilling holes in floor tile or transite.

- Workers who perform these minor work tasks, must meet the training requirements specified in the OSHA Asbestos Standard (1926.58).

B. The following training requirements apply to FERMCO personnel:

- Any individual who may remove 50 linear or 50 square feet or more of friable asbestos-containing material shall have completed training required for asbestos workers by the State of Ohio.

- Every supervisor of an asbestos removal shall qualify as an OSHA "competent person" by completing training approved by the State of Ohio.

- A supplemental 8-hour refresher training class approved by the State of Ohio shall be taken annually by supervisors and workers, enabling them to remain qualified to supervise or perform asbestos removal tasks.

- Any individual who may remove less than 50 linear or 50 square feet of asbestos containing materials must complete annual training as required by the OSHA Asbestos Standard (29 CFR 1926.58).

C. Every individual required to wear a negative pressure respirator while working with asbestos shall have been quantitatively fit-tested within the last 6 months as required by the OSHA Asbestos Standard and shall have attended respirator training within the last 12 months.

3.10 Handling Spills/Incidents/Emergencies Involving Asbestos

A. Every spill or incident that could release asbestos fibers shall be reported immediately to the Facility Owner, the AEDO, and to IH.

B. When airborne fibers are likely to be present, the affected area shall be evacuated immediately.

C. The AEDO and Industrial Hygiene will evaluate the damaged asbestos and determine the corrective action to be taken.

D. If friable asbestos is damaged where personnel are likely to be exposed, the following actions shall be taken to prevent exposure and the spread of asbestos contamination:

- The area shall be evacuated; asbestos warning tape and/or other barriers shall be placed to control access to the area and all personnel entering the area shall comply with the respirator and protective clothing specified by IH.

CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

- All building ventilation systems in the immediate area shall be turned off or sealed off.

E. The Facility Owner or the AEDO shall ensure that the area of damaged asbestos is repaired and that cleanup is completed as soon as possible.

F. Where immediate cleanup of fallen material is not possible, tarps or plastic shall be used to cover the material and the tarps or plastic shall be secured with weights or taped to the floor.

G. After repairs and cleanup have been completed, IH shall visually inspect the area and collect air samples, when required, to ensure the area has been properly cleaned.

H. When IH has determined that the area has been cleaned, the AEDO shall approve the removal of all warning barriers and the area can be reoccupied.

4.0 ATTACHMENT

Attachment A: FERMCO Asbestos Work Permit

CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

ATTACHMENT A
Sheet 1 of 2

FERMCO Asbestos Work Permit

FERMCO ASBESTOS WORK PERMIT

This permit is only valid when it is attached to the FERMCO Work Permit Form which has Section A through D completed.

FERMCO WORK PERMIT NUMBER:

SECTION A - BACKGROUND AND REGULATORY INFORMATION *(To be supplied by supervisor-in-charge)*

1. Exact location
2. Exact description of work to be conducted.
3. Amount of asbestos to be removed (in linear or square feet):
4. Regulatory approval received to begin work: ☐ YES ☐ DNA
   * If yes, regulatory approval for this job starts ☐ incidental
   _____ *(Date)* and stops _____ *(Date)*
5. Does job description meet requirements for small-scale, short-duration work? ☐ YES ☐ NO

Section B contains items which shall be complied with on this job as indicated

SECTION B - PRE-JOB REQUIREMENTS SPECIFIED BY: _____ IH TECHNICIAN INITIALS _____ DATE _____ TIME _____

PREPARATION OF WORK SITE *(All Asbestos Jobs)*

	REQ'D	DNA
1. Work area barricaded and or roped off		
2. Asbestos warning signs posted at work site		
3. Pre-cleaning of work area required		
4. All small items removed from designated work area		
5. Large equipment secured and covered with plastic		
6. Floor and ledges covered with plastic		
7. Area ventilation systems locked and tagged out		
8. Shower established adjacent to work area		
9. Waste water filtered (5 micron filter)		
10. Perimeter air sampling required during work		
11. Nearby building occupants shall be notified of asbestos work to prevent unauthorized access to work area		
12. Contact IH Technician to inspect work area preparation before asbestos removal begins		

