United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Washington, DC 20460

EPA - 340/1-90-003a
November 1990

Stationary Source Compliance Series

EPA

# Asbestos NESHAP Demolition and Renovation Inspection and Safety Procedures Workshop

## Student Manual

NESHAP

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## ACKNOWLEDGMENTS

This document was prepared for the U.S. Environmental Protection Agency (EPA) by Alliance Technologies, Inc. under Contract No. 68-02-4465. Alliance appreciates the support and input given by the EPA Project Manager, Ms. Omayra Salgado during the preparation of this document. Review and comments were provided by legal and technical staff of all Regional Offices along with Headquarters OAQPS (SSCD and ESD) OECM and EHSD. Their input is gratefully acknowledged.

# Table of Contents


*Section* *Page*

To the Instructor ..... iii
Recommended Topic Sequence and Time Allotment ..... iv
Figures ..... xii
Tables ..... xii

1 **BACKGROUND INFORMATION AND DEFINITIONS** ..... 1-1
PURPOSE OF INSPECTIONS ..... 1-1
REGULATORY OVERVIEW ..... 1-2
Clean Air Act (CAA) ..... 1-3
Toxic Substances Control Act (TSCA) ..... 1-5
Asbestos School Hazard Abatement Act (ASHAA) (40 CFR Part 763) ..... 1-5
Worker Protection Rule (WPR) (40 CFR Part 763 Subpart G) ..... 1-6
Asbestos Hazard Emergency Response Act (AHERA) (40 CFR Part 763 Subpart E) ..... 1-6
Asbestos Ban and Phase-out Rule ..... 1-6
Resource Conservation Recovery Act (RCRA) ..... 1-7
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) ..... 1-7
GLOSSARY OF TERMS ..... 1-7
ASBESTOS HISTORY ..... 1-16
GEOLOGICAL TERMS ..... 1-16
FIBER SIZES ..... 1-17
COMMERCIAL PRODUCTS ..... 1-18

2 **NATIONAL REGULATORY STRATEGY/INSPECTOR GENERAL AUDIT** ..... 2-1
OBJECTIVES ..... 2-2
BACKGROUND ..... 2-2
STRATEGY ..... 2-2
Informal action ..... 2-3
Administrative action ..... 2-4
Judicial action ..... 2-4

3 **HEALTH EFFECTS OF EXPOSURE TO ASBESTOS** ..... 3-1
HEALTH EFFECTS ASSOCIATED WITH INHALATION ..... 3-1
The Respiratory System ..... 3-2
Routes of Inhalation Exposure ..... 3-3
Occupational Exposure ..... 3-3
Para-occupational Exposure ..... 3-4
Neighborhood Exposure ..... 3-4
Ambient Background Exposure ..... 3-5
Diseases Associated with Asbestos Inhalation ..... 3-5
Asbestosis ..... 3-5
Lung Cancer ..... 3-5
Mesothelioma ..... 3-6
Other Diseases ..... 3-6
Other Abnormalities ..... 3-7
HEALTH EFFECTS ASSOCIATED WITH INGESTION ..... 3-7
HEALTH EFFECTS ASSOCIATED WITH SKIN CONTACT ..... 3-7
THEORIES ON HAZARD RELATIONSHIPS ..... 3-8
Asbestos Fiber Type ..... 3-8
Asbestos Fiber Size ..... 3-8
Age at Exposure ..... 3-8
Individual Susceptibility ..... 3-8

# Table of Contents


*Section* *Page*

4 IDENTIFYING ASBESTOS CONTAINING MATERIALS ..... 4-1
IMPORTANT DEFINITIONS ..... 4-1
ASBESTOS USES AND CHARACTERISTICS ..... 4-2
Typical Friable Asbestos Materials ..... 4-5
Typical Category I Nonfriable Asbestos Materials ..... 4-6
Typical Category II Nonfriable Asbestos Materials ..... 4-6
ASBESTOS SURFACING MATERIALS ..... 4-6
Condensation Control ..... 4-6
Fireproofing ..... 4-7
Acoustical ..... 4-7
THERMAL SYSTEM INSULATION ..... 4-7
Pipe Insulation ..... 4-7
Boilers and Hot Water Tanks ..... 4-7
Elbows, Valves and T-Fittings ..... 4-8
MISCELLANEOUS BUILDING MATERIALS ..... 4-8

5 ABATEMENT TECHNIQUES ..... 5-1
AREA PREPARATION ..... 5-1
EQUIPMENT ..... 5-3
WORK PRACTICES ..... 5-4
OTHER TECHNIQUES ..... 5-5
Floor Tile Removal ..... 5-5
Pipe Lagging Removal ..... 5-5

6 DEMOLITION AND RENOVATION REGULATIONS ..... 6-1
SOURCES UNDER SUBPART M ..... 6-1
REGULATORY HISTORY OF THE ASBESTOS NESHAP ..... 6-2
DEFINITIONS ..... 6-3
APPLICABILITY OF STANDARD ..... 6-6
Demolitions (Above Cutoff) ..... 6-6
Demolitions (Below Cutoff) ..... 6-7
Demolitions (Ordered) ..... 6-7
Renovations (Above Cutoff) ..... 6-7
Renovations (Below Cutoff) ..... 6-7
Renovations (Planned) ..... 6-7
NOTIFICATION REQUIREMENTS ..... 6-8
Important Terms ..... 6-8
Notifying Responsibility ..... 6-8
Notification Submittal ..... 6-8
Updated Notifications ..... 6-9
Contents of Notification ..... 6-10
PROCEDURES FOR ASBESTOS EMISSION CONTROL ..... 6-11
Removal of ACM ..... 6-11
Exceptions From Removal ..... 6-11
Removal of Units or Sections ..... 6-12
Techniques for Wetting ..... 6-12
Stripping of ACM from an In-place Facility Component ..... 6-13
Wetting Exemptions ..... 6-13
Stripping of Facility Components Taken Out as Units or Sections ..... 6-14
Exemptions from Stripping ..... 6-14

# Table of Contents

*Section* *Page*


Handling of ACM ..... 6-14
NESHAP Training Requirements ..... 6-14
Demolition Operations ..... 6-15
Disturbance of Category I Nonfriable ACM ..... 6-15
WASTE DISPOSAL REQUIREMENTS ..... 6-15
Visible Emissions ..... 6-16
Deposition of ACWM ..... 6-16
Vehicle Marking ..... 6-17
Off-site Transport of ACWM ..... 6-17
Record Availability ..... 6-17
AIR CLEANING ..... 6-17
Fabric Filters ..... 6-17
HEPA Filters ..... 6-18
Other Filtration Devices ..... 6-18
ACTIVE WASTE DISPOSAL SITES ..... 6-18

7 **RESPIRATORY PROTECTION EQUIPMENT ..... 7-1**
CLASSES OF RESPIRATORS ..... 7-1
Air-Purifying Negative Pressure Respirators ..... 7-1
Powered Air-Purifying Respirators (PAPRs) - Equipped with HEPA Filters ..... 7-2
Air-Line (Type C) Supplied-Air Respirators ..... 7-3
Air-Line Respirator with Self-Contained Auxiliary Air Supply ..... 7-4
Supplied-Air (Type C) Respirator with HEPA Filter ..... 7-4
Self-Contained Breathing Apparatus (SCBA) ..... 7-5
SELECTION OF RESPIRATORS ..... 7-5
General Requirements ..... 7-5
Respirator Selection Criteria ..... 7-6
OTHER MEDICAL/PHYSICAL CONSIDERATIONS IN RESPIRATOR USAGE ..... 7-10
Medical Monitoring ..... 7-10
Miscellaneous Considerations ..... 7-10

8 **ASBESTOS INSPECTOR SAFETY GUIDANCE ..... 8-1**
OSHA ASBESTOS STANDARDS ..... 8-1
Scope and Application (Construction Industry Standard) ..... 8-2
Definitions ..... 8-2
Communication Among Employers ..... 8-3
Regulated Areas ..... 8-3
Exposure Monitoring ..... 8-4
Methods of Compliance ..... 8-4
Employee Rotation ..... 8-5
Respiratory Protection ..... 8-5
Protective Clothing ..... 8-5
Hygiene Facilities and Practices ..... 8-5
Requirements for Removal, Demolition and Renovation Operations ..... 8-5
Communication of Hazards to Employees ..... 8-5
Employee Information and Training ..... 8-6
Housekeeping ..... 8-6
Medical Surveillance ..... 8-6
Recordkeeping ..... 8-6
Excursion Limit ..... 8-6

# Table of Contents

*Section* *Page*


EPA WORKER PROTECTION RULE ..... 8-6
EPA/NIOSH GUIDANCE ..... 8-7
EHSD GUIDELINES ..... 8-7
Health and Safety Plan ..... 8-8
Evaluation ..... 8-8
Incident Reporting and Response ..... 8-8
Training ..... 8-9
Medical Monitoring ..... 8-9
Protective Clothing ..... 8-9
Respiratory Protective Equipment ..... 8-9
Other Personal Protection Equipment ..... 8-10
Forbidden Practices ..... 8-10
Personal Hygiene ..... 8-10

**9 RESPIRATORY PROTECTION PROGRAM ELEMENTS ..... 9-1**
RESPIRATOR PROTECTION FACTORS ..... 9-1
Protection Factors ..... 9-2
Fit Factors ..... 9-3
RESPIRATOR FIT TESTING ..... 9-3
Qualitative Fit Testing ..... 9-3
Quantitative Fit Test Procedure ..... 9-6
Fit Factor Determination ..... 9-7
ROUTINE INSPECTION AND MAINTENANCE ..... 9-8
Routine Inspection Requirements ..... 9-8
Cleaning and Disinfecting ..... 9-9
Storage ..... 9-10
FIELD INSPECTION AND CHECKOUT PROCEDURES ..... 9-10
Air Purifying Respirator ..... 9-11
Self-Contained Breathing Apparatus (SCBA) ..... 9-11

**10 PROTECTIVE CLOTHING ..... 10-1**
RECOMMENDED PROTECTIVE CLOTHING FOR ASBESTOS INSPECTIONS ..... 10-2
OPERATIONAL PRACTICES FOR ENTERING AND EXITING SITES ..... 10-3
Entering and Exiting Site with a Three-Stage Decontamination System ..... 10-3
Entering and Exiting Sites Without a Three-Stage Decontamination System ..... 10-5
DISPOSAL OF CONTAMINATED CLOTHING ..... 10-7

**11 ASBESTOS NESHAP INSPECTIONS LEGAL PERSPECTIVES ..... 11-1**
GENERAL ..... 11-1
Owner or Operator ..... 11-1
Authority for Inspections ..... 11-2
Enforcement Options ..... 11-2
TYPES OF EVIDENCE ..... 11-3
Bulk Samples ..... 11-3
Admissions ..... 11-3
Photographs ..... 11-4
Observations ..... 11-4

# Table of Contents


*Section* *Page*

12 OTHER SAFETY CONSIDERATIONS IN ASBESTOS WORK ..... 12-1
HEAT STRESS ..... 12-1
CLIMBING HAZARDS ..... 12-2
Scaffolding ..... 12-2
Ladders ..... 12-2
WORKING SURFACES ..... 12-3
ILLUMINATION (LIGHTING) ..... 12-3
ELECTRICAL SAFETY ..... 12-3
FALLING/FALLEN OBJECTS ..... 12-4
STRUCTURALLY UNSOUND BUILDINGS ..... 12-4
MISCELLANEOUS HAZARDS ..... 12-4
Chemical Hazards ..... 12-4
Biological Hazards ..... 12-4
Lack of Oxygen ..... 12-5
Painted Skylights ..... 12-5
Claustrophobia ..... 12-5
Noise ..... 12-5
Machinery Hazards ..... 12-5

13 PRE-INSPECTION PROCEDURES ..... 13-1
Review Notification ..... 13-1
Identifying Non-Notifiers ..... 13-1
Preparation of Inspection Equipment ..... 13-2

14 ONSITE FACILITY INSPECTIONS ..... 14-1
PRE-ENTRY REMOTE OBSERVATIONS ..... 14-1
PRE-ENTRY INTERVIEW ..... 14-2
Interview Questions ..... 14-3
Document Examination ..... 14-4
Pre-entry Worksite Obsevations ..... 14-4
PRE-REMOVAL INSPECTION ..... 14-5
Applicability ..... 14-5
Notification ..... 14-5
Planned Emission Controls ..... 14-6
Disposal Techniques ..... 14-6
Evidence Collection ..... 14-6
ACTIVE REMOVAL INSPECTIONS ..... 14-7
Removal Area Entry Preparation ..... 14-7
Applicability ..... 14-8
Notification ..... 14-8
Emission Controls ..... 14-9
Evidence Collection ..... 14-13
Disposal Techniques ..... 14-13
Waste Shipment Records ..... 14-14
TSCA Compliance ..... 14-14
Exiting the Removal Area ..... 14-14

# Table of Contents

*Section* *Page*


POST-REMOVAL INSPECTION ..... 14-15
Applicability ..... 14-15
Notification ..... 14-16
Emission Controls ..... 14-16
Waste Disposal ..... 14-16
Evidence Collection ..... 14-17
POST-INSPECTION INTERVIEW ..... 14-17
EXIT OBSERVATIONS ..... 14-18

**15 POST-INSPECTION ..... 15-1**
INSPECTION FOLLOWUP ..... 15-1
DOCUMENTATION ..... 15-1
Document Control ..... 15-2
Corrections to Documentation ..... 15-2
RECORDS MAINTENANCE ..... 15-3
INSPECTION REPORTS ..... 15-3

**16 LANDFILL INSPECTIONS ..... 16-1**
REVIEW PERMIT CONDITIONS ..... 16-1
EVALUATE WASTE SHIPMENT RECORDS ..... 16-2
OTHER ACTIVE WASTE DISPOSAL SITE REQUIREMENTS ..... 16-2
SURVEILLANCE ..... 16-3
Off-loading of Suspect ACWM Unaccompanied by a Waste Manifest ..... 16-3
Landfill Inspection ..... 16-3

**17 ASBESTOS BULK SAMPLING AND ANALYSIS ..... 17-1**
PROTECTIVE EQUIPMENT ..... 17-1
SAMPLING EQUIPMENT ..... 17-2
COLLECTION TECHNIQUES ..... 17-2
Non-Abatement Inspections ..... 17-3
Abatement Inspections ..... 17-3
BULK SAMPLE ANALYSIS ..... 17-4
QUALITY ASSURANCE ..... 17-5
Sample I.D. Numbers ..... 17-5
Chain-of-Custody Forms ..... 17-5
Quality Control (QC) Samples ..... 17-5
Accredited Laboratories ..... 17-5

**18 ASBESTOS AIR MONITORING ..... 18-1**
MEASUREMENT STRATEGIES ..... 18-1
MEASUREMENT APPROACH ..... 18-2
Personal Sampling ..... 18-2
Area Sampling ..... 18-2
Aggressive Sampling ..... 18-2
SAMPLING EQUIPMENT ..... 18-2
Sampling Pumps ..... 18-2
Low Volume ..... 18-2
High Volume ..... 18-2
Filters and Cassettes ..... 18-3

# Table of Contents

*Section* *Page*

ANALYTICAL TECHNIQUES ..... 18-3
Phase Contrast Microscopy (PCM) ..... 18-3
Scanning Electron Microscopy (SEM) ..... 18-3
Transmission Electron Microscopy ..... 18-4
CONTINUOUS MONITORS ..... 18-4

Appendices

A National Emission Standards for Hazardous Air Pollutants (Subpart M - National Emission Standard for Asbestos ..... A-1

B SCBA Proficiency Tests and Checkout Procedures ..... B-1

C Environmental Health and Safety Division (EHSD) Health and Safety Guidelines for EPA Asbestos Inspectors ..... C-1

D Field Inspection Checklists ..... D-1

E Model Consent Decree ..... E-1

F Asbestos NESHAP Inspection Scenario ..... F-1

R References ..... R-1

# Figures

*Number* *Page*


1-1 Size comparisons ..... 1-18

3-1 The respiratory system ..... 3-2

5-1 Negative air filtration system ..... 5-3

5-2 Illustration of a glove bag ..... 5-5

9-1 Qualitative fit test chamber ..... 9-4

9-2 Quantitative fit test ..... 9-6

17-1 Representative chain-of-custody record ..... 17-6


# Tables

*Number* *Page*


1-1 Asbestos Ban and Phase-out Rule ..... 1-7

1-2 The Asbestos Minerals ..... 1-17

1-3 Summary of Asbestos-Containing Products ..... 1-19

3-1 Asbestos Abatement Fiber Levels ..... 3-4

3-2 Ambient Asbestos Fiber Levels ..... 3-4

4-1 Trade Names ..... 4-2

4-2 Summary of Asbestos-Containing Products ..... 4-3

10-1 Cost Range ..... 10-2

18-1 Comparison of Methods for Measuring Airborne Asbestos ..... 18-5

# SECTION 1

# BACKGROUND INFORMATION AND DEFINITIONS

The Environmental Protection Agency (EPA) has identified the need for nationally consistent inspection guidelines to assist EPA, state and local air agency personnel in conducting asbestos NESHAP (National Emission Standards for Hazardous Air Pollutants) inspections specific to demolition and renovation of buildings containing asbestos containing material (ACM). The primary purpose of this workshop is to present clear, concise inspection procedures and detailed interpretation of the regulation (supplemented by EPA issued policy memoranda providing additional guidance and clarification) to agency and delegated State and local staff charged with enforcing the regulation.

The guidance provided in this workshop is geared toward EPA NESHAP inspectors. However, it is also appropriate for state and local regulatory inspectors either in lieu of or as a supplement to specific state and local program requirements.

EPA, state and local agencies are beginning to implement coordinated asbestos programs under the Clean Air Act (CAA) and the Toxic Substances Control Act (TSCA). EPA, state, and local inspectors may also evaluate compliance with certain requirements under the Asbestos Hazard Emergency Response Act (AHERA) and the Worker Protection Rule (WPR) regulations. This workshop includes basic guidelines for inspectors to follow to determine compliance with certain provisions of AHERA and WPR, in order to refer any potential violations to the appropriate asbestos program office for followup.

## PURPOSE OF INSPECTIONS

In order to ensure that the regulated community adheres to the requirements of the asbestos NESHAP, inspectors are assigned at the EPA, state and local agency levels to visit facilities involved in demolition and renovation activities. Observations made and evidence collected onsite by the inspectors are the foundations of any compliance actions where violations of the asbestos NESHAP are detected. The overall objectives of a regulatory inspector can be broken into the following categories:

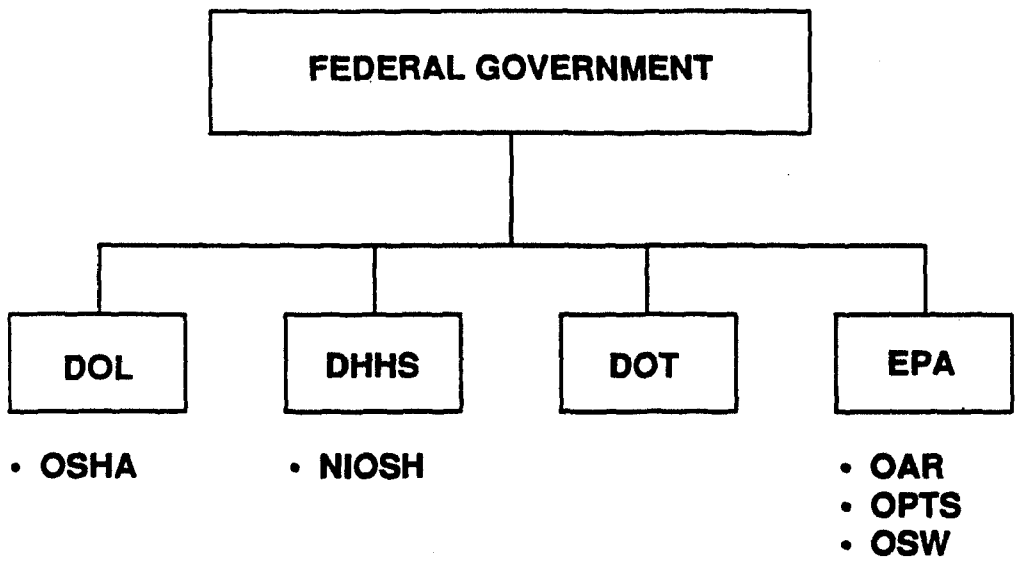
- Determine the need for immediate action in order to protect the public and the asbestos abatement worker (may necessitate obtaining a Temporary Restraining Order under Section 113 of the CAA or use of Section 303 of the CAA "imminent and substantial endangerment to public health" to seek a court order to stop work).

- Verify that the demo/reno operations are carried out according to all requirements of the asbestos NESHAP regulation.
- Gather evidence of any violations of the asbestos NESHAP.
- Determine whether a potential AHERA or WPR violation exists.
- Create a regulatory presence as a deterrent to potential violators.

The overall asbestos NESHAP inspection and compliance program follows a national strategy document entitled *Asbestos Demolition and Renovation Enforcement Strategy* dated March 1988. The guidance contained herein is consistent with the national strategy document regarding inspector training, inspection criteria, and enforcement procedures. This guidance is also consistent with EPA policy to coordinate all asbestos program offices.

## REGULATORY OVERVIEW

Over the past two decades, the regulatory community has become acutely aware of the potential hazards of inhaled asbestos fibers. Regulations have been developed by Federal, state, and local agencies to protect workers and the general public living near sources that have a potential to release asbestos fibers. The overall configuration of the U.S. Federal government relative to the regulation of asbestos is illustrated below.




Within the DOL (Department of Labor), OSHA (Occupational Safety and Health Administration) has developed two standards designed to protect employees at their worksites: Asbestos Regulations for General Industry (29 CFR 1910.1001) and Asbestos Regulations for the Construction Industry (29 CFR 1926.58).

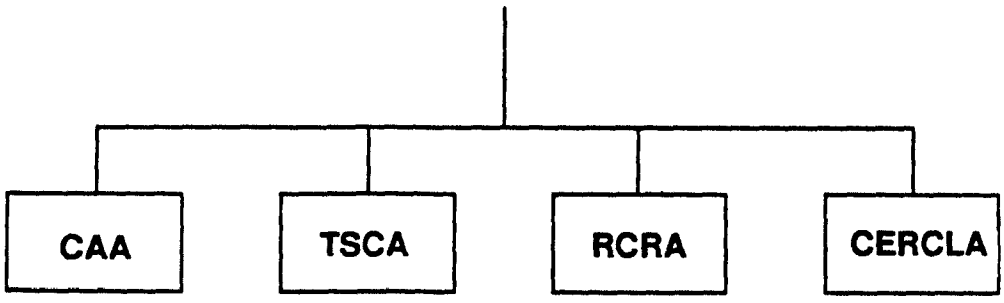
NIOSH (National Institute of Occupational Safety and Health), a branch of the DHHS (Department of Health and Human Services), tests respirators and acts as the research arm of OSHA.

DOT (Department of Transportation) regulates the transport of commercial asbestos and asbestos waste and dictates the labeling of waste bags and transport vehicles.

OAR (Office of Air and Radiation), OPTS (Office of Pesticides and Toxic Substances), and OSW (Office of Solid Waste) are three branches of the EPA which help regulate asbestos.

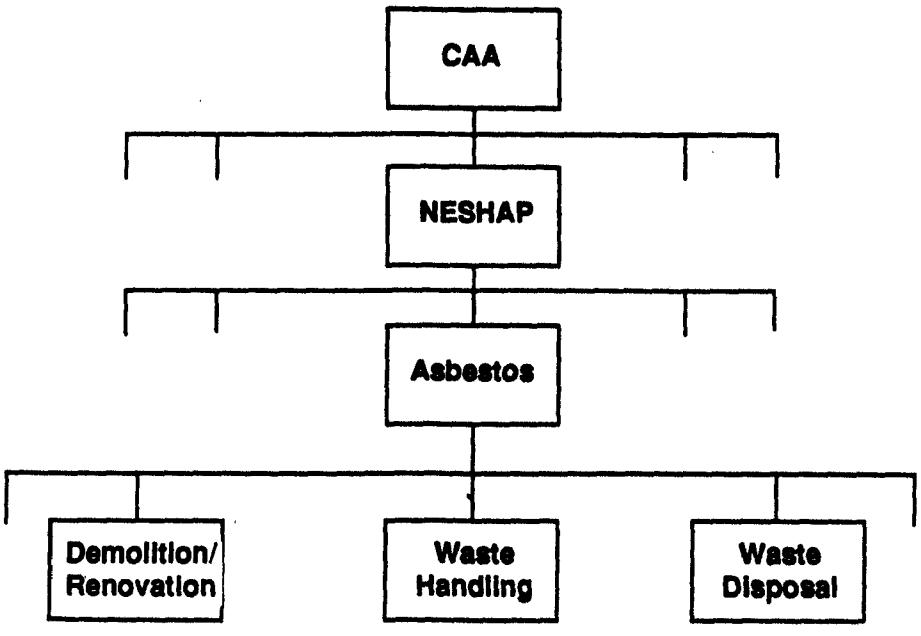
Within EPA, the regulation of asbestos has been incorporated into several legislative acts, illustrated below. Each of these categories will be explained in detail.

## EPA Asbestos Regulations



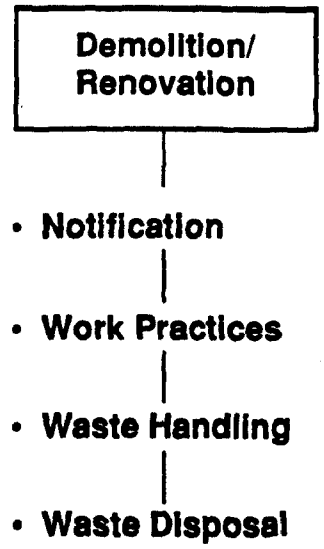

**Clean Air Act (CAA)**

The pathway of CAA authority to demolition/renovation activities is illustrated below.



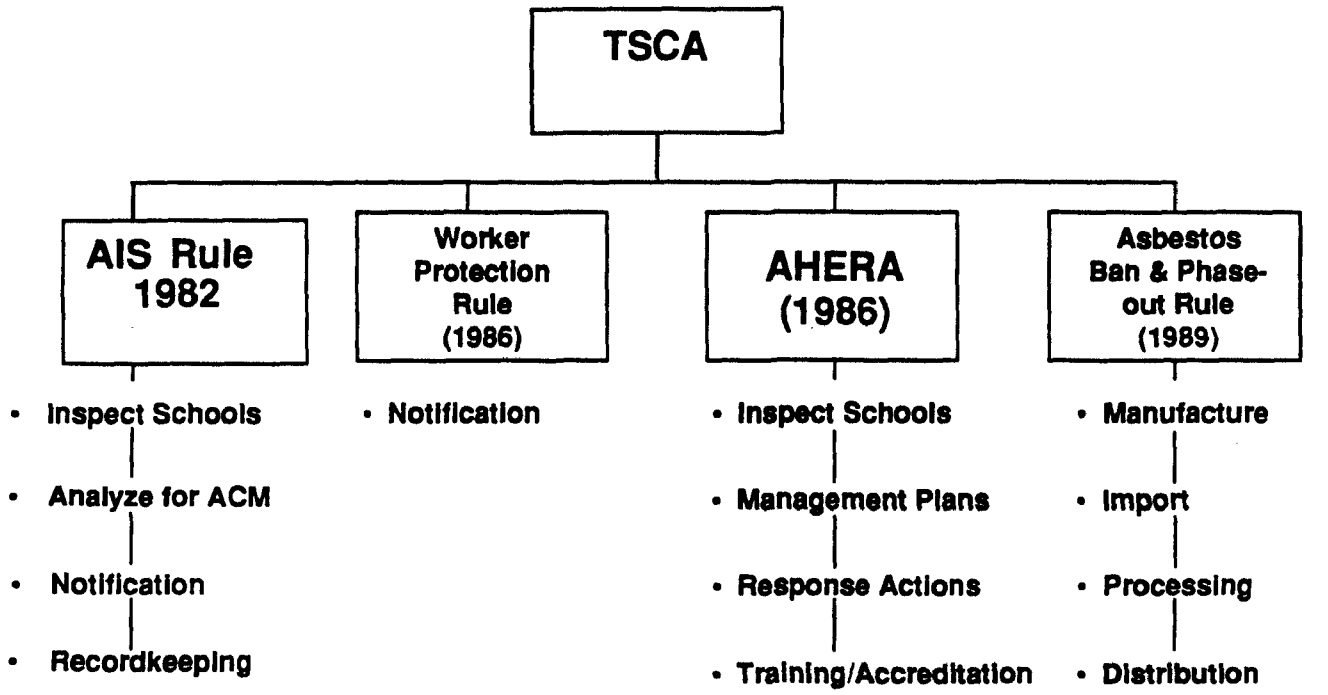
- The EPA regulates asbestos under the National Emission Standards for Hazardous Air Pollutants (NESHAP) which is listed as Section 112 of the Clean Air Act (CAA).
- A hazardous pollutant has been defined as "an air pollutant to which no ambient air quality standard is applicable and which, in the judgment of the Administrator, causes or contributes to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness."
- The NESHAP program currently regulates arsenic, benzene, beryllium, mercury, radionuclides, and vinyl chloride along with asbestos.
- The purpose of the asbestos NESHAP is to protect the public from exposure to asbestos in the ambient air. The asbestos NESHAP program is examined in this manual as it pertains to demolition and renovation of buildings containing asbestos building materials. (The asbestos NESHAP also regulates manufacturing and fabricating operations, spray application of asbestos, waste disposal for asbestos mills, inactive waste disposal sites, and establishes standards for asbestos mills and roadways.)

The demolition/renovation provisions of NESHAP are broken down into four basic categories.




Non-compliance with the provisions of the CAA is considered a misdemeanor.

Toxic Substances Control Act (TSCA)




The original TSCA Asbestos in Schools Rule (40 CFR Part 763), proposed in 1979 and enacted in 1982, set up requirements for inspection of public and private schools (grades kindergarten through 12) for friable material. These inspections involved sampling and analyzing such material to determine the presence of asbestos. The TSCA program also required the schools to provide notification to school workers and parents concerning the presence of asbestos, to post warning signs if friable ACM was found and to maintain records accessible to the public regarding the inspections. There were no requirements for abatement; however, the TSCA program did provide guidance for abatement (i.e., removal, encapsulation, enclosure or maintenance programs). The requirements of this regulation were to have been met by June 1983.

***Asbestos School Hazard Abatement Act (ASHAA) (40 CFR Part 763)***

In 1984, ASHAA was written to provide a source of special funding for the Asbestos in Schools program. The act provided a $600 million grant and loan program to assist financially needy schools with asbestos abatement projects. Since ASHAA funding began in fiscal 1985, a total of over $245 million has been awarded to over 1500 schools.

Additionally, the ASHAA program provided for compilation and distribution of information concerning asbestos and funded the start-up of training institutions. The original training institutes funded were Tufts University, Georgia Institute of Technology, and University of Kansas.

*Worker Protection Rule (WPR) (40 CFR Part 763 Subpart G)*

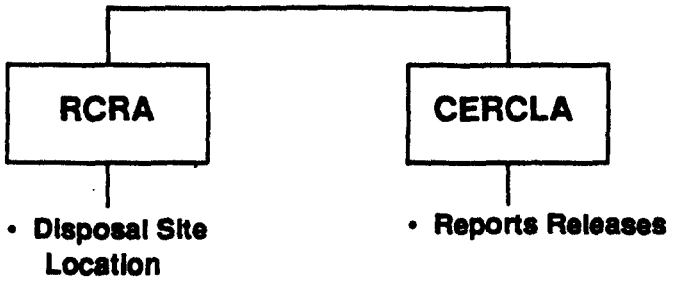
In 1986, EPA published the WPR which extended the provisions of the OSHA asbestos workplace standards to state and public employees (who were not specifically covered by OSHA) who conduct asbestos abatement work . The WPR essentially duplicates the OSHA requirements with an additional notification requirement for emergency projects and projects involving more than 3 linear feet or 3 square feet of friable asbestos containing material.

*Asbestos Hazard Emergency Response Act (AHERA) (40 CFR Part 763 Subpart E)*

In 1986, Congress passed AHERA as a major extension of the original Asbestos in Schools program. The legislation set up a framework for addressing asbestos hazards which might exist in schools. AHERA requires that inspections of public and private schools grades kindergarten through 12 for friable and non-friable asbestos-containing building materials (ACBM) and determinations of ACBM conditions and hazards be made. Based on the inspections, the schools are required under AHERA to develop management plans. Under AHERA, the states must develop accreditation programs and review management plans. Finally, AHERA mandates that the schools implement their management plans and re-inspect the schools every 3 years.

*Asbestos Ban and Phase-out Rule*

In 1989 EPA published an asbestos ban and phase-out rule to prohibit, at staged intervals (see Table 1-1), the future manufacture, importation, processing, and distribution in commerce of almost all asbestos-containing products. The rule requires that products subject to the bans be labeled to promote compliance with and enforcement of the rule. Upon application, and in very limited circumstances, EPA may allow exemptions from the rule's bans.




**Resource Conservation Recovery Act (RCRA)**

The disposal of asbestos was originally listed by RCRA in 1976. However, in that same year asbestos, because it does not migrate in the soil or pose any threat to ground water, was delisted by RCRA and the authority transferred to NESHAP. Therefore, the current RCRA regulations pertain only to facility siting and general landfill operations.

TABLE 1-1. ASBESTOS BAN AND PHASE-OUT RULE

| Stage | Regulated ACM | Manufacture, Import and Processing Ban | Distribution in Commerce Ban |
|---|---|---|---|
| 1 | Flooring & roofing felt, pipeline wrap, A/C flat & corrugated sheet, VAT, clothing | August 27, 1990 | August 25, 1992 |
| 2 | Beater-add & sheet gaskets, clutch facings, auto.transmission components, friction products, drum brake linings (OEM)[1] and disc brake pads (LMV)[2](OEM) | August 25, 1993 | August 25, 1994 |
| 3 | A/C pipe, commercial & corrugated paper, roof & non-roof coatings, brake blocks, drum brake linings (AM)[3], disc brake pads (LMV)(AM), disc brake pads (HV)[4](AM) | August 26, 1996 | August 25, 1997 |

[1]Original Equipment Market
[2]Light- and Medium-weight Vehicle
[3]Aftermarket
[4]Heavy-weight Vehicle

## Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

This act is most commonly referred to as "Superfund." The authority of CERCLA, as clarified in the Superfund Amendments Reauthorization Act (SARA), regulates asbestos as a hazardous substance. Reportable quantities have been established to deal with releases or threats of releases of hazardous substances from vessels and from facilities including trucks and landfills. The trigger reportable quantity (RQ) for a release or threat or release of asbestos is one pound. Non-compliance with the provisions of this act may result in prosecution for a felony offense and the assessment of heavy fines.

## GLOSSARY OF TERMS

A new "asbestos abatement" industry has developed over the past two decades in response to the EPA and OSHA regulations concerning demolition and renovation of buildings containing asbestos. With this industry come many unique or unusual terms and acronyms, some derived from the field of medicine, others from equipment names, etc. The following provides an alphabetical listing of the more common terms encountered.

| | | |
|---|---|---|
| **ACM** | - | Asbestos-Containing Material. |
| **ACWM** | - | Asbestos-Containing Waste Material |
| **Aggressive Air Sampling** | - | Air sampling which takes place after final cleanup while the air is being physically agitated with leaf blowers and fans to produce a "worst case" situation. |
| **AHERA** | - | Asbestos Hazard Emergency Response Act. Requires schools to inspect for asbestos, implement response actions, submit asbestos management plans to states and re-inspect every three years. Specifies use of accredited inspectors, air sampling methods, and waste disposal procedures. 40 CFR 763, Subpart E. |
| **Air Cell** | - | A type of insulation that looks like corrugated paper. It is usually light to medium gray in color. |
| **Air Lock** | - | A system of enclosures consisting of two polyethylene curtained doorways at least 3 feet apart that should permit air movement from clean to contaminated areas. Air locks are usually part of a decontamination chamber attached to an abatement area which is under negative pressure. |
| **Air Monitoring** | - | The process of measuring the airborne fiber concentration in a specific quantity of air over a given amount of time. |
| **Alveolar Macrophages** | - | Highly specialized mobile cells in the lungs that attempt to engulf and digest such lung intruders as dusts or fibers. |
| **Alveoli** | - | Microscopic sacs in the lungs where the exchange of oxygen and carbon dioxide occurs. |
| **Amended Water** | - | Water to which a chemical wetting agent (surfactant) has been added to improve penetration into asbestos-containing materials that are being removed. |
| **Asbestiform** | - | Fibrous minerals which, due to their crystalline structures and chemical composition, can be classified as a form of asbestos. |
| **Asbestos** | - | A generic name given to a number of naturally occurring, hydrated mineral silicates that possess a unique crystalline structure, are incombustible in air, |

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| | | and are separable into fibers. Asbestos includes the asbestiform varieties of chrysotile (serpentine), crocidolite (riebeckite), amosite (cummingtonite-grunerite), anthophyllite, and actinolite. |
| **Asbestos Abatement** | - | Procedures to control fiber release from asbestos-containing materials in buildings. Includes removal, encapsulation, enclosure or repair of ACM. |
| **Asbestos Fibers** | - | Fibers with a length greater than 5 microns and a minimal length to width ratio of 3:1 generated from an asbestos-containing material. |
| **Asbestos NESHAP** | - | The specific portion of Section 112 of the CAA that addresses asbestos. Specific regulations are contained in 40 CFR Part 61, Subpart M. |
| **Asbestosis** | - | A non-malignant, progressive, irreversible lung disease caused by the inhalation of asbestos dust and characterized by diffuse fibrosis and rales. |
| **ASHAA** | - | Asbestos School Hazard Abatement Act. Provides funding for schools having justifiable need for asbestos abatement. |
| **Atmosphere Supplying Respirators** | - | Respiratory protection devices which exclude workplace air altogether and provide clean air from some independent source. (i.e., SCBA and Type C SAR). |
| **CAA** | - | Clean Air Act. The legislation that provides EPA with authority for the regulation of sources of air pollution. |
| **Cancer** | - | A cellular tumor which normally leads to premature death of its host unless controlled. |
| **Category I Nonfriable ACM** | - | Asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products, containing more than 1 percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy. |
| **Category II Nonfriable ACM** | - | Any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined using the methods specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. |

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| **Chrysotile (white asbestos)** | - | The only asbestiform mineral of the serpentine variety which contains approximately 40 percent each of silica and magnesium oxide. It is the most common form of asbestos used in buildings. |
| **Cilia** | - | Tiny, hair-like, mucus-coated structures in the windpipe and bronchi of the lung passages that help force undesirable particles up and out of the lungs. |
| **Clean Room/Area** | - | The first stage or room of the decontamination enclosure system in which workers prepare to enter the work area. |
| **Continuous Flow Airline Device** | - | A respirator that maintains a constant airflow to the wearer. |
| **Decontamination Enclosure System** | - | A series of connected rooms with polyethylene curtained doorways for the purpose of preventing contamination of areas adjacent to the work area. Usually comprised of a clean room, shower and equipment (dirty) room. |
| **Demand Airline Device** | - | A respirator in which air enters the facepiece only when the wearer breathes in. |
| **EHSD** | - | Environmental Health and Safety Division (formerly OHSS or Occupational Health and Safety Staff). The group within EPA that is responsible for developing health and safety guidance specific to EPA employees. |
| **EPA** | - | Environmental Protection Agency. The organization within the Federal government which is ultimately responsible for enforcing the asbestos NESHAP in order to protect people who work or live near potential asbestos release areas such as buildings undergoing demolition or renovation. |
| **Equipment/Dirty Room** | - | The last stage or room of the worker decontamination system before entering the work area. |
| **F/CC** | - | Fibers per cubic centimeter of air. |
| **$FEV_1$** | - | The maximum volume of air that can be forced from an individual's fully inflated lungs in 1 second (Forced Expiratory Volume - 1 second). |

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| **Fiber Control** | - | Minimizing the amount of airborne fiber generation through the application of amended water onto asbestos-containing material, or enclosure (isolation) of the material. |
| **Fibrosis** | - | A condition of the lungs caused by the inhalation of excessive amounts of fibrous dust. It is marked by the presence of scar tissue. |
| **Friable Asbestos Material (FAM)** | - | Any material containing more than 1 percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by PLM, verify the asbestos content by point counting using PLM. |
| **Full Facepiece Respirator** | - | A respirator which covers the wearer's entire face from across the forehead, around the temples, along the cheek bones to below the chin. |
| **FVC** | - | Forced Vital Capacity. A measurement taken during a pulmonary function test which measures the quantity of air that can be forcibly exhaled from a person's lungs after full inhalation. |
| **Glove bag** | - | A sealed compartment with attached inner gloves for the handling of asbestos-containing materials. Properly installed and used, glove bags provide a small work area enclosure used typically for small-scale asbestos stripping operations. Information on glove bag installation, equipment and supplies, and work practices is contained in the OSHA final rule on occupational exposure to asbestos (Appendix G to 29 CFR 1926.58). |
| **Half Mask** | - | A respirator which covers one-half of one's face from the bridge of the nose across the cheeks to below the chin. |
| **Heat Cramps** | - | A form of heat stress resulting in painful spasms of heavily-used skeletal muscles such as hands, arms, legs, and abdomen, sometimes accompanied by dilated pupils and weak pulse resulting from depletion of the salt content of the body. |

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| **Heat Exhaustion** | - | A form of heat stress resulting from dehydration and/or salt depletion, or lack of blood circulation usually accompanied by fatigue, nausea, headache, giddiness, clammy skin, and a pale appearance. |
| **Heat Stroke** | - | The most severe form of heat stress disorders resulting from the loss of the body's ability to sweat; characterized by hot dry skin, dizziness, nausea, severe headache, confusion, delirium, loss of consciousness, convulsion, and possibly coma. |
| **HEPA** | - | High Efficiency Particulate Air filter rated capable of trapping and retaining 99.97% of all particles larger than 0.3 microns. |
| **HEPA Vacuum** | - | A vacuum system equipped with a HEPA filter. |
| **Homogeneous** | - | Evenly mixed and similar in appearance and texture throughout. |
| **HVAC System** | - | Heating, Ventilation, and Air Conditioning system usually found in large buildings and industry facilities. |
| **Local Exhaust Ventilation** | - | The mechanical removal of air contaminants from a point of operation. |
| **Lung Cancer** | - | An uncontrolled growth of abnormal cells in the lungs which normally results in the death of the host. |
| **Medical History** | - | A record of a person's past health record, including all of the hazardous materials that they have been exposed to and any injuries or illnesses which might affect/dictate their future health status. |
| **Mesothelioma** | - | A relatively rare, incurable form of cancer which develops in the lining of the pleura or peritoneum. |
| **Micron** | - | One-millionth of a meter. |
| **Mil-** | - | Prefix meaning one-thousandth; commonly used to describe thickness of polyethylene sheeting (6 mil poly = 0.006" thick.) |
| **Negative Pressure** | - | An atmosphere created in a work area enclosure such that airborne fibers will tend to be drawn through the filtration system rather than leak out into the surrounding areas. The air pressure inside the work area is less than that outside the work area. |

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| **Nonfriable Asbestos-containing Material** | - | Any material containing more than 1 percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. |
| **OPTS** | - | Office of Pesticides and Toxic Substances. The group within EPA which is responsible for implementing and carrying out programs to enforce the TSCA regulations. |
| **Owner/Operator** | - | Any person who owns, leases, operates, controls, or supervises any building, structure, facility, or installation which emits or may emit any air pollutant. |
| **PAPR** | - | Powered Air Purifying Respirator. |
| **Peritoneum** | - | The thin membrane that lines the surface of the abdominal cavity. |
| **Personal Protective Equipment (PPE)** | - | Any material or device worn to protect a worker from exposure to, or contact with, any harmful material or force. May include a respirator, coveralls, hard hat, steel toed shoes, safety glasses, etc. |
| **PF** | - | Protection factor as provided by a respirator; determined by dividing the airborne fiber concentration outside of the mask by the concentration inside the mask. |
| **Phase Contrast Microscopy (PCM)** | - | An optical microscopic technique used for counting fibers in air samples, but which does not distinguish asbestos fibers. |
| **Pipe Lagging** | - | The insulation or wrapping around sections of pipes. |
| **Pleura** | - | The thin membrane surrounding the lungs which also lines the internal surface of the chest cavity. |
| **Polarized Light Microscopy (PLM)** | - | An optical microscopic technique used to distinguish between different types of fibers based on their shapes and unique optical properties; commonly used to determine the presence of asbestos in bulk samples of suspected asbestos- containing materials. |
| **Polyethylene** | - | Plastic sheeting which is often used to seal off an area in which asbestos removal is taking place for the purpose of preventing contamination of other areas. |

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| **Pre-molded Insulation** | - | Insulation found on pipes that is found in half circles. It is usually held in place by steel bands and/or canvas wrap. |
| **Pressure Demand Airline Devices** | - | A respiratory protection device which has a regulator and valve designed to maintain positive pressure in the facepiece at all times. |
| **Protective Clothing** | - | Protective, lightweight garments worn by workers performing asbestos abatement to keep gross contamination off the body. |
| **Pulmonary Function Tests** | - | A part of the medical examination required to determine the health status of a person's lungs. |
| **Qualitative Fit Test** | - | A method of testing a respirator's face-to-facepiece seal commonly using a challenge material of irritant smoke, banana oil or saccharin. Successful qualitative fit tests confer a protection factor of 10 according to OSHA regulation 29 CFR 1910.134 Appendix C. |
| **Quantitative Fit Test** | - | A method of testing a respirator's face to facepiece seal which involves measuring the relative amounts of a challenge substance both inside and outside the mask. Quantitative fit testing results in the establishment of a numerical fit factor. |
| **Rales** | - | A dry crackling sound in the lungs during inhalation; common symptom of asbestosis. |
| **Regulated asbestos-containing material (RACM)** | - | Means (a) friable asbestos material, (b) Category I nonfriable ACM that has become friable, or (c) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by the asbestos NESHAP. |
| **Respirator Program** | - | A written program established by an employer which provides for the safe use of respirators on the job site. |
| **Scanning Electron Microscopy (SEM)** | - | A method of microscopic analysis which utilizes an electron beam directed at the sample and then collects the beams that are reflected to produce an image from which fibers can be identified and counted. |

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| **SCBA** | - | Self Contained Breathing Apparatus. A respirator with air provided by a tank worn by the user; provides the highest level of protection. Can be used when a contaminant's concentration is unknown. |
| **SSCD** | - | Stationary Source Compliance Division. The group within EPA that is responsible for implementing and carrying out a program to assure that the regulated community complies with the asbestos NESHAP. |
| **Surfactant** | - | A chemical wetting agent added to water to improve its penetration into asbestos-containing materials. |
| **TLV** | - | Threshold Limit Value. Levels of contaminants established by the American Conference of Governmental Industrial Hygienists to which it is believed that workers can be exposed with minimal adverse health effects. |
| **Transmission Electron Microscopy (TEM)** | - | A method of microscopic analysis which utilizes an electron beam that is focused onto a thin sample. As the beam penetrates (transmits) through the sample, the difference in densities produces an image on a fluorescent screen from which samples can be identified and counted. |
| **TSCA** | - | Toxic Substances Control Act. Asbestos is regulated as a toxic substance under this legislation. |
| **Tumor** | - | A swelling or growth of cells and tissue in the body which does not serve a useful purpose. |
| **TWA** | - | Time-Weighted Average. |
| **Type C Supplied Air Respirator** | - | A respirator which supplies air to the wearer from an outside source such as a compressor; designed to provide a very high level of protection. |
| **Visible Emissions** | - | Any emissions (excluding condensed uncombined water vapor) visually detectable without the aid of instruments, coming from asbestos-containing material or asbestos-containing waste material or from any asbestos milling, manufacturing or fabricating operation. |
| **Wetting Agents** | - | Materials (such as surfactants) that are added to water which is used for wetting the asbestos-containing material in order for the water to penetrate more effectively. |

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| **WPR** | - | Worker Protection Rule. TSCA regulation which protects public employees performing asbestos abatement work in states not covered by asbestos standards. 40 CFR 763, Subpart G. |
| **260/160/35** | - | 260 linear feet (80 linear meters) of ACM on pipes, 160 square feet (15 square meters) of ACM on other facility components, or 35 cubic feet of ACM off facility components where the amount of ACM previously on pipes and other facility components is unknown. These figures form the basis of applicability in the asbestos NESHAP standard. |

## ASBESTOS HISTORY

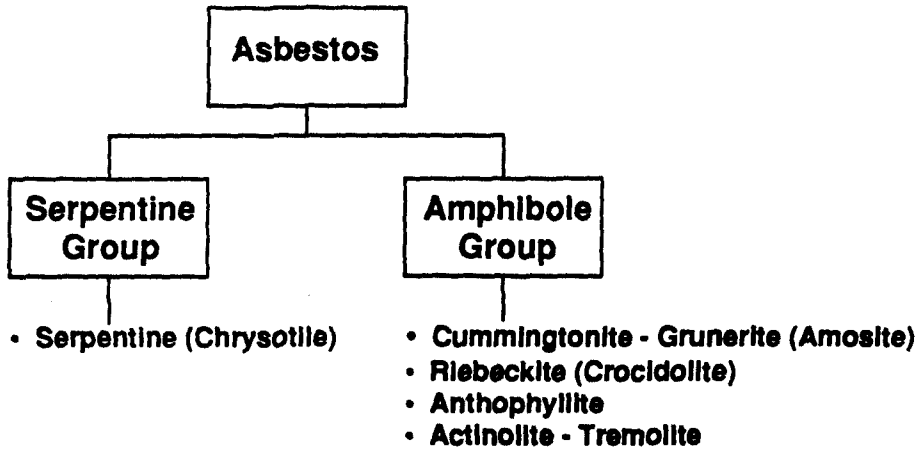
The term asbestos is from a Greek word meaning inextinguishable or indestructible. Ancient people, seeing veins of this fibrous material in rocks, discovered that they could weave the fibers into a tough fabric which would not burn. Because of this, asbestos is often referred to as the "miracle fiber."

There is evidence that asbestos was used to make fireproof cloth as far back as the ancient Greeks. It has been reported that in 1725 Benjamin Franklin traveled to London and impressed his host by giving him a purse made of asbestos, whose properties he demonstrated by tossing it into a fireplace.

The properties of asbestos were not generally known, nor asbestos commercially available until the 1800s. The Industrial Revolution and a change from a culture using organic substances (wood, bone, hide, hemp, etc.) to a culture with large-scale use of extracted metals and ores provided a need for asbestos use in industry.

The principle mining regions of asbestos in the world are Canada and South Africa. Within the United States there are active mines in Vermont and California. There have been incidents where EPA has responded to asbestos releases from exposed asbestos rocks. In Globe, Arizona, the tailings from an abandoned mine caused increased airborne asbestos fibers. This site is now being handled by EPA's Superfund program. In San Jose, California, the excavation activities involved in expanding the city's suburban area resulted in unearthing an asbestos rock vein. EPA is currently investigating the degree of increased airborne asbestos fiber concentrations caused by the weathering of exposed asbestos rocks used as fill for roads and other construction projects.

## GEOLOGICAL TERMS




Asbestos minerals are divided into two major classes-the serpentine and the amphibole groups. The serpentine group is characterized by a lattice structure. It contains chrysotile, which is a white asbestos composed of fine, silky fibers. Amosite, crocidolite, tremolite, anthophyllite and actinolite are chained silicates and comprise the amphibole group.

Table 1-2 provides the chemical structure for each type of asbestos along with a brief listing of key characteristics.

**TABLE 1-2. THE ASBESTOS MINERALS**

| Group | Name | Chemical structure | Characteristics |
|---|---|---|---|
| Serpentine | Chrysotile | $3MgO \cdot 2SiO_2H_2O$ | White asbestos; fine, silky, wavy fibers; flexible and high tensile strength. |
| Amphiboles | Amosite | $(FeMg)SiO_3$ | Brown asbestos; straight, rigid fibers. |
| | Crocidolite | $Mg_2Fe(SiO_3)2 \cdot FeSiO_3 \cdot H_2O$ | Blue asbestos; straight, rigid fibers |
| | Anthrophyllite | $(MgFe)_7Si_8O_{22} \cdot (OH)_2$ | Brittle white fiber. Rarely used. |
| | Tremolite | $Ca_2Mg_5Si_8O_{22}(OH)_2$ | Colorless to pale green; rarely used. |
| | Actinolite | $CaO_3(MgFe)O \cdot 4SiO_2$ | Colorless to pale green; rarely used. |

## FIBER SIZES

Under a microscope asbestos may appear as a string of fibers or a dense mass of fibers called bundles. Typical asbestos fibers are in the 0.1 to 10 micron range which individually would not be visible to the unaided human eye. Due to the small, light-weight nature of asbestos fibers, it is estimated that when re-entrained in the air, fibers may remain suspended for 1 to 3 days.

Figure 1-1 illustrates a comparison of asbestos fibers with other more recognizable materials.

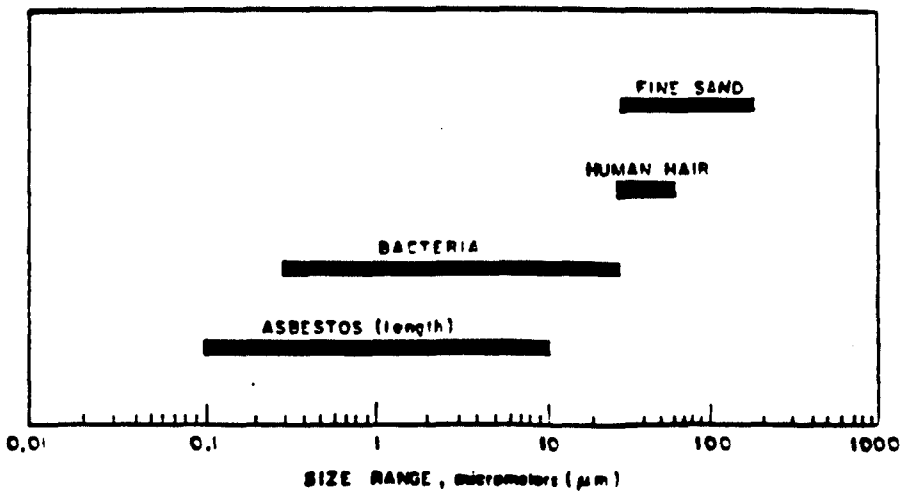



Figure 1-1. Size comparisons.

Note that the visible threshold for the human eye (approximately 50 microns) is about the diameter of a human hair.

## COMMERCIAL PRODUCTS

Asbestos has been used primarily for fireproofing, thermal and acoustical insulation, condensation control and decoration. There have been an estimated 3,600 commercial products containing asbestos. Between 1900 and 1980, approximately 30 million tons of asbestos were used in building materials. However, the most prevalent use of asbestos in commercial products spanned from the 1940s to the 1970s.

The use of asbestos products has declined over the past two decades as EPA and the Consumer Product Safety Commission (CPSC) have banned the use of some products (insulation, fireproofing, lagging, etc.). There has also been voluntary banning of the use of asbestos for items such as hair dryers. However, asbestos products are still widely used. Table 1-3 provides a summary of asbestos content in several commercial product categories.

The main point of the illustration is that commercial products are not made up of 100 percent asbestos. All commercial products have a mix of asbestos with binders. For example,

asbestos cement sheets are generally 20 percent asbestos and 80 percent Portland cement. It is important to recognize that EPA considers a material to contain asbestos only if asbestos constitutes greater than 1 percent of the material by weight.

**TABLE 1-3. SUMMARY OF ASBESTOS- CONTAINING PRODUCTS**

| Product | Average Percent Asbestos |
|---|---|
| **Insulating and Decorative Products** | |
| Spray Coating | 50 |
| Troweled Coating | 70 |
| Preformed Pipe Wrap | 50 |
| Boiler Insultation | 10 |
| **Cement Pipe and Sheet** | 20 |
| **Paper Products** | |
| Roofing Felt | 10 |
| Gaskets | 80 |
| **Plastic Products** | |
| Floor Tile | 20 |
| Coatings and Sealants | 10 |
| Rigid Plastics | 50 |
| **Friction Products** | 50 |
| **Textile Products** | 80 |

Relative to demolition/renovation, two types of asbestos containing materials most commonly found are:

Surfacing materials used for:

- condensation control,
- acoustical insulation,
- decoration,
- fireproofing, and

Thermal insulation found on:

- pipes,
- boilers, and
- ducts.

Section 4 "Identifying Asbestos-Containing Materials" provides additional information on commercial asbestos products.

# SECTION 2

## NATIONAL REGULATORY STRATEGY/INSPECTOR GENERAL AUDIT

EPA first promulgated the asbestos NESHAP in 1973. In 1978, the U.S. Supreme Court ruled that many of the work practices and equipment provisions of the standard were not enforceable under the CAA (Adamo Wrecking Company v. United States). Subsequent revisions were made to the CAA regarding authority for work practice provisions. On April 5, 1984, EPA repromulgated the asbestos standard which reinstated all of the work practice standards.

On April 6, 1984, the first National Strategy for asbestos appeared. The objectives of this strategy were to: 1) provide uniform enforcement of the asbestos NESHAP, and 2) show the state and local delegated agencies that EPA was serious about inspection pursuant to and enforcement of the asbestos NESHAP.

From October 1, 1985 through November 17, 1987, the Inspector General (IG) Office conducted an audit of EPA's administration of the asbestos NESHAP. The audit included EPA regional, state and local programs.

The audit had six principle objectives:

1. To determine whether regional EPA offices, state and local agencies gave sufficient priority to implementing an effective asbestos NESHAP program;

2. To determine whether inspections of demo/reno sites were conducted properly;

3. To evaluate inspection strategies;

4. To determine if enforcement actions were appropriate (would they deter future violations?);

5. To determine whether proper safety equipment was used and if inspectors were adequately trained prior to field activities; and

6. To determine the accuracy of SPMS (Strategic Planning and Management System) data for demo/reno sites.

The IG audit revealed many weaknesses in the administration of the asbestos NESHAP program. In response, the EPA revised its April 6, 1984 National Strategy.

The following summarizes the most current EPA Asbestos Demolition and Renovation Enforcement Strategy issued by Headquarters to regional agencies. The complete strategy document is available from the EPA regional offices.

## OBJECTIVES

- To provide effective and uniform enforcement of the Asbestos NESHAP standard by regions and the delegated states.
- To provide emphasis and assurance to regions and states that EPA is committed to a strong, high priority enforcement posture.

## BACKGROUND

- A historical review of the EPA Compliance Data System revealed that the number of demolition/renovation sources was greater than the number of sources in all other regulated categories combined, and compliance status for demolition/renovation sources was much worse.
- The 1984 repromulgation of the entire asbestos NESHAP standard has ensured that all work practice requirements for demolition/renovation operations are now enforceable.

## STRATEGY

- Publicize the asbestos NESHAP requirements by the following mechanisms:
  - national and local press releases;
  - letters to contractors advising them of the regulations;
  - letters to potentially-affected sources advising them of the regulations; and
  - speaking engagements with trade and industry organizations, and journal articles, presenting the status of regulations and recommendations.

These policies will be facilitated by a clear line of communication from regions to states, to disseminate information from headquarters.

- Establish contractor certification or training programs for asbestos abatement contractors. The training may be patterned after the AHERA accreditation requirements.
- Train regional and state inspectors using EPA's Regional Workshop to perform inspections of asbestos demolition and renovation sources.

- Establish standard operating procedures for conducting demo/reno inspections. Inspectors should: bring copies of the NESHAP asbestos standard; assess compliance to the extent possible prior to making your presence known; present credentials and a calling card for future reference by owner/operator; identify all possible owners/operators and their relationship to each other; use a standard checklist; ask owner/operator to describe their understanding of the regulations; carry only essential items into contaminated area; take samples at demo/reno sites and fill out chain-of- custody forms; use a waterproof camera for photographs; conduct a wrap-up meeting with owner/operator to discuss inspection findings (do not make compliance determinations); reference inspection findings to specific requirements in the asbestos NESHAP; always wear appropriate safety gear.
- Inspect demolition and renovation sources to determine compliance, including locating and inspecting non-notifiers. An inspection plan may include all sources, all contractors, or any other program to meet the Agency goal of 100 percent compliance. Grant agreements currently negotiated with states should specify that inspections of demolition and renovation sources are required.
- Analyze bulk samples for asbestos using laboratories to be identified by EPA, with future provisions for laboratories with a rapid turnaround time in case of an emergency.
- Some states have remarked that maintaining their established inspection levels is difficult because of the many changing demands being placed on the program. The regions may agree to have states incorporate contractor certification, an asbestos waste manifest tracking system or notification fees as a supplement to the state enforcement program.
- Enforce NESHAP provisions by legal mechanisms summarized below. In cases where enforcement authority is delegated to states, Regions are responsible for evaluating the adequacy of state action and initiating appropriate Federal enforcement action consistent with T&A (Timely and Appropriate) guidance.

**Informal action:**

A "Finding of Violation" may be issued to the source, and/or the source may be invited to a "show cause" conference to determine whether immediate compliance can be achieved without formal enforcement proceedings. These actions may be appropriate if a source has properly notified EPA and is making a good faith effort to comply, but is failing in some respects.

**Administrative action:**

1. A Section 113(a)(3) order can require immediate compliance and, if violated, sets the stage for liability to penalties under Section 113(b) judicial action. This order may be appropriate if a source indicates that an initial, insubstantial violation will not be repeated.

2. A Section 303 administrative order can require immediate compliance and, if violated, sets the stage for liability to penalties under a Section 303 civil action. This order must be based on a finding of "imminent and substantial endangerment" to the public health, and EPA must confer with state and local authorities (even if the state has no delegated authority) to confirm the basis for this order. A Section 303 order may be appropriate in instances where a violation is in question and a broader authority is needed to abate a health hazard.

**Judicial action:**

1. A Section 113(b) civil action can require immediate compliance while allowing EPA to seek civil penalties of up to $25,000 per day of violation. This action would be appropriate in most cases where immediate judicial relief is sought for substantial violations of the asbestos NESHAP standard.

2. A Section 113(c) criminal action can result in liability to imprisonment of up to one year and/or penalties of up to $25,000 per day of violation. This action would be appropriate if EPA has evidence that a person knowingly violated the asbestos NESHAP.

   Judicial action under Sections 113(b) or (c) may also be appropriate if a source has completed or nearly completed its activities by the time EPA is ready to take enforcement action. In this case, judicial action may be an effective deterrent to future violations.

3. A Section 303 civil action can require immediate compliance based on a finding of "imminent and substantial endangerment" to the public health. As mentioned above, EPA must confirm the basis for endangerment with state and local authorities. Penalties may not be sought under this action unless the agency has previously issued a Section 303 administrative order which the source has violated, in which case the source is liable to penalties of up to $5,000 per day of violation.

   (EPA's strategy document offers additional enforcement guidance, including procedures to implement legal action and to assess civil penalties.)

   - Follow the Asbestos Demolition/Renovation Penalty Policy.
   - Accountability of regions and states will be augmented by quarterly reporting of performance indicators: total number of notifications, total number of inspections, total number of violations, and violation status.

- Track and audit compliance programs. Audit procedures should include joint region-state inspections and semiannual reviews of State inspection reports. Compliance tracking by regions or states should include information on the number of notifications received, number of projects inspected, number of violations, number of notification violations, and the manner of resolution of the violations. Guidelines for using CDS (Compliance Data System) as a tracking mechanism are contained in EPA's strategy document.
- Coordinate the NESHAP program with EPA's TSCA program (Asbestos In Schools), and the OSHA program for worker exposure. Coordination of notifications is deemed most practical, but regions are free to institute any joint efforts which result in effective NESHAP enforcement.
- The National Asbestos Registry System (NARS) has been established. NARS is a national data base to which delegated agencies must report concerning the compliance history of asbestos contractors. Using information contained in NARS, agencies can determine which contractor's worksites should be targeted for inspection per the National Strategy.