WORK PRACTICES

	REQ'D	DNA
1. Personal air samples required (samples collected for entire shift when possible)		
2. No smoking, eating or drinking permitted in work area		
3. HEPA-filtered vacuum required for clean-up		
4. HEPA vacuum required at point of cut/drilling		
5. Glove bag removal of pipe insulation required		
6. Transite panels shall be removed whole		
7. Asbestos material shall not be allowed to drop		
8. Transite panels shall be wet down/encapsulated before removal		
9. Amended water shall be used to wet down material		
10. Asbestos material thoroughly wet down before removal		
11. Removed material promptly bagged (not allowed to dry out)		
12. Surfaces shall be coated with a sealant to encapsulate any remaining fibers		
13. Work area cleaned after completion of work each day		
14. Tools and equipment shall be cleaned of all residual dust before removal from work area		
15. Personnel to decontaminate at each departure from work area		
16. Bag contaminated clothing and waste promptly		
17. Bagged waste material shall be placed in containers and labeled as asbestos waste (exterior of containers shall be clean and asbestos-free)		
18. Shower before lunch and at end of shift		

PREPARATION OF WORK SITE *(For Total Enclosure Jobs Only)*

	REQ'D	DNA
1. Floor and wall penetrations covered and sealed		
2. Negative air enclosure set-up around work area		
3. Negative air machine operating continuously		
4. Negative pressure achieved at 0.02 inches or greater		

SECTION C - FINAL INSPECTION REQUIREMENTS

	REQ'D	DNA
1. Visual inspection of work area for residual dust required after completion of job (contact IH Technician)		
2. General area air samples required after completion of job (contact IH Technician)		
3. Obtain IH Technician approval before removal of barriers & warning signs		

SECTION D - SIGNATURES *(Employees assigned to job)*
I have read and understood all requirements of this permit.

EMPLOYEE(S) SIGNATURE(S)	BADGE NO	DATE	EMPLOYEE(S) SIGNATURE(S)	BADGE NO.	DATE
1.			4.		
2.			5.		
3.			6.		

APPROVAL TO BEGIN WORK

IH TECHNICIAN SIGNATURE	DATE	TIME

APPROVAL TO REMOVE BARRIERS AND WARNING SIGNS

IH TECHNICIAN SIGNATURE	DATE	TIME

WORK AUTHORIZATION REVIEWED AND FOUND ACCEPTABLE FOR USE

SUPERVISOR-COMPETENT PERSON** SIGNATURE	DATE	TIME

NO.	DISTRIBUTION OF COPIES
1	POST AT JOB
2	SUPERVISOR IN CHARGE
3	INDUSTRIAL HYGIENE/INDUSTRIAL SAFETY
4	EMPLOYEE REPRESENTATIVE

* *This Asbestos Work Permit expires when removal of barriers and warning signs is approved, preparation of additional work area is needed, employees assigned to the job are changed, or job conditions require changes in permit requirements. In no case shall the permit be valid beyond the date in Section A 4. above*

** *For a job which requires the removal of asbestos-containing materials, the signature on this box indicates the supervisor has been trained as an asbestos qualified "Competent Person" per OSHA and as an "On-Site Representative" per NESHAP*

FS-F 7040 (REV 3-1-92)

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CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT

ATTACHMENT A
Sheet 2 of 2

The **FEMP Asbestos Work Permit** is required to control any task involving the cleanup, disturbance, handling, removal, or repair of asbestos containing materials.

Materials containing **Refractory Ceramic Fibers (RCFs)** shall be handled using the same work practice controls which are used for asbestos, including issuance of the FEMP Asbestos Work Permit. RCFs are a man-made product which were manufactured as a high temperature replacement for asbestos. RCFs can be found at the FEMP as thermal lining materials in boilers, dissociators, furnaces, kilns, and reactors.

Small-scale, short-duration job: a maintenance or renovation task where the removal of asbestos containing materials is not the primary goal of the work and any activity where employees exposure to asbestos can be kept below the OSHA action level by use of specific work practices and worker isolation techniques. No large-scale asbestos job shall be reduced in size to create one or more small-scale, short-duration asbestos jobs.

Incident renovations: any small, minor removal of asbestos, not reasonably foreseen or planned, necessary to facilitate normal conduct of business. (In this definition, small refers to less than the reporting quantities of 260 linear feet or 160 square feet of friable asbestos.)

Competent person: a supervisory level individual who has successfully completed a 32-hour classroom and hands-on asbestos training class approved to supervise asbestos removal tasks.

A competent person is required to sign the Asbestos Work Permit as the Supervisor-in-Charge when the work task involves the removal of any quantity of asbestos containing material (this includes the removal of non-friable materials and the drilling of small holes in non-friable materials.

QUALIFICATIONS OF ASBESTOS WORKERS:

Any individual performing work controlled by this Asbestos Work Permit shall have successfully completed asbestos worker training required by the OSHA Asbestos Standard in the last 12 months.

Any individual require to remove 50 linear or 50 square feet of more of friable asbestos-containing material on a job shall have successfully completed asbestos worker training required by the State of OHIO. This training shall have been completed within the last 12 months.

Any individual required to wear a negative pressure respirator while working with asbestos shall have been quantitatively fit-tested within the last 6 months as required by the OSHA Asbestos standard and shall have attended respirator training within the last 12 months.

NOTE: The requirement for quantitative fit-testing in the last 6 months does not apply to individual using

positive pressure respirators (i.e., supplied air respirators, powered-air purifying respirators)

PACKAGING, ON-SITE MOVEMENT AND OFF-SITE SHIPMENT OF MATERIAL

PREVIOUSLY SUBMITTED

4/28/93-DKT

RADIOLOGICALLY NON-CONTAMINATED ASBESTOS CONTAINING MATERIAL WASTE (ACM) DISPOSITION

SSOP-0081

Effective Date: 09-03-92

AUTHORIZED BY: _____ 8/25/92
H. F. Daugherty, President Date

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Westinghouse Environmental Management Company of Ohio
P. O. Box 398704
Cincinnati, Ohio 45239-8704

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RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
09-03-92	0	Procedure required to establish new ACM Waste Disposition procedure. Per Request No. S92-178, initiated by L.W. Johns.

1.0 PURPOSE

To provide a protocol to permit disposition of Asbestos Containing Material (ACM) waste produced in a radiologically non-controlled area as non-radioactive.

2.0 SCOPE

This procedure is created to address the radiological concerns for transfer of radiologically non-contaminated ACM waste created in radiologically non-controlled areas at the Fernald Environmental Management Project (FEMP) to an approved final burial site. This would help minimize the burden of assumed radiologically contaminated ACM waste on site storage and reduce final disposition costs. This procedure does not supersede the material evaluation form procedure for characterizing waste.

3.0 DEFINITIONS

ACM - Asbestos Containing Material

Competent Person - Supervisor of an Asbestos Project, as defined by (7.0 OSHA) 29CFR1926.58.

Inaccessible Areas - Areas accessible to radiological contamination but where the material geometry does not permit a radiological contamination determination to be made.

Julian Calendar Date - A date format using four numbers the first number is the last digit of the year ie. for the year 1992 all the julian calendar dates for that year will begin with the number "2". The number for the year is followed by the number for that day during the year. For January 15, 1992 the julian calendar date is 2015.

Lagging - The cloth wrapping around insulating material used for protection, usually painted to make it nonporous.

Radiologically Controlled Area (RCA) - Any area to which access is controlled in order to protect individuals from exposure to radiation and radioactive materials.

Reusable Container - Locking waste receptacles that will be accessed more than once before container is full, i.e., ISO (sea/land), railroad car and dumpsters.

Serialized Seal - A uniquely numbered connecting device which once installed cannot be opened without breaking the device.