# SECTION 3

# HEALTH EFFECTS OF EXPOSURE TO ASBESTOS

The fact that asbestos is a hazard to man's health was recognized quite early. In the first century AD both Romans and Greeks wrote of a sickness of the lungs in slaves whose occupation was the weaving of asbestos into cloth. However, the association of asbestos with chronic respiratory disease had to be rediscovered in the modern era.

In the late 1920s, Dr. E.R. Merriweather, a London physician, his interest piqued by a series of case reports, conducted an epidemiological study of 363 asbestos textile workers. He stated in his 1930 published report that 26 percent of the workers examined showed signs of asbestosis, a scarring of the lungs; this report firmly linked asbestos exposure with lung disease.

In 1949, Dr. Kenneth Smith, Medical Director of Johns-Manville, published a report describing an excess of cancer of the lung and pleura among individuals dying from asbestosis.

In South Africa, in the 1960s, numerous crocidolite miners were reportedly dying of a form of tuberculosis unresponsive to traditional antibiotic therapy. Dr. Chris Wagner discovered that many of these cases of "TB" were actually mesothelioma, a rare and fatal cancer of the tissue (mesothelium) that covers the internal organs and lines the chest and abdominal cavities.

It is now clear that among asbestos workers, there is, in addition to the risk of asbestosis, a greatly increased risk of death from lung cancer and from pleural (chest) and peritoneal (abdominal) mesothelioma, malignancies that are seldom found in the general population. Moreover, asbestos has been linked with gastrointestinal cancer.

Through the course of normal human activities there are three principle exposure routes for asbestos fibers: (1) inhalation; (2) ingestion; and (3) skin contact. The following provides information regarding the potential hazards of each route of entry.

## HEALTH EFFECTS ASSOCIATED WITH INHALATION

As previously mentioned, epidemiologic investigations have demonstrated that inhalation of asbestos fibers may lead to increased risk of developing one or more diseases. It is important to recognize that the majority of people who have developed asbestos-related

diseases were asbestos workers who were frequently exposed to high concentrations of asbestos fibers every working day with little or no respiratory protection to minimize their risk.

In this section, the respiratory system will be described and each of the major diseases associated with asbestos exposure will be examined. The risks of developing such diseases and ways to minimize the risks will be noted.

**The Respiratory System**

The respiratory system is divided into two segments: the upper and lower air passages. The upper air passage extends from the nose to the larynx, while the lower air passage extends from the larynx to the terminal bronchioles of the bronchial tube system. Once air has passed through the upper air passages, it moves into the region of the lower air passages via the trachea (windpipe) which traverses the neck. The trachea and its branches are lined with small, hair-like, mucous-coated structures called cilia. The trachea enters the thorax where it divides into two branches called bronchi. These bronchi lead to the left and right lungs as illustrated in Figure 3-1.

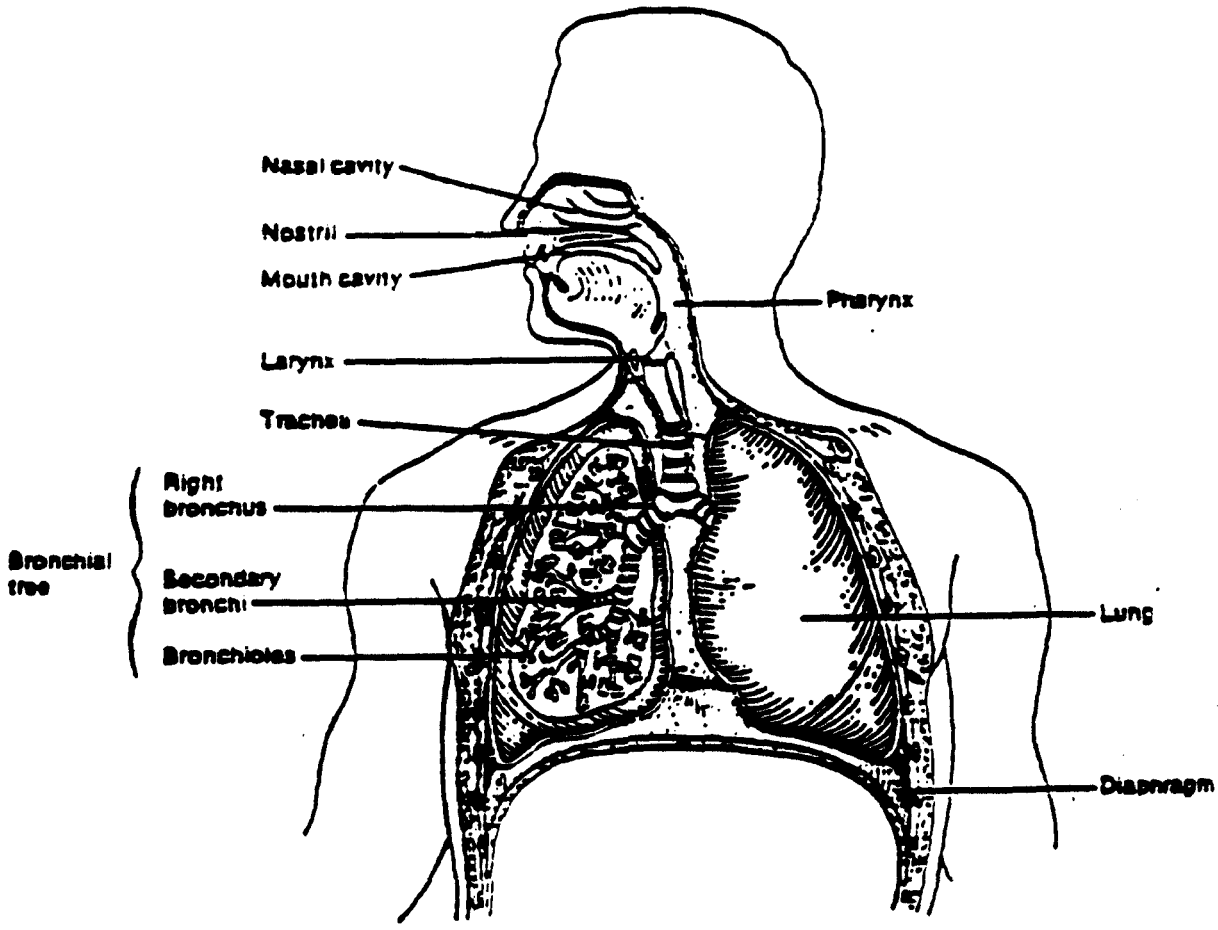



Figure 3-1. The respiratory system.

Each bronchus subdivides into many smaller bronchial tubes which, in turn, divide to become even finer bronchioles. The bronchioles end in microscopic air sacs made up of clusters of even tinier sacs called alveoli, which constitute most of the lung tissue. There are approximately 300,000,000 alveoli whose combined surface area is about 70 $m^2$.

The alveolar walls contain numerous capillaries, the body's tiniest blood vessels. In the lung, the exchange of carbon dioxide for oxygen takes place across the thin membranes of the alveoli and capillaries.

During inhalation, the larger particles in the air stream entering the nose are filtered out by the nasal hairs or trapped by the secretions of mucous membranes in the sinus cavities. A second level of defense is the triggering of the cough mechanism which forces particles out of the trachea into the throat area where they can be swallowed. A third level of physiologic defense occurs in the lining of the trachea and bronchial tubes. There, mucus-coated, hair-like structures known as cilia beat upward in a wave-like motion. This motion, known as the muco-ciliary escalator, is responsible for moving contaminants from the air passageways upward toward the mouth where they are swallowed into the stomach.

The final line of defense rests within the alveoli. There, alveolar macrophages, mobile white blood cells using strong acids and enzymes, engulf and digest foreign bodies.

During inhalation, the rib muscles and diaphragm contract, lifting the rib cage and lowering the diaphragm. This contraction enlarges the chest cavity, allowing the lungs to fill with air. During exhalation, the rib muscles and diaphragm relax, lowering the rib cage and raising the diaphragm. The decreased volume of the chest cavity forces the air out of the lungs.

**Routes of Inhalation Exposure**

It is important to recognize that there are asbestos fibers in all the air we breathe. Since the majority of asbestos-related health problems involves the lung and lung region, inhalation of asbestos fibers is undoubtedly a situation that must be minimized. Individuals may control their exposure to asbestos fibers by properly using respirators and minimizing the time spent in areas of high asbestos fiber concentrations. The various types of inhalation exposure pathways are listed below:

***Occupational Exposure—This pathway includes:***

Direct occupational exposure, resulting from working in asbestos mines, mills, landfills, manufacturing or fabricating plants and asbestos abatement sites (Table 3-1).

TABLE 3-1. ASBESTOS ABATEMENT FIBER LEVELS

| Work area air samples | Geometeric mean (f/cc) (50th percentile) | Range of mean fiber concentrations among abatement projects (f/cc) |
|---|---|---|
| All work areas | 0.74 | less than 0.1 - 30.0 |
| Wet removal only | 0.48 | less than 0.1 - 12.0 |
| Dry removal only | 11.9 | 3.7 - 30.0 |

Reference: "Air Sampling at 52 Asbestos Abatement Projects" (William M. Ewing) referred to in "Draft Scenarios and Respiratory Protection Recommendations for EPA Inspectors (OHSS Memorandum, Jan. 30, 1987).

### *Para-occupational Exposure—This pathway includes:*

Family members exposed to asbestos fibers brought home by workers on their contaminated work clothes and contact with asbestos fibers from deteriorating or disturbed friable asbestos building materials. Such contact can occur in schools, public meeting rooms, offices, airport terminals, gymnasiums, cafeterias, libraries and many other locations (Table 3-2).

TABLE 3-2. AMBIENT ASBESTOS FIBER LEVELS

| Area | Median asbestos fiber concentration |
|---|---|
| Rooms with asbestos surfaces | 0.0006 f/cc |
| Rooms without asbestos surfaces | 0.00054 f/cc |
| Outside air | 0.00002 - 0.00075 f/cc |
| Personal daily exposure | 0.0004 f/cc |

Reference: Asbestiform Fibers Non-occupational Health Risk. National Research Council. National Academy Press, Washington, D.C. 1984.

### *Neighborhood Exposure*

Neighborhood exposure refers to the exposure of people living or working near asbestos mines, manufacturing or fabrication plants, demolition or renovation of buildings containing asbestos, asbestos landfills or living or working near a site where equipment or machinery is sprayed with an asbestos-containing fireproofing or insulating material.

### *Ambient Background Exposure*

Asbestos exposure by this pathway is a result of the release of fibers from the weathering of exposed asbestos-bearing rocks and the release of fibers from the use or weathering of such products as brake linings or exterior construction products that contain asbestos, such as shingles or cladding (see Table 3-2).

On average, an adult male breathes approximately 20 cubic meters of air per day. Since airborne asbestos concentrations are expressed in fibers/cubic centimeter of air, it can be seen that for a typical ambient concentration of asbestos of 0.0004 f/cc (or 400 f/$m^3$), the daily exposure through inhalation would be approximately 8000 fibers/day.

Because the medical community has been unable to establish a "safe level" of asbestos exposure, the regulatory community has been forced to rule that asbestos release be kept "to the minimal extent economically feasible."

## Diseases Associated with Asbestos Inhalation

Several diseases and conditions have been linked to asbestos fiber inhalation. These include asbestosis, lung cancer, mesothelioma, gastrointestinal cancers, and other abnormalities.

### *Asbestosis*

Asbestosis is a disease characterized by fibrotic scarring of the lung. It reduces lung capacity and one's ability to resist respiratory infections. Common symptoms include shortness of breath, rales (a dry, crackling sound in the lungs during inhalation) and clubbing of fingers. Extreme cases of asbestosis will be fatal, usually due to cardiac arrest. Asbestosis is prevalent among workers who have been exposed to large doses of asbestos fibers over a long period of time. Accordingly, there is a clear dose-response relationship between asbestos exposure and the development of this disease; the greater the asbestos exposure, the more likely asbestosis will develop. Like all asbestos-related diseases, it may take many years for asbestosis to develop. The typical latency period for this disease is 15 to 30 years. There are an estimated 4,000 deaths/year associated with asbestosis; nearly all of these deaths occur in individuals who smoke and also suffer from emphysema.

An asbestos inspector using appropriate safety precautions as described in this workshop will have a very small likelihood of developing asbestosis as a result of his/her work.

### *Lung Cancer*

Asbestos exposure is just one of the many of the causes of lung cancer. While employees exposed to industrial concentrations of asbestos in years past have had an increased risk of developing lung cancer (5X), their risk is not as great as the cigarette smoker with no asbestos exposure (10X). However, there is a synergistic effect when these two factors co-exist. OSHA data indicate that a cigarette smoker who also works unprotected with asbestos is more than 50 times more likely to contract lung cancer than the normal

population. An individual's decision not to smoke is an important defense mechanism. Like asbestosis, there exists a long latency period between initial exposure and the occurrence of lung cancer, typically 20 to 30 years. Symptoms include a cough or a change in cough habit and/or a persistent chest pain.

There appears to be a dose-response relationship between asbestos exposure and lung cancer, although no minimal "safe level" of exposure has yet been determined. There are an estimated 2,000 lung cancer deaths/year attributable to asbestos exposure. Again, these figures relate to past industrial situations where workers wore little or no protective equipment.

Proper use of safety equipment will substantially lessen the risk of lung cancer for individuals inspecting or working in asbestos abatement situations.

***Mesothelioma***

Mesothelioma is a cancer of the mesothelium, a thin tissue layer which contains and protects the internal organs of the body. If it occurs in the chest cavity, it is called pleural mesothelioma. Symptoms of this form of mesothelioma include shortness of breath, chest pain and fluid in the chest cavity. Mesothelioma in the abdominal cavity, known as peritoneal mesothelioma, is characterized by abdominal pain and swelling. Both types of cancer spread rapidly and are always fatal, usually within a year of diagnosis. Like the other asbestos-related diseases, the latency period for mesothelioma is 30 to 40 years after initial exposure. According to the National Cancer Institute Mesothelioma Research Report (NIH Publication No. 87-1847), there are an estimated 1,000 - 1,500 mesothelioma deaths/year.

Mesothelioma is the asbestos-associated disease of greatest concern, for it is not associated with cumulative exposure. Although exposure to asbestos has been tied to most cases of mesothelioma, recent data suggest that some cases may occur without such contact. There does not appear to be any increased risk of mesothelioma for smokers, nor does there appear to be a dose-response relationship between asbestos exposure and mesothelioma. Cases have been recorded where the person's asbestos exposure has been quite limited.

***Other Diseases***

Several other diseases are found more often among persons exposed to asbestos than the normal population. These include cancer of the esophagus, stomach, colon and pancreas. The incidence of these health effects is much less than lung cancer. The medical community is uncertain as to whether these other diseases stem from migration of asbestos fibers from the lungs or from ingestion.

*Other Abnormalities*

Pleural plaques, pleural thickening and pleural effusions have been seen in individuals who have been exposed to asbestos. Plaques are diffuse areas of scar tissue that form on the mesothelium of the chest cavity. Pleural thickening is a more pronounced scarring and pleural effusions are accumulations of fluid between the two mesothelial layers.

Some medical professionals regard these lung abnormalities as early signs of more serious asbestos-related diseases; others believe they do not invariably lead to more severe illness. In any event, the mere detection of them should trigger close medical surveillance.

## HEALTH EFFECTS ASSOCIATED WITH INGESTION

The issue of potential health hazards associated with ingestion of asbestos fibers has been examined very closely by EPA's Office of Drinking Water (ODW). ODW has reviewed a multitude of epidemiological studies of humans and laboratory animals. In 1984, EPA's Science Advisory Board (SAB) provided the following statement to the ODW:

> Given the positive signal seen in some epidemiologic studies, plus well-documented evidence for the association between asbestos fiber inhalation and lung cancer, it is hard for the Committee to feel comfortable in dismissing the possibility of an increased risk of gastrointestinal cancer in humans exposed to asbestos fibers from drinking water. However, the Committee concensus is that current peer-reviewed evidence for humans and animals does not support the view that asbestos ingested in water causes organ-specific cancers.

More recent studies by the National Toxicology Program (NTP) involved analysis of the carcinogenic potential of the ingestion of asbestos in rats. They reported that "there was some evidence of carcinogenicity" in rats given an equivalent lifetime diet of chrysotile asbestos. The studies incorporated estimated quantities of asbestos fibers directly ingested in drinking water and those ingested via the muco-ciliary escalator.

Despite the uncertainty of the research conclusions, the ODW has moved forward to propose an asbestos fiber limit in drinking water. The proposed regulation (40 CFR Part 141 published November 13, 1985) provides a limit of 7 million fibers greater than 10 microns in length per liter of water.

## HEALTH EFFECTS ASSOCIATED WITH SKIN CONTACT

Although repeated contact with asbestos has been known to cause warts, the dermal route of asbestos fiber entry to the body is not considered a major health issue. However, since ACM contains a variety of substances which may cause skin irritation and rashes, it is always wise to wear protective clothing when working with asbestos materials.

## THEORIES ON HAZARD RELATIONSHIPS

### Asbestos Fiber Type

In Europe and within some US medical sectors, there is a strong belief that the amphiboles (crocidolite, amosite, tremolite, etc.) are more harmful than the serpentine form of asbestos (chrysotile). Amphibole fibers, which are very thin and needle-like, are thought to enter the lung more easily and in greater quantity than chrysotile fibers, which are thicker and bent and coiled. However, since the medical community cannot come to a consensus regarding the relative risks of amphibole vs serpentine exposure, the EPA and OSHA continue to regard both forms as equally harmful.

### Asbestos Fiber Size

When disturbed, all forms of asbestos shear longitudinally into ever finer fibers. Persons exposed to highly processed asbestos have shown some evidence of increased risk of developing asbestos-related diseases. Additionally, exposure to long, thin fibers appears to generate a greater cancer risk than exposure to short, thick fibers.

The EPA and OSHA do not attempt to regulate any particular size of asbestos fiber. In fact, it should be noted that the PCM analytical method for counting air fiber concentrations considers only those particles greater than 5 microns in length which have a minimum length to width (aspect) ratio of 3:1.

### Age at Exposure

The younger the age at which an individual is first exposed to asbestos, the greater the risk of developing an asbestos-related disease. This is not to imply that young children are more sensitive to the effects of asbestos than adults, for they are not. They simply have more of a life span left, so due to the long latency periods typical of asbestos-related diseases, they have a greater chance of developing such illnesses during their lifetime.

### Individual Susceptibility

Another factor to consider in looking at the risks from asbestos exposure involves one's body's reaction to asbestos fibers. Why some people, after working with asbestos material for many years at high exposure levels, acquire an asbestos-related disease while other members of the same group develop a different asbestos disease or none at all is a question our present scientific/medical community cannot answer.

# SECTION 4

# IDENTIFYING ASBESTOS CONTAINING MATERIALS

In order to properly conduct NESHAP asbestos inspections, inspectors must be knowledgeable of the various commercial uses and applications of asbestos products and which of these are regulated under the asbestos NESHAP. Recognizing the various appearances, compositions, uses, and application techniques can assist the inspector in deciding if a violation has or has not occurred. The remainder of this section provides information that should assist inspectors in recognizing ACM, both in the intact and disturbed state.

## IMPORTANT DEFINITIONS

***Asbestos-containing Material (ACM)***—friable asbestos material, Category I nonfriable ACM that is in poor condition, or Category II nonfriable ACM that has a high probability of becoming crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

***Asbestos-containing Waste Materials (ACWM)***—any waste that contains commercial asbestos and is generated by a source subject to the provisions of this subpart. This term includes filters that control devices, friable asbestos waste material, and bags or other similar packaging contaminated with commercial asbestos. As applied to demolition and renovation operations, this term also includes friable asbestos waste and Category II nonfriable ACM waste that becomes crumbled, pulverized, or reduced to powder by forces that acted on the material during the course of demolition and renovation operations regulated by this subpart, and materials contaminated with ACM including disposable equipment and clothing.

***Category I Nonfriable ACM***—asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products, containing more than 1 percent asbestos as determined using polarized light microscopy according to the method specified in Appendix A, Subpart F, 40 CFR Part 763.

***Category II Nonfriable ACM***—any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined using polarized light microscopy according to the method specified in Appendix A, Subpart F, 40 CFR part 763 that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

***Friable Asbestos Materials***—any material containing more than 1 percent asbestos as determined by the method specified in Section I, Polarized Light Microscopy (PLM) of

Appendix A, Subpart F, 40 CFR Part 763 that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos is less than 10 percent as determined by a method other than point counting by PLM, verify the asbestos content by point counting using PLM.

***In Poor Condition***—Means that the binding of the material is losing its integrity as indicated by peeling, cracking, or crumbling of the material.

## ASBESTOS USES AND CHARACTERISTICS

Table 4-1 lists the types of application and associated trade names of asbestos products. Asbestos cement products (flat sheets or sidings, tiles, corrugated roofing sheets, rainwater pipers, gutters, and pressure piping) constitute approximately 66 percent of the total. These products generally contain 10 to 15 percent asbestos, which functions as a fibrous reinforcement in the cement. A list of specific uses of asbestos and associated binders in building materials along with the average percent asbestos appears in Table 4-2.

**TABLE 4-1. TRADE NAMES**

| Type of application | Trade names | | |
|---|---|---|---|
| Sprayed-on | Asbestos - Spray | Limpet | Spraycraft |
| | Monokote - MK III | Sabinite | Kilnoise Plaster |
| | Cafco - Soundshield | Spraydon | Cafco -Blaze Shield |
| | Audi - Cote | Cafco - Type D | Cafco - Heat Shield |
| | Cafco - Type I | | |
| Pipe and Boiler Wrap | Johns-Manville (JM) and Hewells 85% | Magnesia Blocks, Pipe Coverings, and Cement | |
| | JM Suprex Blocks | JM and Atlas Sponge Felt Pipe Covering | |
| | JM Marinite | JM Thermo-Wrap and Thermo Tape | |
| | JM Asbestos Sponge | JM 302 and 352 Insulating Cements | |
| | JM Thermobestos Blocks | JM Asbestocell | |
| | JM Newtherm | JM Fibrofill | |
| | Atlas 650, 660, 250, 280, 18 Cold Water Paste | Atlasite, Caposite | |
| | Atlas Aircell and Finecell | JM and Atlas Rope Lagging | |
| | "Newalls" Newtembelt | | |

## TABLE 4-2. SUMMARY OF ASBESTOS-CONTAINING PRODUCTS

| Subdivision | Generic name | Asbestos (%) | Dates of use | Binder/sizing |
|---|---|---|---|---|
| Surfacing material | sprayed- or troweled-on | 1-95 | 1935-1970 | sodium silicate, portland cement, organic binders. |
| Preformed thermal insulating products | batts, blocks, and pipe covering | | | |
| | 85% magnesia | 15 | 1926-1949 | magnesium carbonate |
| | calcium silicate | 6-8 | 1949-1971 | calcium silicate |
| Textiles | cloth | | | |
| | blankets (fire) | 100 | 1910-present | none |
| | felts: | 90-95 | 1920-present | cotton/wool |
| | blue stripe | 80 | 1920-present | cotton |
| | red stripe | 90 | 1920-present | cotton |
| | green stripe | 95 | 1920-present | cotton |
| | sheets | 50-95 | 1920-present | cotton/wool |
| | cord/rope/yarn | 80-100 | 1920-present | cotton/wool |
| | tubing | 80-85 | 1920-present | cotton/wool |
| | tape/strip | 90 | 1920-present | cotton/wool |
| | curtains (theatre, welding) | 60-65 | 1945-present | cotton |
| Cementitious concrete-like products | extrusion panels: | 8 | 1965-1977 | portland cement |
| | corrugated | 20-45 | 1930-present | portland cement |
| | flat | 40-50 | 1930-present | portland cement |
| | flexible | 30-50 | 1930-present | portland cement |
| | flexible perforated | 30-50 | 1930-present | portland cement |
| | laminated (outer surface) | 35-50 | 1930-present | portland cement |
| | roof tiles | 20-30 | 1930-present | portland cement |
| | clapboard and shingles: | | | |
| | clapboard | 12-15 | 1944-1945 | portland cement |
| | siding shingles | 12-14 | unknown-present | portland cement |
| | roofing shingles | 20-32 | unknown-present | portland cement |
| | pipe | 20-15 | 1935-present | portland cement |
| Paper products | corrugated: | | | |
| | high temperature | 90 | 1935-present | sodium silicate |
| | moderate temperature | 35-70 | 1910-present | starch |
| | indented | 98 | 1935-present | cotton and organic binder |
| | millboard | 80-85 | 1925-present | starch, lime, clay |
| Roofing felts | smooth surface | 10-15 | 1910-present | asphalt |
| | mineral surface | 10-15 | 1910-present | asphalt |
| | shingles | 1 | 1971-1974 | asphalt |
| | pipeline | 10 | 1920-present | asphalt |

TABLE 4-2 (Continued)

| Subdivision | Generic name | Asbestos (%) | Dates of use | Binder/sizing |
|---|---|---|---|---|
| Asbestos-containing compounds | caulking putties | 30 | 1930–present | linseed oil |
| | adhesive (cold applied) | 5-25 | 1945–present | asphalt |
| | joint compound | | 1945–1975 | asphalt |
| | roofing asphalt | 5 | unknown–present | asphalt |
| | mastics | 5-25 | 1920–present | asphalt |
| | asphalt tile cement | 13-25 | 1959–present | asphalt |
| | roof putty | 10-25 | unknown–present | asphalt |
| | plaster/stucco | 2-10 | unknown–present | portland cement |
| | spackles | 3-5 | 1930–1975 | starch, casein, synthetic resins |
| | sealants fire/water | 50-55 | 1935–present | caster oil or polyisobutylene |
| | cement, insulation | 20-100 | 1900–1973 | clay |
| | cement, finishing | 55 | 1920–1973 | clay |
| | cement, magnesia | 15 | 1926–1950 | magnesium carbonate |
| Asbestos ebony products | | 50 | 1930-present | portland cement |
| Flooring tile and Sheet Goods | vinyl/asbestos tile | 21 | 1950-present | poly(vinyl)chloride |
| | asphalt/asbestos tile | 26-33 | 1920-present | asphalt |
| | sheet goods/resilient | 30 | 1950–present | dry oils |
| Wallcovering | vinyl wallpaper | 6-8 | unknown–present | — |
| Paints and coatings | roof coating | 4-7 | 1900–present | asphalt |
| | air tight | 15 | 1940–present | asphalt |

Some forms of asbestos fibers have high tensile strength and thermal stability. In addition, asbestos is non-combustible and a good acoustical and thermal insulator. Asbestos is effective in condensate control and resistant to corrosion and friction.

Chrysotile use comprises approximately 93 percent of the total consumption of asbestos fibers. The remaining 7 percent comes from the amosite and crocidolite groups. Each may be used individually in asbestos products, but mixtures of chrysotile, crocidolite and amosite are commonly found.

Chrysotile is used in asphalt flooring, vinyl floor tiles, pavings, and road surfaces. It is also found in brake linings, clutch facings, gaskets, and reinforced plastics.

Amosite is less flexible but more heat and acid resistant than chrysotile. It has often been used in high temperature applications and may also be found in small amounts as filter aids in pressure piping products.

Crocidolite is very resistant to acids and to the effects of outdoor exposure and may be found in combination with chrysotile in asbestos cement pressure pipes, textiles, and filtration products.

Anthophyllite, actinolite, and tremolite are used primarily in adhesives and cements. They are too brittle for textile products or for use as fibrous reinforcement.

The following principle categories of asbestos use in buildings may be subject to the asbestos NESHAP if the building is renovated or demolished.

**Typical Friable Asbestos Materials**

- Spray applied materials (fibrous, fluffy)
  - fireproofing
  - decorative coatings
  - condensation control
- Hand troweled insulation (granular, cementitious)
  - acoustical insulation
  - thermal insulation (such as pipe lagging)
- Molded Insulation
  - thermal insulation (such as pipe wraps)

### Typical Category I Nonfriable Asbestos Materials

- gaskets
- resilient floor covering
- asphalt roofing products
- packings

### Typical Category II Nonfriable Asbestos Materials

- asbestos/cement sheet and piping
- coatings
- sealants

## ASBESTOS SURFACING MATERIALS

Asbestos-containing surfacing materials are coatings which were spray-applied or troweled onto steel I-beams, decks, concrete ceilings and walls, and other surfaces. They were applied primarily as thermal insulation, fireproofing, soundproofing, and for decorative purposes.

Sprayed coatings are typically rough and fluffy in appearance, while troweled coatings have a smooth finish and may be covered with a layer of plaster or other non-asbestos material. Both sprayed and troweled asbestos coatings are friable in most applications. Most spray-applied asbestos coatings were banned for fireproofing/insulating in 1973 and for decorative purposes in 1978.

In its 1986 standard OSHA banned all applications of asbestos-containing products through spray techniques. However, the U.S. Court of Appeals for the District of Columbia reviewed this ban and concluded that "the support for the ban plainly fails to meet the 'substantial evidence' standard . . . (and stated that the) ban cannot stand."

Effective January 19, 1990, OSHA amended the regulatory text of the final asbestos standard by deleting the prohibition regarding the spray application of asbestos-containing products. It is believed that deleting this prohibition will not significantly increase the risk to employees.

### Condensation Control

Asbestos insulation was often applied to steel, concrete, or other building surfaces to minimize condensation. The low thermal conductivity of the applied asbestos prevented the cooling of such surfaces, thereby eliminating ceiling and wall "sweating" and reducing metal corrosion and rotting of wood components.

### Fireproofing

Since high temperatures can result in a deterioration of ductility, tensile and compressive strengths in building materials, asbestos has been widely used by the construction industry to fireproof structural steel.

### Acoustical

Since asbestos is fibrous in nature and thus lacks a reverberant surface, it has proved to be an excellent soundproofing material. It was used extensively in schools (hallways, stairwells, band rooms, gymnasiums), restaurants, hotels, and auditoriums for this purpose prior to the 1970's.

## THERMAL SYSTEM INSULATION

Thermal system insulation includes materials applied to pipes, fittings, boilers, breechings, tanks, ducts, and other interior structural components to prevent heat transfer or water condensation. These materials are present in a wide variety of forms. The following examples of thermal insulation are based on product categories.

### Pipe Insulation

Preformed pipe insulation with an asbestos content of about 50 percent has been used for thermal insulation of steam pipes in industrial, commercial, institutional, and residential applications. This product is usually white and chalky in appearance and typically was applied as 3-foot long, half-round sections, held onto the pipe by a covering of plaster-saturated canvas and metal bands. This insulation was applied on straight pipe sections, while wet-applied coatings were used on elbows, flanges, and other irregular surfaces. The installation of wet-applied and preformed asbestos insulations was banned in 1975.

Another type of pipe insulation is manufactured from asbestos-containing paper. Asbestos-containing paper products are manufactured on conventional papermaking equipment using asbestos fibers rather than cellulose. The raw asbestos paper produced in this process contains up to 85 percent asbestos. The final product is typically coated or laminated with other materials.

The typical asbestos-paper pipe covering, often referred to as air-cell insulation, looks and feels like corrugated cardboard and is generally rolled onto the pipe in several layers. It is medium gray in color and commonly held in place with a canvas wrap and metal bands.

### Boilers and Hot Water Tanks

Asbestos-containing preformed block insulation has been used as thermal insulation on boilers, hot water tanks, and heat exchangers in industrial, commercial, institutional, and residential applications. The blocks are commonly chalky white, 2 inches thick and from 1 to 3 feet square. They are often held in place around the boiler by metal wires or expanded

metal lath. A plaster-saturated canvas was often applied as a final covering or wrap. The installation of this type of asbestos insulation was banned by EPA in 1975. Asbestos-containing fire brick and gaskets may also be found as heating system components.

### Elbows, Valves and T-Fittings

Batch mixed ACM has been trowel-applied to irregular joints (elbows, valves, T-fittings, etc.) on thermal systems. The insulation is often covered with a canvas wrap or other covering similar to the adjacent pipe wrap which may make it difficult to distinguish from the material in the straight runs. It is not uncommon to find asbestos-containing "elbow mud" or "lagging" adjacent to straight-runs of non-asbestos pipe insulation. ACM may also be found in valve packings

## MISCELLANEOUS BUILDING MATERIALS

Both friable and non-friable forms of other asbestos-containing building materials exist. Friable materials include ceiling tiles (such as the 2 ft x 3 ft drop-in types and the 1 ft x 1 ft glue-in panels), asbestos-containing paper (commonly found underneath wooden floor boards) and joint compound. It is estimated that 5 to 10 percent of currently installed ceiling tiles contain asbestos.

Typical non-friable miscellaneous asbestos materials include resilient floor covering, asbestos cement sheet (Transite), siding shingles, and asphalt roofing products. Generally, the asbestos in these products is tightly bound and nonfriable. However, with age, or during the course of demolition or renovation, such materials may become friable. Because of this, inspectors must evaluate such materials for their potential to become friable on a case-by-case basis.

# SECTION 5

# ABATEMENT TECHNIQUES

A NESHAP asbestos inspector should be familiar with the procedures the asbestos abatement industry implements to comply with Federal and state regulations. This knowledge will enable a more complete inspection, especially in a pre-removal situation where actual abatement has not yet begun. By evaluating the set-up and proposed abatement plan, the inspector can determine if the project *may* be done in compliance with the asbestos NESHAP.

Although removal, encapsulation, enclosure and repair are all forms of asbestos abatement, NESHAP inspectors investigating demolition and renovation sites will most commonly encounter asbestos *removal* operations. For this reason, this section describes work area preparation activities, equipment used, common work practices and other techniques used by abatement contractors prior to demolition or renovation. Inspectors should not expect to see all of the following at any particular site, for what is happening depends on the type of abatement being done, the phase of the job and the contractor in charge.

## AREA PREPARATION

Precleaning of the work area is conducted. HEPA vacuums are used to clean floors, walls and movable as well as immovable objects. Wet-wiping may also be done. Carpets may be steam-cleaned or removed entirely. Movable items are taken out of the work area and stationary objects are sealed with polyethylene sheeting (poly) and tape.

All windows, doors, drains and other unnecessary openings or penetrations into the worksite are sealed. Duct tape, foam, caulking, poly, plywood and sheetrock are commonly used to establish these critical barriers. In the event that other engineering controls fail, they will help prevent the release of asbestos fibers into the environment.

Warning signs should be posted at each entrance to the work area. Specifications for these signs, which inform the reader that breathing asbestos dust may cause serious bodily harm, are given in the OSHA asbestos standards.

The heating, ventilation and air conditioning (HVAC) system is shut down and isolated to prevent transfer of asbestos dust throughout the building. The control panel for this system is tagged and locked (to prevent activation of the system) or the breaker associated with the HVAC system removed entirely. All contaminated air filters are removed from the system

and disposed of as asbestos-containing waste. All vents and air ducts inside the work area are sealed; plywood, sheet metal, polyethylene sheeting (poly) and tape are commonly used for this purpose.

The electricity supplying the work area is shut off and the control panel locked and tagged. Contractors typically have an electrician wire in necessary amperage at the worksite. All electrical equipment should be connected to ground-fault circuit interrupters.

The walls of the work area are usually covered with two layers of 4 or 6 mil poly. Strapping, nailing blocks, spray adhesive, staples and tape may be used to attach the poly to the walls. Seams in the two layers are offset and the bottoms of the sheets alternately overlapped with the floor poly which extends up the walls 18-24".

The floor of the work area is covered with a minimum of two layers of six mil poly. Seams are sealed using spray adhesive and duct tape, and strapping, spray adhesive, double-sided tape and/or staples may be used to securely fasten the poly at the wall/floor junction.

In certain situations an inspector may encounter a product known as spray poly being used to prepare the walls and floor. This material is applied in equivalent thicknesses to polyethylene sheeting and serves the same purpose.

Arrows are applied to the prepared walls to indicate the locations of exits.

A decontamination unit (decon) is established (Figure 5-1), in most cases contiguous to the work area. It is designed to allow passage to and from the work area while minimizing leakage of asbestos-containing dust to the outside. A typical unit consists of a clean room, a shower room and an equipment room separated by airlocks. The airlocks may simply be two layers of poly hung at the openings to each room of the decon or they may be separate three-foot chambers alternating with and separated from each of the rooms in the decon by overlapping poly. The doorways themselves may be of various designs - arches, slits, inverted T's, etc.

"Negative air" machines are brought in and local exhaust ventilation established (Figure 5-1). These machines provide the EPA-recommended 4 air exchanges per hour and help prevent contamination of areas outside the worksite.

A negative air machine is essentially a cabinet having an opening at each end, one for air intake and one for exhaust. A fan located inside the cabinet draws contaminated air through a series of filters and exhausts the cleaned air to the outside. The final filter in the series is a High Efficiency Particulate Air (HEPA) filter capable of filtering 99.97 percent of particles 0.3 microns or larger from the air.

Negative air machines create a slightly lower air pressure inside the work area relative to the outside; thus, any breach in containment of the worksite permits only uncontaminated air to be drawn into the area, preventing the escape of contaminated air.

The machines should be located as far as possible from the decon and vent to the outside if possible. The number of units needed depends on the volume and configuration of the room. The machines operate 24 hours a day from the beginning of a job until final air clearance is obtained.

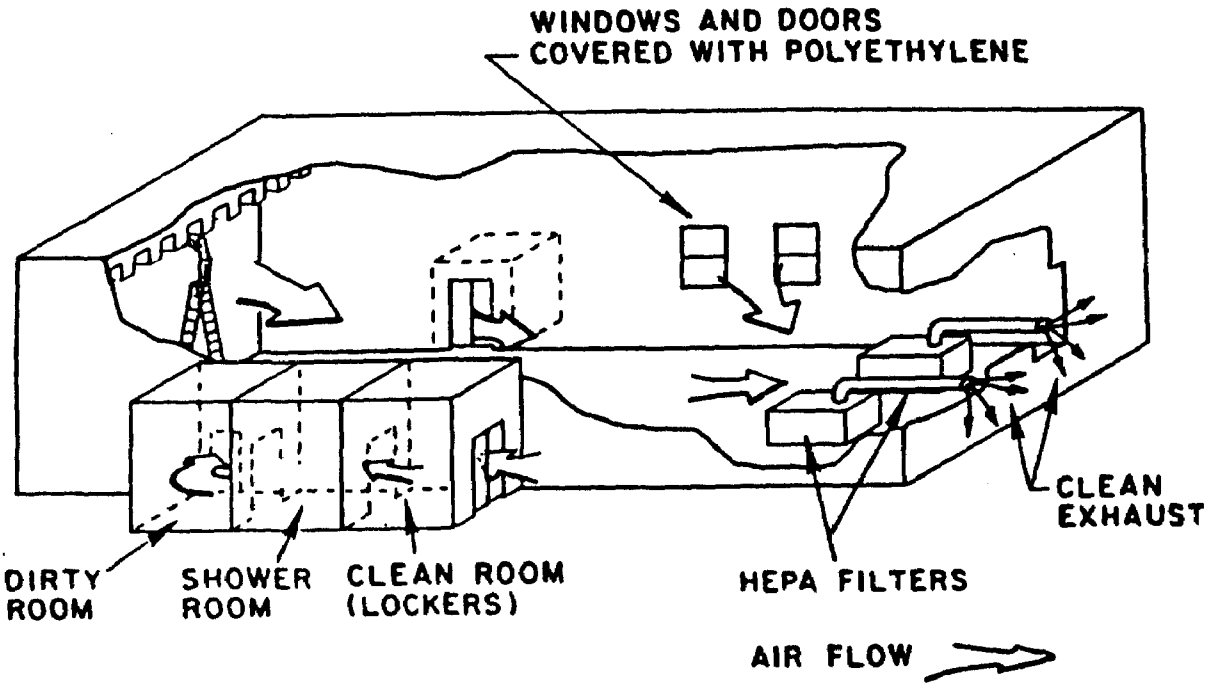



Figure 5-1. Negative air filtration system.

## EQUIPMENT

Numerous pieces of water handling equipment may be present at a removal site. These include garden sprayers, hoses, extension wands, misters and pumps. Garden sprayers and hoses are used to soak the asbestos-containing material (ACM) prior to its removal and to maintain it in the wet state until it is properly collected for disposal. Extension wands provide a fine spray of water precisely where it is needed, reducing the amount of water required; the misters are used to moisten asbestos as it falls during the removal process. Pumps are used to apply amended water to the ACM and may also be used to apply encapsulants or other materials to the substrate after removal.

Workers use a variety of tools for removing ACM and collecting it for disposal. Removal tools include long- and short-handled scrapers, joint compound knives, paint scrapers, nylon scrub pads and a large assortment of brushes (ranging from toothbrushes to toilet brushes!). For hard ACM, chisels and hammers and various types of saws may be used. Collection tools include shovels and squeegees which are often made of plastic or rubber to prevent damage to the polyethylened floor.

Two types of heavy-duty vacuum apparatus may be seen, usually on large jobs. One is a vacuum truck which transports ACM slurry to approved landfills and the other is a vacuum machine which eliminates the need to bag the ACM in the worksite. In each case, ACM is sucked up inside the work area and transported via a vacuum hose to the equipment located outside. The workers may use the hose itself to remove the ACM off the substrate or may feed collected material into a hopper attached to the hose.

Power washers, whose water stream pressure is measured in thousands of pounds per square inch, may be used to clean asbestos-coated surfaces which cannot be reached in any other way.

Heavy duty shredders may also be used at the job site. These break up metal lath and other materials being removed, making it easier to handle and dispose of the waste.

## WORK PRACTICES

Inspectors enforcing the provisions of the asbestos NESHAP should be familiar with the work practice requirements of this regulation. These are found in **61.145, Standard for demolition and renovation:** ***Procedures for asbestos emission control*** **and 61.150, Standard for waste disposal for manufacturing, fabricating, demolition, renovation, and spraying operations.** A properly run abatement project will comply with the requirements of these sections.

Specifically, under most circumstances, workers can be expected to treat friable asbestos-containing material and Category I and Category II nonfriable ACM in poor condition with water to ensure that it is adequately wet prior to its removal. No visible emissions may be discharged to the outside air from collection, mixing, and wetting operations. Workers should not drop or throw ACM and should transport it to the ground in dust-tight chutes or containers if it has been removed or stripped more than 50 feet above ground level and was not removed as units or in sections. All removed or stripped friable asbestos must remain wet until collected for disposal. In addition, it must be sealed in leak-tight and properly labeled containers while wet.

Abatement should begin at the decon and proceed toward the negative air machines. Operating in teams, workers on the ground soak down the material to be removed and shovel it up and bag it as the workers on the scaffolding or ladders scrape it off. The bags are sealed, washed off in the shower or waste-handling area, placed into other labeled waste disposal containers (i.e. bags, fiber drums, metal drums) and removed from the worksite.

## OTHER TECHNIQUES

Inspectors investigating worksites where floor tiles or pipe lagging is being removed may encounter techniques unique to these operations.

### Floor Tile Removal

Solvents (some having a strong citrus odor) are commonly used in the removal of floor tiles. The solution is spread on the floor and allowed to penetrate to dissolve the mastic below. Workers then scrape up the tiles and dispose of them. The solution may be reapplied to dissolve any remaining mastic and the surface scrubbed clean.

Another technique involves flooding the floor with water and manually popping up the tiles using ice scrapers. An abrasive sand slurry may be used to grind down the remaining mastic and produce a smooth surface.

Dry ice may be used to detach floor tiles from their substrate or heat may be applied to the tiles to soften and loosen them for approval. Machines which heat, remove and package up floor tiles may be seen.

### Pipe Lagging Removal

Contractors may choose to remove pipe-lagging using the glove-bag technique (Figure 5-2). OSHA requires secondary containment where the glovebag is being used, but does not mandate that this secondary containment be under negative pressure during small-scale, short duration operations.

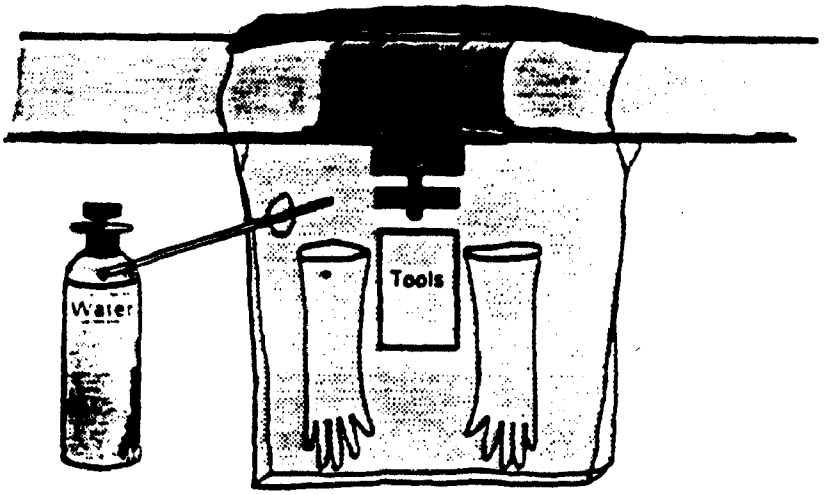



Figure 5-2. Illustration of a glove bag.

A glovebag consists of a 6-12 mil polyethylene bag fitted with long-sleeved gloves, a tool pouch and an opening used for water application and vacuum attachment. Linked bags, multi-sleeve bags and bags which have been designed to permit the removal of horizontal or vertical runs of pipe insulation are available.

The side seams of a glovebag are cut down to accommodate the diameter of the pipe insulation to be removed, necessary tools and other materials are placed in the tool pouch and the bag is attached around the pipe to form an airtight seal. The wand of a garden sprayer containing amended water is attached to the bag and the insulation soaked, removed and dropped into the bottom of the bag. The pipe and upper section of the bag are wiped clean and the ends of remaining insulation are sealed with encapsulant, rewettable fiberglass or other wrapping material. The reusable tools are grasped in a glove and pulled outward; the sleeve is twisted and taped in two locations and the glove containing the tools cut off between the two taped sections. The enclosed tools are then placed into another glovebag for use or are deposited into a bucket of water, opened up and cleaned. The glovebag is then twisted and loosely taped to isolate the ACM in the bottom of the bag. The sprayer wand is removed and the HEPA vacuum attached and used to remove the remaining air from the bag. The bag is tightly taped, the vacuum hose removed and the bag cut down from the pipe and deposited into another labeled disposal bag.

# SECTION 6

# DEMOLITION AND RENOVATION REGULATIONS

The Environmental Protection Agency (EPA), under requirements of the Clean Air Act (CAA) of 1971 is required to develop and enforce regulations necessary to protect the general public from exposure to airborne contaminants that are known to be hazardous to human health. The specific authority of EPA regarding asbestos is listed under Section 112 of the CAA entitled *National Emission Standards for Hazardous Air Pollutants* (NESHAP). The specific citation that addresses building demolition and renovation (including removal and disposal) is 40 CFR Part 61, Subpart M.

## SOURCES UNDER SUBPART M

The following activities are regulated by the asbestos NESHAP:

- asbestos mill operations (61.142);
- surfacing of roadways with asbestos-containing material (61.143);
- manufacturing products which contain commercial asbestos (61.144);
- demolition and/or renovation of facilities that contain asbestos material (61.145);
- spraying of asbestos-containing materials (61.146);
- fabricating operations involving commercial asbestos (61.147);
- insulating materials that contain commercial asbestos (61.148);
- waste disposal for asbestos mills (61.149);
- disposal of asbestos-containing waste generated during manufacturing, demolition, renovation, spraying, and fabricating operations (61.150);
- closure and maintenance of inactive waste disposal sites for asbestos mills, and manufacturing and fabricating sources (61.151);
- operation of air cleaning devices (61.152);
- reporting of information pertaining to process control equipment, filter devices, asbestos generating processes, etc. (61.153);
- active waste disposal sites (61.154); and
- operations involving conversions of asbestos-containing waste material into nonasbestos (asbestos-free) material (61.155).

## REGULATORY HISTORY OF THE ASBESTOS NESHAP

The Asbestos NESHAP regulation has been in existence since 1973 and has been amended several times. The following is a summary relative to demolition/renovation and associated waste handling and disposal provisions:

- April 6, 1973 - Original promulgation developed regulations for:
  - demolition of buildings containing friable asbestos-containing fireproofing and insulating material; and
  - restriction on the spraying of asbestos-containing materials on buildings and structures for fireproofing and insulating purposes.

- May 3, 1974 - Regulations were expanded to include:
  - clarification of definitions;
  - expansion of demolition provisions; and
  - clarification of no visible emission standard to exclude uncombined water from regulatory requirement.

- October 14, 1975 - Substantial changes were made including:
  - inclusion of renovation projects with the already regulated demolition activities;
  - adoption of provision to prohibit use of wet applied and molded insulation (e.g., pipe lagging); and
  - expansion of regulatory scope to cover asbestos-containing waste handling and disposal.

- March 2, 1977 - Subtle changes, mostly addressing definitions.

- June 19, 1978 - Important changes made include:
  - expansion of spraying restrictions to prohibit application of asbestos-containing materials for decorative purposes;
  - adoption of a provision to exempt bituminous or resinous-based materials from the spraying restrictions; and
  - repromulgated certain work practice provisions.

- April 5, 1984 - Repromulgation to ensure existing work practices enforceable.

  The need to repromulgate stemmed from the 1978 Supreme Court decision in the case of Adamo Wrecking Company of Michigan versus United States. The court held that parts of the asbestos standard, in the form of work practice standards, were not emission standards within the meaning of Section 112 of the Clean Air Act as amended in 1970. Thus, certain work practice standards were deemed not enforceable at the time of the Adamo Wrecking case.

During the court case, the CAA was amended (August 7, 1977) to authorize the use of "design, equipment, work practice and operational standards." Some, but not all, of the work practice standards were repromulgated on June 19, 1978. The April 5, 1984 repromulgation of the entire standard ensures that all work practice standards are now enforceable. The standard was also rearranged and parts of it reworded for clarity.

- 1990, - Repromulgation to enhance enforcement and compliance with the standard. The repromulgated rule:
  - requires daily monitoring for visible emissions, weekly inspections of air-cleaning devices, recordkeeping and reporting at asbestos milling, manufacturing and fabricating sources;
  - revises notification requirements for demolition and renovation activities;
  - provides exemptions from the use of wet removal methods;
  - clarifies EPA's position regarding the handling and treatment of nonfriable asbestos material;
  - requires recordkeeping and reporting regarding asbestos waste disposal; and
  - clarifies that operations which convert asbestos-containing waste material into nonasbestos material are regulated by NESHAP.

The following text is a summary of 40 CFR Part 61, Subpart M as it pertains to demolitions/renovations and associated waste handling and disposal. The NESHAP asbestos standard is included as Appendix A in this manual.

DEFINITIONS (61.141)

***Adequately Wet***—Sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.

***Asbestos-containing Waste Materials (ACWM)***—Mill tailings or any waste that contains commercial asbestos and is generated by a source subject to the provisions of this subpart. This term includes filters from control devices, friable asbestos waste material, and bags or other similar packaging contaminated with commercial asbestos. As applied to demolition and renovation operations, this term also includes friable asbestos waste and Category II nonfriable ACM waste that becomes crumbled, pulverized, or reduced to powder by forces that acted on the material during the course of demolition and renovation operations regulated by this subpart, and materials contaminated with asbestos including disposable equipment and clothing.

***Category I Nonfriable ACM***—Asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products, containing more than 1 percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy.

***Category II Nonfriable ACM***—Any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined using the methods specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

***Cutting***—To penetrate with a sharp edged instrument. This includes sawing, but does not include shearing, slicing, or punching.

***Demolition***—The wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility.

***Emergency Renovation Operations***—A renovation operation that was not planned, but results from a sudden, unexpected event that causes an unsafe condition or a disruption of normal industrial operations. This term includes operations necessitated by nonroutine failures of equipment.

***Facility***—means any institutional, commercial, public, industrial, or residential structure (including any building containing condominiums or any building containing individual dwelling units operated as a residential cooperative), installation, or building (residential buildings having four or fewer dwelling units are excluded); any ship; and any active or inactive waste disposal site. For purposes of this definition, any building, structure, or installation that contains a loft used as a dwelling, is not considered a residential structure, installation, or building. Any structure, installation or building that was previously subject to this subpart is not excluded, regardless of its current use or function.

***Facility Component***—Any part of a facility including equipment.

***Friable Asbestos Materials (FAM)***—Any material containing more than 1 percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy (PLM) that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by PLM, verify the asbestos content by point counting using PLM.

***Fugitive Source***—Any source of emissions not controlled by an air pollution control device.

***Glove Bag***—A sealed compartment with attached inner gloves for the handling of asbestos-containing materials. Properly installed and used, glove bags provide a small work area enclosure used typically for small-scale asbestos stripping operations. Information on glove bag installation, equipment and supplies, and work practices is contained in the OSHA's final rule on occupational exposure to asbestos (Appendix G to 29 CFR 1926.58).

***Grinding***—To reduce to powder or small fragments. This includes mechanical chipping or drilling.

***Inactive Waste Disposal Site***—Any disposal site or portion of it where additional asbestos-containing waste material has not been deposited within the past year.

***In Poor Condition***—Means that the binding of the material is losing its integrity as indicated by peeling, cracking, or crumbling of the material.

***Installation***—Any building or structure or any group of buildings or structures at a single demolition or renovation site that are under the control of the same owner or operator (or owner or operator under common control).

***Leak-tight***—Means that solids or liquids cannot escape or spill out. It also means dust-tight.

***Malfunction***—Any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner so that emissions of asbestos are increased. Failures of equipment shall not be considered malfunctions if they are caused in any way by poor maintenance, careless operation, or any other preventable upset conditions, equipment breakdown, or process failure.

***Natural Barrier***—A natural object that effectively precludes or deters access. Includes physical obstacles such as cliffs, lakes or other large bodies of water, deep and wide ravines and mountains. Remoteness, by itself, is not a natural barrier.

***Nonfriable Asbestos Material***—Any material containing more than one percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763 Section 1, Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

***Nonscheduled Renovation Operation***—A renovation operation that is not planned but is caused by the routine failure of equipment.

***Outside Air***—The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open-air ferry dock.

***Owner or Operator of a Demolition or a Renovation Activity***—Any person who owns, leases, operates, controls or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

***Particulate Asbestos Material***—Means finely divided particles of asbestos or material containing asbestos.

***Planned Renovation Operations***—A renovation operation, or a number of such operations, in which some RACM will be removed or stripped within a given period of time and that can be predicted. Individual nonscheduled operations are included if a number of such operations can be predicted to occur during a given period of time based on operating experience.

***Regulated Asbestos-Containing Material (RACM)***—means (a) friable asbestos material, (b) Category I nonfriable ACM that has become friable, or (c) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

***Remove***—Means to take out RACM or facility components that contain or are covered with RACM from any facility.

***Renovation***—Altering a facility or one or more facility components in any way, including the stripping or removal of RACM from a facility component. Operations in which load-supporting structural members are wrecked or taken out are demolitions.

***Resilient Floor Covering***—Asbestos-containing floor tile, including asphalt and vinyl floor tile, and sheet vinyl floor covering containing more than 1 percent asbestos as determined using polarized light microscopy according to the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy.

***Strip***—Means to take off RACM from any part of a facility or facility components.

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

***Visible Emissions***—Any emissions (excluding condensed uncombined water vapor) visually detectable without the aid of instruments, coming from RACM or asbestos-containing waste material, or from any asbestos milling, manufacturing or fabricating operation.

***Waste Generator***—Any owner or operator of a source covered by this subpart whose act or process produces asbestos-containing waste material.

***Waste Shipment Record***—The shipping document required to be originated and signed by the waste generator which is used to track and substantiate the disposition of asbestos-containing waste material.

***Working Day***—Means Monday through Friday and includes holidays that fall on any of the days Monday through Friday.

## APPLICABILITY OF STANDARD [61.145(a)]

Various requirements of this section apply to the owner or operator of a demolition or renovation activity depending on the presence, relative amounts and condition of asbestos (including Category I and Category II nonfriable ACM) found in the facility.

**Demolitions (Above Cutoff)**

In a facility being demolished, all notification [61.145 (b)], emission control procedures [61.145 (c)] and waste disposal requirements (61.150) apply if the combined amount of RACM and Category I and Category II nonfriable ACM that is subjected to sanding, grinding, cutting or abrading present in a facility being demolished is at least:

- 260 linear feet (80 linear meters) on pipes;
- 160 square feet (15 square meters) on other facility components; or
- 35 cubic feet (1 cubic meter) off facility components (where the length or area could not be measured previously).

*Note:* Future references to these regulated amounts of ACM will be designated: **260/160/35.**

**Demolitions (Below Cutofff**

In a facility being demolished, if the combined amount of RACM and Category I and Category II nonfriable ACM that is subjected to sanding, grinding, cutting, or abrading is less than the previously stated quantities, **or there is no asbestos in the facility**, only the notification procedures of §61.145 (b) (1), (2), (3)(i), and (iv) and 4 (i-vii, ix and xvi) apply. Notification must be received by the EPA for a building that will be demolished even if there is no asbestos in the building; this provides an opportunity for EPA to inspect the facility prior to demolition to verify that it contains less than the regulated quantity of asbestos .

**Demolitions (Ordered)**

If the facility is ordered demolished by a State or local governmental agency because the building is structurally unsound and in danger of imminent collapse, notification requirements of §61.145 (b) (1), (2), (3iii), (4, excluding viii) and (5) and emission control procedures of §61.145 (c) (4-9) apply.

**Renovations (Above Cutoff)**

If the combined amount of RACM that will be stripped, removed, dislodged, cut, drilled or similarly disturbed and Category I and Category II nonfriable ACM that is subjected to sanding, grinding, cutting or abrading is at least **260/160/35**, notification requirements of §61.145 (b) and emission control procedures of §61.145 (c) apply.

**Renovations (Below Cutoff)**

If the amount of RACM that will be stripped, removed, dislodged, cut, drilled or similarly disturbed and Category I and Category II nonfriable ACM that is subjected to sanding, grinding, cutting or abrading is less than **260/160/35**, the requirements of the asbestos NESHAP do not apply.

**Renovations (Planned)**

If the predicted combined additive amount of RACM that will be removed or stripped and Category I or Category II nonfriable ACM that will be subjected to sanding, grinding, cuttings, or abrading during planned renovation operations involving individual nonscheduled operations during a calendar year of January 1 through December 31 is more than **260/160/35**, notification requirements of §61.145 (b), emission control procedures of §61.145 (c), and waste disposal requirements of §61.150 apply.

**Renovations (Emergency)**

If the estimated combined amount of RACM to be removed or stripped and Category I and Category II nonfriable ACM that will be subjected to sanding, grinding, cutting or abrading as a result of the sudden, unexpected event that necessitated the renovation exceeds 260/160/35, notification requirements of §61.145(b), emission control procedures of §61.145(c) and waste disposal requirements of §61.150 apply.

## NOTIFICATION REQUIREMENTS [61.145 (b)]

**Important Terms**

***Owner or Operator*** - any person who owns, leases, operates, controls or supervises the facility being demolished or renovated, or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both. An owner/operator could be an asbestos removal contractor, a general contractor, industrial hygienist, etc., or any individual who could be in a position to control the operations.

***Administrator*** - anyone with delegated authority within the EPA asbestos NESHAP program. Inspectors should be aware that where the EPA has delegated authority for the program to a State, only the State may require notification in some cases; in other instances, both the State and EPA must be notified.

**Notifying Responsibility**

Each owner or operator of a demolition or renovation activity to which this section applies is required to:

- notify the Administrator, in writing. (Delivery of the notice by U.S. Postal Service, commercial delivery service, or hand delivery is acceptable);
- postmark or deliver the notice as required; and
- update the notice, as required (e.g., change in start date, 20 percent increase in affected asbestos).

Notification information must be reported on a form similar to that found in Figure 3 of the regulation.

## Notification Submittal

The asbestos NESHAP has established the following notification submittal requirements concerning demolition and renovation activities. Lead times have been designated in certain circumstances to provide the regulatory agency with sufficient time to determine compliance with the standard.

### *Demolitions and Renovations Involving at Least 260/160/35*

Notices must be postmarked or delivered at least 10 working days before asbestos stripping or removal work or any other activity which disturbs asbestos begins. This notification requirement does not apply to planned or emergency renovations.

### *Demolitions Involving Less Than 260/160/35 or No Asbestos*

Notice must be given 10 working days before demolition begins.

### *Planned Renovation Operations Involving Individual Nonscheduled Operations*

For renovation operations subject to the regulation, notice must be given at least 10 working days before the end of the calendar year preceding the year for which notice is being given.

### *Ordered Demolitions*

For demolitions ordered by a governmental agency, notice must be given as early as possible before, but not later than the working day following the demolition.

### *Emergency Renovation Operations*

Notice must be given as early as possible before, but not later than the working day following the renovation.

### *Renovations Involving Less Than 260/160/35*

EPA requires no notification for a single renovation involving less than the regulated amount of RACM. However, if the total RACM involved in several nonscheduled renovation projects exceeds 260/160/35, notice must be given as indicated in ***Planned Renovation Operations...*** above.

## Updated Notifications

Whenever asbestos stripping or removal in **demolition and renovation operations involves at least 260/160/35** (excluding planned renovation operations involving individual nonscheduled operations and emergency renovation operations) or **demolitions involving less than 260/160/35** will begin on a date other than the one contained in the original notice, the EPA must be notified of such a change. In no event shall an operation begin on a date other than the date contained in the written notice of the new start date.

*Later Starting Date*

If the new start date is scheduled after the date contained in the original notice, EPA

- may be notified by telephone as soon as possible before the original start date; and
- must be provided with a written notice of the new start date as soon as possible before, and no later than, the original start date.

Delivery of the updated notice by U.S. Postal Service, commercial delivery service, or hand delivery is acceptable.

*Earlier Starting Date*

If the new start date for demolition and renovations involving at least 260/160/35 or for a demolition involving less than 260/160/35 or no asbestos is scheduled before the date contained in the original notice, EPA must be notified of the change

- in writing, and
- at least 10 working days before asbestos stripping or removal work or demolition begins.

Delivery of the updated notice by U.S. Postal Service, commercial delivery service, or hand delivery is acceptable.

**Contents of Notification**

Whenever notification is required, the following information must be included:

- an indication of whether the notice is the original or revised notification;
- names, addresses and telephone numbers of the facility owner and operator, asbestos removal contractor owner or operator and waste transporter;
- type of operation: demolition or renovation;
- description of the facility or affected part of the facility (size, number of floors, age, present and prior use, etc.);
- procedure employed to detect the presence of RACM and Category I and Category II nonfriable ACM (including analytical methods);
- estimate of the approximate amount of RACM to be removed from the facility and Category I and Category II nonfriable ACM that will be subjected to sanding, grinding, cutting or abrading;
- estimate of the approximate amount of Category I and Category II nonfriable ACM in the affected part of the facility that will not be removed before demolition;

- location and street address of the facility being demolished or renovated;
- scheduled starting and completion dates of asbestos removal work (or other activity that would disturb asbestos material) in a demolition or renovation; planned renovation operations involving individual nonscheduled operations shall indicate the January 1 to December 31 work period;
- scheduled starting and completion dates of demolition or renovation;
- description of work practices and engineering controls to be used (includes asbestos removal and waste-handling emission control procedures);
- name and location of the waste disposal site to be used;
- a certification that an appropriately trained person will supervise the stripping and removal operation. (This requirement shall become effective 1 year after promulgation of this regulation); and
- a description of the procedures to be followed in the event that unexpected RACM is found or Category II nonfriable ACM becomes crumbled, pulverized, or reduced to powder.