3.0 **DEFINITIONS** (cont.)

Single Use Containers - Locking waste receptacles that typically are filled on initial entry and are not expected to be opened again except perhaps on a final inspection prior to disposal, i.e., drums or metal boxes.

Unrestricted Release - A release of property (e.g., waste) based on a formal, documented decision reflecting DOE standards and associated implementing procedures that the property may be utilized, treated or disposed of by any party without concern for radioactive content.

4.0 **RESPONSIBILITIES**

Asbestos Program Coordinator

- Ensures that the requirements of this procedure are followed.
- Assigns responsibilities for maintaining the required lists/logs, such as:
  - Radiologically Non-Contaminated ACM Waste Log.
  - ACM Reusable Container Log.
  - ACM Reusable Container Location List.

Radiological Safety

- Evaluates lagging integrity with an asbestos hazard evaluation specialist, certified in the state of Ohio.
- Responsible for radiological surveys of ACMs.
- Ensures that the Competent Person understands the areas which are below the limits specified in Section 7.1 and any specific controls which will be required to insure survey integrity.
- Ensures that the ACM waste removed in accordance with this procedure meets the requirements of Section 7.1 prior to being loaded into its respective container.
- Provides the seals/locks to control access to containers.
- Has sole responsibility for keys to reusable containers.

Quality Assurance

- Provides audits and surveillance as necessary to ensure that the guidelines listed in this procedure are followed.

4.0 **RESPONSIBILITIES** (cont.)

Competent Person

- Ensures that ACM that is removed and placed in containers in accordance with this procedure has been verified by a radiological safety technician to meet the requirements of Section 7.1.
- Signs the appropriate log.
- Forwards all surveys for ACM waste generated in accordance with this procedure to the Asbestos Program Coordinator or his designee.

5.0 **GENERAL**

ACM waste created in radiologically non-contaminated areas on site has been considered radiologically contaminated waste. This policy was initiated because radiologically contaminated material has been found during past renovations in radiologically non-controlled areas.

The primary sources of ACMs in radiologically non-contaminated areas are found in air duct and pipe insulation, floor tile and floor tile mastic. Because the non-permeable lagging of pipe and duct insulation form a barrier preventing contamination of the internal ACM, external contamination surveys are sufficient to determine if this material is radiologically contaminated. This material shall be radiologically released in accordance with section 7.1 of this procedure. Floor tile and mastic material may be surveyed after removal in accordance with procedures for the radiological release of general construction waste.

This procedure is established to clarify site policy for the radiological unrestricted release of ACM and does not supersede the site "Radiological Controls Requirements Manual", RM-0009 or the "Unrestricted Release of Materials from FMPC", SP-P-35-010.

This procedure requires that the lagging around the ACM is impermeable and that there is no radioactive contamination beneath the lagging. This procedure is not to be used when ACM is suspected to have internal radiological contamination which cannot be verified by external radiological surveys. Some indications of internal ACM contamination exposure that should be evaluated by the radiological technician are:

- Areas where repairs were made and loose/fixed contamination was found in surrounding areas.
- Areas where lagging is porous or has signs of internal water damage.

5.0 **GENERAL** (cont.)

- Insulation around radiologically contaminated system piping.
- Damaged lagging ends.
- Where process knowledge does not make it prudent to permit the ACM to meet the requirements in the "Unrestricted Release of Materials from FMPC", SP-P-35-010.

Floor tile and mastic ACM waste is characteristically non-porous material with no inaccessible areas after removal. These materials shall be radiologically characterized just prior to placing them in a container. If survey results on the floor tile exceed limits specified in "Unrestricted Release of Material from FMPC", SP-P-35-010 the floor tile shall be considered radiologically contaminated material.

6.0 **PREREQUISITES**

6.1 TOOLS AND SPECIFIC EQUIPMENT

Drums, containers, dumpsters, ISO (sea/land) containers as required.

Keys/seals for drums

Appropriate lists and documentation.