When a **facility has been ordered to be demolished**, notification must also include:

- the name, title and authority of the government representative who ordered the demolition;
- the date the order was issued;
- the date the demolition was ordered to begin; and
- a copy of the order.

For **emergency renovations**, notification must include:

- the date and hour that the emergency occurred;
- a description of the sudden, unexpected event; and
- an explanation of how the event caused an unsafe condition or disrupted normal industrial operations.

## PROCEDURES FOR ASBESTOS EMISSION CONTROL [61.145 (c)]

Because EPA does not recognize an acceptable safe ambient source concentration of asbestos, the standard sets forth requirements to prevent emissions of particulate asbestos material to the outside air.

**Removal of RACM [61.145 (c)(1)]**

Remove all RACM from a facility being demolished or renovated before any activity begins that would break up, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal.

**Exceptions from Removal [61.145 (a)(3), (c)(1)(i-iv) and (5)]**

***RACM need not be removed prior to demolition if it:***

- is located in a facility ordered demolished by a governmental agency because the facility is structurally unsound and in danger of imminent collapse. (The portion of the facility containing the RACM must be adequately wet during wrecking.);
- is Category I nonfriable ACM that is not in poor condition and is not friable;
- is on a facility component that is encased in concrete or other similarly hard material and is adequately wet whenever exposed during demolition;
- was not accessible for testing and was, therefore, not discovered until after demolition began and, as a result of the demolition, the material cannot be safely removed. If not removed for safety reasons, the exposed RACM and any asbestos-contaminated debris must be treated as ACWM and adequately wet at all times until disposed of; or
- is Category II nonfriable ACM and the probability is low that it will become crumbled, pulverized, or reduced to powder during demolition.

**Removal of Units or Sections [61.145 (c)(2)]**

When a facility component that contains, is covered with, or is coated with RACM is being taken out of the facility as a unit or in sections:

- adequately wet all RACM exposed during cutting or disjoining operations (if temperatures are above freezing); and
- carefully lower each unit or section to the floor and to ground level (Do not drop, throw, slide or otherwise damage or disturb the RACM.)

**Techniques for Wetting**

Wetting may be accomplished using any of the following:

- portable garden sprayer;
- faucet tap/hose;
- water barrel and pump; or

- hose and nozzle connected to a hydrant.

Workers should apply the wetting agent as a fine mist or spray to ensure adequate wetting of the RACM. Depending on the type of RACM being removed, repeat or continuous application of the wetting agent may be necessary.

High-pressure power washers are not recommended for use in wetting RACM because the force of the water stream (measured in thousands of pounds per square inch) so quickly dislodges RACM that adequate wetting of the material cannot take place.

Although not specifically required by the NESHAP asbestos standard, surfactants, chemicals which reduce the surface tension of water, are commonly added to the water used for wetting RACM. Surfactants aid in the penetration and wetting of RACM and reduce the amount of water required.

EPA guidance recommends using a mixture of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether, or the equivalent, in a 0.16 percent solution (1 oz. per 5 gallons) of water (Purple Book - EPA 560/5-85-024).

**Stripping RACM from an In-place Facility Component [61.145 (c)(3)]**

Adequately wet RACM while it is being stripped from in-place facility components.

**Wetting Exemptions [61.145 (c)(3)(i-iii), (7)(i-iii)]**

Wetting is not required where the wetting operation would damage equipment, present a safety hazard, take place below freezing temperatures, or where RACM being handled is contained in leak-tight wrapping. Detailed information concerning these situations is provided below.

***Equipment Damage or Safety Hazards [61.145 (c)(3)(i-iii)]***

Wetting is not required during a renovation operation if the owner or operator:

- has obtained prior written approval from the Administrator based on a written application that wetting to comply with the asbestos NESHAP would unavoidably damage equipment or present a safety hazard; and
- uses one of the following emission control methods during the renovation activity:
    - an appropriately designed and operated **local exhaust ventilation and collection system** for particulate asbestos;
    - **a glove-bag system** designed and operated to contain the particulate asbestos material;

- **leak-tight wrapping** to contain all RACM prior to dismantlement; or

- **another equivalent wetting or emission control method** approved, in writing, by the Administrator. A copy of this approval must be kept at the worksite and made available for inspection.

***Below Freezing Temperatures [61.145 (c)(7)]***

When the temperature at the point of wetting is below 32°F (0°C), wetting is not required. However, the owner or operator must:

- remove regulated facility components as units or in sections to the maximum extent possible; and
- record required information during periods when wetting operations are suspended due to freezing temperatures. These records must be available for inspection by the Administrator during normal business hours at the demolition or renovation site and must be retained for at least 2 years.

***Wrapped ACM [61.145 (c)(3)(i)(B)(3) and (c)(4)]***

Wetting is not required when, during renovation activities, RACM has been wrapped leak-tight prior to dismantlement, or it has been taken out of the facility as a unit or in sections and contained in leak-tight wrapping.

**Stripping of Facility Components Taken Out as Units or Sections [61.145 (c)(4)]**

When stripping RACM from facility components which have been taken out of a facility as a unit or in sections,

- adequately wet the RACM; or
- use an appropriately designed and operated local exhaust ventilation and collection system for particulate asbestos material.

**Exemptions from Stripping [61.145(c)(5)]**

RACM need not be removed from large facility components such as reactor vessels, large tanks, and steam generators, ***but not beams,*** if the following requirements are met:

- the facility component is handled, stored, disposed of or reused without disturbing or damaging the RACM; and
- the component is encased in a leak-tight, appropriately labeled wrapping during all loading and unloading operations and during storage.

**Handling of RACM [61.145 (c)(6)]**

For all RACM, including material that has been removed or stripped,

- adequately wet the material and ensure that it remains wet until collected and contained or treated in preparation for disposal; and
- carefully lower the material to the ground and floor (Do not drop, throw, slide or otherwise damage or disturb the material); and
- transport the material to the ground via leak-tight chutes or containers if it has been removed or stripped more than 50 feet above ground level and was not removed as units or in sections.

**NESHAP Training Requirements [61.145 (c)(8)]**

Effective 1 year after promulgation of this regulation, no RACM shall be stripped, removed, or otherwise handled or disturbed at a facility unless at least one on-site representative, such as a foreman or management-level person or other authorized representative, trained in the provisions of this regulation and the means of complying with them is present. Every 2 years this individual must receive refresher training in the provisions of this regulation. Evidence that the required training has been completed must be posted and made available for inspection by the Administrator at the demolition or renovation site.

**Demolition Operations [61.145 (c)(9)]**

For facilities ordered to be demolished, the portion of the facility that contains RACM must be kept adequately wet during the wrecking operation.

**Intentional Burning [61.145(c)(10)]**

If the facility is demolished by intentional burning, all RACM, including Categories I and II nonfriable ACM must be removed before burning.

**Disturbance of Category I Nonfriable ACM [61.145 (c)(11)]**

If Category I nonfriable ACM (packings, gaskets, resilient floor covering and asphalt roofing products) is sanded, ground, cut or abraded, the owner or operator must:

- adequately wet the material during the sanding, grinding, cutting or abrading operations;
- comply with the requirements of §61.145(c)(3)(i) if wetting would unavoidably damage equipment or present a safety hazard;
- handle asbestos material produced by sanding, grinding, cutting or abrading as asbestos-containing waste material subject to the waste handling and collection provisions of §61.150.

## WASTE DISPOSAL REQUIREMENTS (61.150)

Section 61.150 of the asbestos NESHAP addresses the collection, transport, deposition, and recordkeeping requirements pertaining to ACWM.

ACWM is defined as any waste that contains commercial asbestos and is generated by a source subject to the provisions of the standard. The term includes:

- control device asbestos waste (e.g., filters, slurries),
- bags or other similar packaging contaminated with commercial asbestos,
- friable asbestos waste material,
- Category II nonfriable ACM waste that has become friable, and
- materials contaminated with asbestos (disposable equipment, clothing, plastic sheeting, cleanup equipment waste, shower water and excess water from wetting procedures).

### Visible Emissions

Each owner or operator of any source covered under the provisions of the asbestos NESHAP must either discharge no visible emissions (VE) to the outside air during the collection, processing, (including incineration), packaging or on-site transporting of any ACWM generated by the source, or use one of the emission control and waste treatment methods described later in this section.

In a 1989 court ruling in Rhode Island (Hugo Key versus EPA), the judge ruled that debris on the ground outside a building was a violation of the no VE requirement. In this case the evidence consisted of pieces of friable asbestos material that had come off an asbestos-covered tank as it was dragged out of a building into a parking lot. The court's interpretation of this part of §61.150 provides greater enforcement flexibility of the no VE requirement and, hence, a need for inspectors to collect samples of ACWM found outside a facility.

#### *Treatment with Water*

- Adequately wet ACWM and seal it, while wet, in leak-tight containers. For materials that will not fit into containers without additional breaking, enclose them in leak-tight wrapping.
- Keep ACWM generated during ordered demolitions or demolitions where RACM is not required to be removed adequately wetted at all times after demolition and during handling and loading for transport to a disposal site. Such ACWM does not have to be sealed in leak-tight containers or wrapping, but may be transported and disposed of in bulk.

- Label containers of ACWM or wrapped ACWM using warning labels specified by OSHA 29 CFR 1910.1001 or 1926.58.
- Label ACWM destined for off-site transport with the name of the waste generator and the location where the waste was generated.

***Processing ACWM into Nonfriable Forms:***

- Form all ACWM into nonfriable pellets or other shapes while discharging no visible emissions to the outside air.

***Emission Control Alternatives:***

- Use an alternative emission control and waste treatment method that has received prior approval by the Administrator.

**Deposition of ACWM**

Deposit, as soon as is practical, all ACWM (excluding Category I nonfriable ACM in good condition) at a waste disposal site operated in accordance with §61.154, or at an EPA-approved site that converts RACM and ACWM into nonasbestos (asbestos-free) material (61.155).

**Vehicle Marking**

Vehicles used to transport ACWM must be marked during the loading and unloading of waste so that the signs are visible and markings in conformation with §61.149(d)(1)(i-iii).

**Off-site Transport of ACWM**

Each owner or operator of a demolition/renovation operation must:

- Maintain appropriate waste shipment records.
- Provide a copy of the waste shipment record to the disposal site owners or operators when the ACWM is delivered to the site.
- Contact appropriate personnel to determine the status of the waste shipment if a copy of the waste shipment record, signed by the owner or operator of the waste disposal site, is not received by the waste generator within 35 days of the date the waste was accepted by the initial transporter.
- Report in writing to EPA if such a signed copy has not been received by the waste generator within 45 days of the date the waste was accepted by the initial transporter.
- Retain a copy of all waste shipment records, including the signed copy of the waste shipment record, for at least 2 years.

### Record Availability

Each owner or operator of a demolition/renovation operation must provide to the Administrator, upon request, all records required under this section.

## AIR CLEANING (61.152)

Under certain conditions detailed in §61.145, Standard for demolition and renovation and §61.150, Standard for waste disposal ..., an owner or operator may choose to control asbestos emissions by using a local exhaust ventilation and collection system. However, if a source cannot meet the air-cleaning requirements when it has elected to do so, it defaults to the "No Visible Emission" component of the standard. The following summarizes requirements pertaining to the use of such a system.

### Fabric Filters

Fabric filters may be used; however, if the use of fabric creates a fire or explosion hazard, or if the Administrator determines that a fabric filter is not feasible, use of wet collectors may be authorized.

*Note:* Due to the transient nature of asbestos abatement, fabric filters are uneconomical, and, therefore, rarely, if ever, used at demolition or renovation sites.

### HEPA Filters

HEPA filters capable of retaining 99.97 percent efficient as determined by ASTM method D-2986-71 may be used.

*Note:* HEPA filtration units are commonly used at demolition/renovation worksites.

### Other Filtration Devices

Other filtering equipment may be authorized for use if the owner or operator demonstrates to the Administrator that it is equivalent to the described equipment in filtering particulate asbestos material.

## ACTIVE WASTE DISPOSAL SITES (61.154)

To be an acceptable site for disposal of ACWM, an active waste disposal site must meet the following requirements:

- **61.154 (a)** - Produce no visible emissions to the outside air where ACWM has been deposited [or meet the requirements of §61.154 (c) or (d)];
- **61.154 (b)]** - Unless a natural barrier adequately deters access by the general public, install and maintain warning signs and fencing [or meet the requirements of §61.154 (c)(1)];

- **61.154 (c)** - At the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, cover the ACWM that has been deposited at the site during the operating day or previous 24-hour period with:

  - at least 6 inches (15 centimeters) of compacted nonasbestos-containing material [61.154 (c)(1)], or

  - a resinous, petroleum-based, or other dust suppression agent, approved by the Administrator, that effectively binds dust and controls wind erosion (Waste oil is not considered a dust suppression agent.)[61.154 (c)(2)].

- **61.154 (d)** - Rather than meet the no visible emission requirement of §61.154 (a), use an alternative emissions control method that has received prior written approval from the Administrator.

Figure 6-1 illustrates waste disposal site requirements.

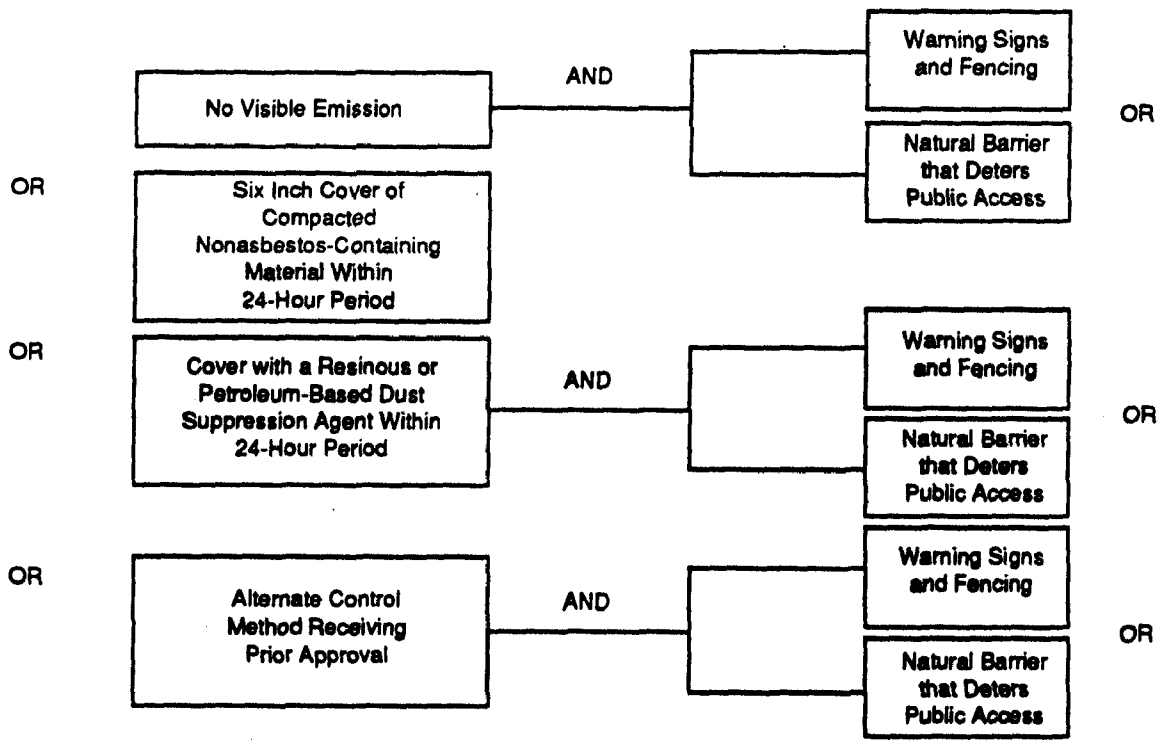



Figure 6-1. Waste disposal site requirements.

- **61.154 (e)** - For all ACWM received, the owner or operator of the active waste disposal site shall do the following:

  - Maintain waste shipment records, using a form similar to that shown in Figure 4 of the regulation.

  - Send a copy of the signed waste shipment record to the waste generator as soon as possible, and no longer than 30 days after receipt of the waste.

  - Upon discovering a discrepancy between the quantity of waste designated on the waste shipment records and the quantity actually received, attempt to reconcile the discrepancy with the waste generator. (If the issue is not resolved within 15 days after receiving the waste, report this in writing to the governmental agency responsible for administering the asbestos NESHAP program for the waste generator and, if different, the governmental agency responsible for administering the asbestos NESHAP program for the disposal site.),

  - Retain a copy of all records and reports required by this paragraph for at least 2 years.

  - Additional requirements of §61.154 concern:

    - recordkeeping;
    - closure procedures;
    - availability of records for inspection; and
    - the need to obtain approval from the Administrator prior to excavating or otherwise disturbing deposited and covered ACWM.

# SECTION 7

# RESPIRATORY PROTECTION EQUIPMENT

## CLASSES OF RESPIRATORS

The two major types of respiratory protection equipment available are air-purifying respirators (APRs) and supplied-air respirators (SARs). Air-purifying respirators have filters through which air passes before it is breathed. APRs may be classified as positive or negative pressure respirators depending on whether the user creates the suction to draw air into the mask (negative pressure) or a fan propels filtered air to the facepiece (positive pressure). SARs deliver air through a hose or airline from a tank or compressor to the user.

The overall protection afforded by a given respirator may be stated in terms of its protection factors (PF). Protection factors for classes of respirators (i.e., half-face, full- face) have been determined by comparing the concentration of a contaminant in the ambient atmosphere to that inside the respirator under use conditions. Half-face negative pressure air-purifying respirators have the lowest protection factor of all classes of respirators, whereas self-contained breathing apparatus (SCBA) systems have the highest.

In this section the design, physical operation, advantages and disadvantages for each of the commonly encountered respirators will be discussed.

### Air-Purifying Negative Pressure Respirators

- ***Single use disposal dust mask***—This paper mask is held onto the face by an elastic band or cloth ties. Disposable masks should never be used in an asbestos-contaminated atmosphere for they do not seal to the face and, therefore, cannot provide sufficient protection.
- ***Half-Mask***—Fits over the bridge of the nose, along the cheek, and under the chin. Two head bands form a four-point suspension to hold the mask in place and maintain the facepiece seal. During inhalation a slight vacuum (negative pressure) is created within the facepiece, causing ambient air to be drawn through High Efficiency Particulate Air (HEPA) filter media and into the facepiece. The expired air exits through an exhalation valve at the bottom of the facepiece.
- ***Full-Face***—Fits over the face across the forehead, along the temple and the cheek, and under the chin. These devices have a head harness with a 5- or 6-

point suspension. During inhalation a slight vacuum (negative pressure) is created in the facepiece, causing ambient air to be drawn through the HEPA filter media and into the facepiece. The expired air exits through an exhalation valve at the bottom of the facepiece.

- *Advantages*
  - size;
  - cost;
  - freedom of movement; and
  - ease of decontamination, cleaning and storage.

- *Disadvantages*
  - filter use limited to specified contaminants;
  - filter loading increases breathing resistance;
  - facepiece fit is critical;
  - requires filter changes;
  - not suited for atmospheres having less than 19.5 percent oxygen;
  - physiologically more stressful than air-supplied respirators;
  - requires fit testing; and
  - full facepiece reduces range of vision.

**Powered Air-Purifying Respirators (PAPRs) - Equipped with HEPA Filters**

Powered air-purifying respirators (PAPRs) have auxiliary battery-powered, motorized filtration units which blow purified air to the facepiece. Since this creates a slight positive pressure in the mask, any breach in the facepiece seal should permit only the outward flow of air from the mask, thereby preventing inhalation of contaminated air.

Some PAPRs are designed so that the motorized filtration unit is worn on the waist.

Alternatively, the unit may be an integral part of the mask itself.

PAPRs may have tight-fitting facepieces or loose-fitting hoods or helmets. PAPRs with tight-fitting masks must supply a minimum of 4 cubic feet of air per minute (4 cfm) to the user whereas the hood or helmet type must supply 6 cfm.

- *Advantages*
  - minimizes leakage of unfiltered air into the mask;
  - fit testing is not required by OSHA;
  - possibly less stressful to use than negative pressure respirators; and
  - provides greater comfort to wearer.

- *Disadvantages*
  - not suited for atmospheres having less than 19.5 percent oxygen;
  - require filter changes;
  - operating time is limited by the battery pack;
  - tight fitting facepiece PAPRs have the same protection factor as full facepiece negative pressure respirators [according to EPA (EHSD)];
  - higher cost than negative pressure respirators [according to EPA (EHSD)];
  - motor will short out if it gets wet (during showering, i.e.);
  - battery pack may develop "use life" memory shorter than expected operating time if the battery is not fully used;
  - due to their loose fit, hood or helmet type PAPRs do not afford the wearer protection from airborne asbestos fibers if the battery pack fails; and
  - full facepiece reduces range of vision.

**Air-Line (Type C) Supplied-Air Respirators**

Air-line (Type C) respirators consist of a half-mask, full-facepiece, hood or helmet to which Grade D breathing air is supplied through a small diameter, high pressure air-line. There are two modes of operation:

***Pressure-Demand Mode***—The pressure-demand supplied air respirator has a regulator and valve design that maintains a positive pressure in the facepiece at all times. Should a reduction of pressure within the mask be sensed, air flow is increased to preserve a positive pressure.

***Continuous-Flow Mode***—The continuous-flow, supplied-air respirator maintains a constant airflow and therefore, in most cases, a positive pressure within the facepiece at all times. Instead of a regulator, it uses a control valve or orifice to adjust air flow.

Each of the two types of supplied-air respirators has its advantages and disadvantages:

- *Advantages*
  - lightweight;
  - breathing air supply is not limited to that which the user can carry; and
  - provides a high level of protection.

- *Disadvantages*
  - hose or air line restricts wearer's movement and may become damaged;
  - offers no protection if air supply fails;
  - expensive system to establish;
  - compressor which supplies the air must be located in an uncontaminated (asbestos-free) environment;

- compressor which supplies the air should not be located in areas where there may be elevated levels of CO, gas fumes, or other potentially toxic substances;
- full facepiece reduces range of vision; and
- system cannot easily be transported.

**Air-Line Respirator with Self-Contained Auxiliary Air Supply**

This respirator combines an air-line respirator with an auxiliary air supply (SCBA) to provide the user with respirable air if the main air supply fails.

- ***Advantages***
  - may be used in IDLH (Immediately Dangerous to Life and Health) atmospheres; and
  - as previously stated for other SARs.

- ***Disadvantages***
  - auxiliary air supply time is limited (for escape purposes only)
  - additional equipment carried increases wearer stress;
  - requires additional training;
  - hose or air line restricts wearer's movement and may become damaged;
  - expensive system to establish;
  - compressor requirements as previously stated for Type C SARs;
  - full facepiece reduces field of vision.

**Supplied-Air (Type C) Respirator with HEPA Filter**

This respirator system consists of a full-facepiece air-line respirator a backup with HEPA filter. It allows the user to disconnect from the air supply system in an emergency and proceed through standard decontamination procedures while breathing through the HEPA cartridges.

- ***Advantages***
  - greater mobility during decontamination; and
  - affords the wearer protection if the air supply fails.

- ***Disadvantages***
  - facepiece requires fit testing since respirator reverts to a negative pressure mode when utilizing HEPA cartridges;
  - restriction of wearer's movement due to the air line; and
  - not suitable for IDLH atmospheres;
  - possibility of damage to the hose or air line; and
  - full facepiece reduces range of vision.

### Self-Contained Breathing Apparatus (SCBA)

The self-contained breathing apparatus consists of a full-facepiece, regulator, and a respirable compressed air supply. The SCBA allows the user to carry the air supply, thus eliminating the need for a stationary air supply. The SCBA must operate in the pressure-demand mode to be used in asbestos atmospheres.

- *Advantages*
  - wearer carries own air supply;
  - highest protection factor; and
  - pressure-demand type respirator is approved for IDLH conditions.

- *Disadvantages*
  - use time limited by air supply;
  - devices are bulky and heavy;
  - requires more extensive training than for other respiratory devices;
  - decontamination may be difficult;
  - refilling tanks may pose problems; and
  - very expensive.

SCBA proficiency tests and checkout procedures are included as Appendix B to this manual.

## SELECTION OF RESPIRATORS

The following presents the criteria for respirator selection provided in the EPA Environmental Health and Safety Division (EHSD) *Health and Safety Guidelines for EPA Asbestos Inspectors*. The EHSD document addresses the use of known or expected fiber concentrations and the type of inspection activity as the principal criteria for determining respirator usage. The entire EPA guidelines document (which is included as Appendix C to this manual) should be reviewed by anyone conducting asbestos inspections.

### General Requirements

In general, inspectors should not wear respirators unless they have been deemed "medically fit" to wear such protection. The determination of whether the individual is medically fit is made by a physician relying on information obtained through a medical and work history questionnaire, a physical examination including a chest x-ray, pulmonary function tests and gastrointestinal exam, and other tests or information deemed necessary by the medical monitoring provisions of EHSD and OSHA regulations.

Inspectors should use only agency-owned respiratory protection equipment that they have been specifically trained and fit-tested to use. Inspectors should never use equipment offered by the abatement contractor. Supplied air respirators other than SCBAs probably will not be worn by inspectors since it is doubtful that their agencies will provide the equipment necessary for this type of system.

## Respirator Selection Criteria

Ideally, respirators should be selected according to the actual or potential airborne asbestos concentrations present at the site. When an exposure level cannot be determined, an unknown exposure condition exists. Such a situation requires the use of SCBA. SCBA offers the maximum level of respiratory protection. The buddy system is required in situations where the SCBA user is in an atmosphere that is either oxygen deficient or highly toxic and would be life threatening in case of respirator failure. All activities covered by these guidelines which would not result in a life-threatening or permanent injury situation would not require using the buddy system.

Fortunately, much is known about the exposure conditions encountered at various worksites. In 1989, Alliance Technologies Corporation, under contract with EPA, reviewed PCM analytical data for over 4,000 air monitoring samples taken during renovation activities at schools, residential buildings, hospitals, offices and industrial buildings. The study concluded that, when the OSHA asbestos standards for renovations were followed, no concentrations in excess of 0.82 f/cc were found in the removal areas during active abatement 95 percent of the time.

The OSHA permissible exposure limit (PEL) for asbestos is 0.2 f/cc and the NIOSH recommended exposure limit is 0.1 f/cc. The EPA, on the other hand, recommends that inspectors' exposures to asbestos be limited to below 0.01 f/cc as an 8 hour Time Weighted Average (TWA). Respirator selection criteria found in the Health and Safety Guidelines are based on this TWA.

If asbestos inspectors can make a determination of a project's OSHA compliance prior to entering containment, they can choose to use the lowest acceptable level of respiratory protection, a NIOSH-approved, full facepiece respirator with HEPA filtration or any approved tight-fitting (i.e. having a tight face-to-facepiece seal) powered air-purifying respirator (PAPR) with HEPA filtration. This conclusion is based on the following assumptions:

- exposures in renovation sites in compliance with OSHA do not exceed 2.0 f/cc 95% of the time;
- full facepiece air-purifying respirators (and tight-fitting PAPRs) provide a protection factor of 50x;
- inspectors will not be in the asbestos enclosure envelope for more than two hours per day.

A 50x protection at an exposure level of 2.0 f/cc for two hours would result in an exposure of 0.01 f/cc TWA. Actually, most exposures would be far less than 0.01 f/cc, for most individuals attain greater than a 50x protection factor from full-face respirators and tight-fitting PAPRs and rarely will be in the envelope for two hours.

Air-purifying respirators include powered air purifying respirators (PAPR). These guidelines assume that PAPRs provide the same protection as other air-purifying respirators due to the possibility that overbreathing (i.e. inhaling at a rate that is greater than the air supplied to the facepiece, resulting in a negative pressure in the facepiece) can occur. This guideline is consistent with the NIOSH Respiratory Decision Logic of 1987 with respect to the protection offered by PAPRs. Additional PAPR studies are being planned by NIOSH; if PAPRs are shown to have higher protection factors in the future, appropriate changes will be made regarding selection of respiratory protection.

*OSHA Asbestos Standard Compliance*

An abatement project's compliance with the OSHA asbestos standards can be gauged by findings that:

1. Records on- or off-site show that all employees have been trained as required by OSHA standards. When records are kept off-site, the inspector should ask the supervisor to state that proper records exist and are available for later review. (Passing an approved AHERA class is desirable but not required for buildings not covered by the AHERA regulations. Compliance with state and local training requirements should be checked on a case-by-case basis.);

2. Records, either on- or off-site, show that project employees have been given medical exams, including a determination that they are fit to wear respirators;

3. Amended water is being used to wet the ACM. (Check to see that amended water is on-site outside the envelope.);

4. No power tools are being used to remove ACM;

5. The envelope is secure and no dust or debris appears to be coming from the removal area;

6. Warning signs are posted and adequately labeled containers are being used in the removal of ACM;

7. A permit for disposal has been obtained from the State or local government;

8. Employees are carefully removing ACM and not dropping materials on the floor;

9. Decontamination accommodations, including shower facilities, are in place;

10. Existing monitoring data indicate that asbestos fibers in the work area do not exceed 2.0 f/cc as an 8-hour TWA;

11. There is a written respiratory protection program and respirators are being used; and

12. A removal plan has been (or can be) made available for review.

The asbestos NESHAP inspector must exercise proper judgment in determining that air-purifying respirators will provide adequate protection. The capability to make such determinations must be obtained through both classroom and on-the-job training. EPA inspectors entering a removal, demolition or renovation area should select the appropriate respiratory protection according to the following locations and conditions.

***No Respiratory Protection Required***

No respiratory protection is required *outside* of the asbestos area-enclosing envelope when:

- inspecting office areas and other locations outside the barrier. All barrier seals must be intact, and all envelope entrances must have at least a double barrier. No visible airborne dust or debris that is potentially asbestos-contaminated should be present on any surface in the area;
- secondary containment is in place during glove-bagging operations. The secondary containment enclosure must be complete, and, for all but small-scale, short-duration operations, must also be under negative pressure;
- materials removed from the envelope have been cleaned and the pathway for removal of bags and equipment is clear and clean;
- all ventilation systems in the envelope are off and sealed (This excludes negative-pressure systems designed for the removal project.); and
- wet methods are being used.

No respiratory protection is required *inside* the envelope when:

- inspecting any restricted area has already passed an appropriate clearing test (e.g., minimum of aggressive sampling demonstrating a concentration below 0.01f/cc by PCM); or
- no removal work has begun and all ACM is intact, not disturbed, not damaged, no debris is present, and the inspection will not disturb any ACM.

***Respiratory Protection Required***

Respiratory protection will be required in many situations encountered by inspection personnel, both inside and outside the active removal area. For example, respiratory protection and personal protective equipment are required for inspections conducted outside the work area if all of the previously listed conditions have not been met. In addition, respirators and personal protective equipment are required whenever an inspector enters a work area that has not been cleared for reoccupancy.

To determine the type of respiratory protection required, an inspector must rely on available information and observations of the conditions at the work site. As a *minimum*, the EHSD document requires either a full-face, air purifying negative pressure respirator with HEPA filters or a powered air purifying respirator (PAPR) with HEPA filters. An inspector can upgrade respirator selections at any time, but should never downgrade selection.

To determine the type of respirator to use, a number of conditions must be met. These conditions can be identified through a records review, pre-entry observations and interviewing site personnel. If adequate information is not available to document all of these conditions, an inspector must use his/her judgment to determine the level of respiratory protection to wear. If upon entering the work area enclosure the inspector determines that the conditions have not been met, he/she should immediately leave the work area and upgrade the level of respiratory protection.

*Air-purifying Respirators*

Full facepiece air-purifying respirators or tight-fitting PAPRs shall be worn by inspectors when:

- inspecting outside the barrier where workers outside the barrier are wearing air-purifying respirators;
- inspecting outside the barrier where the barrier is not complete and/or asbestos-containing debris is present;
- inspecting inside the envelope when an inspection of the operation shows it to be in compliance with the OSHA asbestos standard. If upon entering the envelope, visible emissions are seen or other evidence suggesting non-compliance is apparent, the inspector will **immediately** leave the area. Prior to returning to the removal area to document violations, the inspector shall don SCBA gear;
- inspecting inside the barrier and no active removal or disturbances have occurred in the past 24 hours and the inspection will not disturb any ACM.

*Atmosphere-supplying Respirators*

Atmosphere-supplying respirators are required when:

- performance of the asbestos abatement project is not in accordance with OSHA standards;
- materials are being removed which are not being be properly wetted, or removal causes the generation of significant levels of dust;
- monitoring data at the site show levels in excess of 2.0 f/cc;

- the inspector will be spending more than 2 hours inside the containment envelope; and
- others at the site are wearing atmosphere-supplying respirators.

If the above conditions are not met, or if during the course of the inspection the conditions change, a self-contained breathing apparatus (SCBA) will be required. Supplied air respirators (SARs) may not be acceptable if this would require the inspector to use contractor equipment.

## OTHER MEDICAL/PHYSICAL CONSIDERATIONS IN RESPIRATOR USAGE

### Medical Monitoring

- Wearing a respirator imposes a physical stress on the user. Air-purifying respirators require some effort during inhalation and exhalation to overcome the resistance of the filter media and valve seals. The physical weight of an SCBA may create a problem especially if extended work time and strenuous work are required. Air-line respirators impose some physical stress due to the weight of the attached air-line hose. OSHA regulations state that a person shall not be required to wear respiratory protective devices unless it has been determined that he/she is physically capable of doing so. A physician knowledgeable in the field of occupational health should assess one's pulmonary and cardiovascular status relative to respirator usage.
- Pulmonary considerations: the wearer should be examined for any respiratory impairment from disorders such as emphysema, obstructive lung disease, bronchial asthma, etc. Medical tests required are pulmonary function (PFT), FEV, FVC, and chest x-rays. This testing is preceded by the completion of a medical and work history questionnaire.
- Cardiovascular: the wearer must be evaluated according to one's medical history and current cardiovascular status. A stress test may be required for certain individuals in order to determine the absolute risk.

### Miscellaneous Considerations

- Facial hair: OSHA standards prohibit the use of respirators if one has any growth of facial hair. The effect of facial hair on a respirator's performance (half-mask and full-facepiece respirator) depends upon the degree to which the hair interferes with the sealing surface of the respirator, the physical characteristics of the facial hair, the type of respirator worn in relation to the wearer's facial characteristics, etc. In all cases, however, the wearer cannot expect to obtain a face seal as satisfactory as those obtained by persons who are clean shaven.

- Scars, hollow temples, high cheekbones, deep skin creases, and the lack of teeth or dentures may cause respirator sealing problems. Full dentures should be worn when wearing a respirator, but partial dentures may or may not have to be removed. Full lower dentures may be a problem since the lower edge of the mask may unseat the dentures.
- An inspector may be deemed medically fit to wear a respirator; however, he/she may feel claustrophobic in one and therefore be considered "psychologically" unfit. Prior to using personal protective clothing and a respirator during an actual inspection, an inspector is advised to conduct a test run.

# SECTION 8

# ASBESTOS INSPECTOR SAFETY GUIDANCE

Safety requirements and/or guidelines for government employees involved in asbestos inspection activities are addressed in one form or another in regulations and policies developed by four separate Federal government agencies/groups. Each approaches the subject differently, not always citing asbestos inspectors specifically, but contributing to the overall purpose.

The Occupational Safety and Health Administration (OSHA) and the U.S. Environmental Protection Agency (EPA) have each promulgated regulations pertaining specifically to workers involved in the asbestos industry. The OSHA standards (29 CFR 1910 and 1926) apply to workers involved in the removal, demolition, installation, repair, maintenance, transportation and disposal of asbestos-containing materials.

The National Institute for Occupational Safety and Health (NIOSH) and EPA, as part of a joint venture, were responsible for publishing respiratory protection safety guidance for persons who work in the asbestos abatement industry. This 1986 document, *A Guide to Respiratory Protection for the Asbestos Abatement Industry*, provides information on the hazards associated with airborne asbestos, a model respiratory protection program and recommendations concerning appropriate respirators for reducing asbestos exposure.

The EPA Worker Protection Rule (40 CFR 763) extends provisions of the OSHA asbestos standard to state and local asbestos workers not covered by the Federal OSHA standard.

Most applicable to EPA inspectors assessing compliance with the asbestos NESHAP regulation are the guidelines provided in the *Health and Safety Guidelines for EPA Asbestos Inspectors* prepared by EPA's Environmental Health and Safety Division (EHSD), formerly the Occupational Health and Safety Staff (OHSS). These guidelines are specific to EPA asbestos inspectors and incorporate many of the procedures and practices recommended or required by the previously mentioned regulations and policies.

## OSHA ASBESTOS STANDARDS

The Occupational Safety and Health Administration (OSHA) regulates employee exposure to airborne asbestos fibers in the workplace. The current OSHA regulation encompasses two standards: an amended standard for general industry (29 CFR 1910.1001) and a completely separate standard for the construction industry (29 CFR 1926.58). The latter represents the first health standard issued solely for the construction industry.

The construction standard differs from the general industry standard in that it contains a number of specific job site requirements unique to the construction industry. These include requirements for a "competent person" to supervise site activities; negative pressure enclosures; delineated regulated areas where exposures are or may be above the permissible exposure limit (PEL) and where personal protective equipment is worn; decontamination area(s); clean room(s); shower area(s); equipment room(s); and decontamination entry/exit procedures. The remainder of this subsection focuses on the regulatory requirements specified in the construction industry standard (29 CFR 1926.58).

### Scope and Application (Construction Industry Standard)

The Construction Industry Standard applies to all construction work as defined in 29 CFR 1910.12(b) including, but not limited to the following activities where asbestos, tremolite, anthophyllite or actinolite is present:

- demolition or salvage;
- removal or encapsulation;
- construction, alteration, repair, maintenance or renovation;
- installation of products containing asbestos;
- spill/emergency cleanup; and
- transportation, disposal, storage or containment of asbestos onsite.

### Definitions

The OSHA Asbestos Regulation includes a "Definitions" section within the standard. Included in these definitions are the following:

- ***Action Level***—Airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals of 0.1 f/cc of air calculated as an 8-hour, time-weighed average. Triggers exposure monitoring, medical surveillance, and employee information and training requirements.
- ***Competent Person***—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. The competent person has specific duties as outlined in 1926.32(f).
- ***Decontamination Area***—An enclosed area adjacent and connected to the regulated area consisting of an equipment room, shower and clean room.
- ***Demolition***—The wrecking or taking out of any load-supporting structural member and any related razing, removing or stripping of asbestos, tremolite, anthophyllite or actinolite products.

- ***Equipment Room (Change Room)***—Contaminated room located within the decontamination area that is equipped for the disposal of contaminated materials.
- ***Permissible Exposure Limit (PEL)***—No employee can be exposed to an airborne concentration of asbestos in excess of 0.2 f/cc of air as an 8-hour, time-weighted average (TWA). (The 1986 OSHA reduction of the TWA PEL from f/cc 2.0 to 0.2 f/cc was expected to reduce the excess cancer mortality risk for lifetime exposure to asbestos from 64 deaths per 1,000 workers to 7 deaths per 1,000 workers).
- ***Regulated Area***—Established by the employer to demarcate areas where airborne concentrations of asbestos, tremolite, anthophyllite or actinolite exceed, or can reasonably be expected to exceed, the permissible exposure limit.
- ***Removal***—Taking out or stripping of asbestos, tremolite, anthophyllite or actinolite, or materials containing these minerals.
- ***Renovation***—The modifying of an existing structure.
- ***Repair***—Overhauling, rebuilding, reconstructing or reconditioning.

## Communication Among Employers

On multi-employer work sites, employers introducing potential asbestos hazards onto the work site must inform other employers on the site of their activities and of the existence and requirements pertaining to regulated areas.

## Regulated Areas

- The employer shall establish a regulated area in work areas where airborne concentrations of regulated materials exceed or can reasonably be expected to exceed the PEL.
- Access shall be limited to authorized persons.
- Respirators shall be supplied to all persons entering the regulated area.
- Prohibited activities within the regulated area include eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.
- Requirements for asbestos removal, demolition and renovation operations require that:
  - Whenever feasible, a negative pressure enclosure shall be established; and
  - The employer shall identify a competent person to set up the enclosure, ensure its integrity, limit entry and exit, supervise employee exposure monitoring, ensure that proper protective clothing and respirators are

being worn, ensure employees are properly trained, ensure that employees use hygiene facilities and observe decontamination procedures, and ensure that engineering controls are functioning.

- ***Exception***—For small-scale, short-duration projects such as pipe repair, valve replacement, installing electrical conduits, installing or removing drywall, roofing and other general building maintenance or renovation, the employer is not required to comply with the above requirements.

**Exposure Monitoring**

- Each employer who has a workplace or work operation covered by this standard shall perform monitoring to accurately determine airborne concentrations of the regulated materials to which employees may be exposed.

**Methods of Compliance**

Engineering Controls and Work Practices—The employer shall use one or any combination of the following control methods to reduce the fiber level below the PEL:

- local exhaust ventilation equipped with HEPA filter dust collection systems;
- general ventilation systems;
- vacuum cleaners equipped with HEPA filters;
- use of wet methods, wetting agents, or removal encapsulants;
- prompt disposal of wastes contaminated with asbestos, tremolite, anthophyllite, or actinolite in leak-tight containers;
- use of work practices or other engineering controls that the Assistant Secretary can show to be feasible; and
- wherever the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the limit prescribed (the PEL), the employer shall use them to reduce employee exposure to the lowest levels attainable by these controls, and shall supplement them by the use of respiratory protection.

Appendix F of the OSHA Standard contains more specific engineering controls and work practices.

- ***Prohibitions***
  - high-speed abrasive disc saws not equipped with necessary engineering controls; and

- compressed air that is not used in conjunction with an enclosed ventilation system designed to capture the dust cloud.

**Employee Rotation**

Employers shall not use employee rotation as a means of compliance with the PEL.

**Respiratory Protection**

- The employer shall provide respirators and ensure that they are used when respirator use is required.
- Respirators shall be selected according to Table 2 in the Asbestos Standard.
- The employer shall provide a powered air-purifying respirator (PAPR) in lieu of a negative pressure respirator when requested and appropriate.
- When necessary, a respirator program shall be instituted in accordance with 29 CFR 1910.134.
- Respirator Fit Testing.

Quantitative or qualitative fit testing shall be performed at the initial fitting and every 6 months thereafter for *each employee* wearing a *negative pressure* respirator.

**Protective Clothing**

- Protective clothing shall be provided by the employer for any employee exposed to airborne concentrations of the regulated materials that exceed the PEL.

**Hygiene Facilities and Practices**

- In general, except for small-scale, short-duration activities, the employer shall provide clean change areas for employees required to work in regulated areas or required to wear protective clothing.

**Requirements for Removal, Demolition and Renovation Operations**

A decontamination area must be established contiguous to the work area whenever the PEL is expected to be exceeded (small-scale, short-duration operations expected).

**Communication of Hazards to Employees**

Warning signs must be provided to demarcate the regulated area. The warning signs must bear the information outlined in the Standard.

### Employee Information and Training

A training program shall be instituted for all employees exposed to airborne concentrations of asbestos, tremolite, anthophyllite or actinolite, in excess of the action level.

### Housekeeping

- HEPA vacuums are required where vacuuming methods are selected.
- Asbestos waste consigned for disposal must be collected and disposed of in *sealed, labeled, impermeable bags* or other closed, labeled, impermeable containers.

### Medical Surveillance

Employees are covered by this part of the standard if engaged in work involving airborne levels at or above the action level (0.1 f/cc) for 30 or more days per year.

### Recordkeeping

Medical Surveillance records and exposure monitoring data must be kept for the duration of the person's employment plus 30 years.

### Excursion Limit

In September 1988, OSHA amended its two asbestos standards (29 CFR 1910 and 1926) to establish an excursion limit for asbestos exposure.

No employee can be exposed to an airborne concentration of asbestos in excess of 1.0 f/cc as averaged over a sampling period of 30 minutes. This limit is expected to save 118 people based on lifetime exposures (45 years) and 79 lives based on 20-year exposures.

## EPA WORKER PROTECTION RULE

The EPA Worker Protection Rule (40 CFR 763, Subpart G), originally published in the Federal Register on April 25, 1986 and amended on February 25, 1987 (to reflect OSHA's reduction of the PEL from 2.0 f/cc to 0.2 f/cc), extends provisions of the OSHA Asbestos Standard to state and local government employees who are not covered by state asbestos standards approved by OSHA or by standards that EPA has determined are comparable or more stringent than the EPA rule. The Worker Protection Rule is essentially the same as OSHA's construction industry standard. It differs from the OSHA standard in that it applies solely to asbestos abatement activities. In contrast, the OSHA standard applies to all construction activity involving potential asbestos exposures.

The rule also differs from the OSHA standard in how asbestos is defined, specifically in the language of the definition and by the exclusion of non-asbestiform varieties. The EPA rule has specific reporting requirements not included in the OSHA rule. These requirements

specify that the EPA must be notified prior to undertaking an asbestos abatement project. Notice must be postmarked or delivered at least 10 days prior to abatement. The exception to the notification requirement is for abatement projects involving less than 3 square or linear feet of friable asbestos, and for emergency projects. For emergency projects, the employer must notify EPA "as soon as possible but in no case more than 48 hours after the project begins." The notification must also include a statement that governmental employees are conducting the asbestos abatement activities.

Alternatively, a source subject to the EPA Worker Protection Rule may choose to notify the EPA pursuant to the asbestos NESHAP.

## EPA/NIOSH GUIDANCE

In April 1986, NIOSH and EPA published a jointly prepared guidance manual entitled, *A Guide to Respiratory Protection for the Asbestos Abatement Industry*, EPA 560-OPTS-86-001. This document was intended to provide practical guidance in the selection and use of respiratory protection for persons working in the asbestos abatement industry. The guide was also meant to apply to other types of work activities where exposure or the potential for exposure to airborne asbestos exists.

The document consists of five sections and a number of informational appendices. Specifically, the guide contains the following information:

- a model respiratory protection program including minimum regulatory requirements (at the time of publication);
- a checklist for use in developing or evaluating a respiratory protection program;
- a section on breathing air systems;
- a listing of sources of help for respirator users;
- appendices including fit test procedures, general safety considerations, heat stress considerations, and information on breathing air systems;
- NIOSH/EPA recommendations and basis for recommendations concerning the types of respirators appropriate for use in the abatement industry.

## EHSD GUIDELINES

EPA's Environmental Health and Safety Division's (EHSD's) *Health and Safety Guidelines for EPA Asbestos Inspectors* (attached as Appendix C) are designed to:.

- provide appropriate health and safety information based on the best currently available data for use by EPA's asbestos inspectors; and
- reduce the risks that are associated with some types of asbestos exposures .

The guidelines, although developed for use by EPA inspection staff, are encouraged to be used by state and local inspectors, as well as contractors.

EHSD will continue to monitor and analyze health and safety issues of concern to EPA asbestos inspectors and revise these guidelines periodically as additional significant information from field experience and other sources becomes available.

The following subsections outline the general requirements detailed in the Guidelines. Specific recommendations found in the guidelines on respirator selection, entry and exit procedures, and protective clothing requirements are addressed in subsequent sections of the workshop manual.

**Health and Safety Plan**

A general asbestos inspector health and safety plan must be prepared by each agency/group involved in conducting asbestos inspections. The plan should, at a minimum, include information on the following:

- ***Emergency Procedures***—The plan must include procedures to follow in case of: (1) a medical emergency; (2) accidental release of asbestos; and (3) other emergency situations. For medical emergencies the plan must include the locations and telephone numbers of the nearest medical emergency facility and ambulance service. For asbestos release situations, the plan must include procedures for notifying responsible building officials and affected building occupants. For other emergency situations, emergency and non-emergency local phone numbers for the police department, fire department and the nearest 24-hour poison control center must be noted. In all cases, the location of the nearest phone should be included to make the general plan site-specific.
- ***Personal Protective Equipment***—The plan must specify protective equipment requirements including respiratory equipment and protective clothing available and the types of inspections during which they should be used.
- ***Operational Practices***—The operational practices for each type of inspection likely to be performed must be specified in the plan.

**Evaluation**

The local senior management official should assure that these guidelines are reviewed and revised as necessary at least annually.

**Incident Reporting and Response**

The appropriate OHS program manager must coordinate the reporting and response to any incidents involving injury or illness from asbestos for EPA's asbestos inspectors.

## Training

All employees engaged in asbestos-related field inspection activities must receive a minimum of 24 hours of basic occupational health and safety training, must accompany an experienced asbestos inspector for 3 days of directly supervised field activities, and must receive 8 hours of approved, formal refresher training annually.

All EPA employees required to wear respirators must receive 6 hours of respiratory protection training, must be fit-tested initially and at 6-month intervals thereafter or when there is a significant change in some other factor affecting fit (e.g., loss of teeth, significant change in weight), and must receive approved refresher training annually. All EPA employees requested to enter hazardous waste sites or Superfund sites must receive the necessary training required under OSHA's regulation 29 CFR 1910.120.

## Medical Monitoring

Employees who are routinely engaged in field activities which could result in exposures to toxic substances or which require the use of respiratory protection must be included in the Agency's Occupational Medical Monitoring Program. In addition, employees who wear respiratory protection must be deemed medically fit to wear such equipment.

## Protective Clothing

Recommendations for protective clothing are based on the type of inspection being done. The need for proper disposal of contaminated protective clothing is emphasized.

## Respiratory Protective Equipment

Respiratory protection selection information specific to certain types of inspections is provided. The guidance also mandates the establishment of a Respiratory Protection Program in accordance with OSHA 29 CFR 1910.134, 1926.58, 1910.1001 and EPA Order 1440.3.

The following overriding policies concerning the use of respiratory protection by inspectors are stressed.

1. Employees may not wear respirators until they have been deemed medically fit to wear respiratory protection.

2. Employees should use only EPA-owned respiratory protective equipment that have been specifically trained and fit-tested to use.

The guidance also notes EHSD's presumption that powered air-purifying respirators (PAPR) provide the same protection (but not more) as other full-face, air-purifying respirators. EPA bases its policy on workplace protection factors for PAPRs determined by NIOSH.

### Other Personal Protection Equipment

The guidance recommends that eye protection be worn in eye hazard areas and that safety shoes and hard hats be worn where head and foot injuries might occur.

### Prohibited Practices

Prohibited practices include smoking, eating, drinking, chewing gum or tobacco, and applying makeup in asbestos-contaminated areas.

### Personal Hygiene

All persons who have been in asbestos-contaminated areas should remove contaminated clothing, dispose of it properly, wash their hands and face thoroughly, or shower when appropriate.

# SECTION 9

# RESPIRATORY PROTECTION PROGRAM ELEMENTS

Any employer who requires or permits employees to wear respirators must have a written respiratory protection program. This is required by OSHA in its asbestos standards (29 CFR 1910.1001 and 1926.58) and in its respiratory protection regulation (29 CFR 1910.134). An effective respirator program should include:

- a statement of company policy regarding administration of the program;
- standard operating procedures governing the selection and proper use of respirators;
- medical surveillance, training and fit-testing of workers;
- inspection, cleaning, disinfecting and proper storage of respirators;
- surveillance of work area conditions and degree of employee exposure; and
- recognition and resolution of special problems as they affect respirator use.

Some of the program components which have a direct application to asbestos inspectors are discussed within this section.

## RESPIRATOR PROTECTION FACTORS

The overall protection afforded by a given respirator may be stated in terms of its protection factor (PF) and fit factor (FF). Each of these is defined as the ratio of the concentration of a contaminant in the ambient atmosphere to that inside the respirator facepiece under use conditions.

There is, however, a significant difference between the two. Protection factors are values assigned to an entire class of respirators (i.e., half-face, full-face, etc.). They provide an average value which takes into account the variety of makes and models, and the different facial structures of the user population. Fit factors, on the other hand, are values specific to a given respirator model and to the individual being tested. It is highly possible, therefore, that a fit factor can be determined that is less than or greater than the protection factor assigned to that respirator. It should be noted, however, that at no time can the assigned protection factor be exceeded, regardless of the fit factor obtained. Also, if the obtained fit factor turns out to be less than the assigned protection factor, the *fit factor* must be used to determine the maximum fiber concentration in which the respirator may be worn.

## Protection Factors

Protection factors are determined using a procedure known as a quantitative fit test. During quantitative fit testing, an individual wearing a mask fitted with a probe is placed within an enclosure containing a challenge atmosphere. While the test subject performs a series of activities, air samples are drawn from within the facepiece and test chamber and analyzed for their relative concentrations of challenge material. The ratio between the amount inside the enclosure and the amount inside the mask is the protection factor.

Such fit testing conducted at the Los Alamos Scientific Laboratory resulted in the determination of universally-accepted protection factors for all classes of respirators. The research involved quantitatively fit testing a great number of human subjects wearing various types of respirators while they performed simulated work activities.

The generated test data were tabulated for each class of respirator and percentage figure used to classify each respirator test result. For example, 97 percent of subjects may have obtained a PF $\geq$10 from one manufacturer's respirator, whereas only 69 percent of the subjects testing another respirator had similar results. These discrepancies indicate that no manufacturer has yet produced a mask that can accommodate everyone's distinctive facial features.

One should keep in mind that the protection factors assigned to the various classes of respirators have been based on such research and, therefore, represent average values of respiratory protection.

Protection factors may be used to select appropriate respiratory protection when the ambient concentration of contaminant and its PEL are known. For example, a respirator given a protection factor of 50 may be used in atmospheres not exceeding levels 50 times the PEL. However, according to OSHA, the protection factor assigned to any of the negative pressure respirators may only be applied if the respirator has been quantitatively fit tested on the individual. If only qualitative fit testing (a less exacting procedure) has been done, the wearer can only assume a protection factor of 10.

The following table states the OSHA requirements for respiratory protection devices based on the asbestos PEL of 0.2 f/cc and protection factors assigned to the classes of respirators:

| Maximum airborne asbestos concentrations and (associated protection factors) | Required respirator |
|---|---|
| Not in excess of 2 f/cc (10 x PEL) | Half-mask air-purifying respirator equipped with HEPA filter. |
| Not in excess of 10 f/cc (50 x PEL) | Full facepiece air-purifying respirator with HEPA filters. |
| Not in excess of 20 f/cc (100 x PEL) | Any powered air-purifying respirator (PAPR) with HEPA filters. (Full face mask half face mask, loose fitting (or hood) mask.) |
| Not in excess of 200 f/cc (1,000 x PEL) | Full facepiece supplied air respirator operated in pressure demand mode. |
| Greater than 200 f/cc (>1,000 x PEL) or unknown concentration | Full facepiece supplied air respirator operated in pressure demand mode and equipped with an auxiliary positive pressure self-contained breathing apparatus, or pressure demand SCBA. |

The higher the protection factor, the higher the maximum use concentration. Thus, the OSHA standard defines a range of protection factors from 10 for a half mask air-purifying respirator to >1,000 for a supplied air respirator equipped with auxiliary SCBA or an SCBA. It should be noted that the protection factor of 100 for a PAPR, as allowed by OSHA, has been reduced in a NIOSH Respirator Certification proposal (52 FR 32402, August 27, 1987). The proposed regulation allows a PF=50 for a tight-fitting, full facepiece PAPR and a PF=25 for a loose-fitting hood or helmet PAPR.

### Fit Factors

Fit factors, like protection factors, are determined by conducting a quantitative fit test on an individual wearing a specific make or model of a respirator. As with protection factors, a fit factor is defined as the ratio of challenge agent concentration outside the facepiece with respect to the challenge agent concentration inside the respirator facepiece.

As mentioned earlier, fit factors are specific to an individual and model of respirator. As such, fit factors may be greater or less than the assigned protection factor designated in the OSHA regulation. A fit factor can, therefore, be viewed as a check on assigned protection factors for that person and respirator model. It is important to recognize that if the fit factor for a specific respirator is found to be lower than the assigned protection factor, the calculated fit factor must be used to determine the maximum fiber concentration in which the respirator may be worn. If the fit factor for a specific respirator is found to be greater than the assigned protection factor, the protection factor must be used to determine the maximum fiber concentration in which the respirator may be worn.

## RESPIRATOR FIT TESTING

OSHA regulations require that either qualitative or quantitative respirator fit testing be conducted to ensure that a negative pressure, air-purifying respirator seals properly to the worker's face. If a fit test is not successful with one brand or size of respirator, other brands or sizes should be tested until a proper fit is achieved.

### Qualitative Fit Testing

Qualitative tests determine the subject's sensitivity to a certain smell, taste or irritation from a "challenge" atmosphere. There are currently three recognized test protocols: (1) isoamyl acetate vapor (banana oil/IAA); (2) saccharin solution aerosol; and (3) irritant smoke (or stannic chloride). The banana oil test is based on individual sensitivity to smell, the saccharin solution aerosol to taste. The irritant smoke method relies on taste, smell and sensory irritation. Organic vapor cartridges are used in the respirator during the banana oil test, while particulate and HEPA filters are worn during the saccharin and smoke test protocols, respectively. Odor threshold screening must be performed if banana oil is to be used to ascertain whether the subject can detect its odor.

Prior to having a qualitative fit test performed, the test subject must select the most comfortable respirator available. According to OSHA regulations, three sizes of five models

must be offered for selection. The respirator chosen must be worn at least 5 minutes to allow the individual adequate time to evaluate the positioning of the mask on the nose, mouth and chin, and to assess strap tension and slippage and determine overall comfort.

After this five-minute period, a positive and negative "fit-check" is performed. A negative pressure "fit check" involves blocking the respirator inlets while inhaling. If air leaks into the facepiece, the mask should be repositioned and/or straps tightened, and the negative pressure fit check repeated. If no leakage is noted, a positive pressure test should be performed. The positive pressure "fit check" involves blocking the exhalation valve and breathing out slightly to determine whether air can leak out of the mask through the facepiece seal.

The respirator must be worn for at least 10 minutes prior to fit testing in the challenge atmosphere. During this time the wearer will move his/her head up and down and from side to side in order to allow the respirator to seat properly.

*Qualitative Fit Test Procedure*

- The subject shall enter the test chamber (Figure 9-1) located in a room separate from the screening room where the "fit checks" and odor screening were performed;

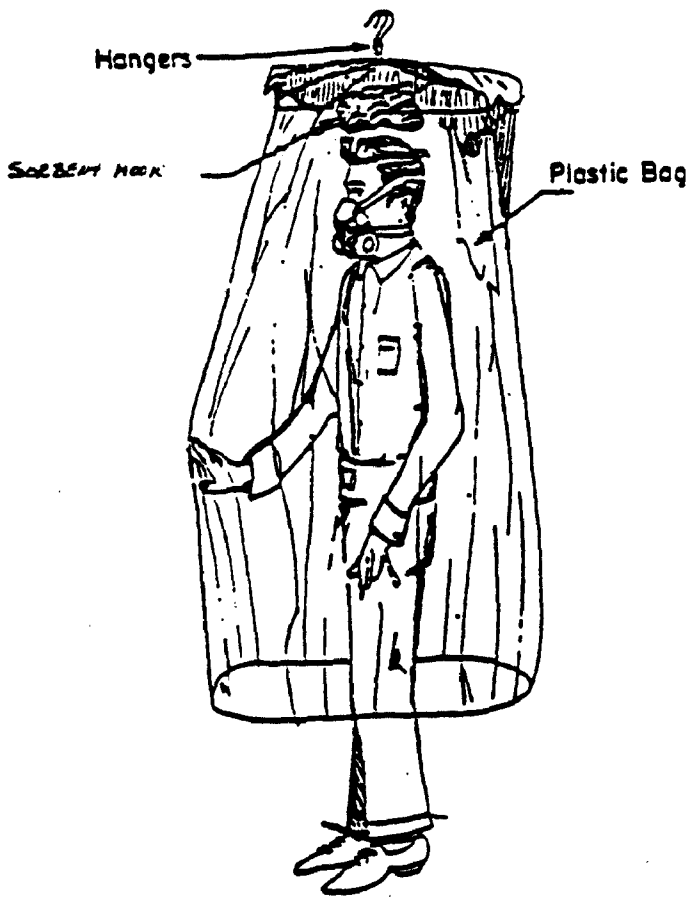



Figure 9-1. Qualitative fit test chamber.

- The subject may be given a piece of paper towel or other porous absorbent, single-ply material wetted with pure IAA and instructed to hang it on a hook at the top of the chamber. Alternatively, a nebulizer is used to introduce saccharin aerosol into the test chamber, or a ventilation tube containing stannic chloride or equivalent may be used to introduce irritant smoke.
- After the IAA, saccharin or smoke is introduced, the subject performs the required fit testing exercises outlined in 29 CFR 1926.58, Appendix C.
- If, at any time during the test the subject detects the banana-like odor, tastes the saccharin aerosol or detects the irritant smoke, a different mask (manufacturer, size, material) should be tested until the individual passes the test.

The subject is instructed to perform the following sequence of exercises for a minimum of 1 minute each.

1. Breathe normally.

2. Breathe deeply. Be certain breaths are deep and regular.

3. Turn head all the way from one side to the other. Inhale on each side. Be certain movement is complete. Do not bump the respirator on the shoulders as this may break the facepiece seal.

4. Nod head up and down. Inhale when head is in the full up position (looking toward ceiling). Be certain motions are complete and made about every second. Do not bump the respirator on the chest as this may break the facepiece seal.

5. Talk aloud and slowly for several minutes. Reciting the Rainbow Passage will result in a wide range of facial movements and be useful in satisfying this requirement.

## RAINBOW PASSAGE

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

6. Jog in place.

7. Breathe normally.

The above procedure is essentially a pass/fail test that does not produce an absolute fit factor. It is assumed that a user passing the test has achieved a protection factor (PF) of at least 10 while wearing a respirator fitted with HEPA cartridges. Qualitative fit testing should be performed prior to field use of the respirator and at least every 6 months thereafter.

## Quantitative Fit Testing

Quantitative fit testing (Figure 9-2) is also conducted using a challenge atmosphere within an enclosure, but a probe is attached to the respirator to allow sampling of the air inside the facepiece. Both the air inside the facepiece and inside the test chamber are measured using an electronic instrument that quantifies the test agent. The ratio of the two values provides a "quantitative" determination (fit factor) regarding respirator fit.

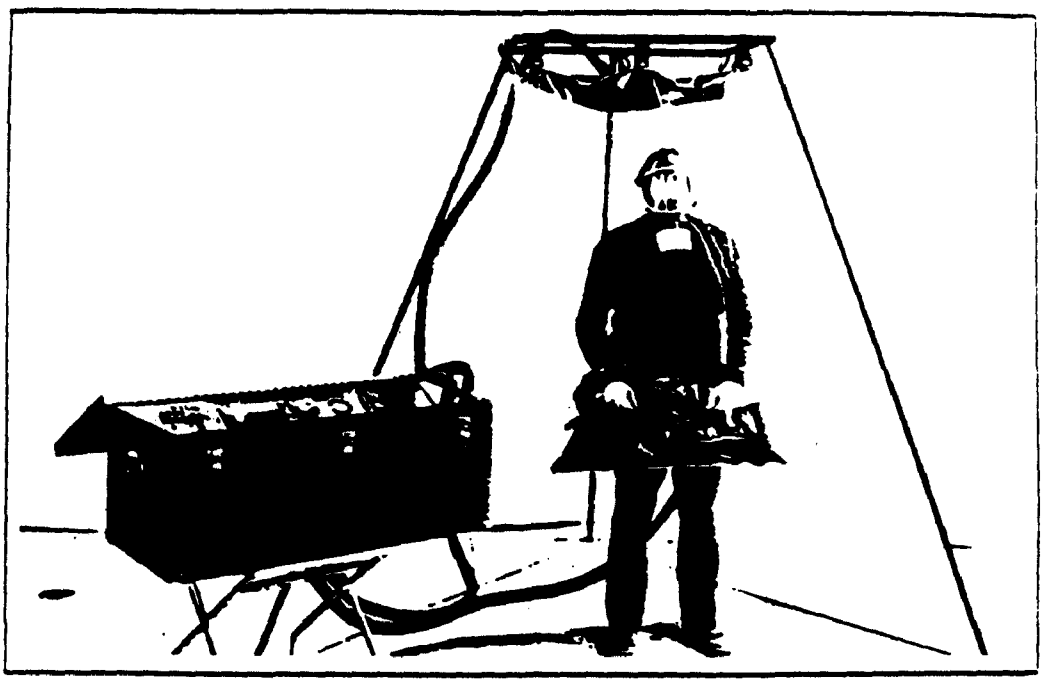


Figure 9-2. Quantitative fit test.