7.0 **PROCEDURE**

7.1 GENERAL

RADIOLOGICAL TECHNICIAN

1. Survey ACM to be removed and record in accordance with the "Unrestricted Release of Materials from FEMP", SP-P-35-010.

2. Verify that ACM meets the standards of Section 7.1.

   NOTE: If the time between radiological survey and ACM removal is greater than 3 days, and it has been determined that not all the ACM in the area meets the requirements of section 7.1 step 3 (NOTE) the radiologically non-contaminated ACM will be marked in place using the Article Surveyed Tags (this tag may be found in SP-P-35-010).

7.1 GENERAL (cont.)

RADIOLOGICAL TECHNICIAN

3. Verify the integrity of the outer lagging.

   NOTE: If there is no indication that the internal insulation has been exposed to radioactive contamination (Section 5.0) and outer lagging radioactive contamination levels are less than those limits found in SP-P-35-010, the lagging and internal ACM will be considered radiologically non-contaminated.

COMPETENT PERSON

4. Locate ACM containers in a radiologically non-controlled area.

5. Sign the appropriate ACM Log (Figure 1 and 2) to verify that all material in the container was permitted to be radiologically released and that all line items are correct. This log shall be maintained by the Asbestos Program Coordinator or designated person.

6. Store filled radiologically non-contaminated ACM containers in a radiologically non-controlled area.

7. Provide a copy of the radiological contamination survey to the Asbestos Program Coordinator or designee after receiving survey from Radiological Technician.

RADIOLOGICAL TECHNICIAN

8. Install a serialized seal to prevent unauthorized opening of the container.

9. Provide the Competent Person with a written copy of the ACM radiological contamination survey.

10. Control access to reusable/single use containers.

ASBESTOS PROGRAM COORDINATOR

11. List and file a copy of the ACM radiological contamination survey received from the Competent Person.

12. Number the radiological contamination surveys, used to characterize ACM being stored in single use containers in sequential order.

7.1 GENERAL (cont.)

ASBESTOS PROGRAM COORDINATOR

13. Number the radiological contamination surveys used to characterize ACM being stored in reusable containers with the load number (#) followed by the sequential number (#) of the survey for that load.

    NOTE: Refer to 7.3 step 7 for instructions on how to determine the LOAD NUMBER (#).

7.2 SINGLE USE CONTAINERS

COMPETENT PERSON

1. Number single use containers in sequential order, starting with ASB-1.

2. Separate ACM which meets the standards of Section 7.1 from radiologically controlled waste and place in a lockable container.

3. Have a radiological technician present when container is being filled, and if the container is to be reopened for any reason.

4. When the container is full, have a radiological technician install a serialized seal to prevent unauthorized opening of the container.

5. Log seal serial numbers in the Radiologically Non-contaminated ACM Waste Log. (See figure 1).

   NOTE: Each line entry will also include: the DATE/TIME the container is filled, The identification number (#) of the survey used to determine if the ACM waste was is not radiologically contaminated, and the Radiological Technician responsible for installing the seal. It will be signed by the Competent Person, whose signature verifies that all material in the container was permitted to be radiologically released and that all line items are correct. This log shall be maintained by the Asbestos Program Coordinator or designated person.

   NOTE: If the container is opened in a radiologically non-controlled area the radiological technician is not required to perform a survey but is required to ensure that no radiologically contaminated materials have been introduced into the container.

Figure 1 - Radiologically Non-Contaminated ACM Waste Log

7.2 SINGLE USE CONTAINERS (cont.)

RADIOLOGICAL TECHNICIAN

6. Supervise the initial filling to ensure that no radiologically contaminated materials have been introduced into the container. Install a serialized seal to prevent unauthorized opening of the container.

7. Supervise any operations where containers are reopened by breaking old seal, verifying radiological controls while the drum is open, and installing a new serialized seal to prevent unauthorized opening of the container.

COMPETENT PERSON

8. Have a radiological technician present if container has to be reopened for any reason and make a new line entry in the radiologically non-contaminated ACM Waste Log. Enter the new seal number in the system administrator log "Transferred to" block, and enter a new line entry.