### *Quantitative Fit Test Procedure*

Select a respirator for comfort and proper "fit" as discussed under qualitative fit testing and learn what procedures will be required during the test..

- Adjust selected respirator and conduct a negative and positive pressure test. Wear respirator at least 5 minutes to seat the facepiece.

- Conduct a qualitative fit test as previously described. (The test subject may undergo a quantitative test only after passing a qualitative fit test).
- Once a stable challenge agent concentration in the test chamber is established, enter chamber.
- Connect the facepiece probe and wait while the peak penetration of the challenge agent concentration inside the mask is measured. (It must not exceed 5 percent for a half mask or 1 percent for a full facepiece.)
- Be sure the challenge agent concentration inside the test chamber has stabilized.
- Perform the following nine exercises as the concentration of the challenge agent inside the facepiece is measured:
  - Breathe normally, without talking, for 1 minute.
  - Breathe deeply for 1 minute, taking care not to hyperventilate.
  - Slowly turn head from side to side between the extreme positions for each side. Perform at least three complete cycles.
  - Slowly move head up and down between the extreme positions of straight up and straight down. Perform at least three complete cycles.
  - Read the Rainbow Passage slowly and loudly.
  - Grimace, frown, smile and generally contort the face for at least 15 seconds.
  - Bend at the waist and touch toes. Return to upright position. Repeat for at least 30 seconds.
  - Jog in place for at least 30 seconds.
  - Breathe normally, as before.

**Fit Factor Determination**

As the test subject performs the exercises, a strip chart recorder transcribes a trace indicating percent penetration of the challenge agent for each exercise. (These test measurements are maintained in a log known as the "fitting test record".) When the average peak concentrations for all the exercises are added and divided into 100, the quantitative "fit factor" is established.

## ROUTINE INSPECTION AND MAINTENANCE

Any organization using respirators on a routine basis must institute a written respirator inspection maintenance and cleaning program. The purpose of this program is to assure that all respirators are maintained at their original level of effectiveness. Most, if not all, equipment manufacturers supply literature which lists the care and cleaning of their respirator's components, including information on servicing. Replacement parts for respirators must be those of the same manufacturer of the equipment. *Substitution of parts from a different brand or type of respirator, or unauthorized modification could decrease or cause a total loss of worker protection. Also, such substitution of parts or modification will invalidate the approval of the respirator, leading to violation of applicable regulations.*

An important part of a respirator maintenance program is the continual inspection of the devices. If properly performed, inspections will identify damaged or malfunctioning respirators before they can be used. Respirator cleaning presents a good opportunity to examine each respirator thoroughly. Respirators should be double checked after cleaning and reassembly operations have been accomplished.

All respirators shall be inspected routinely before and after each use. Inspection shall include a check of the tightness of connections and the condition of the facepiece, headbands, valves, connecting tube, and canisters. Rubber or elastomer parts shall be inspected for pliability and signs of deterioration. Stretching and manipulating rubber or elastomer parts with a massaging action will keep them pliable and flexible, and prevent them from taking a set during storage.

### Routine Inspection Requirements

Whether used on a regular basis or not, all respirators should undergo routine inspection and maintenance at least once a month to ensure that all essential parts are in place and functioning properly. The following provides the minimum requirements for such inspection of stored respirators and is not meant to eliminate the need for equipment checkout immediately prior to use. Since different respirator manufacturers employ various designs, their instructions or guidance should be followed when checking and maintaining respirators.

#### *Air-Purifying Respirators*

- For air-purifying respirators, thoroughly check all connections for gaskets and "O" rings and for proper tightness. Check the condition of the facepiece and all its parts (connecting air tube, headbands, etc.). Inspect rubber or elastomer parts for pliability and signs of deterioration.
- Maintain a record for each respirator inspection, including date, inspector, and any unusual conditions or findings.

*Supplied-Air Respirators*

- Inspect self-contained breathing apparatus monthly. Make sure air and oxygen cylinders are fully charged according to the manufacturer's instructions. Determine whether the regulator and warning devices function properly.
- Keep a record of inspection dates and findings for respirators maintained for emergency use.

Maintenance of SCBA equipment is more difficult than supplied air or air-purifying respirators, primarily because of the complexity of the valve and regulator assembly. Because of this, all repairs or adjustments must be done by the manufacturer, by an authorized repair facility or by a worker who has been trained and certified by the manufacturer. Appendix B provides a set of SCBA checkout procedures for two different types of SCBA. Refer to the manufacturer's instruction for details concerning a specific SCBA model.

## Cleaning and Disinfecting

Respirators should be cleaned after each use in accordance with the manufacturer's instructions. This cleaning is usually done by the wearer if respirators are individually assigned. If such is not the case, it is best to have one person responsible for daily cleaning and inspection of respirators.

OSHA regulations specify that a respirator must be cleaned and disinfected as frequently as necessary to insure that the wearer is provided proper protection. In asbestos abatement operations, it is recommended that respirators be rinsed after each inspection and thoroughly cleaned and inspected at the end of each days' use. Each worker should be briefed on the cleaning procedure and be assured that a clean and disinfected respirator will always be issued. This is of greatest significance when respirators are not individually assigned.

The following general instructions may be helpful in cleaning and disinfecting the respirator.

- Remove all cartridges, canister, filters and gaskets or seals not affixed to their seats.
- Remove headband assembly, straps, exhalation valve cover and cartridge holders.
- Remove speaking diaphragm or speaking diaphragm-exhalation valve assembly.
- Remove inhalation and exhalation valves.
- Wash components separately from the facemask.

- Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120° to 140°F. Most respirator manufacturers market their own cleaners/sanitizers which are dry mixtures of a bactericidal agent and a mild detergent. One-ounce packets for individual use and bulk packages for quantity use are usually available. Remove heavy soil from surfaces with a hand brush.
- Remove all parts from the wash water and rinse twice in clean warm water.
- Air dry parts in a designated clean area.
- Wipe facepieces, valves, and seats with a damp, lint-free cloth to remove any remaining soap or other foreign materials. Reassemble respirator.

### Storage

Follow the manufacturer's storage instructions. Instructions are always furnished with new respirators or affixed to the lid of the carrying case. In addition, these general instructions may be helpful:

- After inspection, cleaning and necessary repair, store respirators where they will be protected from dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. *Note:* Respirators should be thoroughly dried before being sealed in any container for storage.
- Store respirators in a convenient, clean, and sanitary location. The purpose of good respirator storage is to ensure that the respirator will function properly when used.
- Do not store respirators in clothes lockers, bench drawers, or tool boxes. Place them in wall compartments at work stations or in a work area designated for emergency equipment. Store them in the original carton or carrying case.
- Pack or store respirators so that the facepiece and exhalation valves will rest in the normal position. Respirators should not be hung by their straps. This will ensure that proper function is not impaired by distortion of the respirator or its straps.

## FIELD INSPECTION AND CHECKOUT PROCEDURES

Immediately prior to use, a respirator must be thoroughly inspected by the individual who will be using it. As a minimum, OSHA standards require that the respirators be inspected for the following:

- tightness of all connections;
- integrity of the facepiece, valves, connecting tube, and canisters; and
- proper functioning of the regulator and warning devices on SCBA.

Specific to each respirator type, the following should be performed each time the respirator is used.

**Air Purifying Respirator**

- Examine the facepiece for scratches, cracks, tears, holes, distortion, excessive or residual lint, dirt, etc.
- Examine facepiece seal to ensure that it is flexible and that there are no cracks or tears.
- Examine filter cartridge holders for cracks, badly worn threads or missing gaskets.
- Check head straps and harness for breaks, loss of elasticity, broken or malfunctioning buckles, or excessively worn serrations.
- Determine the existence of inhalation and exhalation valves and examine them for wear, foreign particles, cracks, tears, improper seating or installation, or breaks or cracks in the valve body seating surface.
- Ensure that cartridges are the correct type. Cartridges must be from the same manufacturer as the respirator and must be approved for use in an asbestos atmosphere (type H, high efficiency filter, magenta color code).
- If the device has a corrugated breathing tube, examine for broken or missing end connectors, gaskets or o-rings, missing or loose hose clamps, or deterioration of the tubing.
- If respirator is a PAPR, determine whether the battery is fully charged, the cartridges are properly connected, the fan is functioning properly, and appropriate amounts of air are being delivered to the facepiece.
- Conduct a negative pressure test. With the respirator on and adjusted, block the flow into inhalation valves and inhale. The facepiece should collapse inward with no noticeable leaks.
- Conduct a positive pressure test. With the respirator on and adjusted, block the flow from the exhalation valve and exhale. The facepiece should balloon outward slightly with no noticeable leakage.

**Self-Contained Breathing Apparatus (SCBA)**

- Check the facepiece in a similar fashion as for air-purifying respirators.
- Check the air supply system for:

  - integrity and good condition of air supply lines and hoses, including attachments and end fittings;

- correct operation and condition of all regulators, valves, and alarms; and
- sufficient air charge in the high pressure cylinder for the use period. Preferably, the tank should be fully charged.

# SECTION 10

# PROTECTIVE CLOTHING

Protective clothing is worn during inspection of active asbestos removal projects for ease of decontamination, comfort, and preservation of health. In order to stick to the steel decking or other substrate, asbestos has commonly been combined with binders and adhesives. During active removal, the water being used reactivates the adhesives making it very difficult for an improperly clothed individual to remove any accumulation of the substance from his/her clothing, skin, and hair.

Asbestos-containing materials, as mentioned above, typically are mixtures of several substances. Contact with many of these materials may cause irritation or skin rashes and, since asbestos itself is known to cause warts, wise individuals wear protective clothing in the work area. The use of protective clothing will also prevent contamination of one's vehicle and home environment, thus eliminating the possibility of jeopardizing one's own health and that of family members.

The most common protective clothing worn in contaminated environments consists of disposable coveralls, foot and head coverings, and gloves. These items are available in many styles and materials. The advantage of a particular style depends on what type of inspection is being conducted. Table 10-1 provides an approximate cost range for several types of protective clothing.

The use of protective clothing during pre-removal, post-removal and outside inspection situations will be a discretionary decision on the part of the inspector. In general, protective clothing should be worn any time friable ACM is being disturbed or if there is any uncertainty as to the adequacy of cleanup of an area. Protective clothing should be worn whenever asbestos waste storage areas are inspected or if the inspector will be opening bags to determine if the asbestos is adequately wet.

TABLE 10-1. COST RANGE

| | | Tyvek® ($) | Saranex ($) |
|---|---|---|---|
| **Coveralls:** | | | |
| Attached hood and boots, and elastic wrists | | 3.50- 6.00 ea. | 13.00 - 16.50 ea. |
| With expandable back | | 19.00-23.50 | 27.00 - 30.00 |
| **Boots:** | | | |
| | Latex boot | 5.50- 6.50 pair | |
| **Gloves:** | | | |
| | Disposable vinyl | 0.17 ea. | |
| | Polyethylene | 0.02 ea. | |
| | Latex, without powder | 0.19 ea. | |
| | PVC | 0.32 ea. | |

Note: These costs are subject to change based upon supply and demand ratios.

## RECOMMENDED PROTECTIVE CLOTHING FOR ASBESTOS INSPECTIONS

Inspectors should be prepared to wear the following protective clothing when entering a removal, demolition, or renovation area:

- a disposable, full-body, hooded outer coverall (e.g., Tyvek® or equivalent). A coverall with an expanded back should be worn with an SCBA. In certain cases, an inspector may be required to use specialty coveralls such as Saranex-coated Tyvek® (chemical resistance) or Nomex (fire retardant).
- a bathing suit (or equivalent) or an inner disposable coverall. When possible, particularly when a changing or decontamination area is available, all street clothing should be removed before donning protective clothing. When clothing is removed, the inspector may choose to wear a bathing suit under the protective clothing. If it is not possible to remove street clothing, the inspector should roll-up pant legs and sleeves and don an inner disposable coverall.
- disposable gloves (PVC or equivalent) taped to coverall.
- disposable inner booties (e.g., Tyvek® or equivalent may be part of coverall).
- disposable outer booties (water-resistant material) taped to outer coverall.
- hard hats, safety glasses, safety shoes, hearing protection, when required by the situation or by the owner/operator.

## OPERATIONAL PRACTICES FOR ENTERING AND EXITING SITES

The procedures for entering and exiting sites described in this section are a summary of those described in the EHSD *Health and Safety Guidelines for EPA Asbestos Inspectors*, and have been generalized to cover both the use of an air-purifying respirator and SCBA. For a detailed description specific to each type of respirator, refer to Appendix C of this manual.

### Entering and Exiting Site with a Three-Stage Decontamination System

A three-stage decontamination system consists of a clean room, shower room, and equipment room (sometimes referred to as a dirty room) contiguous with the active removal area. The OSHA asbestos Construction Industry Standard (29 CFR 1926.58) requires the use of this type of decontamination system for removal, demolition, and renovation projects (detailed in Appendix F of the OSHA standard).

- ***Prior to Entering the Clean Room***
  - Determine that the respirator is functioning properly.
  - Make sure that you have all materials and equipment necessary to conduct the inspection safely (e.g., protective clothing, respirator, extra plastic bags, spray bottle, disposable towels, flashlight, camera, etc.). All materials carried into the contaminated area should be sealed in a plastic bag to minimize contamination.
  - If you take a camera into the contaminated area, precautions must be taken to minimize contamination and to decontaminate the camera when exiting. Use of a waterproof camera or sealing a conventional camera in an impermeable clear camera box will facilitate a more complete decontamination.
- ***In the Clean Room***
  - Remove all street clothing including socks and underwear. If desired, wear a bathing suit (or equivalent), appropriate footwear (sneakers, steel toed shoes, etc.) and inner disposable footcoverings. The inspector should leave his/her clothes in a clean sealed plastic bag to protect against accidental contamination by abatement workers. Any equipment not taken into the contaminated area should also be placed in the plastic bag.
  - If an SCBA will be used, close the air flow valve and don the SCBA; let the respirator facepiece hang from the neck by the strap.

- Don disposable, full-body, hooded coverall (e.g., Tyvek® or equivalent). If using an SCBA, wear a coverall with an expandable back or oversize (XXL) Tyvek® over the SCBA.

- Don disposable outer boots and seal to outer suit with duct tape. (Tyvek® booties will rip quite easily once they become wet. The inspector may wear disposable rubber boots or reinforced rubber boots).

- Fit respirator facepiece to face. Perform negative and positive pressure field checks for air-purifying respirator. For SCBA, open air valves and adjust facepiece straps.

- Fit the coverall hood snugly around the respirator facepiece and zip up coverall. Use duct tape to close gap at neck if desired.

- Don disposable gloves; use duct tape to seal them to the coveralls.

- Proceed through the shower area and equipment room and into the work area; disposable towels and soap may be left behind in the shower area).

- Conduct the inspection.

• ***Before Leaving the Contaminated Area***

- HEPA vacuum (if possible) any visible debris from protective clothing and sample containers, sampling equipment, and any other items which are being taken out of the work area. Proceed to the equipment room.

• ***In the Equipment Room***

- If possible, decontaminate all non-disposable equipment including footwear at the site. If not, seal all contaminated non-disposable materials in a plastic bag and take them with you to decontaminate at a later time.

- While still wearing the respirator, carefully remove the outer booties and gloves and take off the coveralls, rolling them inside out in the process. Place all contaminated protective clothing in a properly labeled waste disposal container.

- If a PAPR or an SCBA is worn, removal of protective clothing can be awkward since the respirator must continue to function. For a PAPR, remove the belt and harness on which the motor and filter mount and hold while removing coveralls and proceed to the shower. For an SCBA, carefully remove coveralls, lower the tank assembly to the ground or balance it between your legs and proceed to the shower.

- *In the Shower Area*

  - For negative pressure respirators, take a deep breath and thoroughly shower your head with the respirator on; remove respirator and clean it. Dispose of HEPA filter cartridges as asbestos-containing waste.

  - For PAPRs or SCBA, hold battery and mechanical parts away from shower water while rinsing your head and the respirator facepiece. Remove the respirator facepiece and then wet-wipe the other components of the PAPR or SCBA. Dispose of HEPA filters as asbestos-containing waste.

  - If wearing a bathing suit, remove and thoroughly rinse it and place it in a plastic bag. Finish showering, thoroughly washing the entire body with soap and water.

  - Proceed to the clean room.

- *In the Clean Room*

  - Dress in street clothes.

**Entering and Exiting Sites Without a Three-Stage Decontamination System**

Often inspections are required at sites where a three-stage decontamination system is not available. When confronted with such a site, the inspector must use his or her judgment regarding the safest method of conducting the inspection.

- ***Before Entering the Contaminated Area***

  - Make sure the respirator is operating properly.

  - Make sure you have all materials and equipment necessary to conduct the inspection safely (e.g., protective clothing, respirator, disposable towels, extra plastic bags, spray bottle, flashlight, camera etc.). Materials carried into the work area should be sealed in a plastic bag to minimize contamination.

  - If you take a camera into the contaminated area, precautions must be taken to minimize contamination or to decontaminate the camera. Use of a waterproof camera or sealing a conventional camera in an impermeable clear camera box will enable more complete decontamination.

  - Leave all street clothing on. Short-sleeve shirts and short pants are preferable. If you are wearing long pants or long sleeves, roll them up.

- Don an inner disposable coverall and inner booties (e.g., Tyvek® or equivalent) over street clothes.

- If an SCBA will be used, close the air flow valve and don the SCBA; let the respirator facepiece hang from the neck by the strap.

- Don the PAPR.

- Don outer disposable coverall. Wear coverall with an expandable back if an SCBA is used, but do not zip it up. (An oversize (XXL) Tyvek® suit may substitute for an expandable back suit).

- Don disposable outer boots; use duct tape to attach the boots to the outer coverall. (Tyvek® booties will rip quite easily once they become wet. Disposable rubber boots or reinforced rubber boots may be used).

- Fit the respirator facepiece to the face, open the air valve of the SCBA and tighten the facepiece straps. If an air-purifying respirator is used, conduct negative pressure and positive pressure field tests.

- Fit the coverall hood snugly around the respirator facepiece and zip up the coverall.

- Don disposable gloves; use duct tape to seal gloves to the outer coverall.

- Proceed into the work area.

- Conduct the inspection.

• **Before Leaving the Contaminated Area**

- Standing near the exit, HEPA vacuum (if possible) and wet wipe all visible debris from the outer protective clothing (use a spray bottle containing water and disposable towels to wet wipe the suit; use plenty of water). Standing at the doorway inside the work area, remove outer protective clothing, roll the coveralls inside out, and immediately step outside the area. Place the suit in a labeled waste container.

• **Outside the Contaminated Area**

- Thoroughly wet wipe and mist spray the respirator and inner disposable coverall. Move away from the doorway and remove the inner protective clothing. Place the disposable coverall into a labeled waste container.

- Wet and seal all contaminated non-disposable materials in a plastic bag and take them with you to decontaminate later.

## DISPOSAL OF CONTAMINATED CLOTHING

Contaminated or potentially contaminated protective clothing worn during asbestos inspections should be discarded as asbestos-containing waste. These materials include the coveralls, disposable boots, disposable gloves, respirator cartridges, and any other miscellaneous materials such as paper towels or wet wipes. Usually, inspectors can discard their contaminated clothing in labeled, sealable waste containers provided by the owner/operator. Since the owner/operator must treat the waste disposed in this container as asbestos-containing, the inspector can assume that the material he or she discards will be disposed of properly. Although this procedure is generally acceptable, it is always a good idea to obtain permission from the owner/operator before discarding contaminated clothing.

There will be cases, however, when disposal of contaminated clothing will present a problem to the inspector. For example, the inspector may be conducting an inspection where the owner/operator is not properly disposing of waste or where permission to discard inspector waste is not granted. In such cases, proper handling and subsequent disposal of contaminated clothing becomes the responsibility of the inspector. It is important, therefore, that the inspector come to the site prepared for such instances and that policies exist within his/her agency to deal with asbestos-containing waste.

Contaminated clothing must be placed in sealed plastic bags before leaving the site. The inspector should carry disposal bags with him/her. Preferably, these bags should be pre-labeled, sealable waste containers, but plastic trash bags will serve the purpose provided that they are eventually placed in labeled bags before final disposal. The exact procedures to follow in handling the bagged waste and ultimately disposing of the material is up to the policy of the regulatory agency.

# SECTION 11

# ASBESTOS NESHAP INSPECTIONS LEGAL PERSPECTIVES

The following legal guidelines advise inspectors on who is subject to the asbestos NESHAP, the authority for inspections, the enforcement options for regulators, and the legal requirements for evidence. This material was obtained from EPA's strategy document and interaction with EPA attorneys. Further legal questions should be addressed to Regional Counsels or to counsel for the state or local enforcement agency.

## GENERAL INFORMATION

### Owner or Operator

In the general provisions of 40 CFR Part 61, ***National Emission Standards for Hazardous Air Pollutants (NESHAP),*** **"owner or operator"** is defined as:

> "any person who owns, leases, operates, controls or supervises a stationary source" (any building, structure, facility, or installation which emits or may emit any air pollutant which has been designated as hazardous by the Administrator).

Within *Section 61.141 (Definitions)* of Subpart M of the NESHAP regulation, the term "owner or operator" is redefined specific to demolition or renovation activities. **"Owner or operator of a demolition or renovation activity"** means:

> "any person who owns, leases, operates, controls or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both."

Since this definition applies to both the facility owner or operator and demolition or renovation contractors hired by the owner or operator, both are considered legally responsible in the event of noncompliance with the asbestos NESHAP. (Any other individuals such as hygienists, electricians, plumbers, etc. hired either by the facility owner or operator or demolition or renovation contractor are also subject to the regulation's requirements and thus legally responsible as well.) It has been EPA's policy, however, to cite both the facility owner and the demolition/renovation contractor for violations of the asbestos NESHAP seen at demolition or renovation worksites.

In addition to the above responsible parties, *Section 61.154 (Standard for active waste disposal sites)* of Subpart M notes that "each owner or operator of an active waste disposal site that receives asbestos-containing waste material" from mills, demolition or renovation operations, or conversion operations must comply with the waste disposal provisions of the asbestos NESHAP.

Such owners or operators may thus be cited and held legally responsible for violations seen at active waste disposal sites.

**Authority for Inspections**

- Statutory authority for inspection is under Section 114 of the Clean Air Act.
- Allowed activities during inspection include sampling, photography and visual observations. The inspector need not be a certified visible emission observer to judge whether there is an emission.
- If denied access to a facility, an inspector may apply for a warrant to perform the inspection. In order to obtain a warrant the agency should show either that the inspection is scheduled under a "neutral" inspection format, or that there is probable cause to suspect violations of the subject source. The agency must obtain the exact street address of the site and name of the owner in order to have a warrant issued.
- An inspector discovering obvious violations of the asbestos NESHAP during an inspection is not empowered by EPA to order a work stoppage to curtail asbestos emissions. This order must be made, when necessary, at the level of a Division Director. Other orders may be feasible under the power of local health agencies.

**Enforcement Options**

- These options were previously summarized in Section 2 "National Regulatory Strategy". The enforcing agency has the option of pursuing informal action, administrative action, or judicial action to remedy ongoing violations and/or deter future violations. Informal or administrative actions are typically the easiest to perform; however, EPA intends for all delegated agencies to assess penalties for violations and this generally requires judicial actions.
- The source, due to improper waste disposal, may also be subject to regulation under RCRA and/or CERCLA, so air and hazardous waste enforcement personnel should coordinate their actions, if applicable. (Note that the AHERA legislation of 1986 established interim requirements for transport and disposal by reference to Chapters 4 and 5 of EPA's "Asbestos Waste Management Guidance" EPA/530-SW-85-007).
- Other types of relief may be sought besides monetary compensation. For example, in United States versus Cleveland Wrecking Company, the Consent Decree included the following provisions:

- If there is uncertainty as to whether FAM is present at a demolition or renovation site, the defendant will conduct sampling and analysis prior to commencing work activities which would disturb such material.

- Supervisors knowledgeable about asbestos dangers and regulations are required at each worksite where FAM is present.

- Inspection access is allowed to EPA representatives for all of the defendant's worksites for a period of 3 years. Note: EPA has a model consent decree that can be used as guidance. A copy is attached in Appendix E of this manual.

## TYPES OF EVIDENCE

### Bulk Samples

- Sampling is critical because this is the only positive proof that materials contain asbestos.
- Inspectors must use chain-of-custody forms and quality assurance procedures to ensure that samples are traceable and, therefore, permissible as evidence in court.
- The Clean Air Act does not specifically state whether samples should be split with the site owner or operator, although this is required under RCRA. Sample splitting is advised when the owner/operator requests it, in order to encourage good relations between the agency and source.
- Shelf life is not an issue for asbestos bulk samples.

### Admissions

- Admissions of illegal activity from owners or operators, or their representatives and employees, are vital to refuting arguments typically made by the defendants when subject to penalties. The following questions should be posed to site personnel during the initial inspection:

  - Has the owner/operator ever engaged in removal of FAM prior to the current activity?

  - Is the owner/operator aware of EPA regulations governing removal of FAM? Are wetting, bagging, etc., being performed?

  - Did the owner/operator search the current work site for FAM prior to startup of work activity? How was the search conducted?

  - Are current dust emissions (if seen) believed to contain asbestos?

- Contractors may divulge such information willingly due to concern for their health or ignorance of the regulations. While an admission may not always be conclusive proof of a violation, it may be used to question the credibility of the defendant(s) if subsequent contradictory statements are made.

**Photographs**

- Used to help familiarize legal, nontechnical personnel with site activity and to refresh the memory of the inspector.
- Date and describe photo subject on the back of each print. A log should be used or frame numbers recorded on the inspection form, particularly if different sites are photographed on the same roll of film. Since defendants in future legal proceedings will often attempt to establish doubt of credibility regarding traceability of photographic prints, inspectors are advised to take pictures of only *one* site per roll.

**Observations**

- Record observations, relevant statements by site personnel, and visible emissions of dust to the atmosphere, on inspection forms. Cases may not develop for 1-2 years at which time you will be asked to recollect all your observations.

# SECTION 12

# OTHER SAFETY CONSIDERATIONS IN ASBESTOS WORK

Because the inspection environment for evaluating compliance with 40 CFR Part 61, Subpart M is usually a building awaiting demolition or in some stage of renovation, increased asbestos exposure is only one of the many hazards an inspector may encounter on the job. This section enumerates the risks associated with worksite conditions and recommends safety procedures inspectors should follow.

## HEAT STRESS

All forms of heat illness are caused either directly or indirectly by the body's attempt to maintain its normal temperature of 98.6°F. Physical activity causes an increase in the body's metabolic rate, thereby increasing body temperature. The body attempts to dissipate heat via sweating. The loss of water and electrolytes via perspiration is the main factor responsible for all forms of heat stress. These include heat cramps, heat exhaustion, and heat stroke.

Heat cramps are painful muscular contractions of the arms, legs, hands, and trunk. They typically affect the lower legs first and are always preceded by marked sweating. Treatment consists of leaving the hot area and replenishing liquids to the body.

Heat exhaustion usually results from dehydration. The individual becomes pale, has cold, clammy skin and is weak to the point of exhaustion. Other symptoms which may appear include headache, nausea, vomiting, muscle cramps, diarrhea and giddiness. The blood pressure is low and the body temperature may be above or below normal. There is no increase in the body core temperature. If heat exhaustion occurs, the individual should rest in a cool area and drink ample fluids.

Heat stroke occurs when the body's sweating mechanism shuts down entirely. The skin becomes hot and dry and the body temperature quickly rises. The afflicted person must be cooled down immediately and, if conscious, encouraged to drink cool liquids. Medical help must be sought, for the condition may progress to delirium, stupor, unconsciousness, convulsions, deep coma or even death (30-50 percent of all cases!).

Heat stress can be prevented almost entirely by taking a few simple precautions. Since dehydration is the main contributing factor to its development, adequate fluid intake is essential. Plain water is the best liquid, but fruit juices (not fruit drinks, which contain

inordinate amounts of sugar and may cause excessive thirst), may also be used. One should avoid all forms of alcoholic beverages, tea, coffee and other drinks which may contain caffeine, for they are diuretic.

Use of electrolyte replacement drinks is not recommended, for they are not necessary. Peoples' diets nowadays supply vast amounts of electrolytic substances; therefore, it is highly unlikely that anyone, even with profound perspiration, will suffer from a deficiency of them. Additionally, it has been determined that the use of such fluids actually slows down the absorption of water from the stomach into the bloodstream, thus retarding the desired effect.

Other measures that can be taken to reduce the possibility of developing heat stress include use of PAPR or SAR (to help cool the face and lungs), increased local exhaust ventilation and gradual acclimatization to the hot environment.

It is recommended that for any inspection lasting more that 15 minutes in an atmosphere of 70 degrees F or higher, the inspector should follow the recommendations found in the NIOSH Interagency Document on Health and Safety Guidelines for Hazardous Waste Workers.

## CLIMBING HAZARDS

In demolition/renovation jobs, railings and other structures may not be properly secured. In some cases they may have been removed altogether as salvage. The wearing of a respirator may reduce the vision of an inspector thereby creating more need for caution when climbing. The basic safety procedures for scaffolding, ladders and stairways follow.

### Scaffolding

Both scaffolding and ladders are commonly used in asbestos removal projects. Most asbestos renovation projects will involve the use of both stationary and mobile scaffolding. OSHA standards require that when free-standing mobile scaffolding is used, the height must not exceed four times the minimum base dimension. This requirement is based on the fact that scaffolding is easily turned over. For mobile scaffolding on which workers can ride, the minimum base dimension should be one-half the height. OSHA also has established standards regarding guardrails, kickboards, and planking overhand.

### Ladders

As an inspector, one should simply use common sense. Be sure stepladders are used only when fully opened and always face the ladder when using it. Check to see that all the steps are in good condition and never stand on the top step.

Extension ladders should be examined for missing safety feet and proper (1:4) lean ratio before use. Such simple precautions can prevent serious injury.

## WORKING SURFACES

Standard preparation of a worksite involves the placement of polyethylene sheeting on the floor. The use of amended water, often used to ensure the safe removal of asbestos, makes the floor very slippery, so great care must be taken by the inspector.

Additionally, the disposable boots worn by the inspector, air lines and electrical cords, bags of waste, stripped asbestos and other debris present a tripping hazard to the inspector.

High humidity inside the work area may make visibility poor. Since overhead pipes, wires, etc., may not be so apparent, the inspector should exercise additional caution when working in such an environment.

## ILLUMINATION (LIGHTING)

General areas involving asbestos abatement activities require at least 5 to 10 foot-candles of illumination. Office areas, by contrast, require an illumination level of approximately 30 foot-candles. Inspections during active removal will have the best lighting since the workers need it to properly clean the asbestos-coated surfaces. However, pre-removal or post-removal inspections may be done with no electrical lighting available. In order to see above suspended ceilings or into crawl spaces, etc., an inspector will need to use a powerful, waterproof flashlight.

Hazards of poor lighting include risk of head injury from suspended objects such as low hanging pipes, light fixtures, etc., and other injuries due to tripping or falling over objects on the floor.

## ELECTRICAL SAFETY

One of the most common hazards, and one that gives the least warning, is electricity. Incorrect wiring, improper grounding, and lack of proper shielding result in 1,000 people each year being electrocuted. Many of these fatalities result from contact with only 120 volts. The use of wet methods when removing asbestos increases the potential for electrical shock, especially when a person is working around electrical panels, conduit, light fixtures, alarm systems, junction boxes, computers, transformers, etc. In a typical removal project, the power to the worksite has been locked out at the box and temporary ground- fault-interrupted electricity wired in.

Where injury may be caused by electrical hazards and heat sources, protective gear (helmets, insulated gloves, etc.) should be worn.

The following is a listing of procedures that can reduce the risk of electrical shock:

- Have the site foreman escort you and explain how the electrical system has been ground faulted (as required by OSHA).
- Use non-conductive sample collection devices (wood, plastic, rubber).

- Use extreme caution when inspecting around energized wiring or equipment.
- Use care not to break through insulated coverings during inspection activities.
- Avoid accumulated water if an electrical wire or extension cord is lying in or near it.
- Consider electrical equipment and lines to be energized unless tested and determined firsthand otherwise.

## FALLING/FALLEN OBJECTS

Where there is a possibility of head injury from impact or from falling or flying objects, inspectors should wear head protection which meets ANSI Z89.1-1969 safety requirements for industrial head protection.

## STRUCTURALLY UNSOUND BUILDINGS

An inspector should determine, prior to entering a building, whether all or part of a building is structurally sound and safe to enter. Older buildings undergoing renovation may have stairs or floors in danger of collapse. If floors or stairs seem unsafe, the inspector should vacate the area immediately taking care to walk along the outer edge of the floor or stairs where there is more support.

## MISCELLANEOUS HAZARDS

### Chemical Hazards

Some asbestos demolition/renovation activities may be conducted in older buildings that have had chemicals stored onsite. An inspector should be aware of items such as PCBs from transformers or hazardous chemicals from manufacturing operations. Also, the use of spray poly generates an intense ammonia smell that may irritate an inspector whose respiratory protection does not provide ammonia filtration.

Inspectors visiting abatement worksites where solvents are being used to aid in the removal of floor tiles should wear knee-high rubber boots to avoid a dermatitis reaction to the chemicals in use. Although dermatitis may not occur following initial contact with the chemical (liquid or fumes), subsequent exposure may result in a severe reaction.

In situations where dry ice is being used to help remove floor tiles, inspectors should realize that unless good ventilation is provided, carbon dioxide being released may displace the oxygen in the room. An SCBA must be worn under such conditions.

### Biological Hazards

An inspector entering abandoned buildings or confined spaces during an inspection should be aware that rats, stray dogs, poisonous spiders and snakes, bats or other creatures (including dangerous humans!) may reside there. Harmful insects and animals and bird feces are additional hazards inspectors may encounter.

An inspector's equipment should include a first aid kit containing supplies appropriate for medical emergencies which may arise.

**Lack of Oxygen**

In rare situations, there may be oxygen-deficient areas in crawl spaces or other areas with little or no ventilation. An SAR is the only respirator appropriate for such areas.

**Painted Skylights**

Inspectors should be aware that there have been situations where roof skylights, flush with the roof, have been painted, thereby becoming indistinguishable from the rest of the roof. Stepping on such area can break the glass and cause serious injury.

**Claustrophobia**

An inspector, perhaps wearing a body-enclosing plastic suit and SCBA may enter a confined area and become claustrophobic. Subsequent panicky behavior may cause severe injury not only to the inspector but to other individuals as well. One should discontinue the inspection if claustrophobia occurs.

**Noise**

Inspectors should carry hearing protection with them as standard equipment and use it when necessary.

**Machinery Hazards**

Inspectors should take adequate safety precautions when visiting sites where power washers, shredders or high-powered vacuum machines are in use.

# SECTION 13

# PRE-INSPECTION PROCEDURES

In-office activities of a NESHAP inspector prior to onsite inspections ensure smooth field inspections. Specific activities include reviewing notifications, tracking non-notifiers and preparing inspection equipment. Specific details are presented below.

## Review Notification

The notification should be reviewed for completeness relative to the requirements of 61.145(b). When scheduling an inspection, an inspector should focus particular attention on the following details:

- Location of the facility;
- Schedule for demolition or renovation; and
- Quantity of friable, nonfriable having the potential to become friable, and nonfriable ACM (to determine applicability of the asbestos NESHAP).

Asbestos removal operations at schools should be coordinated with the Regional Asbestos Coordinator, if possible, to check for compliance with AHERA and WPR regulations.

## Identifying Non-Notifiers

The worst-case violation of the notification requirements of 61.145(b) would be the complete failure to notify. The following techniques can be used by inspectors to identify non-notifiers:

- Respond to complaints from the general public, employees, or competitors who may have recognized a very low bid award. Also, use cross-referral information from other Federal, State and local agency inspectors.
- Drive by the site enroute to or from other inspections while the demolition/renovation appears to be in progress. The presence of a roll box for disposal of construction debris is strong evidence of demolition/renovation activities.
- Observe trucks entering a landfill and question their origin if suspected asbestos debris is on board. Regularly conducting inspections at landfills to review asbestos receiving records will also provide information on contractors who have notified.

- Review demolition or renovation permits written by the local building department.
- Review trade journals, newspapers, etc., for ongoing or past projects.

**Preparation of Inspection Equipment**

In order to ensure the most efficient and complete inspection possible, an inspector must gather and pack all equipment necessary for the inspection. A detailed list of equipment and explanations of the purpose of each item follows. A checklist is provided in Appendix D for the convenience of inspectors.

- ***Copy of Notification***—If notification has been provided, it should be available to verify the accuracy of information required to be included under 61.145.
- ***Protective Equipment***—The EHSD guidance recommends that the following items be used by asbestos inspectors (refer to Sections 7 and 10 for further details):
  - respirator(s)
  - disposable full-body, hooded coveralls
  - disposable gloves
  - disposable inner and outer booties
  - hard hat
  - safety shoes
  - duct tape
  - liquid soap
  - disposal towels
  - bathing suit (or equivalent)
- ***Employee Identification***—Proper credentials to prove authority for performing the inspection, and any certification cards of respiratory fit-testing or medical monitoring.
- ***Copy of Asbestos NESHAP Regulation***—Helps resolve disagreements if the owner/operator is unfamiliar with regulations; it is advantageous to leave a copy with the owner/operator.
- ***Bound Notebook and Writing Implements***—Note that inspectors should take notes and fill out checklists to every extent possible before entering the removal area. (Note: in some situations, it may be critical to enter the work area quickly to assess potential violations; in these cases the checklist and notebooks can be filled out after the inspections). Where practical, leave the notebook and checklist outside the contaminated area and fill out immediately after decontamination. Alternatively, plastic clipboards, plastic transparency sheets and waterproof pens or divers' underwater writing materials, all of which can be decontaminated, may be used.

- ***Field Data Collection Checklists***—Checklists are useful as a reminder of the baseline information needed for all inspections. See Appendix D for a copy of a representative checklist.
- ***Camera (with flash)***—Take photographs of sample locations and visible emission sources. Waterproof cameras are convenient when wet removal is occurring, and decontamination is required.
- ***Flashlight***—Work may be conducted in areas with inadequate lighting such as basements, above drop ceilings, and buildings in which the electricity has been turned off.
- ***Binoculars***—Necessary for offsite observations.
- ***Tape Measure***—Inspectors should carry tape measures so that they may accurately quantify the amounts of friable ACM. As an alternative, an inspector may pace off distances and estimate distance based on a previously measured pace.
- ***Chain-of-Custody Forms and Labels***—These forms and labels allow inspectors to properly distinguish each sample and to maintain a record of sample possession and transfer.
- ***Shipping Supplies***—Samples may be sent to a laboratory from the field.
- ***Sampling Equipment***—The following equipment and materials are used for bulk sample collection (refer to Section 17 for further details):
  - sample containers
  - water spray bottle
  - adhesive tape
  - tools (knife, tweezers, coring device, etc.)
  - drop cloth
  - wet wipes
  - plastic bags
  - glovebag (for those situations where bags are opened outside the containment area)
  - disposable towels
- ***Extra fresh batteries*** - for camera and flashlight
- ***Business cards***
- ***Building diagrams (if available)***

# SECTION 14

# ONSITE FACILITY INSPECTIONS

Onsite facility inspections provide the foundation for all asbestos NESHAP enforcement actions for substantive violations and therefore are critical to enforcing NESHAP. Onsite inspections are also used to determine whether potential AHERA or WPR violations exist. (Field Inspection Checklists are included as Appendix D to this document.)

In most cases it is necessary for the inspector to enter active removal areas to determine compliance and to collect evidence of non-compliance. Due to irregularly scheduled asbestos removal, inspectors may find themselves conducting a pre-removal inspection if a job is delayed, or a post-removal inspection if a job is completed ahead of schedule. The following provides step-by-step inspection procedures common to pre-removal, active removal, and post-removal inspections. All inspections for the asbestos NESHAP are intended to be *unannounced.*

## PRE-ENTRY REMOTE OBSERVATIONS

The pre-entry observations (which may be conducted remotely using binoculars) enable the inspector to determine the location and type of activities in progress. Additionally, pre-entry observations provide the inspector with information regarding the appropriate safety equipment to use. Upon arriving at the site, an asbestos inspector should do the following:

- Look for visible emissions to the outside air (from window, doors, etc.).
- Look for suspected asbestos-containing debris outside the removal area.
- Observe waste storage areas (dumpsters) and evaluate the quantity and condition of the waste created.
- Note land use surrounding the site in order to assess exposure liabilities. Are there residences, schools, playgrounds, etc. nearby? (Draw a land-use diagram in the field notes.)
- Attempt to establish the magnitude and location of the asbestos project within the facility.
- Sketch the general site layout and areas to be inspected. Verify that all pertinent locations are incorporated into the inspection plan.
- Check safety equipment. The EHSD *Health and Safety Guidelines for EPA Inspectors* states that EPA employees should use only EPA- owned respiratory equipment that they have been specially trained and fit-tested to use.

- Observe trucks being used to haul suspect ACWM. Are they properly marked?

## PRE-ENTRY INTERVIEW

During the pre-entry interview, it is critical that discussions are properly documented. They may later be considered admissions of guilt if violations are detected. The following steps should be followed once an inspector arrives onsite:

- Request to see the owner/operator or site foreman.
- Show identification credentials and explain the authority and purpose of the inspection. (State and local agency inspectors may need to carry specific licenses or certifications.)
- Discuss the inspection procedure:
  - photographs
  - samples
- If denied entrance, do not be forceful. Simply explain that the authority for this type of inspection is explicitly given in Section 114 (a)(2) of the Clean Air Act which states that EPA inspectors shall:

  **"...have a right of entry to, upon, or through any premises in which an emission source is located..."**

  Also state that:

  - the agency's regulatory attorney will be informed and, if necessary,
  - the agency will apply for a warrant to gain entry.
- Show medical monitoring credentials. In some instances, a facility owner/operator may demand to see proof that an inspector is meeting the requirements of the OSHA medical monitoring program. Because this is a reasonable request, inspectors are advised to carry an agency medical monitoring credential. (Note: EPA personnel are not specifically subject to the OSHA standard; however, they are subject to the EHSD guidelines which stipulate similar requirements.)
- Review the notification.
- Sign no waivers. It is EPA's policy that liability waivers never be signed. Other inspectors should refer to the specific policies of their State or local agencies.
- Establish the identities of all responsible individuals, from the person being interviewed to the building owner. Also document the name and title (and address, if possible) of all parties interviewed during the inspection. (Collecting business cards of these individuals is a good practice.)

- Determine a logical sequence for the site inspection to promote its overall efficiency. Determine if there are any safety considerations in addition to those already anticipated.

## Interview Questions

During the interview inspectors should attempt to gain an understanding of the procedures being employed onsite to minimize asbestos fiber release. Inspectors should ask both general and site- specific questions, examine on-site documents and observe work practice procedures outside the work area in order to choose appropriate personal protective equipment (pursuant to the EHSD Guidelines - see Section 7) and to determine preliminary compliance with NESHAP, AHERA and the WPR. Answers to the following may become valuable evidence in the event violations are detected.

### *General Questions*

- Has the owner/operator ever engaged in removal of asbestos before?
- What formal training has the owner/operator or his staff had regarding the handling of asbestos?
- What is the owner/operator's understanding of the NESHAP requirements for the handling of asbestos during removal?

### *Site-specific Questions*

- Has removal work begun? (If not, is all ACM intact, undisturbed and undamaged, and no debris present?)
- Is there a written respiratory protection program and are respirators being used?
- Is the work area completely enclosed with plastic sheeting or equivalent?
- Have all the ventilation systems that have components in the envelope been shut off?
- Are all vents in the work area taped shut?
- Are decontamination means, including shower facilities, in place?
- If glove bags are being used:
  - Is secondary containment which is under negative pressure in place? (OSHA 29 CFR 1926.58 requires that "wherever feasible, the employer shall establish negative pressure enclosures before commencing removal, demolition and renovation operations.)
  - Are the glove bags themselves under negative pressure? (A special attachment to a HEPA vacuum may be used to create a reduced pressure atmosphere within the bag while the removal takes place.. Secondary containments most likely will not be used in this case.)

- What kind of asbestos is being removed? (Is it capable of being adequately wetted?
- Are wet methods being used (i.e. no dry scraping, wire brushing of dry materials, nor sweeping or other handling of dry debris)?
- Is amended water being used to wet the ACM? (Check to see that amended water is onsite outside the envelope.)
- If wet methods are not being used, what emission control methods are being used?
- Are power tools being used to remove ACM?
- Are employees removing ACM appropriately (i.e., using dust-tight chutes, not dropping materials to the floor, etc.)?
- Has a waste disposal permit been received? (not required by NESHAP)

**Document Examination**

- Do existing monitoring data indicate that asbestos fibers in the work area do not exceed 2.0 f/cc?
- Do records on site show that all employees have been trained as required by OSHA, State and local authorities?
- Do records show that project employees have been given medical exams, including a determination that they are fit to wear respirators?
- Has the area already passed an appropriate clearing test (minimum of aggressive sampling with a concentration below 0.01 f/cc by PCM)?
- Is there information posted and available for inspection documenting that at least one on-site representative has received training in the provisions of the NESHAP regulation? (This requirement is effective 1 year after promulgation of the revised NESHAP.)

**Pre-entry Worksite Observations**

- Are warning signs posted?
- As a minimum, have all envelope entrances been constructed as a double entry system (usually two or three sheets of plastic draped between each stage of the entry system)?
- Are all barrier seals intact with no dust or debris coming from the removal area?
- Is there any dust or debris that is potentially asbestos- contaminated present on any surface in the area?
- Are adequately labeled containers being used in the disposal of ACM?
- Have materials removed from the envelope been cleaned?

- Is there a clear and clean pathway for the removal of bags and
- equipment?

## PRE-REMOVAL INSPECTION

Facility inspections conducted prior to commencement of asbestos removal do not enable the inspector to fully evaluate the owner/operator's compliance with the asbestos NESHAP. However, if an inspector does arrive onsite prior to removal, useful information can be gathered. In this case, the principal objectives are to verify that the asbestos NESHAP is applicable, and to gain a sense of the owner/operator's ability to remove the asbestos appropriately.

As with any inspection, safety must be considered before the inspection begins. The specific safety requirements will be left to the discretion of the inspector. As a general rule, however, if any friable ACM or nonfriable ACM in poor condition is being disturbed, the inspector should treat the inspection as an active removal situation and follow the suit-up procedures in Section 10.

The following summarizes inspection activities relative to NESHAP requirements. The entire NESHAP text can be found in this manual as Appendix A.

### Applicability (61.141, 61.145)

- Verify that the site meets the definition of a facility:

  "any institutional, commercial, public, industrial, or residential structure, installation, or building (residential buildings having four or fewer dwelling units are excluded); any ship; and any active or inactive waste disposal site."

- Determine whether the activity is classified as a demolition or renovation.
- Measure the amount of ACM that is scheduled to be disturbed to determine if the minimum quantity of 260/160/35 is exceeded.

### Notification [61.145(b)]

- Determine whether a notification exists and, if it does, verify that the information conveyed verbally during the inspection agrees with the information provided in the notification.
- Determine if the amount of ACM designated by the owner/operator for removal is accurate relative to the amount that the inspector thinks will potentially be disturbed during the demolition or renovation.

**Planned Emission Controls [61.145 (c)]**

Observe equipment onsite and elicit verbal explanations of planned emission control procedures to ascertain whether the owner/operator is sufficiently equipped and knowledgeable to meet the wetting and handling requirements of 61.145 (c). Consider the following:

- Will water and wetting agents be available for wetting ACM before removal and maintaining it in a wet condition until it is collected for disposal?
- If wet methods will not be used, what emission control methods are planned?
- Will ACM be removed or stripped more than 50 feet above ground level? If so, how will it be brought down?

Be aware that the asbestos NESHAP allows exemptions from **removal, stripping, wetting, and packaging of ACM** in certain situations. A detailed description of these exemptions can be found in "**Emission Controls**" of the **ACTIVE REMOVAL INSPECTIONS** portion of this section.

**Disposal Techniques (61.150)**

Although several waste disposal options are delineated by the asbestos NESHAP, most owner/operators choose to remove ACM and package it for off-site transport. Inspectors should determine the following:

- Are leak-tight containers or wrapping available to package removed ACM?
- Do these containers or wrappings exhibit the required OSHA warning label?
- If the removed ACM is destined for off-site transport, are these containers or wrapping materials labeled with the name of the waste generator and the location at which the waste was generated?
- Where will the ACWM be deposited and how often will it be removed from the worksite?
- Has a permit for disposal been obtained? (not required by NESHAP)
- Are waste shipment record forms available for use?
- Is the owner/operator aware of the NESHAP requirements regarding their use?

**Evidence Collection**

In addition to the general information conveyed by the owner/operator, the following evidence should be collected by an inspector during a pre-removal inspection:

- Measurements of area, linear footage or volume of suspect ACM that has already been or will be removed during the project (Is 260/160/35 exceeded?)
- Samples of material which were stated in the notification to be ACM.

Collect these samples using techniques described in Section 17 and document (using sketches and photographs) their specific locations within the facility. If the owner/operator later states that the notification was misrepresentative (i.e., that the material removed did not contain asbestos), these samples may provide legal evidence to the contrary.

- Samples of suspect ACM (friable, nonfriable which has become friable during the demolition or renovation operation, and nonfriable ACM that the inspector feels will be disturbed during the demolition or renovation) **which were not listed by the owner/operator in the notification**

  Collect these samples using techniques described in Section 17 and document (using sketches and photographs) their specific locations within the facility.

## ACTIVE REMOVAL INSPECTIONS

To fully evaluate compliance of the asbestos NESHAP, an inspector must be prepared to enter the active removal area. The inspector will follow the procedures discussed previously for pre-inspection observations and interview. The information gathered during pre-inspection activities will enable the inspector to select appropriate safety equipment and procedures to follow, as detailed in Sections 7 and 10.

The inspector's principal objectives in entering the active asbestos removal area are to: (1) make first-hand observations of the adequacy of wetting and maintaining wetness until ACM is collected for disposal; (2) take samples of any suspect ACM to serve as evidence that a violation involved asbestos-containing material; and (3) accurately determine whether the quantity of suspect ACM exceeds the minimum regulated quantity of 260/160/35.

### Removal Area Entry Preparation

Inspectors should prepare to enter the active site only after determining the safety equipment needed. The following steps summarize the procedures detailed in Section 10:

- If a three-stage decontamination unit is available, the inspector will enter the clean room, remove street clothes (except bathing suit), and suit-up in accordance with the procedures in Section 10. Street clothes should be stored in a plastic bag to ensure that no accidental contamination occurs.
- If there is no 3-stage decontamination unit, the inspector will suit-up with double disposable coveralls over his or her street clothes following the step-by-step procedures listed in Section 10.

#### *Inspection/Sampling Equipment*

Only items that can be washed or showered should be taken into the active removal area; all other items should be left outside. Critical inspection and sampling equipment to bring inside include:

- Pre-labeled sample containers (as described in Section 17);
- Waterproof camera - automatic 35mm with flash;
- Waterproof clipboard with a plastic sheet on which to write (white paper inside a zip-lock bag provides a good background);
- Indelible marker for taking notes on the plastic sheet; and
- Waterproof flashlight.

This equipment may be carried in a zip-lock bag taped to the side of the disposable coverall, or through which a belt is strapped.

**Applicability [61.145(a)]**

Violations of the asbestos NESHAP cannot be validated unless the inspector has sufficient evidence that the site of asbestos removal meets the applicability requirements of [61.145(a)] The following specific criteria must be met:

- For renovations - if the amount of ACM that will be stripped or removed from a facility exceeds 260/160/35, then all notification requirements of 61.145(b) and emission control requirements of 61.145(c) apply.
- For demolitions - if the amount of ACM in the facility exceeds 260/160/35, then all notification requirements of 61.145(b) and emission control requirements of 61.145(c) apply.
- For demolitions - if the amount of ACM in a facility that will be disturbed is less than 260/160/35 (even if no asbestos is present), only the notification requirements of 61.145(b) apply.

The definition of demolitions and renovations differ in that a demolition specifies that a load-supporting structural member is wrecked or removed. The term "demolition" also includes any related handling operations which could be interpreted as any asbestos removal prior to actual demolition, and intentional burning of a facility.

**Notification [61.145(b)]**

- Verify that a notification exists and, if so, verify that the information conveyed verbally during the inspection agrees with the information provided in the notification.
- Determine if the amount of ACM designated by the owner/operator for removal is accurate relative to the amount that the inspector thinks will potentially be disturbed during the demolition or renovation.

**Emission Controls [61.145 (c)]**

Each owner/operator of a demolition or renovation activity must comply with the provisions of 61.145 (c).

**61.145 (c)(1)**—Remove all ACM from a facility being demolished or renovated before any activity begins that would break up, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal.

**61.145 (c)(2)**—When a facility component that contains, is covered with, or is coated with ACM is being taken out of the facility as a unit or in sections, adequately wet all ACM exposed during cutting or disjoining operations and carefully lower them to the floor or ground level. Do not drop, throw, slide or otherwise damage or disturb the ACM.

**61.145 (c)(3)**—Adequately wet ACM while it is being stripped from in-place facility components.

**61.145 (c)(6)**—For all ACM, including material that has been removed or stripped, adequately wet the material and ensure that it remains wet until collected and contained or treated in preparation for disposal. Carefully lower the material to the ground and floor without dropping, throwing, sliding or otherwise damaging or disturbing it. If the ACM has been removed or stripped more than 50 feet above ground level and it was not removed as units or in sections, transport it to the ground in leak-tight chutes or containers .

**61.145 (c)(8)**—Effective 1 year after promulgation of this regulation, no ACM shall be stripped, removed, or otherwise handled or disturbed at a facility unless at least one on-site representative, such as a foreman or management-level person or other authorized representative, trained in the provisions of this regulation and the means of complying with them is present. Every 2 years this individual must receive refresher training in the provisions of this regulation. Evidence that the required training has been completed must be posted and made available for inspection by the Administrator at the demolition or renovation site.

**61.145 (c)(9)**—When a facility is ordered to be demolished, keep the portion of it containing ACM adequately wet during the wrecking operation.

**61.145 (c)(10)**—If the facility is demolished by intentional burning, remove all ACM, including Categories I and II nonfriable ACM before burning.

**61.145 (c)(11)**—If Category I nonfriable ACM is sanded, ground, sawed or abraded, the owner or operator, discharge no visible emissions to the outside air during such operations; and adequately wet the material or use a local exhaust and ventilation and collection system designed and operated to capture the particulate asbestos material generated during such an operation.

*Emission Control Exemptions*

If the owner/operator is not following standard work practices relating to removal, stripping, wetting and packaging of ACM, the inspector must carefully evaluate whether activities seen are justified by the following exemptions in the asbestos NESHAP:

***Removal*** of ACM is not required before demolition if it:

- 61.145 (a)(3) - is located in a building which has been ordered by a government authority to be demolished. Wetting of the portion of the facility that contains ACM is required during the wrecking operation [61.145 (c)(9)] and ACWM must be handled in accordance with waste disposal requirements (61.150).
- 61.145 (c)(1)(i) - is Category I nonfriable ACM in good condition.
- 61.145 (c)(1)(ii) - is on a facility component encased in concrete or other similarly hard material and is adequately wet whenever exposed during demolition. (Doubled concrete-block walls with risers inside do not meet the "encased in concrete" definition.)
- 61.145 (c)(1)(iii) - was not discovered until after demolition began and cannot be safely removed. The ACM must be adequately wet whenever exposed during demolition.
- 61.145 (c)(1)(iv) - is Category II nonfriable ACM and the probability is low that the material will become friable during demolition.

***Stripping*** of ACM from facility components is not required:

- 61.145 (c)(4) - if the components have been taken out of the facility as a unit or in sections contained in leak-tight wrapping.
- 61.145 (c)(5) - if the ACM attached to certain large facility components (excluding beams) which are handled without disturbing the ACM, are appropriately labeled and wrapped leak-tight.

***Wetting*** is not required in renovation operations if

- 61.145 (3)(i) - it causes unavoidable equipment damage or presents a safety hazard. Written approval from the Administrator must be obtained (and kept at the worksite) and either a local exhaust ventilation and collection system, glove-bag system or leak-tight wrapping prior to dismantlement must be employed.
- 61.145 (3)(ii) - the Administrator has given written approval to an alternate equivalent method. This approval must be kept onsite.

- 61.145 (c)(7) - the temperature at the point of wetting is below freezing. Facility components must be removed as units or in sections to the maximum extent possible.

***Packaging*** of ACWM prior to disposal is not required if the ACWM results from a government-ordered facility demolition (61.150). Wetting requirements still apply.

***Determination of Adequately Wet***

***Adequately wet,*** as defined in 61.141 means to:

> "sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet."

The inspector is responsible for the overall determination of "adequately wet" relative to the above listed citations from the asbestos NESHAP. It is important for an inspector to document whether or not material has been adequately wetted and how this determination was made. The following questions and procedures will help document compliance with this provision of the asbestos NESHAP:

- Is there a water supply in place?
- Is water or a wetting agent observed being sprayed onto the suspect ACM or ACWM both during stripping or removal and afterwards while the material awaits proper disposal? If yes, carefully note the method of application used (e.g., misting, fogging, spraying of surface area only or drenching to penetrate the ACM throughout).
- Does the equipment used to apply the wetting agent appear to be operating properly?
- If an aqueous solution is not being used, determine why it is not and document the reason. Possible (although not necessarily valid) reasons include:
  - prior permission obtained from the Administrator (safety hazard, potential equipment damage);
  - no water source at the facility;
  - temperature at the point of wetting below 32 degrees F;
  - portable water supply ran out and contractor continued to work; or
  - contractor prepared the area earlier, etc.
- Examine a stripped or removed piece of suspect ACWM or ACM which wets readily. Does it appear to be wetted throughout? If it does not, adequately wet the sample. Describe and photograph how the physical characteristics of the material change upon wetting (e.g., color, weight, texture, etc.). Take samples, as necessary, to document the presence of asbestos in the suspect material.

- When examining materials that do not readily absorb a wetting agent (e.g., premolded thermal system insulation, ceiling tiles, floor tiles) inspectors should note whether all exposed surfaces of these materials have been wetted as required.
- Is there visible dust (airborne or settled), or dry suspect ACWM debris in the immediate vicinity of the operation? Inspectors should collect samples of such materials for analysis of their possible asbestos content.

***Inspection of Waste Containers***

The presence of a regulatory inspector may often cause the owner/operator to quickly and vastly improve wetting procedures. However, inspectors can determine typical wetting procedures by evaluating the contents of waste containers found both inside containment and in other waste storage areas. The following protocol should be followed:

- Randomly select bags or other containers for inspection.
- Lift the bag or container to assess its overall weight. A bag of dry ACWM can generally be lifted easily with one hand whereas a bag filled with well-wetted material is substantially heavier.

***If waste material is contained in a transparent bag:***

- Visually inspect the contents of the unopened bag for evidence of moisture (e.g., water droplets, water in the bottom of the bag, change in color of the material due to the presence of water, etc.).
- Without opening the bag, squeeze chunks of debris to ascertain whether moisture droplets are emitted.

  Note: Squeezing cannot be used to determine adequate wetting of materials (such as ceiling tiles, floor tiles, or premolded TSI, etc.) which do not readily absorb a wetting agent. For these materials, determine whether exposed surfaces have been adequately wetted, document information and take samples as needed.

- If the material appears dry or not penetrated with water or a wetting agent, open the bag using steps described below and collect a bulk sample (using the procedures specified in Section 17) of each type of suspect material in the bag. Note, and document in the log book, variations in size, patterns, colors, and textures of adequately and inadequately wetted materials seen.

***If the waste material is contained in an opaque bag or other container, or if the material in a transparent bag appears to be inadequately wetted:***

- Carefully open the bag or other container (in the containment area, if possible). If there is no containment area, a glove bag may be used to enclose the container prior to opening it. This will minimize the risk of fiber release.

- Examine the contents of the container as noted above for evidence of moisture, document findings, take samples as needed, and carefully reseal the opened container.
- If inadequately wetted ACM stored outside is discovered upon arrival at a worksite, don protective gear and take samples before continuing the on-site inspection.

**Evidence Collection**

The following specific evidence should be collected by an inspector during an active removal inspection:

- Measurements of area, linear footage or volume of suspect ACM to accurately document that 260/160/35 is exceeded. (Document technique of measurement - tape measure, premeasured pace, etc.)
- Samples of material which were stated in the notification to be ACM.

Collect these samples using techniques described in Section 17 and document (using sketches and photographs) their specific locations within the facility.

If the owner/operator later states that the notification was misrepresentative (i.e., that the material removed did not contain asbestos), these samples may provide legal evidence to the contrary.

- Samples of suspect ACM (collected using techniques described in Section 17) to document violations of the work practice standards. Document specific sample location using photographs and sketches.
- Samples of suspect ACM (friable, nonfriable which has become friable during the demolition or renovation operation, and nonfriable ACM that the inspector feels will be disturbed during the demolition or renovation) *which were not listed by the owner/operator in the notification.*

Collect these samples using techniques described in Section 17 and document (using sketches and photographs) their specific locations within the facility.

**Disposal Techniques (61.150)**

Although several waste disposal options are delineated by the asbestos NESHAP, most owner/operators choose to remove ACM and package it for off-site transport. During an active removal inspection inspectors should determine whether:

- There are visible emissions to the outside air during the collection, packaging, or on-site transport of any ACWM (The inspector must determine the source

of the visible emission and sample the source to verify that the emission contains asbestos material. It is not necessary to be a certified visible emission observer to legally document whether a visible emission exists. The presence of asbestos in such dust constitutes a violation of 61.150.);

- ACWM is being adequately wetted;
- ACWM generated during ordered demolitions or demolitions where ACM is not required to be removed is kept adequately wet at all times after demolition and kept wet during handling and loading for transport to a disposal site. (Sealing in leak-tight containers or wrapping is not required - may be transported and disposed of in bulk)
- Leak-tight containers or wrapping are being used to package removed ACM;
- Containers or wrappings exhibit the required OSHA warning label;
- Containerized ACM destined for off-site transport is labeled with the name of the waste generator and the location at which the waste was generated;
- Vehicles used to transport ACWM are appropriately marked during loading and unloading; and
- The ACWM will be deposited at an appropriate waste disposal site as soon as is practical (excluding removed or stripped Category I ACWM in good condition). Inspectors should verify ACWM destination information reported in the notification. This information can provide the inspector with an opportunity to visit a disposal site and conduct an inspection while deposition of ACWM is taking place.

**Waste Shipment Records [61.150 (d)]**

Asbestos inspectors should examine whatever on-site records exist to ensure that the owner/operator is complying with the waste shipment recordkeeping requirements of the asbestos NESHAP.

**TSCA Compliance**

During the inspection, the inspector can also check for any evidence of apparent violations of the AHERA and WPR regulations. The appropriate asbestos program personnel should be contacted and informed about the possible violations noted. AHERA regulations apply to asbestos abatement work conducted at schools. WPR regulations apply to State and local government employees who take part in asbestos abatement work and are not covered by the OSHA asbestos standard. Abbreviated checklists for the AHERA and WPR regulations are included in Appendix D.