   NOTE: The new line entry shall contain the new seal number, the old seal number in the "Transferred from" block, the name of the radiological technician present when container was opened, and the signature of the person opening the container.

7.3 REUSABLE CONTAINERS

ASBESTOS PROGRAM COORDINATOR

1. Maintain a list of all reusable ACM containers on site in the ACM Reusable Container Location List (See figure 3). Sequentially number reusable ACM containers by general geographic location.

   NOTE: When an empty container is moved to a new general location, the next open consecutive number will be used to identify the container at this location.

2. Keep a separate "ACM Reusable Container Log" (See Figure 2) for each container load.

7.3 REUSABLE CONTAINERS (cont.)

RADIOLOGICAL TECHNICIAN

3. Ensure that reusable containers are locked at all times, except when entries are supervised by Radiological Safety.

   NOTE: Keys for all reusable containers will be kept by Radiological Safety.

COMPETENT PERSON

4. Label container, as specified by the Asbestos Program Coordinator, with "For Radiologically Non-contaminated Asbestos Containing Material Only - for entry contact Name/Phone" (list name/phone of designated person in charge of container). This identifies Radiologically Non-contaminated ACM only and the person responsible for information on the container.

ASBESTOS PROGRAM COORDINATOR (or designee)

5. Log the person responsible for each container in the ACM Reusable Container Location List.

6. Use a separate ACM Reusable Container Log for each container.

COMPETENT PERSON

7. List the Container number (1), and the Julian calendar date (2) that indicates when the container was last empty, at the top of the ACM Reusable Container Log (See figure 2) to individually identify each load. This new number (3) becomes the load number. (Load #_ _ - _ _ _ _)

8. Make a line entry, on the ACM Reusable Container Log, (See figure 2) each time material is placed in a container. The line entry shall include the date, time, number of bags to load in dumpster, survey number used to radiologically release the ACM, and the name of the radiological technician controlling access to the reusable container.

9. Sign the line entry when the bagged ACM is placed in the container. This signature is to verify that all material in the container was verified by a radiological technician to meet the requirements of Section 7.1, and all line entries are correct to the best of his/her knowledge.

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Figure 2 - ACM Reusable Container Log

Figure 3 - ACM Reusable Container Location List

7.3 REUSABLE CONTAINERS (cont.)

COMPETENT PERSON

10. Ensure that the ACM Reusable Container Log includes a copy of the surveys for the ACM inside the container. The survey shall be numbered by load number - sequential survey number for this load.

    NOTE: For example, the survey number for the 3rd radiological survey for container number 1 with the last empty date of Feb 15, 1992 would be 01-2046-03.

11. Label each bag of ACM waste with the survey number used for ACM removal, and the date/time it was placed in the container.

12. Send the container log to the Asbestos Program Coordinator for review and storage, when the container is emptied.

COMPETENT PERSON

13. Complete a line entry, and sign the entry; if no waste is added when a reusable container is opened, the line entry will include time/date, reason for entry, and the name of the radiological technician present.

    NOTE: If a partially filled reusable container is moved to a new location, a line entry will be made in the Reusable ACM Container Log consisting of Time/Date and "Container moved to (location description)". The next time the container is emptied the log number for the new location will be used.

8.0 APPLICABLE DOCUMENTS

8.1 DRIVERS

- DOE 5480.19, "Conduct of Operations Requirements for DOE Facilities"
- RM-0012, "Quality Assurance Program Description"

8.2 REFERENCES

- RM-0012, "Quality Assurance Program Description"
- RM-00009, "Radiological Controls Requirements Manual"
- SP-P-35-010, "Unrestricted Release of Materials from FMPC"

- 4559-

MANAGEMENT OF HAZARDOUS WASTE

PREVIOUSLY SUBMITTED

4/28/93-DKT

ASBESTOS PROGRAM INTERNAL AUDIT/

SELF ASSESSMENT SYSTEM

PREVIOUSLY SUBMITTED

4/28/93-DKT

FEMP ASBESTOS TRAINING

REQUIREMENTS

PREVIOUSLY SUBMITTED

4/28/93-DKT

FEMP ASBESTOS TRAINING REQUIREMENTS

05/21/93 DKT

EMPLOYEE GROUP	CONDITIONS for TRAINING				** ASBESTOS TRAINING REQUIREMENTS					
	ASBESTOS COMPLIANCE & OVERSITE	ASBESTOS O & M & DEMOLITION	POTENTIAL TO DISTURB ACM	NO DIRECT CONTACT	ASBESTOS AWARENESS VIDEO TAPE	3 HR OSHA TRAINING	JOB SPECIFIC ON THE JOB TRAINING	24 hr ASBESTOS WKR TRNG	32 hr ASBESTOS CONTR/SUPVR TRNG & REFRESHER	ASBESTOS RESPIRATOR FIT TEST
NOTES:					1	2	3	4	5	6
1 ASBESTOS WORKERS										
a. PIPE FITTERS		X			X			X		X
b. CARPENTERS		X			X			X		X
c. IND. CLEANERS		X			X			X		X
d. SUPERVISOR		X	X		X				X	X
2 CRAFTSMEN/WORKERS			X		X	X	X			
*CRAFTSMEN/SUPERVRS		X	X		X				X	* X
3 FACILITY OWNER				X	X	X				
4 CONSTRUCTION										
a. ENGINEERING		X			X				X	X
b. SUBCONTR WORKER		X			X			X		X
c. SUBCONTR SUPVR		X			X				X	X
5 ENV SAFETY & HEALTH										
a. INDUSTRIAL HYGIENE	X				X				X	X
b. CLEAN AIR PROGRAM	X				X				X	
6 CRU 3: ENGINEERING	X	X			X				X	X
7 REGULATORY COMPL	X				X				X	X
8 D.O.E.	X				X				X	X
9 ALL OTHERS				X	X					

REGULATORY DRIVERS:

OSHA 1926.58

OSHA 1910.1200 "HAZARD COMMUNICATION"

OHIO ADMIN. CODE 3701-34

NESHAPS 40CFR-61.M

DOE ORDER 5483.1A

NOTES:

1. Covered in General Safety training required annually for all employees.
2. Required yearly, conducted by ES&H/IH
3. Required for workers who have the potential to disturb asbestos in the performance of their specific job assignment. (<50 Lft or <50 Sq ft)
4. A three day (24 hour) asbestos worker training is initially required and a one day refresher annually thereafter.
5. A four day (32 hour), Contractor/Supervisor/Competent Person Asbestos Abatement Practices training is initially required and a one day (8 hour), refresher annually thereafter.
6. Required every 6 months and is similar to normal fit testing, but repeated 3 times to ensure proper fit per OSHA 1926.58 APPENDIX C & H.III.A

* Requirements set by Industrial Hygiene

** As required or approved by ES & H

ASBESTOS ABATEMENT REMOVAL ACTION NO. 26

2.12 STANDARD OPERATING PROCEDURES (S.O.P.)

(AVAILABLE UPON REQUEST)

ESSENTIAL SITE STANDARD OPERATING PROCEDURES INCLUDE:

1.	Site Documentation System	PP 0103	8/28/91
2.	Deviation and Corrective Action Reporting	SSOP 0023	6/27/91
3.	Centralized Training	RM FMPC 002	
4.	FMPC Quality Assurance Plan	RM 0012	
5.	Site Health and Safety Plan	ES&H	6/1/90
6.	FMPC Respiratory Protection Manual	FMPC 2152	4/27/90
7.	Radiation Control	FMPC 505	12/2/88
8.	Completion of NEPA	FMPC 518	5/7/90
9.	Control of Permits for Accomplishing Hazardous Work	FMPC 516	4/23/91
10.	Asbestos Abatement 1992/1993	NEPA CX-362	11/12/91

5/5/93-DKT