**Exiting the Removal Area**

The inspector will leave the active removal area when satisfied that the operation complies with the requirements of the asbestos NESHAP or has collected sufficient evidence

(observations, samples, photographs, owner/operator admissions) if potential violations exist. It is essential that the inspector properly decontaminate himself/herself and any items taken into the active removal area that will not be disposed of as asbestos contaminated waste. The following procedures summarize the detailed decontamination steps listed in Section 10.

- If a 3-stage decontamination unit is available, enter the dirty room, remove disposable clothes (keeping the respirator on), move into the shower area, quickly rinse head region and remove respirator. Dispose of filter cartridges. Finish showering and dry off using disposable towels. Move to clean room to dress in street clothes (see Section 10 for more specific decontamination procedures).
- If there is no three-stage decontamination unit, spray with water and then remove the outer layer of the doubled disposable coveralls just prior to exiting. Spray and remove the second layer just after exiting. Wet wipes can be used to clean potential asbestos fibers from the respirator and face area before removing the respirator and disposing of cartridges (see Section 10 for more specific decontamination procedures).

Inspectors should record observations and fill out chain-of-custody forms immediately upon departing from the contaminated area.

## POST-REMOVAL INSPECTION

Inspection of a facility after asbestos removal has been completed is the least preferred option; any improper removal would already have released fibers to the ambient air. However, an inspector arriving onsite after removal is complete can still gather useful information.

Decisions regarding protective clothing and respiratory protection will be left to the discretion of the inspector. As a general rule, if an inspector has any doubt concerning whether the area is cleared for reoccupancy, he/she should treat the inspection as an active removal situation and follow the suit-up procedures in Section 10.

The following inspection procedures apply to most post-removal inspections relative to enforceable paragraphs of the asbestos NESHAP.

### Applicability [61.145(a)]

- Interview the owner/operator to ascertain where ACM was removed from the facility and establish (measure or pace off) that the minimum quantity of 260/160/35 was exceeded.
- Verify that the site meets the definition of a facility under 61.141 "any institutional, commercial or industrial structure, installation, or building (excluding apartment buildings having no more than four dwelling units)."

- Determine whether the activity was classified as a demolition or renovation based on the definitions under 61.141.

**Notification [61.145(b)]**

- Verify that a notification was submitted and that the information conveyed verbally during the inspection agrees with the information provided in the notification.

**Emission Controls [61.145 (c)]**

- Verify that all ACM [excluding ACM described 61.145 (c)(1)(i-iv)] has been removed from a facility scheduled for complete demolition. Take samples as needed.
- Verify that *all* ACM, *including Category I and Category II nonfriable ACM,* has been removed from a facility scheduled to be demolished by intentional burning. Take samples as needed.
- Visually inspect all areas from which ACM is said to have been removed to verify that it has been done. No dust or debris should be left behind. Take samples as needed.
- Visually inspect other areas of the facility that will be disturbed during the impending demolition or renovation to determine if any other suspect ACM exists. Determine if *260/160/35* is exceeded and take samples as necessary, in accordance with procedures described in Section 17.

**Waste Disposal (61.150)**

If waste is still stored onsite at the time of a post-removal inspection, the inspector should inspect the containers to determine compliance with the 61.150. Use safety equipment and procedures detailed in Section 10 for active removal situations.

- Inspect for leaking or ripped bags, or other evidence of asbestos contamination.
- Lift bags or containers to assess their overall weight. A bag of dry ACWM can generally be lifted easily with one hand whereas a bag filled with well-wetted material is substantially heavier.

***If waste material is contained in a transparent bag:***

- Visually inspect the contents of the unopened bag for evidence of moisture (e.g., water droplets, water in the bottom of the bag, change in color of the material due to the presence of water, etc.).

- Without opening the bag, squeeze chunks of debris to ascertain whether moisture droplets are emitted.

  Note: Squeezing cannot be used to determine adequate wetting of materials (such as ceiling tiles, floor tiles, or premolded TSI, etc.) which do not readily absorb a wetting agent. For these materials, determine whether exposed surfaces have been adequately wetted, document information and take samples as needed.

- If the material appears dry or not penetrated with water or a wetting agent, open the bag using steps described below and collect a bulk sample (using the procedures specified in Section 17) of each type of suspect material in the bag. Note, and document in the log book, variations is size, patterns, colors, and textures of adequately and inadequately wetted materials seen.

***If the waste material is contained in an opaque bag or other container, or if the material in a transparent bag appears to be inadequately wetted:***

- Carefully open the bag or other container (in the containment area, if possible). If there is no containment area, a glove bag may be used to enclose the container prior to opening it. This will minimize the risk of fiber release.
- Examine the contents of the container (as noted above) for evidence of moisture, document findings, take samples as needed, and carefully reseal the opened container.

**Evidence Collection**

In addition to the general information conveyed by the owner/operator, the following specific evidence should be collected by an inspector during a post-removal inspection:

- Samples of any suspect ACM left behind as dust, debris or residue;
- Measurements of area, length, or volume where ACM was removed, in order to establish that the facility met the applicability requirements; and
- Samples of any dry ACM from the storage area if still available. Sketches and photographs are advisable to illustrate specific locations of samples.

## POST-INSPECTION INTERVIEW

When the inspection is complete, the asbestos NESHAP inspector should conduct a quick, concise wrap-up interview to obtain any additional information necessary to complete the checklist and to convey to the owner/operator the findings of the inspection. However, conclusive compliance determinations cannot be made by the inspector in the field. In situations where potential violations are identified, it is important to document any response actions of the owner/operator observed or verbally communicated. This information becomes strong evidence in situations where a follow-up inspection is conducted and similar violations are identified.

If the inspection is of a school and subject to the AHERA regulations, the inspector should ask if the workers are accredited and check the accreditation certificate of the supervisory personnel onsite. If the workers are covered by the WPR, the inspector can ask if the environmental monitoring records have been maintained and if the workers' medical records have been maintained. Any apparent violations of AHERA or the WPR should be referred to the appropriate Federal or state agency.

## EXIT OBSERVATIONS

As the inspector departs a site, he/she should resurvey the site and complete any site drawings not completed prior to or during the inspection. If possible, the inspector should observe the waste storage area and other areas to determine if any significant changes occurred since the inspection began. Any changes should be noted as they help to assess whether the inspection observations are representative of operations when a regulatory inspector is not present. Finally, chain-of-custody forms for any samples collected should be completed.

# SECTION 15

# POST-INSPECTION

No matter how blatant a violation or how thorough an inspection, a case cannot be supported without proper records and documentation. It is imperative that each delegated program office set up and implement a system whereby supporting documentation is properly taken, controlled, and maintained. Generated reports, checklists and sample analysis results must be clear and concise and accurately support the observations of the inspector. Finally, all records must be organized, properly maintained, and readily available for future access. The purpose of this section is to outline inspection followup procedures and general guidance to aid in the process of document control, report preparation, and record maintenance and storage.

## INSPECTION FOLLOWUP

Once an inspection is completed, a decision will be made regarding how many and how quickly samples should be analyzed. When there are serious violations it may be necessary to have analysis completed within a day or less. Arrangements should be made ahead of time with an in-house laboratory or a commercial laboratory to facilitate such a request. Those samples which will provide the greatest proof of asbestos NESHAP violations should be analyzed; other samples taken need not be. However, samples should not be destroyed; they should be stored in a locked facility pending future litigation.

When violations are suspected (Remember, a violation cannot be confirmed until samples are analyzed.), the inspector should brief his/her supervisor and/or attorney to initiate the decision-making process concerning the (1) need for reinspection; (2) need for information request under Section 114 of the CAA; (3) enforcement options available, etc.

Another facility inspection followup item to be considered is a landfill inspection. Because the asbestos NESHAP regulates friable ACM from "cradle to grave", an inspector may consider inspecting a landfill to determine whether the waste from a facility was properly disposed of as indicated in the notification. Inspection of landfills may also be conducted independently of tracking waste from a specific facility. This will be discussed in Section 16.

## DOCUMENTATION

Checklists and reports generated by an inspector may be the basis of affidavits for civil or criminal enforcement actions. They must be precise and legible. NESHAP inspections

ultimately involve the actions of several people: one or more inspectors, laboratory personnel, administrative, legal and clerical staff. Information must be collected and maintained within a system that allows for processing and expedient access. Additionally, this system must protect all records or potential evidence that may be required for enforcement actions. It is imperative that a comprehensive document control system be implemented during all phases of an investigation.

## Document Control

The purpose of document control is to make certain that all project documents issued or generated during a NESHAP investigation are accounted for when the project is complete. A system which accounts for all investigation documents should include serialized document numbering, document inventory procedures, and an evidentiary filing system. Examples of accountable documents include:

- inspection checklists;
- field logbooks;
- sample data sheets;
- sample tags;
- chain-of-custody records and seals;
- laboratory notebook and reports;
- internal memoranda;
- phone memoranda;
- external written communications;
- photographs, drawings, maps; and
- quality assurance plans;.

Under ideal circumstances, each document is given a serialized number which is listed in a Document Inventory Logbook.

## Corrections to Documentation

All documents generated during the course of an inspection are considered part of the permanent evidentiary file and should not be destroyed or thrown away, even if they become illegible or if inaccuracies are discovered. This is particularly important if serialized documents are used, for any gaps in the numbering system will be noted by legal staff. Errors in documents should be noted. If a document requires replacement, it should be noted or corrections made to the original document. Corrections may be made by simply crossing a line through the error, entering the correct information, and initialing and dating it.

If documents are lost or missing (a sample tag lost in shipment, or a chain-of-custody record improperly prepared), a written statement should be prepared detailing the circumstances. The statement should include all pertinent available information that may be used to support an observation or sample. This statement becomes part of the permanent case file.

## RECORDS MAINTENANCE

Records need to be properly filed and maintained to allow for quick and easy access of all case documents. Records also need to be retained under storage conditions which minimize deterioration or loss of data files. With the current widespread use of micro-and personal computers, data management capabilities have improved handling, tracking, and manipulation of large quantities of information. However, these systems do not replace physical evidence such as tags, forms, and checklists. They do alleviate tedious record searching and sorting tasks and can provide quick and easy retrieval of information and cross-referencing capability.

Regardless of whether computer-based data management systems or manual procedures are used, responsible individuals within a program office must be able to access and trace the destination of project files. The inspector must be familiar with and use all filing procedures. Files should be signed out in such a manner as to indicate to others that the file is in the possession of an inspector. When returning the file to storage, the inspector should take care to return it to its proper place for future easy access.

## INSPECTION REPORTS

Inspection reports and checklists clearly and concisely document observations and physical evidence from the inspection. A comprehensive and properly completed checklist can serve as the inspection report. A recommended inspection checklist that serves this purpose is included as Appendix D. An inspector may supplement the checklist with additional information such as:

- Inspector observations;
- Owner/operator admissions;
- Description of evidence collected (including techniques used); and
- Owner/operator response actions.

In cases where violations are observed an inspector should supplement the inspection checklist with an inspection report containing the above information. It may take several years before a lawsuit is filed so a detailed narrative of the inspection will prove beneficial in refreshing the inspector's memory and will provide strong evidence for the case.

# SECTION 16

# LANDFILL INSPECTIONS

The asbestos NESHAP provides emission control and work practice requirements from the time the asbestos is disturbed (potentially releasing airborne fibers) until it is interred in a landfill or converted into asbestos-free materials. However, since no conversion operations are currently licensed, demolition/renovation ACWM typically is transported to landfills for disposal. Regulatory agents should be prepared to conduct inspections of such sites and should follow the personal protective equipment and bulk sampling procedure recommendations found in the EHSD *Health and Safety Guidelines for EPA Asbestos Inspectors* and in Sections 7, 10, and 17 of this manual.

It is important to recognize that *both* the owner or operator of a demolition or renovation operation *and* the owner or operator of the active waste disposal site where ACWM is brought are required to meet waste disposal provisions of the asbestos NESHAP.

Regulatory agents conducting inspections at demolition or renovation sites will determine generator compliance with the ***Standard for waste disposal for ..., demolition, renovation, ...operations, 61.150.*** These inspection activities have already been described in Section 14.

This section details the procedures an inspector should use to ascertain whether a landfill owner or operator is in compliance with ***61.154, Standard for active waste disposal sites.*** A sample inspection form for landfills is included in Appendix D.

## REVIEW PERMIT CONDITIONS

Upon entering the site, contact the site operator to determine whether the landfill has a State-required permit to operate. If it does, check the expiration date of the permit and record pertinent information on the inspection form. (Although permits are not specifically required under NESHAP, most States have a permitting process for landfills.)

Verify that the landfill meets *one* of the following requirements of 61.154:

- No visible emissions are produced. Warning signs must be posted and fencing is required unless a natural barrier adequately deters access by the public.
- A 6-inch cover of compacted, non-asbestos material is provided within 24 hours of the time the waste is deposited. No sign posting or fencing is required.

- An effective resinous or petroleum-based (other than waste oil) dust suppressant is provided within 24 hours of the time the waste was deposited. Warning signs must be posted and fencing is required unless a natural barrier adequately deters access by the public.
- An alternative method previously approved by the Administrator is used. Warning signs must be posted and fencing is required unless a natural barrier adequately deters access by the public.

## EVALUATE WASTE SHIPMENT RECORDS

For all ACWM received, the owner or operator of the active waste disposal site must comply with the following waste shipment recordkeeping provisions of 61.154 (e) of the asbestos NESHAP:

- Record and maintain the following information on forms similar to that noted in the regulation [61.154 (e)(1)]:

  - waste generator's name, address and telephone number;
  - transporter's name, address and telephone number;
  - quantity of ACWM received (cubic yards or meters);
  - presence of improperly enclosed or uncovered waste, or any ACWM not sealed in leak-tight containers; and
  - date of receipt.

- Send a copy of the signed waste shipment record to the waste generator as soon as possible but no longer than 30 days after receipt of the waste [61.154 (e)(2)].
- Attempt to reconcile differences in the amounts of ACWM received and that recorded on the waste manifest form brought by the transporter. If the discrepancy is not resolved within 15 days after receiving the waste, immediately submit a discrepancy report which details the discrepancy and attempts made to reconcile it to the governmental agency responsible for administering the asbestos NESHAP program for the *waste generator* (identified in the waste shipment record), *and, if different,* the governmental agency responsible for administering the asbestos NESHAP program for the disposal site [61.154 (e)(3)].
- Retain a copy of all records and reports required by this paragraph for at least 2 years [61.154 (e)(4)].

## OTHER ACTIVE WASTE DISPOSAL SITE REQUIREMENTS

Landfill owners or operators must also comply with the following provisions of 61.154:

- Maintain, until closure, a map or diagram which contains the location, depth, area, and quantity of ACWM interred in the waste disposal site.

- Obtain written approval from the Administrator prior to conducting any activity that disturbs deposited ACWM.
- Furnish, upon request, and make available during normal business hours for inspection by the Administrator, all records required in 61.154.

## SURVEILLANCE

In addition to determining landfill owner/operator compliance with the requirements of 61.154, *Standard for active waste disposal sites*, while at the site inspectors may note a number of other potential violations of the asbestos NESHAP. By asking the right questions and documenting appropriate information (photographs, samples, etc.) inspectors may be able to *identify non-notifiers* or determine other *generator non-compliance* with certain provisions of the NESHAP regulation.

### Off-loading of Suspect ACWM Unaccompanied by a Waste Manifest

Inspectors should question the origin and determine the amount of any suspect ACWM material being offloaded which is not accompanied by a waste manifest. Document all information obtained from the transporter and landfill owner or operator and take photographs and samples as needed.

Attempt to determine the following:

- Has the suspect ACWM come from *one* or *multiple* sites? (For the NESHAP regulation to be applicable, ACWM must be generated at a site which meets the definition of a "**facility**" and meets the **260/160/35** quantity requirements.)
- Is the vehicle properly marked with an asbestos hazard warning sign?
- Is the suspect ACWM in properly labeled leak-tight containers?
- Is the suspect ACWM adequately wet?
- If the suspect ACWM is not wrapped or contained in leak-tight containers, has it come from a facility ordered demolished by a governmental agency?

### Landfill Inspection

An inspector may notice improperly containerized, inadequately wetted or unlabeled suspect ACWM at the landfill. If a regulated amount of ACWM (260/160/35) is present, an inspector should attempt to determine the material's origin. Inspectors should note that the asbestos NESHAP is applicable only if the materials were generated at a "**facility**", as defined in the NESHAP asbestos standard. For example, if the ACWM seen had been removed from a residential structure involving four or fewer dwelling units, the asbestos NESHAP would not apply. However, the disposal site may be in violation of local or state asbestos waste disposal regulations, so the inspector should notify the appropriate authority. Inspectors should question the landfill operator, examine records, take photographs and samples as needed and document all information obtained.

# SECTION 17

# ASBESTOS BULK SAMPLING AND ANALYSIS

The purpose of bulk sampling is to determine and document if friable material contains regulated amounts of asbestos. Samples should be collected whenever a violation is suspected or an enforcement action is anticipated for the results obtained serve as critical evidence that the material in question contains asbestos and is subject to regulation.

## PROTECTIVE EQUIPMENT

The EHSD *Health and Safety Guidelines for EPA Asbestos Inspectors* specifies personal protective equipment to be used by EPA inspectors required to collect bulk samples under the Asbestos In Schools rule and the NESHAP. These recommendations are summarized below. For further details, refer to earlier sections regarding Inspector Safety.

- ***Protective Clothing***—Inspection personnel should wear the following protective clothing when collecting bulk samples in active abatement environments.

  - bathing suit;
  - disposable, full-body, hooded coverall (e.g., Tyvek® or equivalent);
  - disposable inner and outer booties;
  - disposable gloves; and
  - hard hat, safety glasses, safety shoes, and ear protection, as needed.

Inspectors collecting bulk samples in non-contaminated areas should use their professional judgment in determining whether or not to wear protective clothing. Inspectors may choose not to wear protective clothing when samples can be taken without any significant chance of releasing fibers or may decide to wear disposable coveralls and shoe coverings over their street clothes.

- ***Respiratory Protection***—At a minimum, inspectors collecting bulk samples should wear full-face, air-purifying respirators with HEPA filter cartridges. These include NIOSH-approved, tight-fitting PAPRs equipped with HEPA filters. Cartridges must be NIOSH-approved for asbestos environments. More stringent protection should be used if necessary.
- ***Disposable Towels***—For use after showering.

## SAMPLING EQUIPMENT

The following items are recommended for use by asbestos NESHAP inspectors:

- ***Lightweight Carrying Case***—for storage and transport of sampling materials.
- ***Sample Containers***—any dry, sealable and clean container such as a 35mm film canister, plastic vial, or whirlpak bag.
- ***Water Spray Bottle***—for wetting a surface prior to sampling to prevent generation of dust (may use a surfactant).
- ***Adhesive (Duct) Tape***—to temporarily repair a sampled area, such as pipe wrap.
- ***Postal Tape***—to seal sample containers; can be written on to identify sample.
- ***Tools***—metal tweezers, pen knife, coring device, scissors, etc.
- ***Wet Wipes***—to clean tools between samples as well as to decontaminate equipment, sample containers, etc., when leaving the sampling area.
- ***Plastic Bags***—to store contaminated waste generated during the sampling exercise. The bags should be properly sealed and disposed of as ACM. Zip-lock bags are useful for packaging sample containers for delivery or shipment to the laboratory.
- ***Documentation Material***—notebook or clipboard, inspection checklist, sample labels, chain-of-custody forms, waterproof pens, plastic sheets (overhead transparencies).
- ***Spray Paint***—for identification of sample sites on photographs.

The above items are considered essential and should be included in every sampling kit. Other items such as specialty corers, hammer and chisel, and vinyl tile knives may be helpful during the inspection. Appendix D provides a comprehensive inspection equipment checklist.

## COLLECTION TECHNIQUES

The asbestos NESHAP regulation does not provide any specific recommendations for collecting bulk samples. Procedural guidelines for sample collection can be found in the EHSD *Health and Safety Guidelines for EPA Asbestos Inspectors* and in the TSCA publications entitled *Guidance for Controlling Asbestos-Containing Materials in Buildings (purple book) and Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Material* (pink book). The TSCA guidelines are geared towards environments which are neither contaminated nor disturbed, such as those encountered during asbestos school inspections, pre-abatement inspections, and pre-demolition inspections. Asbestos NESHAP inspectors will inspect both non-abatement situations and abatement inspections.

## Non-Abatement Inspections

Non-abatement inspections are conducted less frequently than abatement inspections. Extensive guidance is available through the TSCA Asbestos-in-Schools program. The most direct sources of information on non-abatement inspections are the two references cited above.

## Abatement Inspections

The samples collected during active abatement inspections usually include materials which have been stripped, removed or still in place. The environments in which these samples are collected are usually not conducive to formal random sampling approaches such as those used during pre-abatement and TSCA inspections. The representativeness of bulk samples is usually based on the judgment of the inspector. Because the goal of collecting bulk samples is to determine and document whether materials associated with a violation contain greater than 1 percent asbestos, this subjective approach is warranted and appropriate. This approach does not exempt the inspector from following some general rules when collecting samples, including:

- Identify homogeneous thermal system insulation, surfacing and miscellaneous materials.
- Wear proper safety equipment, including disposable coveralls, overshoe boots, gloves and a properly selected respirator. A hard hat, safety shoes, protective glasses and ear protection may also be necessary.
- Collect samples of materials where a violation or suspected violation is observed.
- Understand that different types of friable ACM may be removed at the same abatement project. Collect representative samples of each different type of suspect material associated with a violation or suspected violation.
- Collect multiple samples if possible. A minimum of three samples should be taken from each homogeneous area of suspect material encountered.
- Collect a complete core or cross-section of the material.
- Spray the area to be sampled with a water mist or encapsulant mist to minimize fiber release. This is done primarily to reduce inspector exposure. (If the material is dry and the inspector believes there is a wetting violation, the field notes should reflect the dry sample and the inspector should note that he/she wet the sample prior to collecting it).
- Use sampling equipment listed in Appendix D checklist.
- After sampling is completed, wipe the outside of the container with a wet wipe or damp cloth. Wipe tools between sampling points.
- Record a unique I.D. number on a label and affix to the container. Tape the label to prevent it from peeling off and tape the lid shut.

- Never reuse sample containers.
- Photograph the sampling location(s). If necessary, take a second photograph with a reference point. The inspector can also use bright spray paint to indicate the sampling point.
- Make a drawing of the inspection site, noting where samples and photographs were taken. Indicate angles of photographs and written descriptions of materials sampled.
- Complete all documentation including checklist entries and chain-of-custody form. A sample chain-of-custody form is shown in Figure 17-1. Samples must be secured if more than one inspection is planned.
- Dispose of all sampling waste as asbestos-containing material.
- Not all samples must be analyzed. It is advisable to collect extra samples and only analyze enough to satisfy the evidence requirements. Samples may be analyzed at a later time if necessary.

## BULK SAMPLE ANALYSIS

Bulk sample analysis determines the quantity (percent by area/volume), as well as the specific type of asbestos for each sampled area. The NESHAP standard contains no specific method for the analysis of bulk samples for asbestos. However, in no case should asbestos field test kits be used to confirm the presence or absence of asbestos. The solutions deteriorate with age and may indicate false negative results.

EPA's policy has been to adopt the procedure published in 40 CFR Part 763 Appendix A to Subpart F entitled *Interim Method for the Determination of Asbestos in Bulk Insulation Samples*. In this document polarized light microscope (PLM) is recommended for the analysis of bulk samples. Based on optical crystallographic properties, the PLM method must be performed by a microscopist with formal training in optical mineralogy. PLM gives a qualitative differentiation between asbestos and non-asbestos fibers along with a quantitative estimate of percent asbestos by area/volume.

Results from PLM analysis are interpreted as follows:

- If one or more samples from a homogeneous suspect ACM contains greater than 1 percent asbestos, the entire material is considered to contain asbestos.
- If a doubt exists, or if further information is needed, samples should be reanalyzed or additional samples collected.

## QUALITY ASSURANCE

### Sample I.D. Numbers

Assign a unique sample I.D. number to each sample. A non-systematic (random) numbering scheme is recommended, for this helps eliminate a microscopist's potential bias. For example, if a numbering system indicates that seven samples are from the same room, a microscopist may not be objective about each individual sample.

### Chain-of-Custody Forms

In order to ensure that the samples are properly identified and tracked from the point of sample collection through receipt by the analytical laboratory, EPA requires that a chain-of-custody (COC) form be completed and accompany the samples. Figure 17-1 is a sample chain-of-custody form. It contains essential items such as identification number, date, name of sampler and signature of recipient. Some laboratories request that COC forms they supply be used. These forms must be completed in the field and accompany the samples when they leave possession of the inspector. Inspectors should fill in a new COC form if mistakes have been made (i.e., incorrect information transferred from sample containers to COC form).

### Quality Control (QC) Samples

Collection of side-by-side duplicates are recommended at the rate of 1 QC sample/building or 1 QC sample/20 samples, whichever is larger. The laboratory should analyze duplicates without knowing which are the QC samples. The results of duplicates are compared to determine sampling and analytical precision. For additional QC, split side-by-side duplicates with a second laboratory to confirm the results of the first analyses. Any disagreements generated by the QC effort must be investigated; samples should be reanalyzed, or additional samples collected.

### Accredited Laboratories

To diminish the likelihood of challenges to the accuracy of laboratory results during litigation, it is suggested that only accredited laboratories be used for the analysis of bulk samples (per AHERA 40 CFR Part 763, Subpart E). A listing of accredited laboratories published by EPA twice a year is available through the EPA Regional Asbestos Coordinator or the TSCA Hotline (202)-554-1404.

CHAIN OF CUSTODY RECORD

| Project Code | Project Name |
|---|---|
| SAMPLERS (Signature) | |

| I.D. NO. | DATE | TIME | LOCATION | | | | | | | | | | REMARKS |
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| Relinquished by (Signature) | Date/Time | Received by (Signature) | Relinquished by (Signature) | Date/Time | Received by (Signature) |
| Relinquished by (Signature) | Date/Time | Received for Laboratory by (Signature) | Date/Time | Remarks | |

Figure 17-1. Representative chain-of-custody record.

# SECTION 18

# ASBESTOS AIR MONITORING

This section is designed to provide inspectors general information concerning the equipment, methods and procedures involved in air monitoring and air sample analysis. Although there are no requirements under the asbestos NESHAP for conducting air monitoring at demolition/renovation or asbestos removal sites, such requirements have been issued by OSHA (to monitor worker exposure and determine appropriate respiratory protection) and TSCA (to verify the adequacy of abatement activities at public and private schools, grades K-12) so asbestos NESHAP inspectors will often encounter monitoring equipment and air monitoring data during inspections.

The EPA has published a number of guidance manuals which recommend when and where asbestos air monitoring should be conducted. The most recent guidance can be found in *Measuring Airborne Asbestos Following an Abatement Action* (silver book). In addition, procedures for collecting and analyzing asbestos air samples have been published in 40 CFR 763, Subpart E - Asbestos Containing Materials in Schools (Amended). Additional information pertaining to air monitoring can be found in the bibliography.

## MEASUREMENT STRATEGIES

Asbestos air sampling is conducted for a number of reasons and in a variety of scenarios. The most often encountered situations are:

- ***Hazard Assessment***—asbestos fiber concentration in the air is directly measured; used in non-abatement environments to help determine hazard potential.
- ***Monitoring During Active Removal Operations***—Helps determine worker exposure and whether engineering controls and work practices are being properly implemented.

  (Air monitoring data present should be examined by the inspector and considered in the choice of respiratory protection. Inspectors should realize, however, that the data may not represent current conditions.)
- ***Clearance Monitoring***—used to release a contractor after the abatement project is completed; airborne levels must be below an acceptable level before critical barriers are taken down.

- ***Ambient or Background Monitoring***—measures outdoor fiber levels or indoor pre-abatement concentrations.

## MEASUREMENT APPROACH

### Personal Sampling

An air-monitoring device is worn by the worker during his/her normal work schedule. The sampling is used to determine the "breathing zone" fiber levels to which the worker is potentially exposed and is performed to comply with the requirements of the OSHA asbestos standard.

### Area Sampling

A stationary air-monitoring device is placed in an area representative of the overall area under investigation. This technique is used for hazard assessments, ambient and background surveys and for monitoring during and after abatement actions.

### Aggressive Sampling

A large volume area sample is taken while an air moving device (e.g. fan, leaf blower) dislodges and maintains airborne any remaining fibers during the sample collection period. This technique is performed during clearance monitoring.

## SAMPLING EQUIPMENT

### Sampling Pumps

Available from a variety of manufacturers. Usually described as low volume (personal) and high volume pumps.

### Low Volume

Generally light-weight, battery-powered, personal monitoring pumps with a flow rate range of 1 to 5 liters per minute. More sophisticated versions are flow compensating and can be programmed to turn on, shut off, record flow rates, store data and interface with a data logger or personal computer. Used for both personal and area monitoring.

### High Volume

Capable of achieving flow rates up to 25 liters per minute. Heavier, bulkier and more obtrusive than the smaller, low-volume types. Allow larger volumes of air to be sampled in a shorter time period. Used for collecting area samples before, during and after abatement actions.

### Filters and Cassettes

Filters used to collect airborne asbestos fibers are most often 25 mm or 37 mm filters housed in 2- or 3- piece styrene cassettes. Some cassettes, primarily those used for OSHA asbestos monitoring, have been modified with a 50 mm conductive extension cowl to reduce fiber loss on the walls of the cassette. The two most routinely used filter media are:

- ***Cellulose Acetate Membrane***—Pore size between 0.8 - 1.2 um used for collecting samples to be analyzed via Phase Contrast Microscopy (optical) or Scanning Electron Microscopy (SEM). If used for Transmission Electron Microscopy (TEM), special preparation techniques must be used.
- ***Polycarbonate***—Smooth surfaced filters with pore size of 0.4 to 0.8 um. Used for samples collected for Electron Microscopy analysis.

## ANALYTICAL TECHNIQUES

Three options exist for analyzing air samples to determine airborne fiber concentrations: Phase Contrast Microscopy (PCM), Scanning Electron Microscopy (SEM), and Transmission Electron Microscopy (TEM). Each has certain advantages and disadvantages depending on the circumstances in which they are used and the investigator's data requirements. Table 18-1 illustrates a general comparison of these different methods.

### Phase Contrast Microscopy (PCM)

- Adopted by the Occupational Safety and Health Administration (OSHA) as a standard protocol for measuring airborne asbestos in the industrial work place (OSHA Reference Method).
- Nonspecific for asbestos fibers. Counts all fibers that are greater than 5 um in length with an aspect ratio of 3:1.
- Limit of resolution is approximately 0.25 um in diameter.
- Least expensive and most widely available analytical technique.
- Useful in determining worker protection levels in reference to the OSHA standard and for clearing abatement projects.

### Scanning Electron Microscopy (SEM)

- Provides greater resolution than PCM.
- Scanning features can be supplemented with energy dispersive x-ray spectrometry (EDXA or EDS) to provide information on the chemical composition of the structures under investigation.

- Lacks the resolution of TEM. Generally, can "see" fibers 0.20 um in diameter. In addition, does not possess Selective Area Electron Diffraction (SAED) capable with TEM.
- At present, no standard protocol exists.

**Transmission Electron Microscopy**

- TEM is the most sensitive and specific of the cited analytical techniques. It is the method of choice when definitive results are needed.
- Capable of resolving extremely thin, asbestos fibers (typically 0.0025 um in diameter).
- Can be outfitted with EDXA and SAED capabilities to provide definitive information concerning the chemical composition, and crystalline structure of the observed fibers.
- Most expensive and least available of all of the cited techniques.
- Exists as a standard protocol. Method most recently published in 40 CFR 763, Appendix A to Subpart E - Interim Transmission Electron Microscopy Analytical Method and Field Sampling Protocol for the Clearance Testing of an Abatement Site.

## CONTINUOUS MONITORS

- ***Real Time Monitor***—Provides real time data concerning nonspecific fiber concentrations.
- ***Computer Integrated***—Automatically counts all airborne fibers passing through the sensor during a preselected time period. At the completion of the sampling period, the device electronically computes the fiber concentrations in fibers/cc.
- ***Mimics NIOSH Method***—Designed to mimic the NIOSH methodology (i.e., is set up to measure fibers greater than 5 um in length and with a 3:1 aspect ratio).
- ***Advantages:***
  - provide real time data;
  - have a working range of 0.0001 to 30 f/cc;
  - can to determine fiber levels at RDR worksites to indicate if adequate engineering controls and work practices are in effect;
  - can be used to prescreen prior to conducting more expensive analysis; and
  - can be used to monitor preset action levels.

- Disadvantages:
  - not approved by NIOSH;
  - interferences can occur at high dust loading; and
  - high capital cost ($15,000).

TABLE 18-1. COMPARISON OF METHODS FOR MEASURING AIRBORNE ASBESTOS

| | PCM | SEM | TEM |
|---|---|---|---|
| **Standard Methods** | NIOSH 7400 Method* | No standard method | EPA interim methods & previous methods** |
| **Quality Assurance** | Proficiency Analytical Testing Program; no NBS reference materials | No lab testing, or NBS reference materials | Limited lab testing, NBS reference materials available |
| **Cost** | $25-50 | $50-300 | $200-600 |
| **Availability** | Most available | Less available | Least available |
| **Time Requirements** | 1 hour preparation and analysis, less than 6 hours turnaround | 4 hour preparation and analysis, 6-24 hours turnaround | 4-24 hour preparation and analysis, 2-7 days turnaround |
| **Sensitivity (Thinnest Fiber Visible)** | 0.15 um at best; 0.25 um typical | 0.05 um at best; 0.20 um typical | 0.0002 um at best; 0.0025 um typical |
| **Specificity** | Not specific for asbestos | More specific than PCM but not definitive for asbestos (SEM with EDXA) | Definitive for asbestos (TEM with EDXA & SAED). |
| **Collection Filters** | 0.8-1.2 um cellulose ester | 0.4-0.8 um polycarbonate best; cellulose ester also used | 0.4 um polycarbonate, or 0.45 um cellulose ester with special preparation |

*Revision #2: 3/1/87. OSHA Reference Method (ORM, 1986) is a modification of NIOSH 7400. NIOSH P&CAM 239 (Leidal 1979) may be used in some instances as an alternative.

**U.S. EPA, 1987, Yamate, 1984, Samudra, et al., 1978.

Source: Based on information from the EPA/NBS conference on post-abatement air monitoring (NBS/EPA), 1985), the open literature, and government reports, and on peer review comments (modified).

# APPENDIX A

# NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

# (SUBPART M - NATIONAL EMISSION STANDARD FOR ASBESTOS)

federal register

Tuesday
November 20, 1990

# Part III

# Environmental Protection Agency

## 40 CFR Part 61

## National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision; Final Rule

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 61**

**[AD-FRL-3814-7]**

**RIN 2060-AC57**

## National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision

**AGENCY:** Environmental Protection Agency.

**ACTION:** Final rule.

**SUMMARY:** This Federal Register notice promulgates rules under section 112 of the Clean Air Act (CAA) for asbestos emissions and is based on the Administrator's determination that asbestos presents a significant risk to human health as a result of air emissions from one or more source categories and is therefore a hazardous air pollutant (*see* 36 FR 3031, March 31, 1971). The purpose of the revisions promulgated today is to enhance enforcement and promote compliance with the current standard without altering the stringency of existing controls. On January 10, 1989 the Environmental Protection Agency (EPA or the Agency) proposed amendments to the asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP) that would require control device and fugitive emission monitoring, recordkeeping, and reporting for asbestos milling, manufacturing, and fabricating operations. For planned demolitions and renovations, revisions to the notification requirements were proposed, and safety was added as a reason for exemption from the use of wet removal methods. Recordkeeping requirements were proposed for asbestos waste disposal. Clarifying revisions to several definitions and provisions were also proposed. Numerous comments were received on the proposed revisions, and today's notice responds to those comments, and incorporates changes as a result of those comments.

**EFFECTIVE DATE:** November 20, 1990. Under section 307(b)(1) of the Clean Air Act, judicial review of the actions taken by this notice is available only by filing a petition for review in the United States Court of Appeals for the District of Columbia Circuit within 60 Days of today's publication of these rules. Under section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

**ADDRESSES:** *Background information document.* The background information document (BID) for the promulgated revisions may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina, 27711, telephone no. (919) 541-2777. Please refer to "Background Information for Promulgated Asbestos NESHAP Revisions," (Publication No. EPA 450/3-90/017). The BID contains a summary of all the public comments made on the proposed revisions and the Administrator's responses to the comments.

*Dockets.* Docket No. A-88-28 contains supporting information used in developing the final revisions to the asbestos NESHAP and is available for public inspection and copying between 8:30 a.m. and 3:30 p.m., Monday through Friday, at EPA's Air Docket (LE-131), Room M-1500, 1st Floor, Waterside Mall, 401 M Street, SW., Washington, DC 20460. A reasonable fee may be charged for copying.

**FOR FURTHER INFORMATION CONTACT:** For further information and official interpretations of applicability, compliance requirements, and reporting aspects of the promulgated revisions, contact the appropriate Regional, State or local office contact as listed in 40 CFR 61.04. For further information on the background of the regulatory decisions in the promulated revisions, contact Mr. Sims Roy, Standards Development Branch, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone no. (919) 541-5263. For further information on the technical aspects of the promulgated revisions, contact Mr. Ronald Myers, Industrial Studies Branch, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone no. (919) 541-5407.

**SUPPLEMENTARY INFORMATION:**

### I. The Standards

The promulgated revisions implement section 112 of the Clean Air Act (CAA) and are based on the Administrator's determination that asbestos presents a significant risk to human health as a result of air emissions from one or more source categories and is therefore a hazardous air pollutant (*see* 36 FR 3031 (March 31, 1971)). The revisions promulgated today amend the asbestos NESHAP to enhance enforcement and promote compliance with the current standard without altering the stringency of existing controls.

*Milling, Manufacturing and Fabricating*

The revisions to the standards require asbestos milling, manufacturing and fabricating sources to conduct daily monitoring for visible emissions. While the absence of visible emissions does not mean there are no asbestos fibers being emitted, the presence of visible emissions does indicate a serious control device malfunction. Because visible emissions monitoring is intended primarily to detect serious control device malfunctions, weekly inspections of air cleaning devices are also required. In addition, the revisions promulgated require these sources to maintain records of the results of visible emissions monitoring and control device inspections, and to submit quarterly a copy of visible emissions monitoring records of visible emissions occurred during the quarter. The revision requires owners or operators who install fabric filters after the effective date of this rule to provide for easy inspection of the bags.

*Demolition and Renovation*

The revisions require the owner or operator of a demolition or renovation activity to provide additional information in notifications, and to renotify EPA if the start date of a demolition or renovation changes from that given in the original notification. Another revision requires owners or operators to give a 10-day notice for renovations. A person trained in the provisions of this rule and the means of complying with them is required to be on site when asbestos-containing material (ACM) is stripped, removed or disturbed. When wetting is suspended due to freezing temperatures, owners or operators are required to measure air temperature in the work area three times during the workday and keep daily temperature records for at least 2 years. The revisions also clarify EPA's position regarding the handling and treatment of nonfriable asbestos materials such as resilient floor covering, including vinyl asbestos floor tile, and roofing material.

*Waste Disposal*

The revisions require vehicles used to transport asbestos-containing waste material to be marked with the sign prescribed by the Occupational Safety and Health Administration during loading and unloading to warn people of the presence of asbestos. For all asbestos-containing waste material transported offsite, the revisions require that a waste shipment record (WSR) be provided to the waste site owner or operator at the time that the waste is

delivered to the waste disposal site. If a copy of the WSR signed by the waste site owner or operator is not received within 35 days of the date the waste was accepted by the initial transporter, the revisions direct the waste generator to contact the transporter and/or disposal site owner or operator to determine the status of the waste shipment. The revisions further direct the waste generator to submit an exception report to EPA if a signed copy of the WSR is not received within 45 days of the date the waste was accepted by the initial transporter. Labels are required on containers of asbestos-containing waste material from manufacturing, fabricating, demolition and renovation activities indicating the name of the waste generator and the location where the waste was generated.

*Inactive Waste Disposal Sites*

The revisions require the owner or operator of an inactive waste disposal site for a milling, manufacturing or fabricating operation to notify the Administrator in writing prior to excavating or otherwise disturbing asbestos-containing waste material that has been deposited at the disposal site and to record on the deed to the property a notation that will inform future purchasers of the property that it has been used for the disposal of asbestos-containing waste material and that the survey plot and record of the location and quantity of such waste material are on file with the Administrator.

*Active Waste Disposal Sites*

The revisions require the owner or operator of an active waste disposal site to maintain WSRs and report in writing the receipt of a significant amount of improperly enclosed or uncovered waste to EPA by the following working day. The owner or operator of an active waste disposal site is required by the revisions promulgated today to send a signed copy of the WSR back to the waste generator no more than 30 days after receipt of the waste, to attempt to reconcile any discrepancy between the quantity given on the WSR and the quantity actually received and, failing to do so within 15 days after receiving the waste, to report the discrepancy and any attempts to reconcile it to the Administrator. The revisions promulgated today also require the owner or operator of an active disposal site to maintain records of the location, depth and area, and volume of asbestos-containing waste material within the disposal site on a map or diagram of the disposal area. Upon closure, the owner or operator must comply with all the rules promulgated for inactive waste disposal sites. A revision requires the owner or operator of an active waste disposal site to notify the Administrator in writing prior to excavating or otherwise disturbing asbestos-containing waste material that has been deposited at the disposal site and covered.

*Asbestos Conversion Processes*

A section is promulgated to clarify that operations that convert asbestos-containing waste material into nonasbestos (asbestos-free) material are covered by the NESHAP. The provisions promulgated require the owner or operator of such an operation to obtain prior written approval of the Administrator to construct the facility, and conduct a start-up performance test using specified analytical methods and procedures. Requirements for continuous monitoring during and after the initial 90 days of operation, emissions control, maintenance of records of test results on site, and reports to the Administrator are also promulgated today.

## II. Environmental, Energy and Economic Impacts

The environmental, energy, and economic impacts of the revisions for demolition and renovation, including waste disposal, were estimated from two baselines. One is full compliance with the NESHAP, and the other is current use of engineering controls and work practices. Enforcement experience indicates that many asbestos removal operations related to demolition and the subsequent waste disposal operations are performed out of compliance with the NESHAP. The lack of compliance with the NESHAP removal provisions leads to the improper disposal of some waste, especially demolition waste, with the result that emissions from the disposal of demolition waste greatly exceed other emissions, including process emissions from milling, manufacturing, and fabricating. Liability and other considerations generally lead the owners of buildings being renovated to follow or even exceed the requirements of the NESHAP. Thus, the appropriate baseline for demolition is current use of work practices rather than full compliance. At asbestos milling, manufacturing, and fabricating facilities, the required air pollution control devices are generally in place. Thus, for milling, manufacturing, and fabricating, full compliance with the NESHAP, including the waste disposal requirements, is assumed for the baseline.

Few emission measurement data exit for asbestos sources. Thus, emissions were estimated using engineering methods and assumptions, which resulted in substantial uncertainty. A detailed description of the approaches used to estimate emissions is found in "Asbestos Emission Estimates for Milling, Manufacturing, Fabricating, Demolition, Renovation, and Waste Disposal," which is contained in Docket A-88-28. Estimated process emissions under the current NESHAP at full compliance for milling, manufacturing, and fabricating are approximately 7,400 kg/yr. Based on current practices, estimated emissions from the removal activities associated with demolition and renovation are approximately 1,300 kg/yr and estimated waste disposal emissions from all sources are 227,000 kg/yr. If demolition and renovation were in full compliance, estimated emissions from asbestos removal activities associated with demolition and renovation would be about 700 kg/yr. Estimated emissions from waste disposal, assuming full compliance with the NESHAP by all sources, would be about 600 kg/yr.

The costs of the revisions are expected to be small relative to normal operating costs for these industries. The revisions are intended to promote compliance and enhance enforceability. Small additional costs are associated with the recordkeeping and reporting requirements of the revisions. Economic impacts of the promulgated alternatives are expected to be minimal. Adverse impacts of the promulgated revisions on water, noise, and energy were considered. Due to the nature of the revisions, no significant adverse impacts on water, noise, or energy are anticipated.

## III. Public Participation

The revisions were proposed and published in the Federal Register on January 10, 1989 (54 FR 912). The preamble to the proposed standards revisions noted the availability in the docket of the supporting information used in developing the proposed revisions. Public comments were solicited at the time of proposal.

To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed revisions, a public hearing was held on February 8, 1989, at Research Triangle Park, North Carolina. The hearing was open to the public, and 6 persons presented comments.

The public comment period specified in the Federal Register notice was from January 10, 1989 to March 7, 1989. One

hundred comment letters were received in response to the Federal Register proposal. The comments have been carefully considered and, where determined to be appropriate by the Administrator, changes have been made to the proposed revisions.

**IV. Significant Comments and Changes to the Proposed Revisions**

Comments on the proposed revisions were received from industry, trade associations and regulatory agencies. A detailed discussion of these comments and responses can be found in the promulgation BID, which is referred to in the ADDRESSES section of this preamble. The comments and responses summarized in the BID serve as the basis for the changes that have been made to the revisions between proposal and promulgation. The major comments and responses are summarized in this preamble. Most of the comment letters contained multiple comments. Significant comments have been divided into the following areas: demolition and renovation, and waste disposal.

*Demolition and Renovation*

Nonfriable ACM

*Comment:* Several commenters argued that the rule should be modified to clarify that certain products are nonfriable and, therefore, not regulated. Asbestos cement (A/C) products, including transite and exterior shingles, should be included among nonfriable products according to commenters IV-D-49, IV-D-72, and IV-D-93. Asbestos-containing flooring products, such as tile and sheet vinyl flooring, were considered by several commenters (IV-D-15, IV-D-47, IV-D-48, IV-D-55, IV-D-84, and IV-D-95) to always be nonfriable and exempt from the rule, with the exception of flooring that was being sanded (IV-D-47, IV-D-48). Another commenter, IV-D-48, in reference to asbestos roofing products, argued that there is no basis in the record for saying that severely weathered asphaltic material could become brittle. Commenters IV-D-21, IV-D-31, IV-D-48, IV-D-49, and IV-D-93 recommended that the rule be clarified to exempt all nonfriable materials as the rule is currently understood. Commenter IV-D-93 argued that in present day ACM, the asbestos fibers are locked in cement or bituminous or resinous binders and that the materials can be removed and disposed of without any significant release to the environment.

*Response:* In 1973 when the asbestos NESHAP rules were first promulgated for the demolition of buildings, EPA's intention was to distinguish between materials that would readily release asbestos fibers when damaged or disturbed and those materials that were unlikely to result in the release of significant amounts of asbestos fibers. To accomplish this, EPA labeled as "friable" those materials that were likely to readily release fibers. Friable materials, when dry, could easily be crumbled, pulverized, or reduced to powder using hand pressure. The term "reduced to powder" is readily understood to mean that the affected material is changed to a dust or powder that can become airborne. "Pulverized" indicates that the resulting material will include dust as well as a large number of small pieces of the original material. The term "crumbled" indicates that the affected material is easily (i.e., using hand pressure) broken into a large number of small pieces. Although dust is likely to be produced as a result of crumbling, it is possible that there are some types of materials that can be crumbled without producing dust. It is also understood that crumbling refers to an action that occurs essentially in one effort and not to repeated attempts to crumble the material. For example, floor tile in good condition can be broken by hand into a few large pieces, but it is not easily broken in one effort into many small pieces. On the other hand, floor tile that has lost its structural matrix is in poor condition and can be broken into many small pieces in one effort.

Later, EPA realized that, in some instances, nonfriable materials that were subjected to intense forces, such as the intense mechanical forces encountered during demolition, could be crumbled, pulverized, or reduced to powder. In these instances, certain materials which had been considered nonfriable appeared capable of releasing significant amounts of asbestos fibers to the atmosphere. Examples of practices that were observed by EPA to reduce otherwise nonfriable asbestos material to dust capable of becoming airborne included the breaking of nonfriable insulation from steel beams by repeatedly running over the beams with a crawler tractor. In view of the damage done to these otherwise nonfriable materials and the resulting increased potential for fiber release, these and other similar practices involving nonfriable asbestos material were considered to render nonfriable ACM into dust capable of becoming airborne.

As a result, EPA issued a policy determination in 1985 regarding the removal of nonfriable asbestos material that was consistent with EPA's intent to distinguish between material that could release significant amounts of asbestos fibers during demolition and renovation operations and those that would not. This policy determination stated in essence that any ACM, whether originally friable or nonfriable that become (or are likely to become) crumbled, pulverized, or reduced to powder are covered by the NESHAP. Specifically, the determination stated that

> * * * even though the regulations address only material that is presently friable, it does not limit itself to material that is friable at the time of notification. Rather, if at any point during the renovation or demolition, additional friable asbestos material is * * * created from nonfriable forms, then this additional friable material becomes subject to the regulations from the time of creation * * *

The issuance of this determination did not alter the intent of the NESHAP, but was consistent with the intent of the standard that was written to prevent significant emissions of asbestos fibers. The intent of the policy determination was that it apply narrowly to specific instances where otherwise nonfriable materials would be damaged during demolition or renovation to the extent that significant amounts of asbestos fibers would be released to the atmosphere. A statement in the determination to the effect that some nonfriable materials may remain nonfriable throughout demolition and renovation is evidence that this determination was intended to be narrowly interpreted and not used to require removal of all nonfriable materials. For example, materials such as resilient floor covering, asphalt roofing products, packings, and gaskets would rarely, if ever, need to be removed because, even when broken or damaged, they would not release significant amounts of asbestos fibers. But, just as it is important to recognize that some nonfriable materials do not have to be removed prior to demolition, it is also important to recognize that some nonfriable materials should be removed prior to demolition if, as a result of the forces of demolition, nonfriable material is likely to become crumbled, pulverized, or otherwise reduced to powder. For example, the A/C siding on a building that is to be demolished using a wrecking ball is very likely to be crumbled or pulverized with increased potential for the release of significant levels of asbestos fibers. Such material in this instance should be removed prior to demolition.

Since this policy determination was made, there has been some confusion in

its application. As a result, contractors operating in more than one enforcement jurisdiction have encountered different interpretations for similar demolition operations. For example, there have been instances in which contractors are required, prior to demolition, to remove floor tile in one enforcement jurisdiction but not in another. Contractors and/or building owners and operators are unsure as to what materials must be removed and what materials can be left in place and are often hesitant to proceed without a ruling from EPA, which can involve significant delays.

As a consequence, EPA received a number of requests from State and regional enforcement agencies to clarify what is required under the NESHAP in dealing with nonfriable materials since the 1985 policy determination was issued. In response to these requests, a clarification of the nonfriable issue was included in the revisions proposed on January 10, 1989. These revisions were intended to clarify the intent of the original rule. Basically, EPA stated in the January 10, 1989, Federal Register notice that certain nonfriable materials, such as floor tile, roofing products, and packings and gaskets that are in good condition, can be left in buildings being demolished because fiber release from these materials, even if the materials are damaged, is relatively small compared to the fiber release from friable materials. Other nonfriable products such as A/C products have a greater potential to release asbestos fibers when heavily damaged and may have to be removed prior to demolition.

In response to the revisions proposed on January 10, 1989, numerous comments were submitted to EPA. Many of the commenters argued that EPA was attempting to regulate nonfriable materials, which were explicitly exempted in previous asbestos NESHAP rulemakings. Many comments stated that the proposed revisions did not help to clarify EPA's position on nonfriable material and may have made matters more confusing.

In responding to the comments, a literature survey was conducted to determine if it was possible to quantify the fiber release potential of nonfriable materials when they are damaged during demolition. All of the available data on fiber release from floor tile, roofing products, gaskets, packings, and A/C products was reviewed. In some instances, the fiber release data were measured during actual removal operations, while other data were from simulated removal activities in laboratory settings. For the materials evaluated, the potential for fiber release appeared minimal and substantially lower than for friable materials. These findings, while uncertain, support EPA's original argument that there is a basis for making a distinction between materials that readily release fibers and those that do not.

As a result of the comments received on this issue and the additional information gathered in response to comments, EPA has been able to compile a list of nonfriable ACM that, under normal conditions, do not have to be removed prior to demolition operations. These ACM are not expected to release significant amounts of asbestos fibers to the outside air during demolition and, consistent with the intent of the existing standards, are not being regulated. A definition of "category I nonfriable ACM" is added to the final rule, which lists resilient floor covering, roofing products, gaskets, and packings. However, if these materials are in poor condition and are friable or they are subjected to sanding, grinding, cutting, or abrading, they are to be treated as friable asbestos material. Category I nonfriable ACM that is in poor condition, but is not friable and will not be subjected to sanding, grinding, cutting, or abrading, is not subject to the NESHAP. "In poor condition" has been defined to mean that the binding of the material is losing its integrity as indicated by peeling, cracking, or crumbling of the material. Other nonfriable materials are identified as Category II nonfriable ACM and have to be evaluated on a case-by-case basis. Category II materials that become crumbled, pulverized, or reduced to powder during removal or during demolition are covered by the NESHAP.

Broken ACM

*Comment:* Commenters IV-D-47, IV-D-89, IV-D-93, and IV-D-95 explained that use of the term "broken" to describe materials that are subject to the rule is inconsistent with the current NESHAP and expands coverage of the NESHAP. These commenters stated that merely breaking nonfriable material does not equate to fiber release. One commenter, IV-D-89, noted that noncompliance may increase where nonfriable material is broken during demolition or renovation, but is not controlled or reported according to the NESHAP.

*Response:* After considering this issue, EPA agrees with commenters that retaining the word "broken" could be interpreted as substantially increasing the scope of the standard and, therefore, has removed it from the definition. Most nonfriable materials can be broken without releasing significant quantities of airborne asbestos fibers. It is only when the material is extensively damaged, *i.e.*, crumbled, pulverized, or reduced to powder, that the potential for significant fiber release is greatly increased. Also, in the definitions of "asbestos-containing waste material," "friable asbestos material," and elsewhere, the word "broken" is deleted. The EPA is planning to issue additional information in the future on this and other aspects of the NESHAP to help enforcement officials and the regulated community interpret and apply the NESHAP provisions. .

Inspections

*Comment.* Three commenters argued that EPA should include mandatory asbestos surveys in the rule. Commenter IV-D-4 stated that EPA should require surveys for all buildings prior to and separate from any demolition or renovation activity. Commenter IV-D-4 stated that such building surveys could become part of a public record, making the absence of a survey a violation. Commenter IV-D-4 noted that, if the survey indicated that a structure was asbestos free, all notification and enforcement costs would be eliminated. Also, commenter IV-D-4 explained that a demolition without proper notification could be easily established later.

Commenters IV-D-57 and IV-D-84 stated that EPA's requirement to survey buildings prior to demolition and renovation is implicit and should be made explicit and require that surveys be performed by an accredited asbestos inspector. Commenter IV-D-57 also noted that OSHA requires a building survey by a competent person and stated that EPA should similarly require a site-specific survey before demolition, with details on how the building will be demolished and how the asbestos will be controlled.

*Response:* The EPA currently requires that a facility be inspected for asbestos prior to demolition or renovation. As a result of the survey, information on the asbestos material present, the nature of the demolition or renovation, and measures that will be taken to control emissions of asbestos must be reported to EPA. Commenters IV-D-57 and IV-D-84 are correct in saying that it is an implicit requirement and that it is not stated explicitly in the rule. The final rule expressly requires a facility survey for asbestos prior to demolition or renovation. Although previously implied, this revision clarifies EPA's position on the requirement to perform building surveys.

The EPA also considered the suggestion to require that surveys be

performed by an "accredited" inspector or by a "competent" person as required by OSHA. OSHA's requirement to have a competent person perform an engineering survey prior to demolition (29 CFR 1926.850) is to ensure that the structural integrity of a structure is sufficient to prevent worker injury caused by the unplanned collapse of any portion of the structure; a search for asbestos is not required. An accredited inspector or competent person can perform the survey although using such individuals is not required. Using an accredited inspector and following the AHERA requirements for building inspections would help ensure a thorough inspection of the facility as required by the NESHAP. However, EPA has not had this requirement before and did not propose such a requirement. The EPA will consider a requirement to use accredited inspectors in future amendments to the rule.

Commenter IV-D-4's suggestion to require the survey of all buildings in advance of demolition or renovation would increase the stringency of the regulation by requiring all owners and operators to survey their facilities for asbestos even when no demolition or renovation operations were planned. The revisions proposed on January 10, 1989, are intended to clarify the rule and promote compliance. The need for a revision that would affect stringency may be considered at a later date. However, such a requirement would require a substantial commitment of resources to perform surveys of all existing buildings. In addition, it is not clear that it would always negate the need for pre-demolition inspections in the future.

Friable Asbestos Material—Analytical Method

*Comment:* Commenters IV-D-17, IV-D-35, and IV-D-70 supported the proposed changes to the definition of "friable asbestos material," specifically the change to percent by area. Commenter IV-D-69 argued that to go from percent weight to percent area may have a major impact on coverage because there may be wide discrepancies in the results reported by the two methods. Commenter IV-D-69 provided an example of this, stating that a cement-based fireproofing that contained 30 percent asbestos by area contained less than 1 percent by weight. Commenter IV-D-70 felt that the definition of "friable asbestos material" was appropriate; however, the method referenced should not be limited to point counting in view of 47 FR 1982, p. 38535, which clarifies the acceptability of "an equivalent estimation method."

Commenter IV-D-78 stated that the definition would require asbestos content to be determined by transmission electron microscopy (TEM) analysis, and that the high cost of TEM should be considered. Commenter IV-D-78 recommended that the current method continue to be accepted with TEM specified over other methods.

*Response:* The revisions to the asbestos NESHAP proposed on January 10, 1989 would have changed the definition of "friable asbestos material" from "greater than 1 percent weight" to "greater than 1 percent area" and referenced a method for the analysis. Because the method referenced actually contains two analytical methods—polarized light microscopy (PLM) which currently measures area, and x-ray diffraction (XRD) which measures weight—EPA has modified the definition to specify the PLM method to avoid possible confusion as to which method is referenced. Because the PLM point counting method measures percent area, the phrase "by area" is not necessary and has been taken out of the definition. The difference between percent area and percent weight depends on the density and volume of materials in the sample. These relationships are described in Asbestos Content in Bulk Insulation Samples: Visual Estimates and Weight Composition (EPA-560/5-88-011, September 1988). However, the fact remains that the PLM procedure used to determine the amount of asbestos in building materials (Interim Method for the Determination of Asbestos in Bulk Insulation Samples (EPA-600/M4-82-020, December 1982) measures percent area and not percent weight. PLM laboratories polled at meetings of the National Asbestos Council admitted that percent area is what they measure and report. Accordingly, there should be no impact on the standard from the proposed change.

Point counting is not required for the PLM procedure. An equivalent visual estimation technique may be used. Visual estimation may be made during macroscopic examination with a stereobinocular microscope, resulting in a volumetric estimation of components. For most samples, quantitation by macroscopic examination is preferred. Visual estimation may also be made during polarized light microscopy (PLM) examination, resulting in a projected area estimation of components. However, if the asbestos content is estimated to be less than 10 percent by a method other than point counting, such as visual estimation, EPA has revised the definition to require that the determination be repeated using the point counting technique with PLM. Point counting, a systematic technique for estimating concentration, may also be useful in quality assurance activities, especially in establishing a relationship between point counts and visual estimation procedures.

The accuracy of quantitative data from either technique of estimation is dependent upon several factors, including: sample homogeneity, asbestos content, asbestos fiber size, the presence of interfering matrix/binder material, and the skill of the microscopist. It is suggested that the quantitation skill of the microscopist may be improved and concurrently verified through the use of calibration standards. These standards may include well-characterized bulk materials or in-house calibration standards formulated by mixing known weights of commonly available fibrous (asbestos, cellulose, glass, *etc.*) and nonfibrous (plaster, clay, vermiculite, calcium carbonate, *etc.*) materials.

For some materials, experience has shown that gravimetry (gravimetric sample reduction) is a viable technique to aid in the determination of asbestos content. The technique involves the systematic removal (and determination of the resulting weight loss) of interfering components, and the concentration of asbestos in a residue, the components of which are identified by PLM. EPA is currently conducting research to develop procedures that will help determine the appropriate analytical procedure to use based on the type of material, the level of asbestos present in the material, as well as other factors.

TEM is not recommended for routine analysis of bulk samples. TEM may be useful in the analysis of special materials containing finely divided asbestos particles. The EPA is currently reviewing procedures for analyzing bulk samples for asbestos. Under investigation are procedures that would determine what analytical techniques are appropriate for bulk samples of different materials and different asbestos contents. For example, a simple visual estimation technique may be appropriate for the initial screening of bulk samples of friable material. If the visual estimation technique indicates that the asbestos content is less than 10 percent, additional quantitation by point counting would be required. If the material to be analyzed contains asbestos fibers below the limit of resolution for PLM, which is often true of floor tile, then analysis by TEM is appropriate.

Method of Notification

*Comment:* Several comments were received on the requirement to use certified mail for notifying EPA. Most of the commenters objected to the use of certified mail to the exclusion of other methods.

Commenters IV-D-23, IV-D-24, IV-D-25, IV-D-42, IV-D-78, IV-D-59, and IV-D-65 considered the certified mail requirement to be unnecessary for EPA to achieve the intended purpose of the notification process. It was stated that certified mail would require a trip to a post office, which is a deterrent to timely notification. Commenters IV-D-23, IV-D-24, IV-D-41, and IV-D-78 argued that notification by telefax machine may be more practical than certified mail. Commenters IV-D-25, IV-D-65, and IV-D-83 suggested that notification by telephone or telefax be allowed, followed by a written notification. Commenters IV-D-24, IV-D-25, IV-D-42, and IV-D-65 observed that regular mailing of notices works satisfactorily and should be allowed. Commenters IV-D-28 and IV-D-66 favored allowing the use of overnight mail.

Commenter IV-D-59 argued that, if a State agency has jurisdiction, the method of notification should be left up to the State agency.

Commenter IV-D-32 argued that all notifications should be in writing because telephone notification does not result in a legally enforceable written record. Also, commenter IV-D-32 stated that allowing the use of telephones would promote schedule changes for minor reasons that would not otherwise be considered.

*Response:* Several of the commenters objected to the required use of certified mail even though EPA proposed the use of certified mail as a way of ensuring that owners/operators had proof of notification. In view of the negative comments and after reconsidering the issue, the EPA has decided not to require certified mail although its use would be allowed. The use of the regular mail system, *i.e.*, U.S. Postal Service, has worked satisfactorily in the past and will continue to be allowed. Also, because the rule specifies postmark "* * * or deliver * * *," private overnight mail delivery is permitted.

Regarding the use of telephone facsimile (fax) machines to transmit notices, EPA does not consider these systems to be sufficiently reliable, at this time, to allow their use. Often, it is difficult to know whether a transmission was successful. Disadvantages associated with their use include occasional incomplete transmissions and transmissions of poor quality requiring faxed messages to be followed by telephone contact to confirm proper transmission. More than one transmission may be required. In some instances, quality cannot be improved. Also, because of competing messages, it often requires a long time before a fax can be properly transmitted and verified. The EPA may consider the use of facsimile machines in the future when their reliability has been improved.

The EPA does not consider it necessary to allow the use of the telephone for the original notification of a demolition or renovation activity covered by this standard. The notification must be in writing.

Where States or local authorities enforce their own asbestos regulations, they may choose the notification procedures. But if a State is delegated authority for enforcing the NESHAP, then they must adhere to the NESHAP's requirements.

The EPA is in agreement with the commenter who favors written notifications over telephone notifications and the final rule continues to require the former.

It should be noted that OSHA has recently proposed notification requirements (55 FR 29712, July 20, 1990) similar to those in the NESHAP. The EPA is coordinating with OSHA during their rulemaking to determine the most efficient mechanism to avoid duplication and ensure that both EPA and OSHA receive adequate notice without unduly burdening industry.

Renotification

*Comment:* Numerous comments were received on the proposed renotification requirements. Although a few favored the requirements as proposed and a few thought the requirements should be more stringent, most of the commenters favored the use of telephone renotification. The comments were as follows:

Commenter IV-D-28 disagreed with the NADC comment in the proposal preamble that renotification by telephone should be allowed; commenter IV-D-28 recommended a 10-day written notice for all projects.

Commenter IV-D-21 suggested that the renotification provisions be made more flexible by allowing the actual start date to vary by a couple of days for projects lasting longer than 5 days before requiring the owner/operator to renotify.

Commenters IV-D-21, IV-D-25, IV-D-26, IV-D-36, IV-D-37, IV-D-41, IV-D-42, IV-D-45, IV-D-46, IV-D-49, IV-D-50, IV-D-58, IV-D-59, IV-D-60, IV-D-61, IV-D-62, IV-D-65, IV-D-69, IV-D-71, IV-D-73, IV-D-74, IV-D-76, IV-D-87, IV-D-88, and IV-D-94 suggested that EPA allow the use of some other means besides certified mail for renotification, such as same day telephone or telefax messages, when a 5-day written notice would further delay the project. This would be simpler and less time-consuming. Commenter IV-D-41 also suggested that, when it is feasible to provide a 5-day written notice, i.e., delays are known at least 5 days in advance, then such notice would be provided. Also, as commenters IV-D-46, IV-D-49, IV-D-50, IV-D-58, IV-D-60, IV-D-62, IV-D-69, and IV-D-73 suggested, a telephone notice could be followed by a written notice.

According to commenters IV-D-23, IV-D-24, IV-D-36, IV-D-37, IV-D-41, IV-D-42, IV-D-43, IV-D-45, IV-D-46, IV-D-49, IV-D-50, IV-D-51, IV-D-58, IV-D-59, IV-D-63, IV-D-64, IV-D-73, IV-D-75, IV-D-76, IV-D-78, IV-D-87, IV-D-88, and IV-D-94, there are numerous unforeseen factors, such as equipment mobilization problems, personnel availability, weather, or other project difficulties, that can cause a removal project to start on a date other than the one submitted in the original notification. These commenters explained that the proposed renotification requirements, with their additional waiting requirements, could result in unreasonable project delays and significantly increased project costs. Several of these commenters and commenter IV-D-84 suggested that EPA allow a project to start within some reasonable period of time, such as a couple of days, of the original start date without having to renotify EPA in writing. The EPA should provide for some flexibility in predicting the exact start date. In the experience of one of the commenters, jobs usually start within a day or two of the scheduled date.

*Response:* The EPA agrees that a 10-day advance notice is appropriate for demolitions and renovations that can be planned for and scheduled. In some situations, however, such as emergency renovations or government-ordered demolition of buildings that are in danger of imminent collapse, EPA considers shorter notification periods appropriate. For renotification, a 10-day additional waiting period would be excessively burdensome.

The EPA has considered the suggestion that telephone renotification be permitted and has determined that providing for the use of the telephone, followed by a written notice, would provide the necessary flexibility and would be in the best interests of both

the regulated community and EPA. The EPA does not want to interfere with commerce by requiring a 5-day waiting period for a written renotification when a telephone call followed by a written renotification would suffice. Nor does EPA wish to make useless visits to jobs that have been rescheduled because a written renotification of a change in start date was not received in time.

Emergency Renovation

*Comment:* Commenters IV-D-9, IV-D-14, IV-D-41, IV-D-42, and IV-D-49 stated that the scope of the term "emergency renovation operation" should not be limited to events resulting in "unsafe conditions," but should include events such as fires, ruptured pipes, boiler failures, and other situations that could present potential public health or safety hazards if not immediately attended to. Commenter IV-D-18 asked if the definition would include the release of asbestos into the air. Commenter IV-D-63 recommended that the definition include operations necessary to protect equipment from significant damage.

*Response:* Events that would necessitate an emergency renovation include those that may produce immediately unsafe conditions as well as those that, if not quickly remedied, could reasonably be foreseen to result in an unsafe or detrimental effect on health. For example, a boiler in an apartment building that suddenly malfunctions during the winter would need to be repaired immediately. To protect equipment from significant damage and to avoid imposing an unreasonable financial burden by requiring sources that experience a sudden unexpected equipment failure to wait 10 days, the final rule includes equipment damage and financial burden as additional reasons for emergency renovations, and the definition of emergency renovation is revised accordingly.

Definition of Facility

*Comment:* Several commenters argued that the exclusion of residential facilities having four or fewer dwelling units should be eliminated. Commenter IV-D-89 asserted that residential demolition and renovation and associated waste disposal involve significant quantities of asbestos and should be regulated. Commenter IV-D-54 argued that residential buildings having four or fewer units should not be exempt from the work practices provisions even if they are exempt from the notification requirements. Commenter IV-D-94 recommended that only facilities with one dwelling unit be excluded because renters of apartments are frequently exposed as a result of asbestos work performed by untrained workers.

*Response:* The recommendation to remove the exemption for residential facilities having four or fewer dwelling units would expand the scope of the rule. Revisions that alter stringency may be considered during a later rulemaking. However, EPA does not consider residential structures that are demolished or renovated as part of a commercial or public project to be exempt from this rule. For example, the demolition of one or more houses as part of an urban renewal project, a highway construction project, or a project to develop a shopping mall, industrial facility, or other private development, would be subject to the NESHAP. Nor would the conversion of a hotel or large apartment building to a condominium, a cooperative, or a loft exempt the structure from the NESHAP. To clarify that condominiums, cooperatives, and lofts which exceed four dwelling units are subject to the NESHAP, the definition of facility has been modified accordingly. The owner of a home that renovates his house or demolishes it to construct another house is not to be subject to the NESHAP.

Definition of Installation

*Comment:* Commenter IV-D-63 argued that the definition of "installation" needs clarification and asks whether a group of residential buildings would be excluded. The commenter argued that a group of residential buildings at one location being demolished or renovated by one developer should be covered.

*Response:* A group of residential buildings under the control of the same owner or operator is considered an installation according to the definition of "installation" and is, therefore, covered by the rule. As an example, several houses located on highway right-of-way that are all demolished as part of the same highway project would be considered an "installation," even when the houses are not proximate to each other. In this example, the houses are under the control of the same owner or operator, i.e., the highway agency responsible for the highway project.

Training

*Comment:* Commenters IV-D-18 and IV-D-86 recommended that a refresher course be attended every 2 years.

*Response:* Regarding the commenters who recommended that refresher courses be taken every 2 years, EPA agrees and has modified the rule to require refresher courses. The EPA considers such additional training important to maintain familiarity with the NESHAP as well as to keep abreast of any changes in the standards.

Sanding, Grinding, or Abrading Nonfriable ACM

*Comment:* Commenters IV-D-15, IV-D-47, IV-D-48, IV-D-55, IV-D-84, and IV-D-95 considered asbestos-containing flooring products, such as tile and sheet vinyl flooring, to always be nonfriable and exempt from the rule, with the exception of flooring that was being sanded (Commenters IV-D-47 and IV-D-48.)

*Response:* The EPA considers the deliberate sanding, grinding, or abrading (including drilling, cutting, and chipping) of all nonfriable materials, including resilient floor covering, asphalt roofing material, packings, and gaskets to be sources of asbestos emissions and the revisions require otherwise nonfriable ACM to be treated as if it were friable when it is sanded, ground or abraded.

Also, a definition of "grinding" is added to clarify the types of activities, especially those involving nonfriable asbestos materials, that are subject to the regulation. For example, typical floor tile removal methods, such as mechanical chipping, result in the floor tile being broken up into numerous small fragments. This removal method is subject to the NESHAP provisions. Other floor tile removal methods are available that do not result in the material being so severely damaged. Such methods include the use of heat from heat guns or electric heat machines, the use of infrared machines, flooding with water or amended water, and the use of dry ice or liquid nitrogen. These methods when properly utilized allow the tiles to be removed with a minimum of damage to the tiles and would not be subject to the NESHAP.

Definition of Nonfriable Asbestos Material

*Comment:* Commenters IV-D-15 and IV-D-89 asserted that the meaning of "nonfriable" is unclear because it was not defined in the revisions proposed on January 30, 1989. A problem may result if it is considered the opposite of friable. Commenter IV-D-39 also argued for a definition of "nonfriable" and asserted that, like "friable," the threshold of at least 1 percent by area should apply.

*Response:* The EPA agrees that the meaning of "nonfriable" needs to be clarified. A definition of "nonfriable asbestos material" has been added to the final rule. The EPA considers nonfriable asbestos material to be material containing more than 1 percent

asbestos by area that cannot be crumbled, pulverized, or reduced to power by hand pressure. However, some nonfriable asbestos materials can be crumbled, pulverized, etc., in the course of demolition/renovation operations leading to asbestos emissions and are, therefore, subject to control under the NESHAP.

*Waste Disposal*

Marking

*Comment:* Commenters IV-D-61 and IV-D-98 asserted that the term "placard" is inappropriate because it has a specific application under DOT regulations for hazardous waste transport, and that the proposal should be revised to maintain the distinction between "marking" and "placarding" as was done in RCRA and TSCA rulemakings.

*Response:* The EPA has modified the final rule to replace the term "placard," a term used by the DOT in its regulation of the transportation of hazardous materials, with the term "mark" as suggested by the commenters. This should help avoid confusing DOT requirements with requirements under the NESHAP.

Labeling

*Comment:* Commenters IV-D-18, IV-D-28, IV-D-41, and IV-D-84 recommended that EPA in Section 61.150, and perhaps elsewhere, cite only OSHA labels and delete references to other labels because OSHA requires the use of their labels in all cases.

*Response:* The EPA agrees with the commenters who suggest that only OSHA labels be required on containers and has revised the final rule accordingly.

Offsite Disposal

*Comment:* Two commenters were concerned with placarding and other requirements of § 61.149(d). Commenter IV-D-22 stated that his company moves tailings from the mill by dump truck or earth-moving equipment to a disposal site on company property and would like the requirements for placards, etc., in § 61.149(d) changed so that they would apply only to transport to an offsite disposal facility.

Commenter IV-D-93 also suggested that the requirements of § 61.149(d) should apply only to vehicles transferring waste offsite.

*Response:* Although company personnel may not require a warning that asbestos waste is being transported, others who are on site and who are not company employees, e.g., vendor and construction personnel, clearly do. Further, OSHA requires that workers be informed of hazards to which they are exposed. Accordingly, EPA believes the provisions of § 61.149(d) are appropriate as proposed and should not be changed as suggested.

EPA Identification Number

*Comment:* Several comments addressed the proposal to assign identification numbers to generators of asbestos waste. Most of the commenters found the requirement confusing. Commenters IV-D-9 and IV-D-49 stated that the system of using EPA identification numbers is confusing and misleading and should be subject to public comment rather than tacked onto the final version of the amendments. Commenter IV-D-25 wondered how the system is to operate and whether they would use the number they already have for hazardous waste. Commenter IV-D-26 was unclear as to who the generator would be and suggested that the abatement contractor be considered the generator. Commenter IV-D-28 thought that this requirement would generate a list of one-time generators, and that it should be deferred for further study. Commenter IV-D-41 asked if RCRA hazardous waste identification numbers were going to be assigned to asbestos waste generators. As explained by commenter IV-D-61, not all generators will have an EPA identification number as required in § 61.150(d) (1)(i) and (4)(i). Commenters IV-D-62 and IV-D-63 expressed confusion over the proposed identification number and urged that a single number be assigned to an entire company, rather than to each building or facility. Commenter IV-D-18 asked how the identification numbers are to be determined and assigned; is it to be done now; and, if the program is delegated to a State or local program, would this require a State identification number?

*Response:* Because of the confusion expressed by all the commenters over how a system of assigning identification numbers to asbestos waste generators would work, EPA has reconsidered this revision and has decided to delete the requirement for an identification number. The EPA is confident that, even without such a unique numbering system, it will be possible to track waste shipments for the purpose of pursuing enforcement actions.

Semiannual Reports

*Comment:* Commenter IV-D-4 opposed semiannual reporting by generators or disposal sites but recommended exception reporting by both. Commenter IV-D-9 noted that semiannual reporting is also redundant in view of the Superfund Amendments and Reauthorization Act (SARA) Title III regulations. Commenters IV-D-28, IV-D-39, IV-D-41, IV-D-75, and IV-D-83 asserted that EPA should delete the semiannual reporting requirement in § 61.150(d)(4) because it is redundant since the information is also provided on the waste tracking form and will just add more paperwork. Commenter IV-D-94 was concerned that small, rural landfills will use the proposed recordkeeping requirements as an excuse to refuse to accept asbestos waste, which could increase illegal dumping. Commenter IV-D-94 stated that the regulation in effect prior to the January 10, 1989, proposal should be retained.

Commenters IV-D-24, IV-D-61, and IV-D-62 noted that most waste shipment reporting now occurs on an annual basis and that they preferred annual to semiannual reporting. Commenter IV-D-41 recommended that EPA adopt the biennial reporting used by EPA's Office of Solid Waste (OSW). Commenter IV-D-65 stated that, if necessary, EPA should supplement the existing biennial RCRA report.

Commenter IV-D-63 asserted that it is unnecessary for the generator to submit semiannual waste disposal reports. Commenter IV-D-61 stated that the proposal imposes redundant reporting requirements on owners/operators due to § 61.150(c)(4).

Commenter IV-D-51 argued that industrial landfills on site that are subject to RCRA and State statutes should be exempt from the reporting and recordkeeping requirements of § 61.150(d). Commenter IV-D-55 stated that § 61.150(d) does not define adequately who keeps disposal records and who submits semiannual reports. Commenter IV-D-55 felt that building owners are unfamiliar with the report called for in § 61.150(d)(4).

*Response:* Upon additional consideration of this provision, EPA has decided to omit the requirement for semiannual reporting from today's rule. This decision is based in part on several comments opposing semiannual reporting as unnecessary. In addition, because of the large commitment of enforcement resources that would be required for such a system to properly function, EPA believes that the proposal is overly ambitious at this time. The EPA believes, however, that enforcement can use the available information and adequately identify violators by comparing the waste records that are required to be kept by waste generators and waste disposal sites. At this time, a more workable

solution will be to require disposal sites to report to EPA whenever there is a discrepancy between the amount of waste received and the amount reported on the waste shipment papers. The discrepancy report should be submitted to the same agency that was notified of the demolition or renovation and, if different, to the agency responsible for administering the NESHAP program for the disposal site. In addition, new and existing disposal sites will be required to comply with the general reporting provisions of 40 CFR part 61. Specifically, new disposal sites will be required to comply with the requirement to apply for approval to construct (§ 61.07), and the requirements to notify EPA of startup dates (§ 61.09). Existing disposal sites that will accept asbestos waste after the effective date of the rule will be required to supply EPA with certain information concerning their operations (§ 61.10). This information will assist enforcement in tracking asbestos waste.

Excepted Waste Shipment Report

The proposed revisions included a requirement for waste generators to indicate, as part of a semiannual report to the Administrator, waste shipments for which 35 days or more have elapsed since the waste was shipped without the waste generator having received a copy of the WSR signed and dated by the disposal site owner or operator. While EPA has determined that semiannual reports are not necessary, it considers this requirement a vital part of the asbestos waste tracking system and a provisions for excepted waste shipment reports is included in the final rule.

Waste Conversion Processes

*Comment:* Commenter IV-D-21 asked that procedures for sample preparation for TEM be clarified; that comminution size of particle reduction be specified; that the standard or interim method of analysis that is acceptable be identified; and that laboratory qualifications meeting requirements of the National Institute of Standards and Technology (NIST) and AHERA be identified.

*Response:* Currently EPA has no protocol for TEM analysis of output materials. The final rule requires the owner or operator of waste conversion processes to submit a protocol for sampling and analysis by TEM for approval by EPA.

V. Administrative

The docket is an organized and complete file of all the information considered by EPA in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can effectively participate in the rulemaking process. Along with the statement of basis and purpose of the proposed and promulgated revisions and EPA responses to significant comments, the contents of the docket, except for interagency review materials, will serve as the record in case of judicial review (section 307(d)(7)(A)).

The effective date of this regulation is November 20, 1990. Section 112 of the Clean Air Act provides that standards of performance or revisions thereof become effective upon promulgation except that in the case of an existing source, the standard shall not apply until 90 days after its effective date.

As prescribed by section 112, the promulgation of these standards was preceded by the Administrator's determination that asbestos presents a significant risk to human health as a result of air emissions from one or more source categories and is therefore a hazardous air pollutant (36 FR 3031, dated March 31, 1971). In accordance with section 117 of the Act, publication of these promulgated standards was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new standard promulgated under section 112 of the Act. Since the costs of the revision will be small, an economic impact assessment was not considered necessary for this regulation.

Information collection requirements associated with this regulation (those included in 40 CFR part 60, subpart A and subpart XXX) have been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.* and have been assigned OMB control number (2060-0101).

Under Executive Order 12291, EPA is required to judge whether a regulation is a "major rule" and therefore subject to the requirements of a regulatory impact analysis (RIA). The Agency has determined that this regulation would result in none of the adverse economic effects set forth in section 1 of the Order as grounds for finding a regulation to be a "major rule." The Agency has, therefore, concluded that this regulation is not a "major rule" under Executive Order 12291.

The Regulatory Flexibility Act of 1980 requires the identification of potentially adverse impacts of Federal regulations upon small business entities. The Act specifically requires the completion of a Regulatory Flexibility Analysis in those instances where small business impacts are possible. Because these standards impose no adverse economic impacts, a Regulatory Flexibility Analysis has not been conducted.

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that this rule will not have a significant economic impact on a substantial number of small entities.

**List of Subjects in 40 CFR Part 61**

Asbestos, Beryllium, Benzene, Hazardous substances, Mercury, Reporting and recordkeeping requirements, Vinyl chloride, Blast furnaces, Steel mills.

Dated: October 29, 1990.

William K. Reilly,

*Administrator.*

40 CFR part 61 is amended as follows:

**PART 61—[AMENDED]**

1. The authority citation for 40 CFR part 61, subpart M, is revised to read as follows:

Authority: 42 U.S.C. 7401, 7412, 7414, 7416, 7601.

2.–3. Section 61.140 is revised to read as follows:

**§ 61.140 Applicability.**

The provisions of this subpart are applicable to those sources specified in § 61.142 through 61.151, 61.154, and 61.155.

4. In § 61.141, the following definitions are revised: "Asbestos-containing waste materials," "Commercial asbestos," "Demolition," "Emergency renovation operation," "Fabricating," "Facility," "Facility component," "Friable asbestos materials," "Inactive waste disposal site," "Manufacturing," "Outside air," "Particulate asbestos material," "Planned renovation operation," "Remove," "Renovation," "Roadways," "Strip," and "Visible emissions."

The following definitions are added: "Adequately wet," "Category I nonfriable ACM," "Cutting," "Category II nonfriable ACM," "Fugitive sources," "Glove bag," "Grinding," "In poor condition," "Installation," "Leak-tight," "Malfunction," "Natural barrier," "Nonfriable asbestos-containing material," "Nonscheduled renovation operation," "Owner or operator of a demolition or a renovation activity," "Regulated asbestos-containing material," "Resilient floor covering," "Waste generator," "Waste shipment record," and "Working day."

The definitions, "Adequately wetted" and "Asbestos material," are removed.

**§ 61.141 Definitions.**

* * * * *

*Adequately wet* means sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.

* * * * *

*Asbestos-containing waste materials* means mill tailings or any waste that contains commercial asbestos and is generated by a source subject to the provisions of this subpart. This term includes filters from control devices, friable asbestos waste material, and bags or other similar packaging contaminated with commercial asbestos. As applied to demolition and renovations operations, this term also includes regulated asbestos-containing material waste and materials contaminated with asbestos including disposable equipment and clothing.

* * * * *

*Category I nonfriable asbestos-containing material (ACM)* means asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.

*Category II nonfriable ACM* means any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined using the methods specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

*Commercial asbestos* means any material containing asbestos that is extracted from ore and has value because of its asbestos content.

*Cutting* means to penetrate with a sharp-edged instrument and includes sawing, but does not include shearing, slicing, or punching.

*Demolition* means the wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility.

*Emergency renovation operation* means a renovation operation that was not planned but results from a sudden, unexpected event that, if not immediately attended to, presents a safety or public health hazard, is necessary to protect equipment from damage, or is necessary to avoid imposing an unreasonable financial burden. This term includes operations necessitated by nonroutine failures of equipment.

*Fabricating* means any processing (*e.g.*, cutting, sawing, drilling) of a manufactured product that contains commercial asbestos, with the exception of processing at temporary sites (field fabricating) for the construction or restoration of facilities. In the case of friction products, fabricating includes bonding, debonding, grinding, sawing, drilling, or other similar operations performed as part of fabricating.

*Facility* means any institutional, commercial, public, industrial, or residential structure, installation, or building (including any structure, installation, or building containing condominiums or individual dwelling units operated as a residential cooperative, but excluding residential buildings having four or fewer dwelling units); any ship; and any active or inactive waste disposal site. For purposes of this definition, any building, structure, or installation that contains a loft used as a dwelling is not considered a residential structure, installation, or building. Any structure, installation or building that was previously subject to this subpart is not excluded, regardless of its current use or function.

*Facility component* means any part of a facility including equipment.

*Friable asbestos material* means any material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763 section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.

*Fugitive source* means any source of emissions not controlled by an air pollution control device.

*Glove bag* means a sealed compartment with attached inner gloves used for the handling of asbestos-containing materials. properly installed and used, glove bags provide a small work area enclosure typically used for small-scale asbestos stripping operations. Information on glove-bag installation, equipment and supplies, and work practices is contained in the Occupational Safety and Health Administration's (OSHA's) final rule on occupational exposure to asbestos (appendix G to 29 CFR 1926.58).

*Grinding* means to reduce to powder or small fragments and includes mechanical chipping or drilling.

*In poor condition* means the binding of the material is losing its integrity as indicated by peeling, cracking, or crumbling of the material.

*Inactive waste disposal site* means any disposal site or portion of it where additional asbestos-containing waste material has not been deposited within the past year.

*Installation* means any building or structure or any group of buildings or structures at a single demolition or renovation site that are under the control of the same owner or operator (or owner or operator under common control).

*Leak-tight* means that solids or liquids cannot escape or spill out. It also means dust-tight.

*Malfunction* means any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner so that emissions of asbestos are increased. Failures of equipment shall not be considered malfunctions if they are caused in any way by poor maintenance, careless operation, or any other preventable upset conditions, equipment breakdown, or process failure.

*Manufacturing* means the combining of commercial asbestos—or, in the case of woven friction products, the combining of textiles containing commercial asbestos—with any other material(s), including commercial asbestos, and the processing of this combination into a product. Chlorine production is considered a part of manufacturing.

*Natural barrier* means a natural object that effectively precludes or deters access. Natural barriers include physical obstacles such as cliffs, lakes or other large bodies of water, deep and wide ravines, and mountains. Remoteness by itself is not a natural barrier.

*Nonfriable asbestos-containing material* means any material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

*Nonscheduled renovation operation* means a renovation operation necessitated by the routine failure of equipment, which is expected to occur within a given period based on past operating experience, but for which an exact date cannot be predicted.

*Outside air* means the air outside buildings and structures, including, but

not limited to, the air under a bridge or in an open air ferry dock.

*Owner or operator of a demolition or renovation activity* means any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

*Particulate asbestos material* means finely divided particles of asbestos or material containing asbestos.

*Planned renovation operations* means a renovation operation, or a number of such operations, in which some RACM will be removed or stripped within a given period of time and that can be predicted. Individual nonscheduled operations are included if a number of such operations can be predicted to occur during a given period of time based on operating experience.

*Regulated asbestos-containing material* (RACM) means (a) Friable asbestos material, (b) Category I nonfriable ACM that has become friable, (c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

*Remove* means to take out RACM or facility components that contain or are covered with RACM from any facility.

*Renovation* means altering a facility or one or more facility components in any way, including the stripping or removal of RACM from a facility component. Operations in which load-supporting structural members are wrecked or taken out are demolitions.

*Resilient floor covering* means asbestos-containing floor tile, including asphalt and vinyl floor tile, and sheet vinyl floor covering containing more than 1 percent asbestos as determined using polarized light microscopy according to the method specified in appendix A, subpart F, 40 CFR part 763, Section 1, Polarized Light Microscopy.

*Roadways* means surfaces on which vehicles travel. This term includes public and private highways, roads, streets, parking areas, and driveways.

*Strip* means to take off RACM from any part of a facility or facility components.

* * * * *

*Visible emissions* means any emissions, which are visually detectable without the aid of instruments, coming from RACM or asbestos-containing waste material, or from any asbestos milling, manufacturing, or fabricating operation. This does not include condensed, uncombined water vapor.

*Waste generator* means any owner or operator of a source covered by this subpart whose act or process produces asbestos-containing waste material.

*Waste shipment record* means the shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

*Working day* means Monday through Friday and includes holidays that fall on any of the days Monday through Friday.

5. Section 61.142 is revised to read as follows:

**§ 61.142 Standard for asbestos mills.**

(a) Each owner or operator of an asbestos mill shall either discharge no visible emissions to the outside air from that asbestos mill, including fugitive sources, or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(b) Each owner or operator of an asbestos mill shall meet the following requirements:

(1) Monitor each potential source of asbestos emissions from any part of the mill facility, including air cleaning devices, process equipment, and buildings that house equipment for material processing and handling, at least once each day, during daylight hours, for visible emissions to the outside air during periods of operation. The monitoring shall be by visual observation of at least 15 seconds duration per source of emissions.

(2) Inspect each air cleaning device at least once each week for proper operation and for changes that signal the potential for malfunction, including, to the maximum extent possible without dismantling other than opening the device, the presence of tears, holes, and abrasions in filter bags and for dust deposits on the clean side of bags. For air cleaning devices that cannot be inspected on a weekly basis according to this paragraph, submit to the Administrator, and revise as necessary, a written maintenance plan to include, at a minimum, the following:

(i) Maintenance schedule.

(ii) Recordkeeping plan.

(3) Maintain records of the results of visible emissions monitoring and air cleaning device inspections using a format similar to that shown in Figures 1 and 2 and include the following:

(i) Date and time of each inspection.

(ii) Presence or absence of visible emissions.

(iii) Condition of fabric filters, including presence of any tears, holes, and abrasions.

(iv) Presence of dust deposits on clean side of fabric filters.

(v) Brief description of corrective actions taken, including date and time.

(vi) Daily hours of operation for each air cleaning device.

(4) Furnish upon request, and make available at the affected facility during normal business hours for inspection by the Administrator, all records required under this section.

(5) Retain a copy of all monitoring and inspection records for at least 2 years.

(6) Submit quarterly a copy of visible emission monitoring records to the Administrator if visible emissions occurred during the report period. Quarterly reports shall be postmarked by the 30th day following the end of the calendar quarter.

BILLING CODE 6560-50-M

| Date of inspection (mo/day/yr) | Time of inspection (a.m./p.m.) | Air cleaning device or fugitive source designation or number | Visible emissions observed (yes/no), corrective action taken | Daily operating hours | Inspector's initials |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Figure 1. Record of Visible Emission Monitoring

1. Air cleaning device designation or number _____

2. Date of inspection _____ _____ _____ _____

3. Time of inspection _____ _____ _____ _____

4. Is air cleaning device operating properly (yes/no) _____ _____ _____ _____

5. Tears, holes, or abrasions in fabric filter (yes/no) _____ _____ _____ _____

6. Dust on clean side of fabric filters (yes/no) _____ _____ _____ _____

7. Other signs of malfunctions or potential malfunctions (yes/no) _____ _____ _____ _____

8. Describe other malfunctions or signs of potential malfunctions. _____

_____

_____

9. Describe corrective action(s) taken. _____

_____

_____

10. Date and time corrective action taken _____ _____ _____ _____

11. Inspected by

| (Print/Type Name) | (Title) | (Signature) | (Date) |
|---|---|---|---|
| | | | |
| (Print/Type Name) | (Title) | (Signature) | (Date) |

Figure 2. Air Cleaning Device Inspection Checklist

BILLING CODE 6560-50-C

6. Section 61.143 is revised to read as follows:

**§ 61.143 Standard for roadways.**

No person may construct or maintain a roadway with asbestos tailings or asbestos-containing waste material on that roadway, unless, for asbestos tailings.

(a) It is a temporary roadway on an area of asbestos ore deposits (asbestos mine); or

(b) It is a temporary roadway at an active asbestos mill site and is encapsulated with a resinous or bituminous binder. The encapsulated road surface must be maintained at a minimum frequency of one per year to prevent dust emissions; or

(c) It is encapsulated in asphalt concrete meeting the specifications contained in section 401 of Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-85, 1985, or their equivalent.

7. In § 61.144, paragraph (a)(9) and paragraphs (b) (1) and (2) are revised, and paragraphs (b)(3) through (b)(8) are added to read as follows:

**§ 61.144 Standards for manufacturing.**

(a) * * *

(9) The manufacture of chlorine utilizing asbestos diaphragm technology.

* * * * *

(b) * * *

(1) Discharge no visible emissions to the outside air from these operations or from any building or structure in which they are conducted or from any other fugitive sources; or

(2) Use the methods specified by § 61.152 to clean emissions from these operations containing particulate asbestos material before they escape to, or are vented to, the outside air.

(3) Monitor each potential source of asbestos emissions from any part of the manufacturing facility, including air cleaning devices, process equipment, and buildings housing material processing and handling equipment, at least once each day during daylight hours for visible emissions to the outside air during periods of operation. The monitoring shall be visual observation of at least 15 seconds duration per source of emissions.

(4) Inspect each air cleaning device at least once each week for proper operation and for changes that signal the potential for malfunctions, including, to the maximum extent possible without dismantling other than opening the device, the presence of tears, holes, and abrasions in filter bags and for dust deposits on the clean side of bags. For air cleaning devices that cannot be inspected on a weekly basis according to this paragraph, submit to the Administrator, and revise as necessary, a written maintenance plan to include, at a minimum, the following:

(i) Maintenance schedule.

(ii) Recordkeeping plan.

(5) Maintain records of the results of visible emission monitoring and air cleaning device inspections using a format similar to that shown in Figures 1 and 2 and include the following.

(i) Date and time of each inspection.

(ii) Presence or absence of visible emissions.

(iii) Condition of fabric filters, including presence of any tears, holes and abrasions.

(iv) Presence of dust deposits on clean side of fabric filters.

(v) Brief description of corrective actions taken, including date and time.

(vi) Daily hours of operation for each air cleaning device.

(6) Furnish upon request, and make available at the affected facility during normal business hours for inspection by the Administrator, all records required under this section.

(7) Retain a copy of all monitoring and inspection records for at least 2 years.

(8) Submit quarterly a copy of the visible emission monitoring records to the Administrator if visible emissions occurred during the report period. Quarterly reports shall be postmarked by the 30th day following the end of the calendar quarter.

8. Sections 61.146 and 61.147 are removed, and § 61.145 is revised to read as follows:

**§ 61.145 Standard for demolition and renovation.**

(a) *Applicability.* To determine which requirements of paragraphs (a), (b), and (c) of this section apply to the owner or operator of a demolition or renovation activity and prior to the commencement of the demolition or renovation, thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos, including Category I and Category II nonfriable ACM. The requirements of paragraphs (b) and (c) of this section apply to each owner or operator of a demolition or renovation activity, including the removal of RACM as follows:

(1) In a facility being demolished, all the requirements of paragraphs (b) and (c) of this section apply, except as provided in paragraph (a)(3) of this section, if the combined amount of RACM is

(i) At least 80 linear meters (260 linear feet) on pipes or at least 15 square meters (160 square feet) on other facility components, or

(ii) At least 1 cubic meter (35 cubic feet) off facility components where the length or area could not be measured previously.

(2) In a facility being demolished, only the notification requirements of paragraphs (b)(1), (2), (3)(i) and (iv), and (4)(i) through (vii) and (4)(ix) and (xvi) of this section apply, if the combined amount of RACM is

(i) Less than 80 linear meters (260 linear feet) on pipes less than 15 square meters (160 square feet) on other facility components, and

(ii) Less than one cubic meter (35 cubic feet) off facility components where the length or area could not be measured previously or there is no asbestos.

(3) If the facility is being demolished under an order of a State or local government agency, issued because the facility is structurally unsound and in danger of imminent collapse, only the requirements of paragraphs (b)(1), (b)(2), (b)(3)(iii), (b)(4) (except (b)(4)(viii)), (b)(5), and (c)(4) through (c)(9) of this section apply.

(4) In a facility being renovated, including any individual nonscheduled renovation operation, all the requirements of paragraphs (b) and (c) of this section apply if the combined amount of RACM to be stripped, removed, dislodged, cut, drilled, or similarly disturbed is

(i) At least 80 linear meters (260 linear feet) on pipes or at least 15 square meters (160 square feet) on other facility components, or

(ii) At least 1 cubic meter (35 cubic feet) off facility components where the length or area could not be measured previously.

(iii) To determine whether paragraph (a)(4) of this section applies to planned renovation operations involving individual nonscheduled operations, predict the combined additive amount of RACM to be removed or stripped during a calendar year of January 1 through December 31.

(iv) To determine whether paragraph (a)(4) of this section applies to emergency renovation operations, estimate the combined amount of RACM to be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(5) Owners or operators of demolition and renovation operations are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(b) *Notification requirements.* Each owner or operator of a demolition or

renovation activity to which this section applies shall:

(1) Provide the Administrator with written notice of intention to demolish or renovate. Delivery of the notice by U.S. Postal Service, commercial delivery service, or hand delivery is acceptable.

(2) Update notice, as necessary, including when the amount of asbestos affected changes by at least 20 percent.

(3) Postmark or deliver the notice as follows:

(i) At least 10 working days before asbestos stripping or removal work or any other activity begins (such as site preparation that would break up, dislodge or similarly disturb asbestos material), if the operation is described in paragraphs (a) (1) and (4) (except (a)(4)(iii) and (a)(4)(iv)) of this section. If the operation is as described in paragraph (a)(2) of this section, notification is required 10 working days before demolition begins.

(ii) At least 10 working days before the end of the calendar year preceding the year for which notice is being given for renovations described in paragraph (a)(4)(iii) of this section.

(iii) As early as possible before, but not later than, the following working day if the operation is a demolition ordered according to paragraph (a)(3) of this section or, if the operation is a renovation described in paragraph (a)(4)(iv) of this section.

(iv) For asbestos stripping or removal work in a demolition or renovation operation, described in paragraphs (a) (1) and (4) (except (a)(4)(iii) and (a)(4)(iv)) of this section, and for a demolition described in paragraph (a)(2) of this section, that will begin on a date other than the one contained in the original notice, notice of the new start date must be provided to the Administrator as follows:

(A) When the asbestos stripping or removal operation or demolition operation covered by this paragraph will begin after the date contained in the notice,

(1) Notify the Administrator of the new start date by telephone as soon as possible before the original start date, and

(2) Provide the Administrator with a written notice of the new start date as soon as possible before, and no later than, the original start date. Delivery of the updated notice by the U.S. Postal Service, commercial delivery service, or hand delivery is acceptable.

(B) When the asbestos stripping or removal operation or demolition operation covered by this paragraph will begin on a date earlier than the original start date,

(1) Provide the Administrator with a written notice of the new start date at least 10 working days before asbestos stripping or removal work begins.

(2) For demolitions covered by paragraph (a)(2) of this section, provide the Administrator written notice of a new start date at least 10 working days before commencement of demolition. Delivery of updated notice by U.S. Postal Service, commercial delivery service, or hand delivery is acceptable.

(C) In no event shall an operation covered by this paragraph begin on a date other than the date contained in the written notice of the new start date.

(4) Include the following in the notice:

(i) An indication of whether the notice is the original or a revised notification.

(ii) Name, address, and telephone number of both the facility owner and operator and the asbestos removal contractor owner or operator.

(iii) Type of operation: demolition or renovation.

(iv) Description of the facility or affected part of the facility including the size (square meters [square feet] and number of floors), age, and present and prior use of the facility.

(v) Procedure, including analytical methods, employed to detect the presence of RACM and Category I and Category II nonfriable ACM.

(vi) Estimate of the approximate amount of RACM to be removed from the facility in terms of length of pipe in linear meters (linear feet), surface area in square meters (square feet) on other facility components, or volume in cubic meters (cubic feet) if off the facility components. Also, estimate the approximate amount of Category I and Category II nonfriable ACM in the affected part of the facility that will not be removed before demolition.

(vii) Location and street address (including building number or name and floor or room number, if appropriate), city, county, and state, of the facility being demolished or renovated.

(viii) Scheduled starting and completion dates of asbestos removal work (or any other activity, such as site preparation that would break up, dislodge, or similarly disturb asbestos material) in a demolition or renovation; planned renovation operations involving individual nonscheduled operations shall only include the beginning and ending dates of the report period as described in paragraph (a)(4)(iii) of this section.

(ix) Scheduled starting and completion dates of demolition or renovation.

(x) Description of planned demolition or renovation work to be performed and method(s) to be employed, including demolition or renovation techniques to be used and description of affected facility components.

(xi) Description of work practices and engineering controls to be used to comply with the requirements of this subpart, including asbestos removal and waste-handling emission control procedures.

(xii) Name and location of the waste disposal site where the asbestos-containing waste material will be deposited.

(xiii) A certification that at least one person trained as required by paragraph (c)(8) of this section will supervise the stripping and removal described by this notification. This requirement shall become effective 1 year after promulgation of this regulation.

(xiv) For facilities described in paragraph (a)(3) of this section, the name, title, and authority of the State or local government representative who has ordered the demolition, the date that the order was issued, and the date on which the demolition was ordered to begin. A copy of the order shall be attached to the notification.

(xv) For emergency renovations described in paragraph (a)(4)(iv) of this section, the date and hour that the emergency occurred, a description of the sudden, unexpected event, and an explanation of how the event caused an unsafe condition, or would cause equipment damage or an unreasonable financial burden.

(xvi) Description of procedures to be followed in the event that unexpected RACM is found or Category II nonfriable ACM becomes crumbled, pulverized, or reduced to powder.

(xvii) Name, address, and telephone number of the waste transporter.

(5) The information required in paragraph (b)(4) of this section must be reported using a form similiar to that shown in Figure 3.

(c) *Procedures for asbestos emission control.* Each owner or operator of a demolition or renovation activity to whom this paragraph applies, according to paragraph (a) of this section, shall comply with the following procedures:

(1) Remove all RACM from a facility being demolished or renovated before any activity begins that would break up, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal. RACM need not be removed before demolition if:

(i) It is Category I nonfriable ACM that is not in poor condition and is not friable.

(ii) It is on a facility component that is encased in concrete or other similarly

hard material and is adequately wet whenever exposed during demolition; or

(iii) It was not accessible for testing and was, therefore, not discovered until after demolition began and, as a result of the demolition, the material cannot be safely removed. If not removed for safety reasons, the exposed RACM and any asbestos-contaminated debris must be treated as asbestos-containing waste material and adequately wet at all times until disposed of.

(iv) They are Category II nonfriable ACM and the probability is low that the materials will become crumbled, pulverized, or reduced to powder during demolition.

(2) When a facility component that contains, is covered with, or is coated with RACM is being taken out of the facility as a unit or in sections:

(i) Adequately wet all RACM exposed during cutting or disjoining operations; and

(ii) Carefully lower each unit or section to the floor and to ground level, not dropping, throwing, sliding, or otherwise damaging or disturbing the RACM.

(3) When RACM is stripped from a facility component while it remains in place in the facility, adequately wet the RACM during the stripping operation.

(i) In renovation operations, wetting is not required if:

(A) The owner or operator has obtained prior written approval from the Administrator based on a written application that wetting to comply with this paragraph would unavoidably damage equipment or present a safety hazard; and

(B) The owner or operator uses of the following emission control methods:

(1) A local exhaust ventilation and collection system designed and operated to capture the particulate asbestos material produced by the stripping and removal of the asbestos materials. The system must exhibit no visible emissions to the outside air or be designed and operated in accordance with the requirements in § 61.152.

(2) A glove-bag system designed and operated to contain the particulate asbestos material produced by the stripping of the asbestos materials.

(3) Leak-tight wrapping to contain all RACM prior to dismantlement.

(ii) In renovation operations where wetting would result in equipment damage or a safety hazard, and the methods allowed in paragraph (c)(3)(i) of this section cannot be used, another method may be used after obtaining written approval from the Administrator based upon a determination that it is equivalent to wetting in controlling emissions or to the methods allowed in paragraph (c)(3)(i) of this section.

(iii) A copy of the Administrator's written approval shall be kept at the worksite and made available for inspection.

(4) After a facility component covered with, coated with, or containing RACM has been taken out of the facility as a unit or in sections pursuant to paragraph (c)(2) of this section, it shall be stripped or contained in leak-tight wrapping, except as described in paragraph (c)(5) of this section. If stripped, either:

(i) Adequately wet the RACM during stripping; or

(ii) Use a local exhaust ventilation and collection system designed and operated to capture the particulate asbestos material produced by the stripping. The system must exhibit no visible emissions to the outside air or be designed and operated in accordance with the requirements in § 61.152.

(5) For large facility components such as reactor vessels, large tanks, and steam generators, but not beams (which must be handled in accordance with paragraphs (c)(2), (3), and (4) of this section), the RACM is not required to be stripped if the following requirements are met:

(i) The component is removed, transported, stored, disposed of, or reused without disturbing or damaging the RACM.

(ii) The component is encased in a leak-tight wrapping.

(iii) The leak-tight wrapping is labeled according to § 61.149(d)(1)(i), (ii), and (iii) during all loading and unloading operations and during storage.

(6) For all RACM, including material that has been removed or stripped:

(i) Adequately wet the material and ensure that it remains wet until collected and contained or treated in preparation for disposal in accordance with § 61.150; and

(ii) Carefully lower the material to the ground and floor, not dropping, throwing, sliding, or otherwise damaging or disturbing the material.

(iii) Transport the material to the ground via leak-tight chutes or containers if it has been removed or stripped more than 50 feet above ground level and was not removed as units or in sections.

(iv) RACM contained in leak-tight wrapping that has been removed in accordance with paragraphs (c)(4) and (c)(3)(i)(B)(3) of this section need not be wetted.

(7) When the temperature at the point of wetting is below 0 °C (32 °F):

(i) The owner or operator need not comply with paragraph (c)(2)(i) and the wetting provisions of paragraph (c)(3) of this section.

(ii) The owner or operator shall remove facility components containing, coated with, or covered with RACM as units or in sections to the maximum extent possible.

(iii) During periods when wetting operations are suspended due to freezing temperatures, the owner or operator must record the temperature in the area containing the facility components at the beginning, middle, and end of each workday and keep daily temperature records available for inspection by the Administrator during normal business hours at the demolition or renovation site. The owner or operator shall retain the temperature records for at least 2 years.

(8) Effective 1 year after promulgation of this regulation, no RACM shall be stripped, removed, or otherwise handled or disturbed at a facility regulated by this section unless at least one on-site representative, such as a foreman or management-level person or other authorized representative, trained in the provisions of this regulation and the means of complying with them, is present. Every 2 years, the trained on-site individual shall receive refresher training in the provisions of this regulation. The required training shall include as a minimum: applicability; notifications; material identification; control procedures for removals including, at least, wetting, local exhaust ventilation, negative pressure enclosures, glove-bag procedures, and High Efficiency Particulate Air (HEPA) filters; waste disposal work practices; reporting and recordkeeping; and asbestos hazards and worker protection. Evidence that the required training has been completed shall be posted and made available for inspection by the Administrator at the demolition or renovation site.

(9) For facilities described in paragraph (a)(3) of this section, adequately wet the portion of the facility that contains RACM during the wrecking operation.

(10) If a facility is demolished by intentional burning, all RACM including Category I and Category II nonfriable ACM must be removed in accordance with the NESHAP before burning.

BILLING CODE 6560-50-M

NOTIFICATION OF DEMOLITION AND RENOVATION

| Operator Project # | Postmark | Date Received | Notification # |
|---|---|---|---|
| | | | |

I. TYPE OF NOTIFICATION ( O=Original R=Revised C=Cancelled ):

II. FACILITY INFORMATION ( Identify owner, removal contractor, and other operator )

| | | |
|---|---|---|
| OWNER NAME: | | |
| Address: | | |
| City: | State: | Zip: |
| Contact: | | Tel: |
| REMOVAL CONTRACTOR: | | |
| Address: | | |
| City: | State: | Zip: |
| Contact: | | Tel: |
| OTHER OPERATOR: | | |
| Address: | | |
| City: | State: | Zip: |
| Contact: | | Tel: |

III. TYPE OF OPERATION ( D=Demo O=Ordered Demo R=Renovation E=Emer.Renovation ):

IV. IS ASBESTOS PRESENT? ( Yes/No )

V. FACILITY DESCRIPTION ( Include building name, number and floor or room number )

| | | |
|---|---|---|
| Bldg Name: | | |
| Address: | | |
| City: | State: | County: |
| Site Location: | | |
| Building Size: | # of Floors: | Age in Years: |
| Present Use: | Prior Use: | |

VI. PROCEDURE, INCLUDING ANALYTICAL METHOD, IF APPROPRIATE, USED TO DETECT THE PRESENCE OF ASBESTOS MATERIAL:

| VII. APPROXIMATE AMOUNT OF ASBESTOS, INCLUDING: 1. Regulated ACM to be removed 2. Category I ACM Not Removed 3. Category II ACM Not Removed | RACM To Be Removed | Nonfriable Asbestos Material Not To Be Removed | | Indicate Unit of Measurement Below | |
|---|---|---|---|---|---|
| | | Cat I | Cat II | UNIT | |
| Pipes | | | | LnFt: | Ln m: |
| Surface Area | | | | SqFt: | Sq m: |
| Vol RACM Off Facility Component | | | | CuFt: | Cu m: |

VIII. SCHEDULED DATES ASBESTOS REMOVAL (MM/DD/YY) Start: Complete:

IX. SCHEDULED DATES DEMO/RENOVATION (MM/DD/YY) Start: Complete:

Continued on page two

Figure 3. Notification of Demolition and Renovation

NOTIFICATION OF DEMOLITION AND RENOVATION (continued)

| | | |
|---|---|---|
| X. DESCRIPTION OF PLANNED DEMOLITION OR RENOVATION WORK, AND METHOD(S) TO BE USED: | | |
| XI. DESCRIPTION OF WORK PRACTICES AND ENGINEERING CONTROLS TO BE USED TO PREVENT EMISSIONS OF ASBESTOS AT THE DEMOLITION AND RENOVATION SITE: | | |
| XII. WASTE TRANSPORTER #1 | | |
| Name: | | |
| Address | | |
| City: | State: | Zip: |
| Contact Person: | | Telephone: |
| WASTE TRANSPORTER #2 | | |
| Name: | | |
| Address: | | |
| City: | State: | Zip: |
| Contact Person: | | Telephone: |
| XIII. WASTE DISPOSAL SITE | | |
| Name: | | |
| Location: | | |
| City: | State: | Zip: |
| Telephone: | | |
| XIV. IF DEMOLITION ORDERED BY A GOVERNMENT AGENCY, PLEASE IDENTIFY THE AGENCY BELOW: | | |
| Name: | Title: | |
| Authority: | | |
| Date of Order (MM/DD/YY): | Date Ordered to Begin (MM/DD/YY): | |
| XV. FOR EMERGENCY RENOVATIONS | | |
| Date and Hour of Emergency (MM/DD/YY): | | |
| Description of the Sudden, Unexpected Event: | | |
| Explanation of how the event caused unsafe conditions or would cause equipment damage or an unreasonable financial burden: | | |
| XVI. DESCRIPTION OF PROCEDURES TO BE FOLLOWED IN THE EVENT THAT UNEXPECTED ASBESTOS IS FOUND OR PREVIOUSLY NONFRIABLE ASBESTOS MATERIAL BECOMES CRUMBLED, PULVERIZED, OR REDUCED TO POWDER. | | |
| XVI. I CERTIFY THAT AN INDIVIDUAL TRAINED IN THE PROVISIONS OF THIS REGULATION (40 CFR PART 61, SUBPART M) WILL BE ON-SITE DURING THE DEMOLITION OR RENOVATION AND EVIDENC THAT THE REQUIRED TRAINING HAS BEEN ACCOMPLISHED BY THIS PERSON WILL BE AVAILABLE FOR INSPECTION DURING NORMAL BUSINESS HOURS. (Required 1 year after promulgation) | | |
| | (Signature of Owner/Operator) | (Date) |
| XVII. I CERTIFY THAT THE ABOVE INFORMATION IS CORRECT. | | |
| | (Signature of Owner/Operator) | (Date) |

Figure 3. Notification of Demolition and Renovation

BILLING CODE 6560-50-C

9. Section 61.148 is redesignated as § 61.146 and is amended by revising paragraphs (a), the introductory text of (b), paragraph (b)(2), and paragraph (d) to read as follows:

**§ 61.146 Standard for spraying.**

* * * * *

(a) For spray-on application on buildings, structures, pipes, and conduits, do not use material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy, except as provided in paragraph (c) of this section.

(b) For spray-on application of materials that contain more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy, on equipment and machinery, except as provided in paragraph (c) of this section:

* * * * *

(2) Discharge no visible emissions to the outside air from spray-on application of the asbestos-containing material or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

* * * * *

(d) Owners or operators of sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07 and 61.09.

10. Section 61.149 is redesignated as § 61.147, paragraphs (b)(1) and (2) are revised, and paragraphs (b)(3) through (b)(8) are added to read as follows:

**§ 61.147 Standard for fabricating.**

* * * * *

(b) * * *

(1) Discharge no visible emissions to the outside air from any of the operations or from any building or structure in which they are conducted or from any other fugitive sources; or

(2) Use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(3) Monitor each potential source of asbestos emissions from any part of the fabricating facility, including air cleaning devices, process equipment, and buildings that house equipment for material processing and handling, at least once each day, during daylight hours, for visible emissions to the outside air during periods of operation. The monitoring shall be by visual observation of at least 15 seconds duration per source of emissions.

(4) Inspect each air cleaning device at least once each week for proper operation and for changes that signal the potential for malfunctions, including, to the maximum extent possible without dismantling other than opening the device, the presence of tears, holes, and abrasions in filter bags and for dust deposits on the clean side of bags. For air cleaning devices that cannot be inspected on a weekly basis according to this paragraph, submit to the Administrator, and revise as necessary, a written maintenance plan to include, at a minimum, the following:

(i) Maintenance schedule.

(ii) Recordkeeping plan.

(5) Maintain records of the results of visible emission monitoring and air cleaning device inspections using a format similar to that shown in Figures 1 and 2 and include the following:

(i) Date and time of each inspection.

(ii) Presence or absence of visible emissions.

(iii) Condition of fabric filters, including presence of any tears, holes, and abrasions.

(iv) Presence of dust deposits on clean side of fabric filters.

(v) Brief description of corrective actions taken, including date and time.

(vi) Daily hours of operation for each air cleaning device.

(6) Furnish upon request and make available at the affected facility during normal business hours for inspection by the Administrator, all records required under this section.

(7) Retain a copy of all monitoring and inspection records for at least 2 years.

(8) Submit quarterly a copy of the visible emission monitoring records to the Administrator if visible emissions occurred during the report period. Quarterly reports shall be postmarked by the 30th day following the end of the calendar quarter.

11. Section 61.150 is redesignated as § 61.148 and revised to read as follows:

**§ 61.148 Standard for insulating materials.**

No owner or operator of a facility may install or reinstall on a facility component any insulating materials that contain commercial asbestos if the materials are either molded and friable or wet-applied and friable after drying. The provisions of this section do not apply to spray-applied insulating materials regulated under § 61.146.

12. Section 61.151 is redesignated as § 61.149 and is amended by revising paragraphs (a), (b), introductory text of (c), (c)(1) (ii) and (iii), and (c)(2), and adding new paragraphs (d) through (f) to read as follows:

**§ 61.149 Standard for waste disposal for asbestos mills.**

* * * * *

(a) Deposit all asbestos-containing waste material at a waste disposal site operated in accordance with the provisions of § 61.154; and

(b) Discharge no visible emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air. Dispose of the asbestos waste from control devices in accordance with § 61.150(a) or paragraph (c) of this section; and

(c) Discharge no visible emissions to the outside air during the collection, processing, packaging, or on-site transporting of any asbestos-containing waste material, or use one of the disposal methods specified in paragraphs (c) (1) or (2) of this section, as follows:

(1) * * *

(ii) Discharge no visible emissions to the outside air from the wetting operation or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

* * * * *

(iii) Wetting may be suspended when the ambient temperature at the waste disposal site is less than −9.5 °C (15 °F), as determined by an appropriate measurement method with an accuracy of ± 1°C (± 2 °F). During periods when wetting operations are suspended, the temperature must be recorded at least at hourly intervals, and records must be retained for at least 2 years in a form suitable for inspection.

(2) Use an alternative emission control and waste treatment method that has received prior written approval by the Administrator. To obtain approval for an alternative method, a written application must be submitted to the Administrator demonstrating that the following criteria are met:

(i) The alternative method will control asbestos emissions equivalent to currently required methods.

(ii) The suitability of the alternative method for the intended application.

(iii) The alternative method will not violate other regulations.

(iv) The alternative method will not result in increased water pollution, land pollution, or occupational hazards.

(d) When waste is transported by vehicle to a disposal site:

(1) Mark vehicles used to transport asbestos-containing waste material during the loading and unloading of the waste so that the signs are visible. The markings must:

(i) Be displayed in such a manner and location that a person can easily read the legend.

(ii) Conform to the requirements for 51 cm × 36 cm (20 in × 14 in) upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph; and

(iii) Display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

Legend
DANGER
ASBESTOS DUST HAZARD
CANCER AND LUNG DISEASE HAZARD
Authorized Personnel Only
Notation
2.5 cm (1 inch) Sans Serif, Gothic or Block
2.5 cm (1 inch) Sans Serif, Gothic or Block
1.9 cm (¾ inch) Sans Serif, Gothic or Block
14 Point Gothic

Spacing between any two lines must be a least equal to the height of the upper of the two lines.

(2) For off-site disposal, provide a copy of the waste shipment record, described in paragraph (e)(1) of this section, to the disposal site owner or operator at the same time as the asbestos-containing waste material is delivered to the disposal site.

(e) For all asbestos-containing waste material transported off the facility site:

(1) Maintain asbestos waste shipment records, using a form similar to that shown in Figure 4, and include the following information:

(i) The name, address, and telephone number of the waste generator.

(ii) The name and address of the local, State, or EPA Regional agency responsible for administering the asbestos NESHAP program.

(iii) The quantity of the asbestos-containing waste material in cubic meters (cubic yards).

(iv) The name and telephone number of the disposal site operator.

(v) The name and physical site location of the disposal site.

(vi) The date transported.

(vii) The name, address, and telephone number of the transporter(s).

(viii) A certification that the contents of this consignment are fully and accurately described by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

(2) For waste shipments where a copy of the waste shipment record, signed by the owner or operator of the designated disposal site, is not received by the waste generator within 35 days of the date the waste was accepted by the initial transporter, contact the transporter and/or the owner or operator of the designated disposal site to determine the status of the waste shipment.

(3) Report in writing to the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the waste generator if a copy of the waste shipment record, signed by the owner or operator of the designated waste disposal site, is not received by the waste generator within 45 days of the date the waste was accepted by the initial transporter. Include in the report the following information:

(i) A copy of the waste shipment record for which a confirmation of delivery was not received, and

(ii) A cover letter signed by the waste generator explaining the efforts taken to locate the asbestos waste shipment and the results of those efforts.

(4) Retain a copy of all waste shipment records, including a copy of the waste shipment record signed by the owner or operator of the designated waste disposal site, for at least 2 years.

(f) Furnish upon request, and make available for inspection by the Administrator, all records required under this section.

BILLING CODE 6560-50-M

| | | | |
|---|---|---|---|
| Generator | 1. Work site name and mailing address | Owner's name | Owner's telephone no. |
| | 2. Operator's name and address | | Operator's telephone no. |
| | 3. Waste disposal site (WDS) name, mailing address, and physical site location | | WDS phone no. |
| | 4. Name, and address of responsible agency | | |
| | 5. Description of materials | 6. Containers No. Type | 7. Total quantity $m^3$ ($yd^3$) |
| | | | |
| | | | |
| | 8. Special handling instructions and additional information | | |
| | 9. OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations. | | |
| | Printed/typed name & title | Signature | Month Day Year |
| Transporter | 10. Transporter 1 (Acknowledgment of receipt of materials) | | |
| | Printed/typed name & title<br>Address and telephone no. | Signature | Month Day Year |
| | 11. Transporter 2 (Acknowledgment of receipt of materials) | | |
| | Printed/typed name & title<br>Address and telephone no. | Signature | Month Day Year |
| Disposal Site | 12. Discrepancy indication space | | |
| | 13. Waste disposal site owner or operator: Certification of receipt of asbestos materials covered by this manifest except as noted in item 12. | | |
| | Printed/typed name & title | Signature | Month Day Year |

(Continued)

Figure 4. Waste Shipment Record

INSTRUCTIONS

Waste Generator Section (Items 1-9)

1. Enter the name of the facility at which asbestos waste is generated and the address where the facility is located. In the appropriate spaces, also enter the name of the owner of the facility and the owner's phone number.

2. If a demolition or renovation, enter the name and address of the company and authorized agent responsible for performing the asbestos removal. In the appropriate spaces, also enter the phone number of the operator.

3. Enter the name, address, and physical site location of the waste disposal site (WDS) that will be receiving the asbestos materials. In the appropriate spaces, also enter the phone number of the WDS. Enter "on-site" if the waste will be disposed of on the generator's property.

4. Provide the name and address of the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program.

5. Indicate the types of asbestos waste materials generated. If from a demolition or renovation, indicate the amount of asbestos that is

   - Friable asbestos material
   - Nonfriable asbestos material

6. Enter the number of containers used to transport the asbestos materials listed in item 5. Also enter one of the following container codes used in transporting each type of asbestos material (specify any other type of container used if not listed below):

   DM - Metal drums, barrels
   DP - Plastic drums, barrels
   BA - 6 mil plastic bags or wrapping

7. Enter the quantities of each type of asbestos material removed in units of cubic meters (cubic yards).

8. Use this space to indicate special transportation, treatment, storage or disposal or Bill of Lading information. If an alternate waste disposal site is designated, note it here. Emergency response telephone numbers or similar information may be included here.

9. The authorized agent of the waste generator must read and then sign and date this certification. The date is the date of receipt by transporter.

NOTE: The waste generator must retain a copy of this form.

(continued)

Figure 4. Waste Shipment Record

Transporter Section (Items 10 & 11)

10. & 11. Enter name, address, and telephone number of each transporter used, if applicable. Print or type the full name and title of person accepting responsibility and acknowledging receipt of materials as listed on this waste shipment record for transport. Enter date of receipt and signature.

NOTE: The transporter must retain a copy of this form.

Disposal Site Section (Items 12 & 13)

12. The authorized representative of the WDS must note in this space any discrepancy between waste described on this manifest and waste actually received as well as any improperly enclosed or contained waste. Any rejected materials should be listed and destination of those materials provided. A site that converts asbestos-containing waste material to nonasbestos material is considered a WDS.

13. The signature (by hand) of the authorized WDS agent indicates acceptance and agreement with statements on this manifest except as noted in item 12. The date is the date of signature and receipt of shipment.

NOTE: The WDS must retain a completed copy of this form. The WDS must also send a completed copy to the operator listed in item 2.

Figure 4. Waste Shipment Record

BILLING CODE 6560-50-C

13. Section 61.152 is redesignated as § 61.150 and is revised to read as follows:

**§ 61.150 Standard for waste disposal for manufacturing, fabricating, demolition, renovation, and spraying operations.**

Each owner or operator of any source covered under the provisions of §§ 61.144, 61.145, 61.146, and 61.147 shall comply with the following provisions:

(a) Discharge no visible emissions to the outside air during the collection, processing (including incineration), packaging, or transporting of any asbestos-containing waste material generated by the source, or use one of the emission control and waste treatment methods specified in paragraphs (a) (1) through (4) of this section.

(1) Adequately wet asbestos-containing waste material as follows:

(i) Mix control device asbestos waste to form a slurry; adequately wet other asbestos-containing waste material; and

(ii) Discharge no visible emissions to the outside air from collection, mixing, wetting, and handling operations, or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air; and

(iii) After wetting, seal all asbestos-containing waste material in leak-tight containers while wet; or, for materials that will not fit into containers without additional breaking, put materials into leak-tight wrapping; and

(iv) Label the containers or wrapped materials specified in paragraph (a)(1)(iii) of this section using warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.1001(j)(2) or 1926.58(k)(2)(iii). The labels shall be printed in letters of sufficient size and contrast so as to be readily visible and legible.

(v) For asbestos-containing waste material to be transported off the facility site, label containers or wrapped materials with the name of the waste generator and the location at which the waste was generated.

(2) Process asbestos-containing waste material into nonfriable forms as follows:

(i) Form all asbestos-containing waste material into nonfriable pellets or other shapes;

(ii) Discharge no visible emissions to the outside air from collection and processing operations, including incineration, or use the method specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(3) For facilities demolished where the RACM is not removed prior to demolition according to §§ 61.145(c)(1)(i), (ii), (iii), and (iv) or for facilities demolished according to § 61.145(c)(9), adequately wet asbestos-containing waste material at all times after demolition and keep wet during handling and loading for transport to a disposal site. Asbestos-containing waste materials covered by this paragraph do not have to be sealed in leak-tight containers or wrapping but may be transported and disposed of in bulk.

(4) Use an alternative emission control and waste treatment method that has received prior approval by the Administrator according to the procedure described in § 61.149(c)(2).

(5) As applied to demolition and renovation, the requirements of paragraph (a) of this section do not apply to Category I nonfriable ACM waste and Category II nonfriable ACM waste that did not become crumbled, pulverized, or reduced to powder.

(b) All asbestos-containing waste material shall be desposited as soon as is practical by the waste generator at:

(1) A waste disposal site operated in accordance with the provisions of § 61.154, or

(2) An EPA-approved site that converts RACM and asbestos-containing waste material into nonasbestos (asbestos-free) material according to the provisions of § 61.155.

(3) The requirements of paragraph (b) of this section do not apply to Category I nonfriable ACM that is not RACM.

(c) Mark vehicles used to transport asbestos-containing waste material during the loading and unloading of waste so that the signs are visible. The markings must conform to the requirements of §§ 61.149(d)(1) (i), (ii), and (iii).

(d) For all asbestos-containing waste material transported off the facility site:

(1) Maintain waste shipment records, using a form similar to that shown in Figure 4, and include the following information:

(i) The name, address, and telephone number of the waste generator.

(ii) The name and address of the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program.

(iii) The approximate quantity in cubic meters (cubic yards).

(iv) The name and telephone number of the disposal site operator.

(v) The name and physical site location of the disposal site.

(vi) The date transported.

(vii) The name, address, and telephone number of the transporter(s).

(viii) A certification that the contents of this consignment are fully and accurately described by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

(2) Provide a copy of the waste shipment record, described in paragraph (d)(1) of this section, to the disposal site owners or operators at the same time as the asbestos-containing waste material is delivered to the disposal site.

(3) For waste shipments where a copy of the waste shipment record, signed by the owner or operator of the designated disposal site, is not received by the waste generator within 35 days of the date the waste was accepted by the initial transporter, contact the transporter and/or the owner or operator of the designated disposal site to determine the status of the waste shipment.

(4) Report in writing to the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the waste generator if a copy of the waste shipment record, signed by the owner or operator of the designated waste disposal site, is not received by the waste generator within 45 days of the date the waste was accepted by the initial transporter. Include in the report the following information:

(i) A copy of the waste shipment record for which a confirmation of delivery was not received, and

(ii) A cover letter signed by the waste generator explaining the efforts taken to locate the asbestos waste shipment and the results of those efforts.

(5) Retain a copy of all waste shipment records, including a copy of the waste shipment record signed by the owner or operator of the designated waste disposal site, for at least 2 years.

(e) Furnish upon request, and make available for inspection by the Administrator, all records required under this section.

14. Section 61.153 is redesignated as § 61.151 and is amended by revising the introductory text, paragraphs (a)(2), (a)(4), and (b)(3), and adding paragraphs (d) and (e) to read as follows:

**§ 61.151 Standard for inactive waste disposal sites for asbestos mills and manufacturing and fabricating operations.**

Each owner or operator of any inactive waste disposal site that was operated by sources covered under

§§ 61.142, 61.144, or 61.147 and received deposits of asbestos-containing waste material generated by the sources, shall:

(a) * * *

(2) Cover the asbestos-containing waste material with at least 15 centimeters (6 inches) of compacted nonasbestos-containing material, and grow and maintain a cover of vegetation on the area adequate to prevent exposure of the asbestos-containing waste material. In desert areas where vegetation would be difficult to maintain, at least 8 additional centimeters (3 inches) of well-graded, nonasbestos crushed rock may be placed on top of the final cover instead of vegetation and maintained to prevent emissions; or

* * * * *

(4) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent that effectively binds dust to control surface air emissions may be used instead of the methods in paragraphs (a)(1), (2), and (3) of this section. Use the agent in the manner and frequency recommended for the particular asbestos tailings by the manufacturer of the dust suppression agent to achieve and maintain dust control. Obtain prior written approval of the Administrator to use other equally effective dust suppression agents. For purposes of this paragraph, any used, spent, or other waste oil is not considered a dust suppression agent.

(b) * * *

(3) When requesting a determination on whether a natural barrier adequately deters public access, supply information enabling the Administrator to determine whether a fence or a natural barrier adequately deters access by the general public.

* * * * *

(d) Notify the Administrator in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at a waste disposal site under this section, and follow the procedures specified in the notification. If the excavation will begin on a date other than the one contained in the original notice, notice of the new start date must be provided to the Administrator at least 10 working days before excavation begins and in no event shall excavation begin earlier than the date specified in the original notification. Include the following information in the notice:

(1) Scheduled starting and completion dates.

(2) Reason for disturbing the waste.

(3) Procedures to be used to control emissions during the excavation, storage, transport, and ultimate disposal of the excavated asbestos-containing waste material. If deemed necessary, the Administrator may require changes in the emission control procedures to be used.

(4) Location of any temporary storage site and the final disposal site.

(e) Within 60 days of a site becoming inactive and after the effective date of this subpart, record, in accordance with State law, a notation on the deed to the facility property and on any other instrument that would normally be examined during a title search; this notation will in perpetuity notify any potential purchaser of the property that:

(1) The land has been used for the disposal of asbestos-containing waste material;

(2) The survey plot and record of the location and quantity of asbestos-containing waste disposed of within the disposal site required in § 61.154(f) have been filed with the Administrator; and

(3) The site is subject to 40 CFR part 61, subpart M.

15. Section 61.154 is redesignated as § 61.152 and amended by removing paragraph (a)(1)(i), redesignating paragraphs (a)(1)(ii)–(iv) as paragraphs (a)(1)(i)–(iii), redesignating paragraph (b)(2) as paragraph (b)(3), revising the introductory text of paragraph (a) and paragraphs (b)(1) and (b)(3), and adding paragraphs (a)(3) and (b)(2) to read as follows:

**§ 61.152 Air cleaning.**

(a) The owner or operator who uses air cleaning, as specified in §§ 61.142(a), 61.144(b)(2), 61.145(c)(3)(i)(B)(1), 61.145(c)(4)(ii), 61.145(c)(11)(i), 61.146(b)(2), 61.147(b)(2), 61.149(b), 61.149(c)(1)(ii), 61.150(a)(1)(ii), 61.150(a)(2)(ii), and 61.155(e) shall:

* * * * *

(3) For fabric filter collection devices installed after January 10, 1989, provide for easy inspection for faulty bags.

(b) * * *

(1) After January 10, 1989, if the use of fabric creates a fire or explosion hazard, or the Administrator determines that a fabric filter is not feasible, the Administrator may authorize as a substitute the use of wet collectors designed to operate with a unit contacting energy of at least 9.95 kilopascals (40 inches water gage pressure).

(2) Use a HEPA filter that is certified to be at least 99.97 percent efficient for 0.3 micron particles.

(3) The Administrator may authorize the use of filtering equipment other than described in paragraphs (a)(1) and (b)(1) and (2) of this section if the owner or operator demonstrates to the Administrator's satisfaction that it is equivalent to the described equipment in filtering particulate asbestos material.

16. Section 61.155 is redesignated as § 61.153 and amended by redesignating paragraphs (a)(3) and (a)(4) as paragraphs (a)(4) and (a)(5), respectively, revising the introductory text of paragraphs (a), (a)(4), and (a)(5) and revising paragraphs (a)(2), (a)(4)(ii) and (iii), and (b), and adding paragraph (a)(3) to read as follows:

**§ 61.153 Reporting.**

(a) Any new source to which this subpart applies (with the exception of sources subject to §§ 61.143, 61.146, and 61.148), which has an initial startup date preceding the effective date of this revision, shall provide the following information to the Administrator postmarked or delivered within 90 days of the effective date. In the case of a new source that does not have an initial startup date preceding the effective date, the information shall be provided, postmarked or delivered, within 90 days of the initial startup date. Any owner or operator of an existing source shall provide the following information to the Administrator within 90 days of the effective date of this subpart unless the owner or operator of the existing source has previously provided this information to the Administrator. Any changes in the information provided by any existing source shall be provided to the Administrator, postmarked or delivered, within 30 days after the change.

* * * * *

(2) If a fabric filter device is used to control emissions,

(i) The airflow permeability in $m^3/min/m^2$ ($ft^3/min/ft^2$) if the fabric filter device uses a woven fabric, and, if the fabric is synthetic, whether the fill yarn is span or not spun; and

(ii) If the fabric filter device uses a felted fabric, the density in $g/m^2$ ($oz/yd^2$), the minimum thickness in millimeters (inches), and the airflow permeability in $m^3/min/m^2$ ($ft^3/min/ft^2$).

(3) If a HEPA filter is used to control emissions, the certified efficiency.

(4) For sources subject to §§ 61.149 and 61.150:

* * * * *

(ii) The average volume of asbestos-containing waste material disposed of, measured in $m^3$/day ($yd^3$/day); and

(iii) The emission control methods used in all stages of waste disposal; and

* * * * *

(5) For sources subject to §§ 61.151 and 61.154:

* * * * *

(b) The information required by paragraph (a) of this section must accompany the information required by § 61.10. Active waste disposal sites subject to § 61.154 shall also comply with this provision. Roadways, demolition and renovation, spraying, and insulating materials are exempted from the requirements of § 61.10(a). The information described in this section must be reported using the format of Appendix A of this part as a guide.

17. Section 61.156 is redesignated as § 61.154 and amended by revising the introductory text of § 61.154, paragraphs (c) and (d), and adding paragraphs (e) through (j) to read as follows:

**§ 61.154 Standard for active waste disposal sites.**

Each owner or operator of an active waste disposal site that receives asbestos-containing waste material from a source covered under §§ 61.149, 61.150, or 61.155 shall meet the requirements of this section:

* * * * *

(c) Rather than meet the no visible emission requirement of paragraph (a) of this section, at the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material that has been deposited at the site during the operating day or previous 24-hour period shall:

(1) Be covered with at least 15 centimeters (6 inches) of compacted nonasbestos-containing material, or

(2) Be covered with a resinous or petroleum-based dust suppression agent that effectively binds dust and controls wind erosion. Such an agent shall be used in the manner and frequency recommended for the particular dust by the dust suppression agent manufacturer to achieve and maintain dust control. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, any used, spent, or other waste oil is not considered a dust suppression agent.

(d) Rather than meet the no visible emission requirement of paragraph (a) of this section, use an alternative emissions control method that has received prior written approval by the Administrator according to the procedures described in § 61.149(c)(2).

(e) For all asbestos-containing waste material received, the owner or operator of the active waste disposal site shall:

(1) Maintain waste shipment records, using a form similar to that shown in Figure 4, and include the following information:

(i) The name, address, and telephone number of the waste generator.

(ii) The name, address, and telephone number of the transporter(s).

(iii) The quantity of the asbestos-containing waste material in cubic meters (cubic yards).

(iv) The presence of improperly enclosed or uncovered waste, or any asbestos-containing waste material not sealed in lead-tight containers. Report in writing to the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the waste generator (identified in the waste shipment record), and, if different, the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the disposal site, by the following working day, the presence of a significant amount of improperly enclosed or uncovered waste. Submit a copy of the waste shipment record along with the report.

(v) The date of the receipt.

(2) As soon as possible and no longer than 30 days after receipt of the waste, send a copy of the signed waste shipment record to the waste generator.

(3) Upon discovering a discrepancy between the quantity of waste designated on the waste shipment records and the quantity actually received, attempt to reconcile the discrepancy with the waste generator. If the discrepancy is not resolved within 15 days after receiving the waste, immediately report in writing to the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the waste generator (identified in the waste shipment record), and, if different, the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the disposal site. Describe the discrepancy and attempts to reconcile it, and submit a copy of the waste shipment record along with the report.

(4) Retain a copy of all records and reports required by this paragraph for at least 2 years.

(f) Maintain, until closure, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal site on a map or diagram of the disposal area.

(g) Upon closure, comply with all the provisions of § 61.151.

(h) Submit to the Administrator, upon closure of the facility, a copy of records of asbestos waste disposal locations and quantities.

(i) Furnish upon request, and make available during normal business hours for inspection by the Administrator, all records required under this section.

(j) Notify the Administrator in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at a waste disposal site and is covered. If the excavation will begin on a date other than the one contained in the original notice, notice of the new start date must be provided to the Administrator at least 10 working days before excavation begins and in no event shall excavation begin earlier than the date specified in the original notification. Include the following information in the notice:

(1) Scheduled starting and completion dates.

(2) Reason for disturbing the waste.

(3) Procedures to be used to control emissions during the excavation, storage, transport, and ultimate disposal of the excavated asbestos-containing waste material. If deemed necessary, the Administrator may require changes in the emission control procedures to be used.

(4) Location of any temporary storage site and the final disposal site.

18. Section 61.155 is added to subpart M to read as follows:

**§ 61.155 Standard for operations that convert asbesto-containing waste material into nonasbestos (asbestos-free) material.**

Each owner or operator of an operation that converts RACM and asbestos-containing waste material into nonasbestos (asbestos-free) material shall:

(a) Obtain the prior written approval of the Administrator to construct the facility. To obtain approval, the owner or operator shall provide the Administrator with the following information:

(1) Application to construct pursuant to § 61.07.

(2) In addition to the information requirements of § 61.07(b)(3), a

(i) Description of waste feed handling and temporary storage.

(ii) Description of process operating conditions.

(iii) Description of the handling and temporary storage of the end product.

(iv) Description of the protocol to be followed when analyzing output materials by transmission electron microscopy.

(3) Performance test protocol, including provisions for obtaining information required under paragraph (b) of this section.

(4) The Administrator may require that a demonstration of the process be performed prior to approval of the application to construct.

(b) Conduct a start-up performance test. Test results shall include:

(1) A detailed description of the types and quantities of nonasbestos material, RACM, and asbestos-containing waste material processed, *e.g.*, asbestos cement products, friable asbestos insulation, plaster, wood, plastic, wire, etc. Test feed is to include the full range of materials that will be encountered in actual operation of the process.

(2) Results of analyses, using polarized light microscopy, that document the asbestos content of the wastes processed.

(3) Results of analyses, using transmission electron microscopy, that document that the output materials are free of asbestos. Samples for analysis are to be collected as 8-hour composite samples (one 200-gram (7-ounce) sample per hour), beginning with the initial introduction of RACM or asbestos-containing waste material and continuing until the end of the performance test.

(4) A description of operating parameters, such as temperature and residence time, defining the full range over which the process is expected to operate to produce nonasbestos (asbestos-free) materials. Specify the limits for each operating parameter within which the process will produce nonasbestos (asbestos-free) materials.

(5) The length of the test.

(c) During the initial 90 days of operation:

(1) Continuously monitor and log the operating parameters identified during start-up performance tests that are intended to ensure the production of nonasbestos (asbestos-free) output material.

(2) Monitor input materials to ensure that they are consistent with the test feed materials described during start-up performance tests in paragraph (b)(1) of this section.

(3) Collect and analyze samples, taken as 10-day composite samples (one 200-gram (7-ounce) sample collected every 8 hours of operation) of all output material for the presence of asbestos. Composite samples may be for fewer than 10 days. Transmission electron microscopy (TEM) shall be used to analyze the output material for the presence of asbestos. During the initial 90-day period, all output materials must be stored on-site until analysis shows the material to be asbestos-free or disposed of as asbestos-containing waste material according to § 61.150.

(d) After the initial 90 days of operation,

(1) Continuously monitor and record the operating parameters identified during start-up performance testing and any subsequent performance testing. Any output produced during a period of deviation from the range of operating conditions established to ensure the production of nonasbestos (asbestos-free) output materials shall be:

(i) Disposed of as asbestos-containing waste material according to § 61.150, or

(ii) Recycled as waste feed during process operation within the established range of operating conditions, or

(iii) Stored temporarily on-site in a leak-tight container until analyzed for asbestos content. Any product material that is not asbestos-free shall be either disposed of as asbestos-containing waste material or recycled as waste feed to the process.

(2) Collect and analyze monthly composite samples (one 200-gram (7-ounce) sample collected every 8 hours of operation) of the output material. Transmission electron microscopy shall be used to analyze the output material for the presence of asbestos.

(e) Discharge no visible emissions to the outside air from any part of the operation, or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(f) Maintain records on-site and include the following information:

(1) Results of start-up performance testing and all subsequent performance testing, including operating parameters, feed characteristic, and analyses of output materials.

(2) Results of the composite analyses required during the initial 90 days of operation under § 61.155(c).

(3) Results of the monthly composite analyses required under § 61.155(d).

(4) Results of continuous monitoring and logs of process operating parameters required under § 61.155 (c) and (d).

(5) The information on waste shipments received as required in § 61.154(e).

(6) For output materials where no analyses were performed to determine the presence of asbestos, record the name and location of the purchaser or disposal site to which the output materials were sold or deposited, and the date of sale or disposal.

(7) Retain records required by paragraph (f) of this section for at least 2 years.

(g) Submit the following reports to the Administrator:

(1) A report for each analysis of product composite samples performed during the initial 90 days of operation.

(2) A quarterly report, including the following information concerning activities during each consecutive 3-month period:

(i) Results of analyses of monthly product composite samples.

(ii) A description of any deviation from the operating parameters established during performance testing, the duration of the deviation, and steps taken to correct the deviation.

(iii) Disposition of any product produced during a period of deviation, including whether it was recycled, disposed of as asbestos-containing waste material, or stored temporarily on-site until analyzed for asbestos content.

(iv) The information on waste disposal activities as required in § 61.154(f).

(h) Nonasbestos (asbestos-free) output material is not subject to any of the provisions of this subpart. Output materials in which asbestos is detected, or output materials produced when the operating parameters deviated from those established during the start-up performance testing, unless shown by TEM analysis to be asbestos-free, shall be considered to be asbestos-containing waste and shall be handled and disposed of according to §§ 61.150 and 61.154 or reprocessed while all of the established operating parameters are being met.

19. Section 61.156 is added to subpart M to read as follows:

**§ 61.156 Cross-reference to other asbestos regulations.**

In addition to this subpart, the regulations referenced in Table 1 also apply to asbestos and may be applicable to those sources specified in §§ 61.142 through 61.151, 61.154, and 61.155 of this subpart. These cross-references are presented for the reader's information and to promote compliance with the cited regulations.

20. Section 61.157 is added to subpart M to read as follows:

**§ 61.157 Delegation of authority.**

(a) In delegating implementation and enforcement authority to a State under section 112(d) of the Act, the authorities contained in paragraph (b) of this section shall be retained by the Administrator and not transferred to a State.

(b) Authorities that will not be delegated to States:

(1) Section 61.149(c)(2)

(2) Section 61.150(a)(4)

(3) Section 61.151(c)

(4) Section 61.152(b)(3)

(5) Section 61.154(d)

(6) Section 61.155(a).

[FR Doc. 90-26835 Filed 11-19-90; 8:45 am]

BILLING CODE 6560-50-M

TABLE 1.—CROSS-REFERENCE TO OTHER ASBESTOS REGULATIONS

| Agency | CFR citation | Comment |
|---|---|---|
| EPA | 40 CFR 763, Subpart E, F | Requires schools to inspect for asbestos and implement response actions and submit asbestos management plans to States. Specifies use of accredited inspectors, air sampling methods, and waste disposal procedures. |
| | 40 CFR 427 | Effluent standards for asbestos manufacturing source categories. |
| | 40 CFR 763, Subpart G | Protects public employees performing asbestos abatement work in States not covered by OSHA asbestos standard. |
| OSHA | 29 CFR 1910.1001 | Worker protection measures—engineering controls, worker training, labeling, respiratory protection, bagging of waste, 0.2 f/cc permissible exposure level. |
| | 29 CFR 1926.58 | Worker protection measures for all construction work involving asbestos, including demolition and renovation—work practices, worker training, bagging of waste, 0.2 f/cc permissible exposure level. |
| MSHA | 30 CFR 56, Subpart D | Specifies exposures limits, engineering controls, and respiratory protection measures for workers in surface mines. |
| | 30 CFR 57, Subpart D | Specifies exposure limits, engineering controls, and respiratory protection measures for workers in underground mines. |
| DOT | 49 CFR 171 and 172 | Regulates the transportation of asbestos-containing waste material. Requires waste containment and shipping papers. |

# APPENDIX B

# SCBA PROFICIENCY TESTS, CHECKOUT PROCEDURES

SCBA PROFICIENCY TESTS, CHECKOUT PROCEDURES

An SCBA must be periodically inspected according to manufacturers, as well as 29 CFR 1910 recommendations. In addition, an SCBA should be field checked immediately prior to any use. The following two checklists can be used to ensure proper inspection. The first checklist is for a pressure-demand SCBA unit with no demand/pressure demand mode-select lever such as the MSA 401 or MSA Ultralite Air Mask. The second checklist is for an SCBA with mode-select levers, such as Scott IIA pressure paks. Note: Both checklists indicate that inspection steps marked (M) are required monthly rather than prior to each use.

CHECKLIST: PRESSURE-DEMAND SCBA WITHOUT MODE SELECT LEVER

Prior to starting on checklist, make sure that:

- High-pressure hose connector is tight on cylinder fitting.
- Bypass valve is closed.
- Mainline valve is closed.
- Regulator outlet is not covered or obstructed.

1. Back Pack and Harness Assembly

   - Straps

     - Visually inspect for complete set.
     - Visually inspect for frayed or damaged straps.

- Buckles

  - Visually inspect for mating ends.
  - Check locking function.

- Back Plate and Cylinder Lock

  - Visually inspect back plate for cracks and missing rivets or screws.
  - Visually inspect cylinder hold-down strap; physically check strap tightener and lock to assure that it is fully engaged.

2. <u>Cylinder and Cylinder Valve Assembly</u>

- Cylinder

  - Physically check to assure that it is tightly fastened to back plate.
  - Visually inspect for large dents or gouges in metal (M).
  - Check hydrostatic test date to assure it is current (M).

- Head and Valve Assembly

  - Visually determine if cylinder valve lock is present (M).

- Visually inspect cylinder gauge for condition of face, needle, and lens (M).
- Open cylinder valve; listen or feel for leakage around packing (if leakage is noted, do not use until repaired). Note function of valve lock.

3. <u>Regulator and High-Pressure Hose</u>

- High Pressure Hose and Connector

  - Listen or feel for leakage in hose or at hose-to-cylinder connector. (Bubble in outer hose covering may be caused by seepage of air through hose when stored under pressure. This does not necessarily indicate a faulty hose.)

- Regulator and Low-Pressure Alarm

  - Place mouth onto or over regulator outlet and blow. A positive pressure should be created and maintained for 5-10 seconds without loss of air. Next, suck to create a slight negative pressure on regulator; hold for 5-10 seconds. Vacuum should remain constant. This tests the integrity of the diaphragm. Any loss of pressure or vacuum during this test indicates a leak in the apparatus.

- Ascertain that regulator outlet is not covered or obstructed. Open and close bypass valve momentarily to assure flow of air through by-pass system.

- Cover regulator outlet with palm of hand. Open mainline valve and read regulator gauge (must read at least 1,800 psi and not more than rated cylinder pressure).

- Remove hand from outlet and replace in rapid movement. Repeat twice more. Air should escape when hand is removed each time, indicating a positive pressure in chamber.

- Close cylinder valve and slowly move hand from regulator outlet to allow air to flow slowly. Gauge should begin to show immediate loss of pressure as air flows. Low-pressure alarm should sound between 520 and 480 psi. Remove hand completely from outlet and close mainline valve.

4. <u>Facepiece and Corrugated Breathing Tube</u>

- Facepiece

  - Visually inspect head harness for damaged serrations and deteriorated rubber. Visually inspect rubber facepiece body for signs of deterioration or extreme distortion.

- Visually inspect lens for proper seal in rubber facepiece, retaining clamp properly in place, and absence of cracks or large scratches.

- Visually inspect exhalation valve for visible deterioration or buildup of foreign materials.

- Carry out negative pressure test for overall seal and check of exhalation valve. In monthly inspection, place mask against face and use following procedure; in preparing for use, don back pack, then facepiece, and use following procedure: With facepiece held tightly to face (or facepiece properly donned), stretch breathing tube to open corrugations and place thumb or hand over end of connector. Inhale. Negative pressure should be created inside mask, causing it to pull tightly to face for 5-10 seconds. If negative pressures drops, this indicates a leak in the facepiece.

- Breathing Tube and Connector

  - Stretch breathing tube and visually inspect for deterioration and holes.

  - Visually inspect connector to assure good condition of threads and for presence and proper condition of rubber gasket seal.

5. Storage of Units

Certain criteria must be met before an SCBA is stored. Units not meeting the criteria should be set aside for repair by a certified technician.

- Cylinder refilled as necessary and unit cleaned and inspected.
- Cylinder valve closed.
- High-pressure hose connector tight on cylinder.
- Pressure bled off of high-pressure hose and regulator.
- Bypass valve closed.
- Mainline valve closed.
- All straps completely loosened and laid straight.
- Facepiece properly stored to protect against dust, direct sunlight, extreme temperatures, excessive moisture, and damaging chemicals.

CHECKLIST: PRESSURE-DEMAND, OPEN-CIRCUIT SCBA WITH MODE-SELECT LEVER

Prior to starting on checklist, make sure that:

- High-pressure hose connector is tight on cylinder fitting.
- Bypass valve is closed.
- Mainline valve is open and locked (when lock present).
- Select lever is on demand mode.
- Regulator outlet is not covered or obstructed.

1. <u>Back Pack and Harness Assembly</u>

   - Straps

     - Visually inspect for complete set.
     - Visually inspect for frayed or damaged straps.

   - Buckles

     - Visually inspect for mating ends.
     - Check locking function.

   - Back Plate and Cylinder Lock

     - Visually inspect back plate for cracks and missing rivets or screws.

- Visually inspect cylinder hold-down strap; physically check strap tightener and lock to assure that it is fully engaged.

2. <u>Cylinder and Cylinder Valve Assembly</u>

- Cylinder

  - Physically check to assure that it is tightly fastened to back plate.

  - Visually inspect for large dents or gouges in metal (M).

  - Check hydrostatic test date to assure it is current (M).

- Head and Valve Assembly

  - Visually determine if cylinder valve lock is present (M).

  - Visually inspect cylinder gauge for condition of face, needle, and lens (M).

  - Open cylinder valve; listen or feel for leakage around packing (if leakage is noted, do not use until repaired). Note function of valve lock.

3. Regulator and High-Pressure Hose

- High Pressure Hose and Connector

  Listen or feel for leakage in hose or at hose-to-cylinder connector. (Bubble in outer hose covering may be caused by seepage of air through hose when stored under pressure. This does not necessarily indicate a faulty hose.)

- Regulator and Low-Pressure Alarm

  - Place mouth onto or over regulator outlet and blow. A positive pressure should be created and maintained for 5-10 seconds without loss of air. Next, suck to create a slight negative pressure on regulator; hold for 5-10 seconds. Vacuum should remain constant. This tests the integrity of the diaphragm. Any loss of pressure or vacuum during this test indicates a leak in the apparatus.

  - Read pressure on regulator gauge (must read at least 1,800 psi and not more than rated cylinder pressure).

  - Suck on regulator outlet. Air should be delivered with very slight effort.

- On units with select level, place hand over regulator outlet. Select pressure-demand mode. Remove and replace hand over outlet in rapid movement. Repeat twice more. Air should escape when hand is removed each time, indicating a positive pressure in chamber. Select demand mode on select lever and remove hand from outlet. At this point, there should be no air leaking from any point on the pressurized unit.

- Close cylinder valve. Ascertain that regulator outlet is not covered or obstructed. Position regulator outlet is not covered or obstructed. Position regulator to observe regulator gauge. Slowly open bypass valve. Air should flow from outlet, and gauge pressure should begin to decrease immediately. Alarm should sound at pressure reading between 500 and 480 psi (this assures function of bypass valve and low-pressure alarm). After pressure is completely released, close bypass valve.

4. <u>Facepiece and Corrugated Breathing Tube</u>

- Facepiece

  - Visually inspect head harness for damaged serrations and deteriorated rubber. Visually inspect rubber facepiece body for signs of deterioration or extreme distortion.

- Visually inspect lens for proper seal in rubber facepiece, retaining clamp properly in place, and absence of cracks or large scratches.

- Visually inspect exhalation valve for visible deterioration or buildup of foreign materials.

- Carry out negative pressure test for overall seal and check of exhalation valve. In monthly inspection, place mask against face and use following procedure; in preparing for use, don back pack, then facepiece, and use following procedure: With facepiece held tightly to face (or facepiece properly donned), stretch breathing tube to open corrugations and place thumb or hand over end of connector. Inhale. Negative pressure should be created inside mask, causing it to pull tightly to face for 5-10 seconds. If negative pressures drops, this indicates a leak in the facepiece. Note: On Scott Pressur-Pak II and IIA facepiece units only, place connector end of the breathing tube approximately 1/4 to 1/2-inch from palm of hand and exhale. If any air returns through tube, do not use the unit.

- Breathing Tube and Connector

  - Stretch breathing tube and visually inspect for deterioration and holes.

- Visually inspect connector to assure good condition of threads and for presence and proper condition of O-ring or rubber gasket seal.

5. <u>Storage of Units</u>

Certain criteria must be met before an SCBA is stored. Units not meeting the criteria should be set aside for repair by a certified technician.

- Cylinder refilled as necessary and unit cleaned and inspected.
- Cylinder valve closed.
- High-pressure hose connector tight on cylinder.
- Pressure bled off of high-pressure hose and regulator.
- Bypass valve closed.
- Mainline valve open (when mainline valve lock present, it should be engaged).
- Select level, if present, on demand mode.
- All straps completely loosened and laid straight.

- Facepiece properly stored to protect against dust, direct sunlight, extreme temperatures, excessive moisture, and damaging chemicals.

# APPENDIX C

# ENVIRONMENTAL HEALTH AND SAFETY DIVISION (EHSD)

# HEALTH AND SAFETY GUIDELINES FOR EPA ASBESTOS INSPECTORS

United States
Environmental Protection
Agency

Office of Administration
and Resources
Management

March 1991

EPA

# Health and Safety Guidelines for EPA Asbestos Inspectors

(Revised)

Printed on Recycled Pape

Office of Administration
Safety, Health, and Environmental Management Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 29 1991

OFFICE OF
ADMINISTRATION
AND RESOURCES
MANAGEMENT

**MEMORANDUM**

**SUBJECT:** Revised Health and Safety Guidelines for Asbestos Inspectors

**FROM:** Julius C. Jimeno, Director
Safety, Health and Environmental Management Division

**TO:** Regional Administrators
Assistant Administrators
Laboratory Directors

The attached "Health and Safety Guidelines for EPA Asbestos Inspectors," revised in March 1991, were developed for use by EPA employees in carrying out the Agency's various missions to control asbestos exposures through inspection activities.

The two primary objectives for the Guidelines are:

- to provide for the health and safety of asbestos inspectors based on the best currently available information;
- to reduce the likelihood of significant asbestos exposures to the public through enhanced inspector guidance.

We will continue to analyze asbestos inspector health and safety issues and will develop revised guidelines in the future, as warranted.

The Safety, Health and Environmental Management Division (SHEMD), Office of Administration, is the lead office for development of these guidelines. Please keep Howard O. Wilson, Chief, Technical Assistance and Evaluation Branch or David Scott Smith, Chief, Policy and Resources Development Branch, SHEMD, advised of your experiences using the Guidelines. Your constructive comments on inspector health and safety issues are welcomed, and we encourage your input as additional experience is gained with our new guidance. Our FTS number is 382-3640.

Attachment
"Health & Safety Guidelines for EPA Asbestos Inspectors"

cc: Occupational Health and Safety Managers

Printed on Recycled Paper

# HEALTH AND SAFETY GUIDELINES

# FOR EPA ASBESTOS INSPECTORS

Revised March, 1991

Safety, Health and Environmental Management Division
United States Environmental Protection Agency
Headquarters
401 M Street, Southwest
Washington, District of Columbia
20460

# PREFACE

These Guidelines were devloped by the Safety, Health, and Environmental Management Division for employees of the United States Environmental Protection Agency. They apply to EPA employees who manage or supervise EPA asbestos inspectors, and to EPA employees who perform asbestos inspections.

Beginning in 1989 and continuing through 1990, drafts of this document were circulated within EPA for internal review and comment. A number of changes to this document were made in response to questions and comments received from the reviewers. EPA Offices which were offered an opportunity to review and comment on the draft Guidelines included:

1) Office of Administration and Resources Management;
2) Office of Air and Radiation;
3) Office of Pesticides and Toxic Substances;
4) Office of Solid Waste and Emergency Response;
5) Office of Enforcement.

In addition, on March 4, 1991 the Environmental Assistance Division (EAD) (TS-799), Office of Toxic Substances (OTS) provided further comments about these Guidelines. In response to EAD's comments, the the following language is hereby incorporated into these Guidelines:

> "EPA recognizes that its safety and health managers, and other managers, have a responsibility to establish protective - yet practical - respiratory protection programs for their workers who engage in asbestos-related inspection activities. EPA managers are expected to: 1) ensure that EPA's asbestos inspectors and their supervisors are aware of their obligations to meet applicable OSHA requirements, and to ensure that their workers are properly trained, certified, and equipped; 2) establish respiratory protection programs for their asbestos inspectors which are consistent with the EPA asbestos program's (TS-799) policy, as described in the NIOSH/EPA "white book."
>
> EPA managers are encouraged to provide maximum levels of respiratory protection during asbestos-related work."

Questions about the Guidelines should be directed to:

Chief, Technical Assistance and Evaluation Branch
Safety, Health, and Environmental Management Division (PM-273)
United States Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460
Telephone: (202) 382-3640

TABLE OF CONTENTS

Health and Safety Guidelines for EPA Asbestos Inspectors


Page

INTRODUCTION.....1

A. GENERAL REQUIREMENTS.....1

1. Asbestos Inspector's Health and Safety Plan.....1
   a. Emergency Procedures.....1
   b. Personal Protective Equipment.....2
   c. Operational Practices.....2

2. Evaluation.....2
3. Incident Reporting and Response.....2
4. Training.....2
5. Medical Monitoring.....3
6. Protective Clothing.....3
7. Respiratory Protective Equipment.....3
8. Other Personal Protective Equipment.....7
9. Prohibited Practices.....7
10. Personal Hygiene.....7

B. PROTECTIVE EQUIPMENT GUIDELINES FOR REMOVAL, DEMOLITION, AND RENOVATION INSPECTIONS.....7

1. Protective Clothing.....7
2. Respiratory Protection.....8
   a. No Respiratory Protection Required (outside containment).....8
   b. No Respiratory Protection Required (inside containment).....8
   c. Air-Purifying Respirators.....9
   d. Self-Contained Breating Apparatus (SCBA).....9

C. PROTECTIVE EQUIPMENT GUIDELINES FOR ASBESTOS MANUFACTURING AND FABRICATING INSPECTIONS.....10

1. Protective Clothing.....10
2. Respiratory Protection.....10

D. PROTECTIVE EQUIPMENT AND PROCEDURAL GUIDELINES FOR COLLECTING BULK SAMPLES.....11

1. Protective Clothing.....11
2. Respiratory Protection.....11
3. Procedural Guidelines.....11
   a. Preliminary Steps.....11
   b. Sampling Procedures.....12
   c. After Sampling.....13

TABLE OF CONTENTS (CONTINUED)

E. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECTING ASBESTOS WASTE DISPOSAL AND STORAGE SITES.....13

1. Protective Clothing.....13
2. Respiratory Protection.....14
   a. No Respiratory Protection Required.....14
   b. Air-Purifying Respirators.....14
   c. Self-Contained Breathing Apparatus (SCBA).....14

F. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECTING EMERGENCY REMOVAL OPERATIONS AT SUPERFUND SITES.....14

1. Protective Clothing.....14
2. Respiratory Protection.....15
   a. No Respiratory Protection Required.....15
   b. Air Purifying Respirators.....15
   c. Self-Contained Breathing Apparatus (SCBA).....15

G. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECTING AN ABANDONED BUILDING.....16

1. Protective Clothing.....16
2. Respiratory Protection.....16
   a. No Respiratory Protection Required.....16
   b. Air Purifying Respirators.....16

H. OPERATIONAL PRACTICES FOR ENTERING AND EXITING SITES.....16

1. Wearing SCBA When a Three-Stage Decontamination System is Present.....16
2. Wearing an SCBA When a Shower is Not Present.....19
3. Wearing an Air-Purifying Respirator When a Three-Stage Decontamination System is Present.....20
4. Wearing an Air-Purifying Respirator When a Shower is Not Present.....22

# Health and Safety Guidelines for EPA Asbestos Inspectors

## INTRODUCTION

These Guidelines are based on good health and safety practices and are designed to minimize the likelihood of illness or injury to EPA's asbestos inspectors. No set of guidelines can anticipate every situation or substitute for the sound judgment of properly trained professionals. However, these guidelines can be an effective tool for assuring that the Agency's mandate to conduct asbestos inspections is safely conducted.

Asbestos inspections are performed to determine compliance with environmental regulations including the National Emissions Standards for Hazardous Air Pollutants (NESHAP), Asbestos-in-School Toxic Substance Control Act (TSCA), and Worker Protection (TSCA). EPA inspectors who perform asbestos inspections may be involved in a variety of activities including: inspecting removal, demolition, distribution and abatement sites; inspecting manufacturing and fabricating operations; collecting bulk samples; inspecting emergency removals at Superfund sites; and inspecting abandoned buildings, among others.

These guidelines were prepared by the EPA's Safety, Health and Environmental Management Division (SHEMD) for EPA employees who are involved with EPA asbestos inspections. The SHEMD has no authority over contractors, contractor agents, assigns or employees; State agents, assigns or employees; or local government agents, assigns or employees in matters pertaining to asbestos exposures. However, the SHEMD encourages EPA program offices to include these Guidelines as minimum conditions of health and safety terms for contracts pertaining to asbestos inspection services, and as recommended guidelines for collaborating State and local government asbestos inspectors.

## A. GENERAL REQUIREMENTS

1. Asbestos Inspector's Health and Safety Plan. A general Asbestos Inspector's Health and Safety Plan must be prepared by each EPA Regional Office and other EPA organizations involved in asbestos inspections. At a minimum, the Plan must include emergency procedures, personal protective equipment, and operational practices. The Plan must be transmitted to the appropriate safety committee for review and approval and then to the safety program manager and senior management official (e.g., the Regional Administrator) for their review and approvals.

   a. Emergency Procedures. The Plan must include procedures to be followed in: 1) medical emergencies, 2) accidental releases of asbestos, and 3) other emergency situations. For medical emergencies, the Plan must include the locations

and telephone numbers of the nearest medical emergency facilities and ambulance services. For asbestos releases, the plan must include procedures for notifying responsible building officials, as well as affected building occupants. For other emergency situations, the Plan must include provisions for identifying the emergency and non-emergency local phone numbers for the police department, the local fire department, and the nearest 24-hour poison control center. In all cases, the location of the nearest phone should be included to make the general plan site specific. The use of an inspection kit containing cards with phone numbers should be considered.

b. Personal Protective Equipment. The Plan must specify protective equipment requirements, including respiratory protection and protective clothing. The protective equipment required may vary depending on the type of inspection. For example, an inspector performing a NESHAP inspection at an abatement site may be required to wear self-contained breathing apparatus (SCBA) and a full body disposable suit. On the other hand, an inspector performing an Asbestos-in-Schools visual walk-through may not be required to wear any protective equipment because measurable exposure would be unlikely in situations in which no asbestos-containing materials (ACM) have been disturbed and where no asbestos-containing debris is present. The Plan must specify protective equipment recommendations for each type of inspection likely to be performed.

c. Operational Practices. The Plan must specify operational practices for each type of inspection likely to be performed. The operational practices may vary depending on the activities performed during the inspections.

2. Evaluation. The senior management official should assure that these Asbestos Inspectors' Health and Safety Plans are reviewed and revised as necessary at least annually.

3. Incident Reporting and Response. The appropriate program manager must coordinate the reporting and response to any incidents involving injury or illness, from asbestos for EPA's asbestos inspectors. Chapter 3 of the EPA's Occupational Health and Safety Manual details these reporting requirements and procedures [EPA #1440].

4. Training. All EPA employees engaged in asbestos-related field inspection activities must receive a minimum of 24 hours of approved basic occupational health and safety training; must accompany an experienced asbestos inspector for at least three days of directly supervised field activities; and must receive eight hours of approved, formal

refresher training annually. These, and additional requirements are described in EPA Order 1440.2, "Health and Safety Requirements for Employees Engaged in Field Activities." All EPA employees required to wear respirators must receive six hours of approved respiratory protection training, must be fit-tested at least semi-annually, and must receive approved refresher training annually, as described in EPA Order 1440.3. All EPA employees requested to enter hazardous waste sites or Superfund sites must receive the necessary training required under OSHA's regulation 29 CFR 1910.120.

5. Medical Monitoring. All EPA employees routinely engaged in field activities which are likely to result in exposure to toxic substances, or which require the use of respiratory protective equipment must be included in the Agency's Occupational Medical Monitoring Program. EPA Order 1440.2 requires that all EPA employees engaged in field activities be included in the medical monitoring program. EPA Order 1440.3 requires that all employees who wear respiratory protection be determined to be medically fit to wear respiratory protection.

6. Protective Clothing. The protective clothing needed may vary with the type of inspection and with the level of anticipated asbestos contamination. Personal protective clothing may not be needed for some inspections, such as a visual walk-through of a school where no abatement action is underway. On the other hand, a disposable suit, along with disposable gloves, head, and foot coverings may be needed where contamination of clothing is anticipated. Maneuvering into crawlspaces and inspecting asbestos removal operations inside the work area are examples of activities requiring such clothing.

After the inspection, the disposable suit, gloves, and head and foot coverings should be disposed of properly. If the site has a method for disposing of contaminated protective clothing, and the site manager agrees, disposal of contaminated clothing can be done at the site. If the site does not have an adequate method for disposing of contaminated materials, or if the site manager does not allow the EPA to dispose of materials at the site, then they must be sealed in properly labeled plastic bags and removed for proper disposal elsewhere. Disposable protective clothing must never be reused. Proper disposal of protective clothing prevents the spread of asbestos contamination to other areas.

7. Respiratory Protective Equipment. To provide asbestos inspectors with appropriate respiratory protection, respirators must be selected on the basis of the anticipated

levels of exposure that meet all OSHA requirements. When an anticipated exposure level cannot be determined, an unknown exposure condition exists. Such a situation requires the use of atmosphere supplying respirators such as a self-contained breathing apparatus (SCBA). Of currently available respiratory protective equipment, the SCBA offers the maximum level of respiratory protection.

Fortunately, much is known about the exposure conditions encountered at sites that are in compliance with current OSHA asbestos standards. When such circumstances are encountered by an inspector, they permit the initial selection o an air purifying respirator. The lowest acceptable level of respiratory protection to be used is that afforded by a NIOSH-approved full facepiece air-purifying respirator with HEPA filtration or any approved tight-fitting (i.e., having a tight face-to-facepiece seal) powered air-purifying respirator (PAPR) with High Efficiency Particulate Air (HEPA) filtration.

To assist in determining when air-purifying respirators can safely be used in conducting asbestos inspections, a study of exposure levels at renovation sites was conducted by Alliance Technology Corporation under contract to EPA. The study reviewed over 4000 air monitoring samples taken at renovation sites where, for the most part, OSHA requirements were met. It was undertaken to determine the parameters that had to be met to ensure that asbestos inspectors would be provided adequate protection when using air-purifying respirators.

The results of the study indicated that 95 percent of the time, when the OSHA asbestos standards for renovations conducted in schools, residential buildings, hospitals, offices, and industrial buildings were followed, no airborne concentrations in excess of 0.82 f/cc were present in the removal areas during active abatement i.e., the study that showed that the concentration would not exceed 0.82 f/cc 95% of the time. The data was based on Phase Contrast Microscopy (PCM) analyses. The OSHA 8-hour time-weighted-average (TWA) permissible exposure limit is 0.2 f/cc and the NIOSH-recommended exposure limit is 0.1 f/cc. Thus, before entering the envelope, if asbestos inspectors can make a determination of a project's OSHA compliance, an air-purifying respirator can be selected as shown in the following paragraph

The EPA's recommendations for respirator selections found in these Guidelines are intended to limit inspectors' exposures to asbestos to below 0.01 f/cc as an 8-hour time-weighted-average (TWA). These recommendations are based, in part, on expected inspection patterns such as not being in the envelope for more than two hours per day. The use of full facepiece air-purifying respirators or tight-fitting PAPRs

can provide such protection when used at sites that are in compliance with the OSHA asbestos standard and when inspectors spend no more than 2 hours per day inside the containment envelope. This conclusion is based on the following assumptions:

- o exposures at renovation sites that are in compliance with the OSHA asbestos standard do not exceed 2.0 f/cc more than 95% of the time (2.0 f/cc is the maximum level for which full facepiece APRs can reduce inspectors exposures to below 0.01 f/cc) lasting no more than a 2 hour exposure;

- o full facepiece air-purifying respirators (and tight-fitting PAPRs) provide a protection factor of 50X;

- o **inspectors will not be in the asbestos enclosure envelope for more than two hours per day.**

A 50X protection at a concentration up to 2.0 f/cc for two hours would result in an 8-hour TWA exposure of 0.01 f/cc. Actually, most exposures would be far less than 0.01 f/cc, since most individuals get much more than a 50X protection from full facepiece respirators (and PAPRs), and often they will not be in the envelope for two hours. Therefore, by following these recommendations, inspectors will have a high protection level because their exposure will most often be much less than 0.01 f/cc.

An abatement project's compliance with the OSHA asbestos standards can be gauged by findings that:

1) records on or off-site show that all employees have been trained as required by OSHA standards. When records are kept off-site, the inspector will request the supervisor to state that proper records exist and are available for review at a later date. [Passing an approved AHERA class is desirable but not required for buildings not covered by the AHERA regulations. Compliance with state and local training requirements should be checked.];

2) records (that can be made available at a later date) show that project employees have been given medical exams, including a determination that they are medically fit to wear respirators;

3) amended water is being used to wet the asbestos-containing material (ACM), [check to see that amended water is on-site outside the envelope];

4) no power tools are being used to remove ACM

5) the envelope is secure and no dust or debris appears to be coming from the removal area;

6) warning signs and adequately labeled containers are being used to remove the ACM;

7) a permit for disposal has been obtained from the state or local government;

8) employees are carefully removing ACM and are not dropping materials on the floor;

9) decontamination accommodations, including shower facilities, are in place;

10) existing monitoring data indicates that asbestos fibers in the work area do not exceed 2.0 f/cc as an 8-hour TWA;

11) there is a written respiratory protection program and respirators are being used;

12) a removal plan can be made available for review.

Determining that air-purifying respirators will provide adequate protection requires a certain degree of judgment. The ability to make such determinations must be obtained through both classroom and on-the-job training.

The buddy system is required in situations in which the SCBA-user is in an atmosphere that is either oxygen-deficient or is highly toxic and would be life-threatening in case of a respirator failure. Activities which would <u>not</u> result in a life-threatening or permanent injury situation would generally <u>not</u> require using the buddy system. A buddy system or appropriately outfitted assistant may be required in certain decontamination procedures. The decision to require a buddy system for decontamination would have to be made on a case-by-case-basis.

A Respirator Protection Program must be established in accordance with the OSHA standard for respiratory protection, 29 CFR 1910.134, the OSHA standards for asbestos, 29 CFR 1926.58 and 29 CFR 1910.1001, and EPA Order 1440.3 "Respiratory Protection".

Air-purifying respirators include Powered Air-Purifying Respirators (PAPR). These guidelines assume that tight-fitting PAPRs do not provide greater protection than do other air-purifying respirators due to the possibility that over-breathing (i.e., inhaling at a rate that is greater than the air supplied to the facepiece, resulting in a negative pressure in the facepiece) can occur. This guideline is based on workplace protection factors for PAPRs determined by NIOSH. This guideline

is consistent with the NIOSH Respirator Decision Logic of 1987 with respect to the protection offered by PAPRS. Additional PAPR studies are being planned by NIOSH. If they are shown to have higher protection factors in the future, appropriate changes will be made regarding selection of respiratory protection in this section.

EPA EMPLOYEES MAY NOT WEAR RESPIRATORS UNTIL THEY HAVE BEEN DETERMINED TO BE MEDICALLY FIT TO WEAR RESPIRATORY PROTECTION.

EPA EMPLOYEES SHOULD USE ONLY EPA-OWNED RESPIRATORY PROTECTIVE EQUIPMENT THAT THEY HAVE BEEN SPECIFICALLY TRAINED AND FIT-TESTED TO USE.

8. Other Personal Protective Equipment (PPE). It is recommended that eye protection be worn at all times in eye hazard areas (refer to EPA's Eye Protection Program Guidelines). Safety shoes or hard hat protection must be used where head or foot injury hazards can occur.

9. Prohibited Practices. Smoking, eating, drinking, chewing gum or tobacco, and applying makeup are prohibited in asbestos-contaminated areas.

10. Personal Hygiene. Personnel who have been in asbestos-contaminated areas must remove contaminated clothing, and other articles. Disposables should be properly bagged and discarded in landfills that are equipped to accept asbestos-containing materials. Personnel must wash their hands and faces thoroughly, or shower as appropriate. Employees should never eat, drink, apply makeup, chew gum or tobacco, or smoke before completing the decontamination process.

B. PROTECTIVE EQUIPMENT GUIDELINES FOR REMOVAL, DEMOLITION, AND RENOVATION INSPECTIONS.

EPA Asbestos Inspectors are required to inspect removal, demolition, and renovation sites under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and the Asbestos Abatement Worker Protection Rule and other regulations.

1. Protective Clothing. EPA inspectors entering a removal, demolition, or renovation area should wear the following protective clothing:

- a disposable, full-body, hooded, outer coverall (e.g., a Saranex-coated Tyvek suit or equivalent). A coverall with an expandable back should be worn when SCBA is to be used;

- a bathing suit (or equivalent) or an inner disposable coverall (when possible, particularly when a changing area or decontamination area is available, all street clothing should be removed before donning protective clothing. When clothing is removed, the inspector may choose to wear a bathing suit under the protective clothing. In situations where removing all street clothing is not possible, the inspector should roll up pants legs and sleeves and don an inner disposable coverall. The outer coverall is then worn over the bathing suit or inner coverall.);

- disposable gloves (taped to the outer coverall);

- disposable inner booties (e.g., Tyvek or equivalent);

- disposable outer booties (taped to the outer coverall).

2. Respiratory Protection. EPA inspectors entering a removal, demolition, or renovation area should select the appropriate respiratory protection according to the following locations and conditions:

a. No respiratory protection is required outside of the asbestos area-enclosing envelope when:

   - inspecting office area and other locations outside the barrier. All barrier seals must be intact, and all envelope entrances must have at least a double barrier. No visible airborne dust or debris that is potentially asbestos-contaminated should be present on any surface in the area; and

   - secondary containment is in place during glove bagging operations. The secondary containment enclosure must be complete, and for all but small-scale, short-duration operations must also be under negative pressure;

   - materials removed from the envelope have been cleaned and the pathway for removal of bags and equipment is clear and clean; and

   - all ventilation systems in the envelope are off and sealed (this does not include negative pressure systems designed for the removal project); and

   - wet methods are being used.

b. No respiratory protection is required inside the containment envelope when:

- o inspecting any restricted area that has already passed an appropriate clearance test (minimum of aggressive sampling demonstrating a concentration below 0.01 f/cc by PCM);

- o no removal work has begun and all ACM is intact, not disturbed, not damaged, and no debris is present.

c. Full facepiece air-purifying respirators or tight-fitting PAPRs shall be worn by inspectors when:

- o inspecting outside the barrier, and workers outside the barrier are wearing air-purifying respirators;

- o inspecting outside the barrier where the barrier is not complete and/or asbestos-containing debris is present;

- o inspecting inside the envelope when an inspection of the operation shows it to be in compliance with the OSHA asbestos standards. If, upon entering the envelope, visible emissions are seen or other evidence suggesting non-compliance is apparent, the inspector will <u>immediately</u> leave the area. Prior to returning to the removal area to document the violations, the inspector shall don SCBA gear;

- o inspecting inside the barrier and no active removal or disturbances have occurred in the past 24 hours and the inspection will not disturb any ACM.

d. Atmosphere-Supplying Respirators are required when:

- o performance of the asbestos abatement project is not in accordance with OSHA standards;

- o materials are being removed which are not being properly wetted, or removal causes the generation of significant levels of dust;

- o monitoring data at the site show levels in excess of 2.0 f/cc, or the EPA inspection may last for more than 2 hours;

- o others at the site are wearing atmosphere-supplying respirators.

C. PROTECTIVE EQUIPMENT GUIDELINES FOR ASBESTOS MANUFACTURING AND FABRICATING INSPECTIONS.

EPA asbestos inspectors are required to inspect asbestos manufacturing operations under the National Emissions Standards for Hazardous Air Pollutants (NESHAP).

1. Protective Clothing. The following protective clothing is recommended for EPA inspectors at manufacturing operations to prevent contamination of their street clothing:

- a disposable, full body, hooded coverall (e.g., a Tyvek suit or equivalent) or a disposable, full body, hooded coverall with an expandable back to cover the air tank (if SCBA is required);
- disposable shoe coverings;
- a hard hat (if applicable);
- eye protection (when respirators are not used); and
- safety shoes (if applicable).

2. Respiratory Protection. EPA inspectors at manufacturing and fabricating operations should select respiratory protection based on employers' airborne fiber monitoring data (if available at the site). For exposure levels up to 2.0 f/cc, full facepiece air-purifying respirators or tight-fitting PAPRs shall be used for up to two hours of inspection time/day. If monitoring data is not available, the site is considered to be in violation of the OSHA standards. SCBA shall be used when the inspector cannot determine that exposures are likely to remain below 2.0 f/cc during the inspection.

Situations where excessive exposures may occur include:

- loose asbestos materials are handled outside of an exhausted enclosure;
- observing the accumulation on walls or surfaces, of any debris that may consist of friable asbestos-containing materials;
- uncontrolled dumping, cutting, mixing, bagging, packaging, grinding operations or any type of fabrication where asbestos fibers may be emitted into the general air; and
- in-plant transport of friable asbestos-containing materials that are not completely sealed.

Not all situations where the potential exists for excessive emissions of asbestos can be listed. Therefore, the inspector will have to use professional judgment to determine if an air-purifying respirator will provide adequate protection.

D. PROTECTIVE EQUIPMENT AND PROCEDURAL GUIDELINES FOR COLLECTING BULK SAMPLES.

EPA asbestos inspectors are required to collect bulk samples under the Asbestos-in-Schools Rule, Asbestos Worker Protection Rule, and the National Emissions Standards for Hazardous Air Pollutants.

1. Protective Clothing. EPA inspectors should wear the following protective clothing over their street clothes when collecting bulk samples (Note: when samples can be taken without any significant chance of releasing fibers, this clothing may not be necessary. Professional judgment must be used in such unusual cases.):

- a disposable, full body, hooded coverall (e.g., a Tyvek suit or equivalent);
- eye protection (if no full facepiece respirator is used);
- disposable shoe coverings;
- hard hat (if applicable); and
- disposable gloves.

2. Respiratory Protection. EPA inspectors collecting bulk samples should wear full facepiece air-purifying respirators with HEPA filter cartridges (this includes NIOSH-approved tight-fitting PAPRs equipped with HEPA filters).

3. Procedural Guidelines. These procedural guidelines are for inspectors who collect bulk samples in non-contaminated areas (e.g., Asbestos-in-Schools inspectors). These practices should be followed to minimize fiber release and building occupant concern.

a. Preliminary Steps.

- Discuss with building officials how the samples will be obtained and the rationale for selecting the sampling locations and the number of samples.

  Also discuss the advisability of notifying employees and/or their representatives prior to the inspection.

- Determine the equipment needed during the inspection to adequately access the area, (e.g., ladders, scaffolding).

- Determine the best time to obtain the samples in each area selected (i.e., times when few people are normally in the vicinity or passing through);

- Limit access to the area while samples are being collected. Post area(s) with appropriate signs or construct barricades, if necessary. Under no circumstances should samples be taken when school children or other unprotected individuals are present;

- Determine the minimum number of people needed in the affected area during sample collection, and limit access to that number. [These individuals may need to use PPE, depending on the asbestos inspector's assessment of the potential for asbestos fiber release];

- Determine how the area will be decontaminated should there be an accident (e.g., a piece of asbestos comes loose and drops to the floor). Be prepared to isolate the area and to damp wipe/mop the area, and/or have access to a HEPA vacuum;

- Based on the best information available, determine what PPE would be required in the event of an accident, under what conditions it will be worn and by whom.

b. Sampling Procedures.

- Sampling procedures must minimize the amount of the inspector's personal exposure to the asbestos. Also, these procedures must minimize the amount of disturbance of the asbestos material.

- Don appropriate protective clothing and respiratory protective equipment.

- Before the sample is collected, place a covering on the floor under the sample collection area.

- Spray the area to be sampled with a water mist or encapsulant mist prior to sampling to minimize release of fibers (e.g., use a hand-held plant mist sprayer).

- Sampling equipment, in most cases, will consist of plastic containers or empty film canisters and a sharp instrument such as a knife or scalpel. Once the samples have been obtained, the sampling equipment must be wiped thoroughly with a damp cloth. The outsides of the film canisters must be damp-wiped before being placed into the plastic bag. Whatever is chosen to wipe the sampling equipment and sample containers must be properly disposed of in plastic bags that are properly labeled. An encapsulant should be used to seal the hole made by the inspector while extracting the sample. The sampled surface should not be left in a worse condition than before sampling was done.

c. After Sampling.

- Wet-wipe the outside of the coveralls and shoe coverings. Remove coveralls, shoe covers, and gloves and dispose of them and the wipe down cloths as asbestos-contaminated wastes.

- Spray the respirator and respirator HEPA filters with water and dispose of the filters as asbestos waste.

- Dispose of all asbestos-contaminated materials properly.

- The asbestos samples must be packaged and shipped in a manner that assures that the sample containers will not release asbestos during transportation. **[Make sure the sample vials are securely taped shut and well-cushioned to prevent breakage.]**

## E. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECTING ASBESTOS WASTE DISPOSAL AND STORAGE SITES.

EPA Asbestos Inspectors are required to inspect asbestos waste disposal and storage sites under the National Emissions Standards for Hazardous Air Pollutants (NESHAP). Before entering these sites, inspectors must have completed all OSHA training required as cited in 29 CFR 1910.120.

1. Protective Clothing. EPA inspectors should wear the following protective clothing over their street clothes when inspecting asbestos waste disposal and storage sites:

- a disposable, full body, hooded coverall (e.g., Tyvek or equivalent);

- disposable gloves; and

- disposable boots.

2. Respiratory Protection. EPA inspectors at asbestos waste disposal and storage sites should select respiratory protection based on the requirements of the approved site safety plan. This assumes that an approved site safety plan has been implemented.

When no approved site safety plan is in place, the inspector must have reviewed an appropriate generic site inspection plan for the site being inspected.

The absence of a site safety plan should be reported to appropriate persons in charge and possibly to the local OSHA area office.

a. No respiratory protection is required when:

- all disposal trenches have been covered for a minimum of 24 hours, no asbestos-containing materials are visible at the disposal site.

b. Full facepiece Air-Purifying Respirators or tight-fitting PAPR should be worn when:

- trenches are being dug at the disposal site and airborne dust is not visible;

- asbestos materials are visible on the ground or floor of the site, or bags or drums containing asbestos are damaged but airborne dust is not visible; and

- inspecting a storage site, as long as airborne dust is not present.

c. Atmosphere-Supplying Respirators (e.g., SCBA or supplied air respirators (SAR) should be worn when:

- others at the site are wearing atmosphere-supplying respirators; or

- airborne dust is visible at the site.

F. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECITNG EMERGENCY REMOVAL OPERATIONS AT SUPERFUND SITES.

EPA inspectors are required to inspect emergency removals at Superfund sites under CERCLA.

1. Protective Clothing. EPA inspectors should wear the following protective clothing while inspecting emergency removal

operations at Superfund sites:

- a disposable, full body, hooded, outer coverall (e.g., a Saranex-coated Tyvek suit or equivalent). A coverall with an expandable back should be worn with SCBA;

- a bathing suit (or equivalent) or an inner, full body, inner coverall. (When possible, particularly when a changing area or decontamination area is available, all street clothing should be removed before donning protective clothing. When clothing is removed, the inspector may choose to wear a bathing suit under the protective clothing. In situations where removing all street clothing is not possible, the inspector should roll up pants legs and sleeves and don an inner disposable coverall. The outer disposable coverall is then worn over the bathing suit or inner coverall;

- disposable gloves (taped to the outer coverall);

- eye protection (when no full facepiece respirators are worn);

- disposable inner booties;

- disposable outer boots (taped to the outer coverall); and

- hard hat (if applicable).

2. Respiratory Protection. EPA inspectors at an emergency removal operation should select the appropriate respiratory protection according to the following conditions:

a. No Respiratory Protection is required when:

- in the Support Zone (i.e., the noncontaminated or clean area).

b. Air-Purifying Respirators should be worn when:

- in the Exclusion Zone or the Contamination Reduction Zone, when acceptable to the On-Scene-Coordinator (OSC) and no airborne dust is visible.

c. Atmosphere-Supplying Respirators should be worn when:

- airborne dust is visible, for example during windy conditions or during operations that disrupt the asbestos; or
- others at the site are wearing atmosphere-supplying respirators.

G. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECTING AN ABANDONED BUILDING.

1. Protective Clothing. EPA personnel should wear or carry with them the following protective clothing while inspecting an abandoned building:

- a disposable, full body, hooded coverall (e.g., a Tyvek suit or equivalent);
- disposable shoe coverings;
- eye protection (if no full facepiece respirators are worn);
- disposable gloves; and
- hard hat (if applicable).

If any suspect materials are visible on floors or surfaces, the protective clothing should be worn.

2. Respiratory Protection. EPA personnel inspecting an abandoned building should select the appropriate respiratory protection according to the following conditions:

a. No Respiratory Protection is required when:

- no suspect materials are present;
- intact suspect materials are present and no debris from those materials is observed.

b. Air-Purifying Respirators should be worn when:

- suspect materials are visible on the floors or surfaces;
- collecting bulk samples. (See Section D for specific guidelines for collecting bulk samples.)

H. OPERATIONAL PRACTICES FOR ENTERING AND EXITING SITES.

Although the operational practices in this section are aimed primarily at removal, demolition, and renovation sites, these practices can be easily modified to fit the conditions for other types of inspections.

1. Wearing an SCBA When a Three-Stage Decontamination System is Present. The three-stage decontamination system discussed here consists of a clean room, a shower area, and an equipment room (or equivalent). A detailed description of this type of

decontamination system, commonly used in the asbestos abatement industry, can be found in the OSHA asbestos regulation, 29 CFR 1926.58, Appendix F.

a. Before entering the Clean Room:

- Make sure SCBA is operating properly;

- Make sure you have all materials necessary to conduct the inspection safely (e.g., duct tape, disposable towels, protective clothing, respirator, extra plastic bags, spray bottle, etc.) All materials that must be carried into the contaminated area should be sealed in a plastic bag to minimize contamination;

- If you take a camera into the contaminated area, precautions must be taken to minimize contamination or to decontaminate the camera. Possible solutions include using a waterproof camera or sealing a conventional camera in an impermeable clear camera box. Both of these methods are used by SCUBA divers.

b. In the Clean Room:

- Remove all street clothing including socks and underwear and store them in a clean, sealed plastic bag. The bag should be placed in a secured area. If desired, don a bathing suit (or equivalent) and inner booties. [Inspectors may prefer to have the bathing suit on before going to the site.];

- With the air flow valve closed, don SCBA; let the respirator facepiece hang from the neck with the aid of a strap;

- Don disposable outer coveralls with expandable back, but do not zip it;

- Don disposable outer boots. Use duct tape to attach the boots to the legs of the outer coveralls;

- Fit the respirator facepiece to the face, tighten the facepiece straps, and check seal;

- Connect hose to regulator and turn air valve on;

- Fit the coverall hood snugly around the respirator facepiece;

- Zip up the suit;

- Don the disposable gloves. Use duct tape to attach the gloves to the sleeves of the outer coveralls;

- Proceed to the Shower Area.

c. In the Shower Area:

- Leave disposable towels (sealed in a plastic bag) near the shower.

- Proceed to the contaminated area and perform inspection.

d. Before leaving the contaminated area:

- HEPA vacuum (if possible) and wet wipe all visible debris from protective clothing. (Use a spray bottle and disposable towels to wet wipe the suit.) Proceed to the equipment room.

e. In the Equipment Room:

- Seal all contaminated nondisposable materials in a plastic bag and remove them for decontamination at a later time.

- Remove outer protective clothing including boots, gloves, and coverall and place them in a proper container for disposal.

- With SCBA, bathing suit, and inner booties still on, proceed to the Shower Room.

f. In the Shower Area:

- Thoroughly shower down with the SCBA, bathing suit, and inner booties still on. Once totally wet, remove the respirator, turn off the air supply valve, clean the respirator, and place the respirator outside the shower on the clean side;

- Continue showering. While in the shower, remove inner booties and place them in a proper container for disposal. Next, remove bathing suit, thoroughly rinse it, and place it in a plastic bag. Finish showering by thoroughly washing the entire body with soap and water;

- Proceed to the Clean Room.

g. In the Clean Room:

- Dress into street clothes. All disposables should be given to the site operator if she/he will accept them and if they will be disposed of in an approved landfill. Otherwise, place the disposables in labeled plastic bags and remove them for proper disposal.

2. <u>Wearing an SCBA When a Shower is Not Present or Available.</u>

a. Before entering the contaminated area:

- Make sure SCBA is operating properly;

- Make sure materials necessary to conduct the inspection safely (e.g., disposable towels, extra plastic bags, spray bottle, etc) are on hand. All materials that must be carried into the work area should be sealed in a plastic bag to minimize contamination;

- If a camera is to be taken into the contaminated area, precautions must be taken to minimize contamination or to decontaminate the camera. Possible solutions include using a waterproof camera or sealing a conventional camera in an impermeable box. Both of these methods are used by SCUBA divers;

- Leave all street clothing on. (Short sleeved shirts and short pants are preferable to long sleeved shirts and long pants. If wearing long pants or long sleeves, roll them up.);

- Don an inner disposable coverall and inner booties (e.g., a Tyvek suit or equivalent) over street clothes;

- With the air flow valve closed, don the SCBA; let the respirator facepiece hang from the neck with the aid of a strap;

- Don disposable outer coverall with expandable back, but do not zip it up;

- Fit the respirator facepiece to the face, tighten the facepiece straps and check face seal;

- Connect hose to regulator and turn on air valve;

- Fit the coverall hood snugly around the respirator facepiece;

- Zip up suit;

- Don the disposable gloves. Use duct tape to attach gloves to the sleeves of the outer coverall;

- Proceed to the contaminated area and perform inspection.

b. Before leaving the contaminated area:

- Standing near the exit, HEPA vacuum (if possible) and wet wipe all visible debris from the outer protective clothing. (Use a spray bottle containing water and disposable towels to wet wipe the suit; use plenty of water.) Place all disposable materials in a proper container for disposal. Standing at the doorway inside the work area, remove outer protective clothing and immediately step outside the area.

c. Outside the contaminated area:

- Once outside, thoroughly wet wipe and mist spray the SCBA and inner protective clothing. Move away from the doorway and remove the SCBA and the inner protective clothing. Place all disposable materials in a proper container for disposal.

- Seal all contaminated nondisposable materials in a plastic bag and take them with you for decontamination at a later time.

3. Wearing an Air-Purifying Respirator When a Three-Stage Decontamination System is Present. The three-stage decontamination system discussed here consists of a clean room, a shower area, and an equipment room (or equivalent). A detailed description of this type of decontamination system, commonly used in the asbestos abatement industry, can be found in the OSHA asbestos regulation, 29 CFR 1926.58, Appendix F.

a. Before entering the Clean Room:

- Make sure that all materials necessary to conduct the inspection safely. (e.g. duct tape, disposable towels, protective clothing, respirator, extra plastic bags, spray bottle,

etc.) have been obtained. All materials that must be carried into the contaminated area should be sealed in a plastic bag to minimize contamination;

- If a camera is to be taken into the contaminated area, precautions must be taken to minimize contamination or to decontaminate the camera. Possible methods include using a waterproof camera or sealing a conventional camera in an impermeable clear camera box. Both of these methods are used by SCUBA divers.

b. In the Clean Room:

- Remove all street clothing including socks and underwear and store them in a clean, sealed plastic bag. If desired, don a bathing suit (or equivalent) and inner booties. Inspectors may prefer to have the bathing suit on before going to the site;

- Don disposable, full body, hooded coverall. Do not put the hood on yet. Do not zip up suit, yet. Don other appropriate protective clothing. Use duct tape to attach the boots to the outer coveralls;

- Don respirator. The respirator straps should be worn under the hood. Perform positive and negative pressure checks as appropriate;

- Fit the coverall hood snugly around the respirator; zip up suit; attach gloves with duct tape;

- Proceed to the Shower Area.

c. In the Shower Area:

- Leave disposable towels (sealed in a plastic bag) near the shower.

- Proceed through the equipment room to the contaminated area and perform the inspection.

d. Before leaving the Contaminated Area:

- HEPA vacuum (if possible) and wet wipe all visible debris from protective clothing. (Use a spray bottle and disposable towels to wet wipe the suit.) Proceed to the equipment room.

e. In the Equipment Room:

- Seal all contaminated nondisposable materials in a plastic bag and remove them for decontamination at a later time;

- Remove protective clothing and place it in a proper container for disposal. Keep wearing the respirator;

- With respirator on, proceed to the shower area.

f. In the Shower Area:

- Thoroughly shower down with the respirator and bathing suit on. Remove respirator and clean it. Place it outside the shower on the clean side.

- Remove inner booties and place them in a proper container for disposal.

- Remove bathing suit, thoroughly rinse it, and place it in a plastic bag. Finish showering by thoroughly washing the entire body with soap and water.

- Dispose of towels as asbestos contaminated waste.

- Proceed to the clean room.

g. In the Clean Room

- Dress into street clothes.

- All disposables should be given to the site operator if she/he will accept them and if they will be disposed of in an approved landfill. Otherwise, place the disposables in labeled plastic bags and remove them for proper disposal.

4. Wearing an Air-Purifying Respirator When a Shower is Not Present or Available. Follow the guidelines listed in section 2, "Wearing a SCBA When a Shower is Not Present", substituting appropriate procedures for air-purifying respirators.

## I. References

The following references provide additional information on the safe handling of asbestos.


1. A Guide to Respiratory Protection for the Asbestos Abatement Industry. EPA 560-OPTS-86-001, April 1986.

2. Guidance for Controlling Asbestos-Containing Materials in Buildings. EPA 560/5-85-024, June 1985.

3. Asbestos Fact Book. EPA, A-107/86-002, June 1986.

4. Guidance for Preventing Asbestos Disease Among Auto Mechanics. EPA, Office of Pesticides and Toxic Substance, Asbestos Action Program, June 1986.

5. Measuring Airborne Asbestos Following an Abatement Action. EPA 600/4-85-049, November 1985.

6. Guidance for Controlling Friable Asbestos-Containing Materials in Buildings. EPA 560/5-83-002, March 1983.

7. Asbestos-Containing Materials in School Buildings: A Guidance Document Parts 1 and 2. EPA

8. Quantification of Asbestos Airborne Emissions Associated with Renovation Projects. EPA Contract No. 68-02-4465 Alliance Technologies 1988 Draft Final Report.

# APPENDIX D

# FIELD INSPECTION CHECKLISTS

## APPENDIX D-1

## ASBESTOS NESHAP
## DEMOLITION AND RENOVATION
## INSPECTION EQUIPMENT CHECKLIST

General Inspection Equipment

- Employee I.D. ___
- Copy of regulation ___
- Field notebook ___
- Pens/pencils ___
- Inspection checklist ___
- Camera/flash (preferably waterproof) ___
- Waterproof flashlight ___
- Tape measure ___
- Plastic clipboard ___
- Duct tape ___
- Disposable towels ___
- Plastic sheets ___

**Safety Equipment**

- Full-facepiece air-purifying negative pressure respirator ___
- PAPR (tight-fitting) ___
- SCBA (pressure demand type) ___
- Respirator cartridges ___
- Disposable full-body coveralls ___
- Disposable boots ___
- Hard hat ___
- Safety glasses ___
- Safety shoes ___
- Ear protection ___
- Asbestos waste bags (preferably 6 mil) ___
- Bathing suit ___
- Disposable towels ___

## Sampling Equipment

| | |
|---|---|
| Sample containers | — |
| Water spray bottle | — |
| Duct tape | — |
| Tamperproof tape | — |
| Tools (locking blade pen knife, slotted screwdriver, needle-nose pliers) | — |
| Plastic drop cloths | — |
| Wet wipes | — |
| Reclosable quart- and gallon-size plastic bags | — |
| Sample labels | — |
| Spray paint | — |
| Shipping supplies | — |
| Chain-of-custody forms | — |
| Waterproof markers | — |
| Glove bags | — |
| Surfactant | — |
| Bathroom caulking | — |

# APPENDIX D-2

# FACILITY INSPECTION CHECKLIST

## ASBESTOS DEMOLITION AND RENOVATION (D/R) FIELD DATA COLLECTION CHECKLIST

### I. GENERAL INFORMATION

Site Name:_____

Location:_____

_____

Date of inspection:_____ Time of inspection:_____

Weather conditions:_____

Inspector(s):_____

_____

Notification Received? Yes (date):_____ No:_____

Reason for Inspection:_____

Routine Compliance Inspection _____ Citizen complaint ____

Suspected Non-notifier _____ State Oversight/Joint _____

Other (explain _____

### II. REMOTE OBSERVATIONS

Using the space provided, draw a sketch of the suspected abatement area. Draw the building or other source of suspect ACM, waste storage area(s), location(s) of debris, land use surrounding site, vehicles of importance, etc. Estimate and indicate dimensions and distances as accurately as possible on the drawing.

## REMOTE OBSERVATION SKETCH

| | Yes | No |
|---|---|---|
| 1. Visible emissions to the outside air? | — | — |

If yes, describe specific location (e.g., door, window, waste storage area, etc.) referring to remote observation sketch.

_____

_____

_____

| | Yes | No |
|---|---|---|
| 2. Suspect ACM debris observed outside removal area? | — | — |

If yes, describe [e.g., location, estimated quantity, condition (intact? crushed? wet? dry?)]

_____

_____

_____

| | | Yes | No |
|---|---|---|---|
| 3. | Are vehicles being used to haul suspect ACWM properly marked? [61.150(c)] | ___ | ___ |

4. Land use surrounding site (i.e., residential, schools, businesses, etc.):

_____

_____

_____

a. Distance to the closest residence/public building from the D/R site: _____

b. Number of residences or occupied buildings on adjacent properties or lots: _____

c. Distance to pedestrian walkway, street, or thoroughfare from site: _____

d. Additional information indicating potential public exposure:

_____

_____

5. Building/Structure Information

a. Use (office, retail, industry, school, etc.): _____

b. Brief physical description of building involved in D/R (number of floors, dimensions, etc.):

_____

_____

c. Year constructed: _____ Year(s) renovated: _____

## III. PRE-INSPECTION INTERVIEW

| | Yes | No |
|---|---|---|
| 1. Credentials shown: | | |
| agency identification | ___ | ___ |
| medical monitoring certification | ___ | ___ |

2. Name and position of person being interviewed (include company name):

_____

_____

3. Establish identity of owner/operator(s):

   a. Owner name: _____

   b. Main contact person and title: _____

   c. Mailing address:

   _____
   City State Zip Code

   d. Telephone number: _____
   (area code)

4. Describe any changes/modifications/discrepancies to the information provided in the notification:

_____

5. Prime Contractor (provide the following information for each contractor related to the D/R job):

   a. Company name: _____

   b. Main contact person and title: _____

c. Mailing address:_____

_____
City State Zip Code

d. Telephone number: _____
(area code)

e. Contractor's responsibilities at job: _____

_____

f. Number of employees involved in job: _____

g. Number of on-site employees trained in asbestos removal: ____

h. Name of Supervisor (if different from 5b.):_____

i. What type of asbestos training has the supervisor had?_____

_____

6. On-site Representative

a. If applicable, name of on-site representative who has had required training in the provisions of the NESHAP regulation (effective 1 year after promulgation of the revised NESHAP):

_____

b. Is evidence regarding this individual's training posted and available for inspection at the demo/reno site? Yes__ No__ N/A __

7. Subcontractors [Provide the following information for each subcontractor or any other party onsite (e.g., hygienist, consultant, etc.) who controls or supervises the D/R project.]

a. Company name: _____

b. Main contact person and title: _____

c. Mailing address: _____

_____
City State Zip Code

d. Telephone number: _____
(Area Code)

e. Responsibilities at job: _____

f. Number of employees involved in job: _____

g. Number of on-site employees trained in asbestos removal: ____

h. Name of supervisor: _____

i. What type of asbestos training has the supervisor had? _____

8. Activity Description:

| | Yes | No |
|---|---|---|
| a. Is more than one project occurring at the facility? | __ | __ |

(If yes, complete a separate checklist for each or differentiate accordingly.)

b. Type of activity:

Demolition __ Ordered Demolition __ Planned renovation __

Nonscheduled Operation __ Emergency Renovation __

c. Describe the project and indicate its current phase: _____

_____

_____

_____

d. Describe type of abatement occurring (e.g., removal, encapsulation, etc.):

_____

_____

e. Abatement starting date: _____

## IV. SITE INSPECTION OBSERVATIONS

### A. Types of Suspect ACM

***Insulation***

Pipe insulation (felt, air cell, premolded, asbestos cement) ____
Block insulation ____

***Surfacing Materials***

Plaster ____ Spackling compound ____ Stucco ____

Joint compound ____ Sprayed-on (acoustical, decorative or insulative) ____

***Miscellaneous***

Ceiling tiles ____ Acoustical tiles ____

***Category I Nonfriable ACM***

Packings ____ Gaskets ____ Asphalt roofing products ____

Resilient floor coverings (vinyl/asbestos tile, asphalt/asbestos tile, linoleum ____

***Category II Nonfriable ACM***

Extrusion panels ____ Clapboards/shingles ____ Millboard ____

Vinyl wallpaper ____ Pegboard ____ Putties ____

Sealants ____ Adhesives (mastics) ____ Concrete/asbestos pipe ____

Paints and coatings ____

Textiles (fire blankets, laboratory aprons, theater and welding curtains, gloves) __

Laboratory benchtops __

*Other (Specify)*

_____

_____

_____

_____

B. **Quantity Determination [61.145(a)]**

Complete Attachment A (Quantification of ACM) and the following:

1. Linear footage of ACM present on pipes: _____

2. Square footage of ACM present on other facility components: _____

3. Amount of ACM off facility components where the amount of ACM previously on pipes and other facility components is unknown: _____

4. Method of measuring or estimating amount of ACM present:

_____

| | Yes | No | N/A |
|---|---|---|---|
| **C. Emission Control Procedures [61.145(c)]** | | | |
| 1. Facility ordered demolished (removal not required): | __ | __ | __ |

If "yes",

a. Governmental agency ordering demolition:

_____

b. Portion of facility containing ACM adequately wet during wrecking? __ __

| | | Yes | No | N/A |
|---|---|---|---|---|
| | c. Visible dust emissions: | — | — | |
| 2. | Category I nonfriable ACM not in poor condition and not friable? (removal not required) | — | — | — |
| 3. | Encased in concrete (removal not required): | — | — | — |
| | If "yes", adequately wetted whenever exposed during demolition? | — | — | |
| 4. | ACM not discovered until after demolition began and cannot be safely removed (removal not required) | — | — | — |
| | If "yes", adequately wet at time of inspection? | — | — | |
| 5. | Category II nonfriable with low probability of becoming crumbled, pulverized or reduced to a powder during demolition? (removal not required) | — | — | — |
| 6. | Unit/section removal: | | | |
| | If "yes", | | | |
| | a. ACM adequately wet whenever exposed? | — | — | |
| | b. Lowered to floor and ground level without disturbing ACM? | — | — | |
| 7. | Stripping in place? | — | — | — |
| | If "yes", | | | |
| | a. ACM adequately wet while being stripped and until collected and contained or treated in preparation for disposal? | — | — | — |
| | b. Carefully lowered to floor or ground? | — | — | |
| | c. Transported to ground via leak-tight chutes or containers if removed or stripped >50 feet above ground level and not removed as units or in sections? | — | — | |

| | | Yes | No | N/A |
|---|---|---|---|---|
| 8. | Temperature at point of wetting below 32°F? | — | — | |
| | If "yes", | | | |
| | a. Regulated facility components being removed as units or sections? | — | — | |
| | b. Visible emissions to the outside air? | — | — | |
| | c. Required records kept regarding cessation of wetting? | — | — | |
| | d. Records available for inspection: | — | — | |
| 9. | Has the owner/operator been granted an exemption from wetting? | — | — | |
| | a. Reason for exemption _____ | | | |
| | b. Who granted the exemption? _____ | | | |
| | _____ | | | |
| | c. Is one of the following emission control techniques in use? | — | — | |
| | Local exhaust ventilation and collection system | — | — | |
| | Glove-bag system | — | — | |
| | Leak-tight wrapping | — | — | |
| | Equivalent approved method (with approval kept at the worksite) | — | — | |
| | d. Are there visible emissions to the outside air? | — | — | |

| | | Yes | No | N/A |
|---|---|---|---|---|
| 10. | Is the facility being demolished by intentional burning? | — | — | — |
| | If "yes", has all ACM (including Categories I and II) been removed before burning? | — | — | |
| 11. | Is Category I nonfriable ACM being sanded, ground or abraded? | — | — | |
| | If "yes", | | | |
| | a. Are visible emissions produced? | — | — | |
| | b. Is the ACM adequately wet? | — | — | |
| | c. Is a local exhaust and ventilation and collection system being used? | — | — | |
| 12. | Are large facility components being removed without the ACM being stripped? | — | — | |
| | If "yes", | | | |
| | a. Is the ACM being disturbed or damaged in any way? | — | — | |
| | b. Is the component encased in a leak-tight wrapping labeled appropriately during all loading and unloading operations and during storage? | — | — | |

## D. Evaluation of Wetting

| | | | |
|---|---|---|---|
| 1. | Is there a water or wetting agent supply? | — | — |

2. What equipment is used to apply it? _____

_____

| | | Yes | No | N/A |
|---|---|---|---|---|
| 3. | Is water or a wetting agent observed being sprayed on suspect ACM during: | | | |
| | a. removal of units or sections? | __ | __ | |
| | b. stripping? | __ | __ | |
| | c. government-ordered demolitions? | __ | __ | |
| 4. | Is there visible dust (airborne or settled), or dry suspect ACM or ACWM debris in the immediate vicinity of the operation? | __ | __ | |
| 5. | Upon examination of some removed ACM, does the full depth of the ACM appear to have been wetted? | __ | __ | |
| 6. | Describe how the ACM changes when it is wetted (e.g., color, texture, weight, etc.): _____ | | | |
| 7. | Is ACM awaiting containerization adequately wet throughout? | __ | __ | |
| | If not, describe: _____ | | | |
| 8. | Is ACM in bags or other containers adequately wet? (follow sampling procedures detailed in "Asbestos NESHAP Demolition and Renovation Inspection Procedures Field Manual") | __ | __ | |
| | If not, describe: _____ | | | |
| 9. | Are there any open or ripped waste bags in the waste storage area? | __ | __ | |
| | How many? __ | | | |
| | Are the contents of these bags adequately wet? | __ | __ | |

| | Yes | No | N/A |
|---|---|---|---|

E. **Waste Disposal (61.150)**

1. Are there visible emissions to the outside air? ___ ___

2. Is there any suspect ACM dust or debris on the ground? ___ ___

   If yes, describe the quantity and location of the material and collect samples for analysis (sketch and photograph as necessary): _____

   _____

   _____

3. Is the owner/operator choosing an alternative to the "no visible emission" standard? ___ ___

   If yes, which of the following options is in use?

   ___ Treat with water and put into leak-tight, labeled containers:

   Is the ACM adequately wet? ___ ___

   Are the containers leak-tight? ___ ___

   Are the containers properly labeled? ___ ___

   ___ Process into nonfriable forms

   ___ Alternative method approved by Administrator

   Description of alternative method: _____

   _____

| | Yes | No | N/A |
|---|---|---|---|

Approving agency: _____

Name and title of approving official: _____

_____

4. Is ACWM being generated during an ordered demolition or demolition where ACM is not required to be removed? __ __

If "yes", is the ACWM kept:

a. adequately wet after demolition? __ __

b. wet during handling and loading for transport to a disposal site? __ __

(sealing in leak-tight containers or wrapping not required - may be transported and disposed of in bulk)

5. Are containers of ACWM destined for off-site transport labeled with the name of the waste generator and the location of its generation? __ __ __

6. Is all ACWM (excluding Category I Nonfriable in good condition) disposed of properly as soon as is practical? __ __ __

7. Are vehicles used in the transport of ACWM marked appropriately during loading and unloading? __ __ __

8. Waste Shipment Records

The following information may not be available onsite:

a. Are appropriate waste shipment records maintained? __ __

b. Has a signed copy of the waste shipment record been received by the generator from the waste disposal facility within 35 days? __ __ __

| | | Yes | No | N/A |
|---|---|---|---|---|
| c. | If such a signed copy has not been received, has the status of the ACWM been determined? | ___ | ___ | ___ |
| d. | Has the generator notified EPA in writing within 45 days if a signed copy of the waste shipment record has not been received from the disposal facility? | ___ | ___ | ___ |
| e. | Are copies of all waste shipment records (including the signed copy sent by the disposal facility) maintained for 2 years? | ___ | ___ | |

f. Comments: _____

_____

_____

_____

Whenever a violation of the asbestos NESHAP is suspected, document occurrence in field notes and with photographs and take samples as needed to prove ACM was involved. Use Attachment B for documenting sample information and Attachment C for documenting photograph information.

## V. OSHA REQUIREMENTS

| | | |
|---|---|---|
| Containment Barrier? | ___ | ___ |
| Respiratory Protection? | ___ | ___ |
| Glove Bag? | ___ | ___ |
| Secondary containment in place where glove bags are used? | ___ | ___ |
| Decontamination unit? | ___ | ___ |
| Signs posted? | ___ | ___ |

Estimated size of containment area: _____

Number and cfm rating of local exhaust ventilation units: _____

Hygienist company: _____

On-site representative: _____

## VI. POST INSPECTION INTERVIEW

Summary of Recommendations/Discussion with Owner/Operator:

_____

_____

_____

_____

_____

_____

_____

## VII. ADDITIONAL COMMENTS

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ _____

Inspector Signature Date

# APPENDIX D-3

# LANDFILL INSPECTION CHECKLIST

## ASBESTOS DISPOSAL LANDFILL
## INSPECTION CHECKLIST

Site Name: _____

Site Address: _____

Inspector(s): _____

Date of Inspection: _____ Time of Inspection: _____

### I. PRELIMINARY INTERVIEW

1. Site Contact: _____

2. Title: _____

3. Affiliation: _____

4. Telephone number: _____

| | YES | NO |
|---|---|---|
| 5. Is the landfill approved by the State? | __ | __ |
| If yes, Operating Permit No.: _____ | | |
| Effective date: _____ through _____ | | |
| 6. Is the disposal site operated in compliance with *one* of the following site requirements? (61.154) | __ | __ |
| a. No visible emissions [61.154(a)] *and* | __ | __ |
| warning signs and fencing, or natural barrier [61.154(b)] | __ | __ |
| b. 6-inch cover within 24 hours [61.154(c)(1)] | __ | __ |
| c. Dust suppressant within 24 hours [61.154(c)(2)] *and* | __ | __ |
| warning signs and fencing, or natural barrier [61.154(b)] | __ | __ |

| | YES | NO | N/A |
|---|---|---|---|
| d. Administrator approved alternative method [61.154(c)] | ___ | ___ | |
| If yes, explain: _____ | | | |
| 7. Are waste shipment records maintained onsite? [61.154(e)(1)] | ___ | ___ | |
| Do these records contain the following information? | | | |
| a. Waste generator's information [61.154(e)(1)(i)]: | | | |
| 1) name | ___ | ___ | |
| 2) address | ___ | ___ | |
| 3) telephone number | ___ | ___ | |
| b. Transporter's information [61.154(e)(1)(ii)]: | | | |
| 1) name | ___ | ___ | |
| 2) address | ___ | ___ | |
| 3) telephone number | ___ | ___ | |
| c. Quantity of ACWM (cubic yards or meters) [61.154(e)(1)(iii)]: | ___ | ___ | |
| d. Presence of improperly enclosed or uncovered waste, or any ACWM not sealed in leak-tight containers [61.154(e)(1)(iv): | ___ | ___ | |
| [Has the landfill operator reported to the EPA, in writing, by the following day, the presence of a significant amount of improperly enclosed or uncovered waste?] | ___ | ___ | ___ |
| e. Date of receipt [61.154(e)(1)(v)]: | ___ | ___ | |
| 8. Have signed copies of waste shipment records been sent to the waste generator as soon as possible, but no longer than 30 days after receipt of the waste? [61.154(e)(2)] | ___ | ___ | |

| | | YES | NO | N/A |
|---|---|---|---|---|
| 9. | Has the landfill operator attempted to reconcile differences between the quantity of waste designated on the waste shipment record and the quantity actually received? [61.154(e)(3)] | — | — | — |
| | Explain: _____ | | | |
| | If the discrepancy is not resolved within 15 days after receiving the waste, has a report been filed with the government agency responsible for administering the asbestos NESHAP program for the *waste generator* | — | — | |
| | ***and*** | | | |
| | if different, the government agency responsible for administering the asbestos NESHAP program for the *disposal site*? | — | — | |
| 10. | Are copies of all records and reports retained for 2 years? [61.154(e)(4)] | — | — | |
| 11. | Is a map or diagram of the disposal area being maintained? [61.154(f)] | — | — | |
| | Does the map or diagram contain the following ACWM information? | | | |
| | location | — | — | |
| | depth | — | — | |
| | area | — | — | |
| | quantity | — | — | |
| | cubic yards or meters | — | — | |
| 12. | Are records available for inspection? [61.154(i)] | — | — | |
| 13. | Has written approval from the Administrator been obtained prior to excavating or otherwise disturbing any ACWM already deposited and covered? [61.154(j)] | — | — | |

14. When was waste last received? _____

15. What was the method of containerization? _____

_____

16. How was it deposited (e.g., manually off-loaded, dumped semiautomatically)?

_____

_____

17. Where was it actually deposited? (Note on sketch below.)

**SKETCH OF DISPOSAL SITE (PLAN VIEW)**

(Include Site Entrance and Boundaries, Roadways, Active cells, Closed cells, Borrow Areas, Direction of Prevailing Wind, and Location of Deposited Asbestos-Containing Waste.

| | | YES | NO |
|---|---|---|---|
| 18. | Are there any special provisions for handling ACWM at this landfill? | ___ | ___ |

If yes, describe: _____

_____

_____

## III. VISUAL OBSERVATIONS

Determine the following at the disposal site. Collect samples and take photographs as necessary to document non-compliance with the provisions of the asbestos NESHAP. Use **Attachment A** for documenting sample information and **Attachment B** for documenting photograph information.

| | | | |
|---|---|---|---|
| 1. | Are there visible emissions? [61.154(a)] | ___ | ___ |

If yes, describe location, magnitude and activity causing the emissions: _____

_____

_____

2. If barriers (fencing, natural) exist, describe them in detail. [61.154(b)(1)] _____

_____

| | | | |
|---|---|---|---|
| | Can the barriers keep out intruders? | ___ | ___ |

Explain. _____

| | | | |
|---|---|---|---|
| 3. | Are warning signs posted? [61.154(b)(1)] | ___ | ___ |
| 4. | Is the waste sufficiently covered? [61.154(c)(1)] | ___ | ___ |

Depth of cover material (inches, feet): _____

| | | YES | NO |
|---|---|---|---|
| 5. | Is the waste covered daily? [61.154(c)(1)] | ___ | ___ |
| | Type of cover material: _____ | | |
| 6. | Is a dust suppressant agent used? [61.154(c)(2)] | ___ | ___ |
| | Type of suppressant used: _____ | | |
| 7. | Is any ACWM exposed? | ___ | ___ |
| | a. Was it deposited within the past 24 hours? [61.154(c)(2)] | ___ | ___ |
| | b. Is it sealed in leak-tight containers? [61.150(a)(1)(iii)] | ___ | ___ |
| | c. Are the containers intact? | ___ | ___ |
| | If no, explain: _____ | | |
| | d. Are the containers or wrapped materials labeled with the following? [61.150(1)(v)] | | |
| | asbestos hazard warning | ___ | ___ |
| | name of waste generator | ___ | ___ |
| | location where waste was generated | ___ | ___ |
| | (If not, examine records and attempt to determine who generated the ACWM.) | | |
| | e. If ACWM seen is not contained or wrapped, was it generated during a governmentally-ordered demolition? [61.145(a)(3)] | ___ | ___ |
| 8. | Are vehicles seen unloading ACWM marked with the following information? [61.150(c)(3)] | ___ | ___ |
| | easy to read legend | ___ | ___ |
| | 20" x 14" upright format sign | ___ | ___ |
| | asbestos hazard warning | ___ | ___ |

| | YES | NO |
|---|---|---|
| Does the transporter possess a properly completed waste manifest? | ___ | ___ |

If not, determine as many of the following as possible:

transporter company name _____
address _____
telephone no. _____

generator's name _____
address _____
telephone no. _____
location where ACWM is being collected _____

## IV. POST INSPECTION INTERVIEW

Summary of Recommendations/Discussions with Site Operator.

_____

_____

_____

_____

## V. ADDITIONAL COMMENTS

_____

_____

_____

_____

_____

| | | Date |
|---|---|---|
| Inspector signature(s): | _____ | _____ |
| | _____ | _____ |

Attachment A
Sample Collection Log

# SAMPLE COLLECTION LOG

Facility Name _____

Facility Address _____

_____

Sampler(s) _____

_____

Date Sampled _____

| SAMPLE NUMBER | SAMPLE LOCATION | SAMPLE DESCRIPTION | TIME SAMPLE TAKEN | COMMENTS |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## Attachment B
## Photo Identification Log Sheet

Name/Address of Facility: _____

_____

Date: _____ Inspector (photographer): _____

| Frame No. | Time | Sample No. | Description |
|---|---|---|---|
| | | | |
| | | | |
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| | | | |

Remarks: _____

_____

Inspector Signature: _____

ATTACHMENT C
ASBESTOS D/R CHECKLIST

QUANTIFICATION OF ACM

| Facility Component[a] | Quantity[b] Area $ft^2$ | Length ft | Measurement/ Estimation Technique[c] | Friable[d] |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
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| | | | | |
| | | | | |
| | | | | |
| | | | | |
| Total | | | | |

[a]Examples of facility components: pipe, duct, boiler, I-Beam, ceiling, steel deck, etc.
[b]Quantity of suspect ACM that will be disturbed during demo/reno.
[c]Measurement Technique: Measured or estimated - if estimated, explain technique.
[d]Friable rating: yes, no, or potentially during demolition or renovation.

# APPENDIX D-4

# AHERA INSPECTION CHECKLIST

ABBREVIATED CHECKLIST FOR AHERA COMPLIANCE
FOR USE ON NESHAP INSPECTIONS

Local Education Agency (LEA) _____

Address _____

School _____

Address _____

Designated Person _____

Phone Number _____

Abatement Project Description (including size of project):

_____

_____

Was Project Supervisor Accredited? Yes _____ No _____

Accreditation Number _____ Date _____

Each worker, state/number of accreditation, date of accreditation

Was Air Clearance in progress? Yes _____ No _____

Name of Person Conducting Clearance _____

Affiliation _____

Laboratory contracted to analyze samples:

_____ _____
Name Address/Phone Number

Type of Analysis: TEM _____ PCM _____

Was the Management Plan available to look at?

Yes ___ No ___ Location of Plan LEA ____ School ____

Was the abatement project included in the Plan? Yes _____ No _____

_____ _____
Inspector Date

# APPENDIX D-5

# WORKER PROTECTION RULE CHECKLIST

## WORKER PROTECTION RULE CHECKLIST

Date of Inspection: _____

Inspection Site: _____

1. Is asbestos abatement work being done? (Abatement means activity involving the removal, enclosure or encapsulation of friable asbestos material.)

   Yes ___ No ___

2. Is abatement work performed by State and local government employees not covered by the OSHA Rule (29 CFR 1926.58)?

   Yes ___ No ___

3. Does the work involve more than 3 linear feet or 3 square feet?

   Yes ___ No ___

Notes: _____

_____

_____

_____

_____

_____

| _____ | _____ | _____ |
|---|---|---|
| Inspector's Signature | Telephone Number | Date |

# APPENDIX E

# MODEL CONSENT DECHEE

UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF LOUISIANA

| | |
|---|---|
| UNITED STATES OF AMERICA,<br>Plaintiff,<br>v.<br>AMALGAMATED PROPERTY OWNERS,<br>INC. and<br>XYZ DEMOLITION CONTRACTORS,<br>INC.,<br>Defendants | Civil Action No. |

## CONSENT DECREE

Plaintiff, United States of America, on behalf of the United States Environmental Protection Agency ("EPA"), having filed a Complaint alleging violations of the National Emission Standard for Hazardous Air Pollutants ("NESHAP") for asbestos, codified at 40 C.F.R. §61.140 et seq., and the Clean Air Act, 42 U.S.C. §7401 et seq., and requesting permanent injunctive relief and civil penalties;

And Defendants having duly filed an Answer denying the claims of the plaintiff; [if appropriate]

And Plaintiff and Defendants having agreed that settlement of this action is in the public interest and that entry of this Consent Decree without further litigation is the most appropriate means of resolving this action, avoiding protracted litigation costs and expenses;

And Plaintiff and Defendants having moved this Court to enter this Consent Decree, subject to the provisions of 28 C.F.R. §50.7;

NOW THEREFORE, before the taking of any testimony, upon the pleadings, without adjudication of any issue of fact or law, and with no finding or admission of liability against or by Defendants, and upon consent of the parties to this Consent Decree, it is hereby Ordered, Adjudged, and Decreed as follows:

## I.
## JURISDICTION

This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§1331, 1345, and 1355, and 42 U.S.C. §7413(b) and over the parties consenting to this Consent Decree. Venue is proper in this Court. The Complaint states a claim upon which relief may be granted against Defendants.

## II.
## DEFINITIONS AND PARTIES

A. "Defendants" shall mean Amalgamated Property Owners, Inc., and XYZ Demolition Contractors, Inc.

B. "Plaintiff" shall mean the United States of America and the United States Environmental Protection Agency.

C. Terms used in this Consent Decree which are defined in 42 U.S.C. §7412(a), 42 U.S.C. §7602, 40 C.F.R. §61.02, and 40 C.F.R. §61.141 shall have the meanings contained therein.

## III.

## APPLICABILITY

A. The undersigned representatives of each party to this Consent Decree certifies that he or she is fully authorized by each party whom he or she represents to enter into the terms and conditions of this Decree, and to execute and legally bind that party to it.

B. The provisions of this Consent Decree shall apply to and be binding upon the Defendants, as well as their officers, directors, agents, servants, employees, successors, and assigns, and all persons, firms and corporations having notice of this Consent Decree and who are, or will be, acting pursuant to this Consent Decree, or on behalf of, in concert with or in participation with the Defendant to this action in furtherance of this Decree.

C. The provisions of this Consent Decree shall apply to all of Defendant APO's facilities in all states, territories, and possessions of the United States of America.

D. The provisions of this Consent Decree shall apply to all of Defendant XYZ's demolitions or renovations in all states, territories, and possessions of the United States of America.

E. Defendants shall condition any and all contracts for demolitions or renovations subject to this Decree during its effective period on compliance with the terms of this Decree.

## IV.
## COMPLIANCE PROGRAM

A. Defendants shall hereafter comply with the requirements of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for asbestos in 40 C.F.R §61.140 et seq. Defendants shall submit written notification for demolition or renovation operations to be postmarked or delivered at least ten (10) days before each demolition or renovation begins if the amount of asbestos is as stated in 40 C.F.R §61.145(a).

B. In the case of an emergency renovation as defined in 40 C.F.R. §61.141, Defendants shall provide written notice to the appropriate EPA regional office and the appropriate delegated state or local air pollution control agency as early as possible, but not later than the following working day after asbestos stripping or removal work or the sanding, grinding, cutting or category I & II nonfriable asbestos-containing material begins.

C. Defendant XYZ shall, on and after the date of entry of the Consent Decree, implement the office procedures set forth in Attachment 1 to this Consent Decree to ensure compliance with the notice requirements for demolition and renovation operations subject to the asbestos regulations, and shall use the notification format set forth as Attachments 2 and 3 to comply with this Consent Decree. [Optional, but suggested if there have been notice violations. See Attachments 1-3 of PC&J decree, attached as Exhibit B, as modified.]

D. All notifications required by this Consent Decree shall be sent by certified mail or hand delivery to the appropriate EPA Regional office and the appropriate delegated state or local air pollution control agency. Defendants shall maintain records of said notifications together with proof of mailing by certified mail for the duration of this Decree.

E. This Consent Decree in no way affects 1) the Defendant's responsibility to comply with any State, Federal or local laws or regulations or any Order by the Court, including compliance with all applicable NESHAPS requirements; and 2) enforcement of any such NESHAP requirements made applicable by reason of any revision of the Clean Air Act and its implementing regulations.

[Optional provisions. Sections I-III, "Notification", "Asbestos Control Program", and "Asbestos Training Program", attached, are recommended as targets for settlement with contractors where appropriate, such as multiple violations or situations in which the contractor has a large number of work crews and inadequate centralized management of them.]

## V.
## CIVIL PENALTY

Defendants shall pay a total civil penalty of $ (penalty in accord with penalty policy). Said payment shall be in full satisfaction of Plaintiff's claims against defendants for the violation alleged in the Complaint in this action. Payment shall be made by cashier's or certified check payable to "Treasurer of the United States of America" and tendered within 30 days after final entry of this Decree to the United States Attorney for the Middle District of Louisiana, [Address]. Defendants shall send a copy of the check to the Office of Regional Counsel [Address], and to the Land and Natural Resources Division, U.S. Department of Justice [Address]. Civil penalty payments under this decree are not tax deductible.

[Optional provisions. Sections IV-VI attached are recommended if it is necessary to provide for an installment schedule for payment of civil penalties. An installment approach is appropriate only if defendants demonstrate that a lump sum payment is financially infeasible.]

## VI.

## CONTRACTOR DEBARMENT AND SUSPENSION

[Optional provision. Section VII attached, may be a useful negotiating tool against contractors which do business with the Federal government. However, the Office of Inspector General, Suspension and Debarment Branch (FTS 475-3960) should be consulted prior to making any commitments regarding suspension or debarment proceedings.]

## VII.

## STIPULATED PENALTIES

[At a minimum, should apply to violations of specific injunctive relief, such as training program or asbestos control program.]

A. Defendant XYZ shall pay stipulated penalties of $_____ per day per violation of any provision of Sections ____ of this Consent Decree.

B. All payments of stipulated penalties shall be made within thirty (30) days of the date of noncompliance by cashiers's or certified check made payable to the "Treasurer of the United States" and mailed to the United States Attorney [Address] District of Louisiana. A copy of the letter forwarding such check, together with a brief description of the noncompliance, shall be mailed to the Office of Regional Counsel, [Address] and to the Land and Natural Resources Division, U.S. Department of Justice.

C. Nothing contained herein shall be construed to prevent or limit the rights of the plaintiff to obtain any other remedy, sanction, or relief which may be available to it by virtue of Defendant's failure to comply with this Consent Decree, the Clean Air Act, or the asbestos NESHAP.

## VIII.
## FORCE MAJEURE

[Optional - may be inserted if demanded by Defendants. Section VIII attached is recommended.]

## IX.
## TERMINATION

This Consent Decree shall terminate 3 years from the date of its entry, provided the Defendant has complied with its terms, including the payment of any accrued stipulated penalties. The United States shall have the right to seek extension of this period in the event of any violation of the Decree. The Court will retain jurisdiction over this matter to enforce the provisions of this Decree.

## X.
## PUBLIC NOTICE

Each party consents to entry of this Consent Decree, subject to the public notice and comment requirements of 28 C.F.R. §50.7.

## XII.
## COSTS

Each party shall bear its own costs.

For Plaintiff - United States of America:

_____ Dated: _____

Assistant Attorney General
Land and Natural Resources Division
United States Department of Justice

_____ Dated: _____

Assistant Administrator for
Enforcement and Compliance Monitoring
United States Environmental Protection
Agency

_____ Dated: _____

Assistant United States Attorney
Middle District of Louisiana

_____ Dated: _____

Trial Attorney
Land and Natural Resources Division
Environmental Enforcement Section
United States Department of Justice

_____ Dated: _____

For Defendant XYZ Demolition
Contractors, Inc.

_____ Dated: _____

For Defendant Amalgamated Property
Owners, Inc.

ENTRY OF THE COURT

Judgment entered in accordance with the foregoing Consent Decree this ____ day of _____, 1987.

BY THE COURT:

_____
United States District
Judge

Model Consent Decree

Optional Provisions

## I. NOTIFICATION

The notification provisions of this paragraph are in addition to, and are not a substitute for, the notification provisions of 40 C.F.R. §61.145(b).

A. Until the termination of this decree, XYZ Demolition agrees to do the following regarding any demolition and/or renovation project it undertakes, regardless of whether asbestos material is involved, where the dollar amount of XYZ's initial contract exceeds $75,000.00 in either case or services rendered.

1. XYZ Demolition will notify the Environmental Protection Agency (hereinafter called "EPA") and the corresponding or relevant State/local environmental agency of the demolition/renovation activity by XYZ.

2. Notifications made pursuant to Paragraph I(A)(1) shall include the information specified in 40 C.F.R. 61.145(b)(4) and shall be submitted at least ten (10) days prior to the commencement of the renovation and/or demolition work by XYZ or contractors hired by it to perform renovation and/or demolition work. The notification to the EPA shall be sent via certified mail to the United States Environmental Protection Agency, [Address]

3. In addition to the information required by 40 C.F.R. §61.145(b), each notification shall include:

   (1) The name and position of the person responsible for supervising all work involving asbestos-containing material (ACM).

   (2) A description of the procedures and equipment to be used to prevent visible emissions of asbestos-containing material, and to decontaminate workers.

   (3) A description of the location and amount of ACM in the facility to undergo renovation or demolition.

(4) The name of the person who determined whether asbestos-containing material (ACM) was located at the site and the basis on which such determination was made.

B. XYZ shall also include the information specified in Paragraph I(A)(3) in notifications submitted pursuant to 40 C.F.R. §61.145(b) concerning renovation/demolition projects involving asbestos where the value of the initial contract is less than $75,000.00 in cash or services rendered.

C. The notice provisions of the Consent Decree do not eliminate or modify any obligation of XYZ to give notice to any state or local agency.

## II. ASBESTOS CONTROL PROGRAM

A. Within sixty (60) days after final entry of this Decree by the Court, XYZ shall develop or have developed an asbestos control program (ACP). This plan will detail XYZ's procedures for complying with the Asbestos NESHAP, 40 C.F.R., Part 61, Subpart M. It also shall include procedures governing submittal of notifications required by this Decree.

B. As part of the ACP, XYZ shall designate an Asbestos Program Manager (APM) and an alternative APM. The APM will have the following duties and responsibilities:

1. Managing all asbestos control program activities, including the asbestos training program for XYZ.

2. Acting as the primary liaison between XYZ and EPA and/or any state/local air pollution control agency. The APM shall be responsible for ensuring that EPA and the appropriate state/local air pollution agency receives the proper notification.

3. Ensuring that each site is inspected prior to submittal of the notification discused above to determine whether ACM is present.

4. Ensuring that decontamination facilities are available, equipped, and used at each job site involving removal of ACM.

5. Maintaining any records of any landfill receipts and reports of analyses performed on samples taken to determine the presence of ACM.

C. The president of XYZ will be responsible at all times for the APM's performance of his duties.

D. At each demolition and renovation project involving ACM, XYZ shall designate site-asbestos-supervisors who shall either be or who shall report to the ACM. XYZ shall have the right to designate different individuals as asbestos supervisor at a particular site on a day-to-day basis.

1. Each site-asbestos-supervisor shall have the primary responsibility for managing all asbestos activities at the work site.

2. The site-asbestos-supervisor will be the primary contact through which any employee at the site involved with asbestos removal shall receive guidance and instructions.

3. The site-asbestos-supervisor shall be the primary liaison between EPA and/or state/local inspectors and on-site employees.

4. The site-asbestos-supervisor shall immediately correct any violations of the Asbestos NESHAP he discovers. If an immediate remedy is not possible, the supervisor shall stop all asbestos removal activities until the violations are corrected.

5. The site-asbestos-supervisor shall have a copy of the written notification for that site in his possession while on-site.

E. XYZ shall take all reasonable steps to see that the employees engaged in removal, handling, and transporting activities follow all practices and procedures learned during the Asbestos Training Program (discussed in Section IV) and any written and/or oral instructions provided by the APM and/or the job site asbestos supervisor.

F. XYZ shall develop written Asbestos Policies and Procedures. The procedures shall address all of the requirements listed in this document and responsibilities of the APM, supervisors and employees. The policy shall provide that workers are encouraged to report any violations of the program or any Asbestos NESHAP (40 C.F.R. Part 61, Subpart M) to the Asbestos Program Manager or the site-asbestos-supervisor. The procedures shall detail how ACM is to be removed at a site facility and how ACM is to be disposed of.

1. These procedures shall be given to each employee and supervisor involved with asbestos activites.

2. These procedures shall be periodically reviewed by the APM and XYZ company officers and revised if necessary, based upon changes in the regulations, development of new removal techniques or any other reason necessary to ensure that all requirements are addressed.

G. XYZ shall submit its ACP to EPA for review and approval within seventy-five (75) days of the date this Decree is approved and entered as an order of the Court. If EPA requires changes in the ACP, EPA's comments shall thereafter be incorporated.

## III. ASBESTOS TRAINING PROGRAM

A. XYZ shall develop and implement an Asbestos Training Program (ATP) for all company employees engaged in actual asbestos removal, handling, transportation and disposal activities, all foremen/supervisors of asbestos activities and an Asbestos Program Manager (APM) and an alternate as of the effective date of this Decree.

B. XYZ has chosen and will hire [trainer acceptable to EPA] to provide the ATP for the persons identified in Paragraph III(A). The ATP offered by [trainer] will consist of its regular "Worker Training" course plus all requirements of the Asbestos Control Program described in Paragraph II of this Decree. This course will cover, at a minimum, information concerning the background of asbestos; federal, state and city regulations; medical surveillance, health effects of asbestos, worker protection, air sampling and general and special work practices. XYZ will ensure that the course devotes at least three hours to actual asbestos removal techniques required by the Asbestos NESHAP, 40 C.F.R. Part 61, Subpart M.

C. XYZ will implement the ATP within 45 days of the entry of this Decree by the Court.

D. One year from the effective date of this Decree, XYZ will provide the training program identified in Section III(B) of this Decree to employees engaged in actual asbestos removal, handling, transportation and disposal activities who were hired by XYZ after completion of the initial training program. XYZ must complete this training program within 15 months of the effective date of this Decree.

E. Within 15 days of the training program's completion, XYZ must submit satisfactory evidence from the person who conducts the training program that each employee required above to be trained has successfully completed the ATP. The submissions shall be sent by certified amil to the United States Environmental Protection Agency, [Address].

## IV. CIVIL PENALTY

A. Defendant shall pay a total civil penalty payment of $___ _____ in _____ installments together with interest by cashier's or certified check payable to "Treasurer, United States of America" and sent by registered mail to the United States Attorney [Address] according to the following schedule.

1) $_____ shall be paid within ____ days of final entry of this consent decree.

2) $_____ shall be paid within ____ days of final entry of this consent decree, together with accrued interest at the specified rate.

3) Etc.

B. Interest shall accrue upon the unpaid balance at a rate equal to the coupon issue yield equivalent (as determined by the Secretary of the Treasury) of the average accepted auction price for the last auction of 52-week U.S. Treasury bills settled immediately prior to the time of the preceeding payment and shall be included in each subsequent payment under the schedule of payments set forth in sub-paragraphs A(2) and (3), above. Interest shall be computed from [time of first payment]. Thirty (30) days prior to the payments described in A(2) and (3), above, the U.S. Attorney's Office shall send a statement of interest due and owing for the upcoming payment.

C. The civil penalty payments made under this Consent Decree are not tax deductible. Upon final entry of this Consent Decree, the United States shall be deemed a judgment creditor for purposes of enforcement of this Decree.

## V. ACCELERATION OF PAYMENTS

A. If the Defendant: (1) fails to make any payment in the time specified under this Consent Decree, or (2) files a voluntary petition in bankruptcy under the Bankruptcy Code of the United States, or (3) is adjudicated as bankrupt under such Code, or (4) is the subject of a petition filed in federal or state court for the appointment of a trustee or receiver in bankruptcy or insolvency, or (5) makes a general assignment for the benefit of creditors, then on the occurrence of any such conditions, at the option of the United States, the entire balance of the principal amount of civil penalty, together with all accrued interest at the rate specified above in paragraph B of Section IV of this Consent Decree, shall become immediately due and payable. Defendant shall also be liable for attorneys' fees and costs incurred by the United States as a result of the implementation of this acceleration provision.

B. Within five (5) business days after Defendant becomes aware of an occurrence of any of the events or conditions described in subparagraph V(A)(2)-(5) above, the Defendant shall give immediate written notice to the U.S. Environmental Protection Agency, [Address] and to the United States Attorney [Address] by certified first class mail, postage prepaid.

## VI. GUARANTY

See Exhibit A attached hereto.

## VII. CONTRACTOR DEBARMENT AND SUSPENSION

It is the policy of the Environmental Protection Agency (EPA) to do business only with responsible contractors. EPA contends it has the authority to debar or suspend irresponsible contractors from EPA-assisted, indirect procurement under 40 C.F.R. §32.100, et seq. and from direct Federal procurement under 48 C.F.R. §9.400, et seq. of the Federal Acquisition Regulation.

EPA agrees that it will not institute debarment or suspension proceedings against the Defendant based on the violations that underlie this Consent Decree as long as the Defendant complies with the terms and conditions of this Consent Decree. If EPA determines, after appropriate notice and an opportunity for a hearing pursuant to 40 C.F.R. §32.100, et seq. and 48 C.F.R. §9.400 et seq., that Defendant has breached the terms and conditions of this Consent Decree, then Defendant agrees that such breach may constitute a cause for debarment and suspension. In such case, if EPA initiates a debarment or suspension action, it may cite the violations which gave rise to this Consent Decree as causes for debarment or suspension, in addition to the violations of the Consent Decree.

## VIII. FORCE MAJEURE

If any event occurs that causes or may cause delays in the completion of the activities described herein, XYZ shall within five days of its learning of such event notify the United States in writing of the delay or anticipated delay, describing in detail the precise cause or causes of the delay, the anticipated length of the delay, the measures taken and to be taken by XYZ to prevent or minimize the delay and the time-table by which these measures will be implemented. XYZ will adopt all reasonable measures to avoid or minimize any such delay. If the United States and XYZ agree that the delay, or anticipated delay, has been or will be caused by circumstances entirely beyond the control of XYZ and agree on the length of the delay, the time for performance hereunder will, with Court approval, be extended for a period equal to the delay resulting from such circumstances. If the United States and XYZ do not agree that the delay, or anticipated delay, has been or will be caused by circumstances entirely beyond the control of XYZ, and/or do not agree on the length of the delay, XYZ may submit the matter to the Court for resolution. In any such proceeding, XYZ shall bear the burden of demonstrating that the delay or anticipated delay, has been or will be caused by circumstances entirely beyond its control and of the necessity of the proposed length of the delay. Increased costs or expenses associated with implementation of the activities required by this Consent Decree and changes in economic circumstances of the defendants shall not be considered circumstances beyond the control of the defendants. XYZ shall be entitled to the benefits of this paragraph only if XYZ has given the notice of the delay or anticipated delay as set forth above in this paragraph.

EXHIBIT A

## Guaranty of Payment by Indorsers

1. In consideration of the payment schedule set forth in Section VI, Part A, of the consent decree filed in United States v. P.C.& J. Contracting Co., Inc., Civil Action No. C84-4141 (Northern District of Iowa) ("hereinafter the Decree"), the undersigned indorsers jointly and severally unconditionally guaranty the payment of a $105,000 civil penalty, together with interest at the rate specified in Section VI, Part B of the Decree, and all costs, expenses, and attorney's fees incurred in the collection of said civil penalty.

2. As payments are made pursuant to the payment schedule set forth in Section VI, Part A, of the Decree, the United States agrees to reduce indorsers' obligation and guarantee accordingly.

3. Indorsers' liability is independent of any other guaranties between Indorsers and any other parties' guaranties.

4. This guarantee is binding upon the Indorsers, their heirs, personal representatives, and assigns.

5. Indorsers waive any presentment, demand, protest, and notice of dishonor associated with this guarantee.

X _____
Kreso P. Bezmalinovic,
individually and as Vice President
of PC&J Contracting Co., Inc.

X _____
Nerina Bonic, wife of Kreso
P. Bezmalinovic, individually,
and as President of PC&J Contracting
Co., Inc.

Sworn to and subscribed to, after presentation of photographic identification of above-undersigned indorsers, before me this 4th day of [illegible], 1986.

_____
Notary Public
My Commisison expires on
_____

[illegible]
Notary Public, State of [illegible]
[illegible]
I. [illegible] in Dallas County
[illegible] March 31, 1987

EXHIBIT B

(date)

TO: ALL OFFICE PERSONNEL

E.P.A. NOTIFICATION PROCEDURE FOR ALL DEMOLITION AND RENOVATION JOB INVOLVING

ASBESTOS REMOVAL

In order to meet strict compliance with E.P.A. notification requirement, the following procedure is now in effect and is to be followed for all demolition and renovation jobs. Note that one of the two notification forms (see attached) must be completed prior to beginning any demolition or renovation activity.

On a demolition or renovation job involving the stripping or removal of any amount of asbestos material on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members, fill out the attached form. It must be postmarked or delivered at least ten (10) days before demolition or renovation or any associated stripping or removal of asbestos material begins.

The original of the appropriate notification document shall be sent to the proper state agency or local air pollution control agency. A copy of the same notice shall be sent to the appropriate U.S. EPA regional office.

A copy of each document sent shall be kept in the job file

(date)

(To the appropriate EPA regional office and the state or delegated local agency)

TWENTY DAY NOTIFICATION OF ASBESTOS REMOVAL ACTIVITIES
PURSUANT TO 40 C.F.R. § 61.146

Dear _____:

Pursuant to the requirements of 40 CFR 61.146, the following notification of impending asbestos removal is provided by P C & J Contracting Co., Inc., located at _____.

FACILITY TO BE DEMOLISHED OR RENOVATED

Name of facility: _____
Address: _____
City: _____ State: _____ Zip: _____
Telephone: _____

Name of owner: _____
Address: _____
City: _____ State: _____ Zip: _____
Telephone: _____

Size of facility: _____
Age of facility: _____
Prior usage: _____
Demolition or renovation methodology: _____

ASBESTOS INFORMATION

Removal dates: _____ Start _____ Finish _____
Quantity on pipes (linear feet) _____
Quantity on other components (square feet) _____
Description of asbestos material: _____

Method of asbestos measurement: _____

Sincerely yours,



ATTACHMENT
Page

(date)

(To the appropriate U. S. EPA regional office, and the state or delegated local agency)

TEN DAY NOTICE OF ASBESTOS REMOVAL ACTIVITIES
PURSUANT TO 40 C.F.R. § 61.146

Dear _____:

Pursuant to the requirements of 40 CFR section 61.146, the following notification of impending asbestos removal is provided by P C & J Contracting Co., Inc., located at _____.

FACILITY TO BE DEMOLISHED OR RENOVATED

Name of facility: _____
Address: _____
City: _____ State: _____ Zip: _____
Telephone: _____

Name of owner: _____
Address: _____
City: _____ State: _____ Zip: _____
Telephone: _____

Size of facility: _____
Age of facility: _____
Prior usage: _____
Demolition or renovation methodology: _____

ASBESTOS INFORMATION

Removal dates: Start _____ Finish _____
Quantity on pipes (linear feet) _____
Quantity on other components (square feet) _____
Description of asbestos material: _____

Removal emission control procedures: _____



ATTACHMENT

DISPOSAL INFORMATION

Waste handling emission control procedures: _____

_____

_____

Disposal site name: _____
Address: _____
City: _____ State: _____ Zip: _____
Telephone: _____

Sincerely yours,



ATTACHMENT _____
Page _____ of

# APPENDIX F

# ASBESTOS NESHAP INSPECTION SCENARIO

"INSPECTIONS AND REPORT WRITING: FOR THE FUN OF IT"

May 19, 1988 Karen A. Meyer and Dana J. Stotsky

## ASBESTOS NESHAP FACT PATTERN

You are a highly trained and skilled EPA NESHAP asbestos inspector. One afternoon you get a telephone call at your desk and a frantic and hushed voice at the other end of the line asks, "Are you with EPA?".

The person tells you that she works at the First National Bank in downtown Duke City and that she is worried about some construction work going on at the bank. She tells you that there is white dust flying all around the bank lobby and that she and her co-workers have been coughing a lot since the work began. She tells you that when she told her supervisor she was worried about the renovation project, her supervisor told her that there was nothing to worry about. She tells you that she took a sample of the white dust to a lab that a friend of hers runs and that her friend told her the material was asbestos. She refuses to give you her name.

You get your respirator and suit and go down to the bank. When you arrive in your decontamination suit, the bank manager and the foreman of the construction site quickly greet you with a barrage of questions. You present your EPA credentials and tell the manager and foreman that you are there to take a look at the renovation project in the bank lobby. They ask if they have to let you in, and you tell them you can always go back to the office and get a search warrant. They let you in. When you enter the bank lobby this is what you see:

The bank lobby is huge. It appears to be 200 feet long and 100 feet wide. The renovation work involves the ceiling, which appears to be 30 feet from the floor. There is scaffolding going up to the ceiling and twelve men standing on it are scraping a white, fluffy material off the ceiling. The men are dressed in T-shirts and jeans. The workers, scaffolding, and the floor below are covered with white dust. The bank lobby is full of bank patrons, lined up to conduct last-minute transactions before the bank closes. There is a sign posted near the tellers' counter which says "PLEASE EXCUSE THE DUST. WE ARE MAKING THE BANK MORE BEAUTIFUL FOR ALL OF YOU!".

(For non-Air people, the asbestos NESHAP requires the following:

1. Notification to the State or EPA on a planned renovation or demolition project involving friable (crumbly) asbestos-containing material.

2. Wet removal of asbestos if over 160 square feet, 260 linear feet, or 35 cubic feet.

3. Bagging and proper disposal of asbestos materials.

## LIST OF AVAILABLE REFERENCES

The following is a list of publications that deal with asbestos. These publications may be available from the EPA Regional Offices or from the Asbestos and Small Business Ombudsman, OSDBU A-149-C, Washington, D.C. 20460. Telephone: (800) 368-5888; for D.C. and VA: (703-557-1938). Information may also be obtained by calling the TSCA Hotline (202) 554-1404.


1. Malmberg, K.B. EPA Demolition & Renovation Inspection Procedures. Stationary Source Enforcement Division, Washington, D.C. October 1975. (S.22 Document).

2. Piper, S.G., and P. Ford. 1988 NESHAPs Asbestos Demolition and Renovation Inspection Workshop - Final Report. Alliance Technologies Corporation. EPA Contract No. 68-02-4465, Work Assignment No. 21. March 1988.

3. Piper, S.G., et al. Asbestos NESHAP Inspector Safety Workshop - Draft Final Report. Alliance Technologies Corporation. EPA Contract No. 68-02-4465, Work Assignment No. 40. June 1988.

4. U.S. Environmental Protection Agency. Asbestos Demolition and Renovation Enforcement Strategy (Revised). Stationary Source Compliance Division. Washington, D.C. March 31, 1988.

5. U.S. Environmental Protection Agency. Draft Health and Safety Guidelines for EPA Asbestos Inspectors (Revised). Environmental Health and Safety Division, Office of Administration and Resource Management, Washington, D.C. June 1990. (Attached as Appendix C).

6. Piper, S.G. and N. Lebedzinski. 1989 Demolition and Renovation Inspection and Safety Procedures Workshop - Final Report. Alliance Technologies Corporation. EPA Contract No. 68-02-4465, Work Assignment No. 89-112. July 1989.

7. U.S. Environmental Protection Agency. Asbestos-Containing Materials in School Buildings: A Guidance Document, Parts 1 and 2. Office of Toxic Substances, Washington, D.C. C00090, March 1979. (Orange Books).

8. American Industrial Hygiene Association. Respiratory Protection, a Manual and Guideline. Prepared by L.R. Binkner, Department of Environmental Health and Safety Affairs, NY, 1980.


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340/1-81-
005

9. U.S. Department of Health and Human Services. Workplace Exposure to Asbestos National Institute for Occupational Safety and Health Publication N. 81-103, April 1980.

10. U.S. Environmental Protection Agency. Support Document/Asbestos-Containing Materials in Schools/Health Effects and Magnitude of Exposure. Office of Pesticides and Toxic Substances, Washington, D.C. EPA-560/12-80-003, October 1980.

11. U.S. Environmental Protection Agency. Asbestos-Containing Materials in School Buildings, Guidance for Asbestos Analytical Programs. EPA-560/13-80-017A, December 1980.

12. U.S. Environmental Protection Agency. Solid Waste Landfill Design and Operation Practices. Contract No. 68-01-3915, Washington, D.C. April 1981.

13. U.S. Environmental Protection Agency. Evaluation of Encapsulants for Sprayed-On Asbestos-Containing Materials in Buildings. Office of Research and Development, Cincinnati, OH. 1981.

14. The Foundation of the Wall and Ceiling Industry, Washington, D.C. Guide Specifications for the Abatement of Asbestos Release from Spray- or Trowel-Applied Materials in Buildings and Other Structures. December 1981.

15. U.S. Environmental Protection Agency, Region VII. Asbestos Exposure Assessment in Buildings. Inspection Manual. October 1982.

16. U.S. Environmental Protection Agency. Guidance for Controlling Friable Asbestos-Containing Materials in Buildings. Office of Pesticides and Toxic Substances, Washington, D.C. EPA-560/5-83-002, March1983. (Blue Book).

17. U.S. Environmental Protection Agency. Airborne Asbestos Levels in Schools. Washington, D.C. EPA-560/5-83-003, June 1983.

18. U.S. Environmental Protection Agency. Evaluation of the Asbestos-in-Schools Identification and Notification Rule. EPA-560/5-84-005, October 1984.

19. U.S. Environmental Protection Agency. Asbestos in Buildings: A National Survey of Asbestos-Containing Friable Materials. EPA-560/5-84-006, October 1984.

20. U.S. Environmental Protection Agency. Asbestos Waste Management Guidance. EPA-530-SW-85-007, May 1985. (Little Blue Book).

21. U.S. Environmental Protection Agency. Guidance for Controlling Asbestos-Containing Materials in Buildings. EPA-560/5-85-024, June 1985. (Purple Book).

22. U.S. Environmental Protection Agency. Evaluation of Asbestos Abatement Techniques, Phase 1: Removal. EPA-560/5-85-019, October 1985.

23. U.S. Environmental Protection Agency. Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials. Office of Pesticides and Toxic Substances, Washington, D.C. EPA-560/5-85-030A, October 1985. (Pink Book).

24. U.S. Environmental Protection Agency. Measuring Airborne Asbestos Following an Abatement Action. Washington, D.C. EPA-600/4-85-049, November 1985. (Silver Book).

25. U.S. Environmental Protection Agency. A Guide to Respiratory Protection for the Asbestos Abatement Industry. Office of Pesticides and Toxic Substances Washington, D.C. EPA-560-OPTS-86-001, April 1986. (White Book).

26. U.S. Department of Labor, Occupational Safety & Health Administration. Occupational Exposure to Asbestos: Tremolite, Anthophyllite, and Actinolite; Final Rules. 29 CFR Parts 1910 and 1926. (51 FR 22733) June 1986.

27. U.S. Environmental Protection Agency. Guidance for Presenting Asbestos Disease Among Auto Mechanics. Office of Pesticides and Toxic Substances, Washington, D.C. June 1986. (Yellow Book).

28. U.S. Environmental Protection Agency. Evaluation of Asbestos Abatement Techniques, Phase Z: Encapsulation with Latex Paint. EPA 560/5-86-016, July 1986.

29. U.S. Environmental Protection Agency. Electron Microscope Measurement of Airborne Asbestos Concentrations: A Provisional Methodology Manual. EPA-600/2-77-178, Revised June 1978.

30. U.S. Environmental Protection Agency. Methodology for the Measurement of Airborne Asbestos by Electron Microscopy (Draft Report), July 1984.

31. Asbestos: A Perspective To An Overview. Huff, J.E. Toxicology Information Response Center, Oak Ridge, Tennessee, March 1978.

32. Natale, A. and Levins, H.J. "Asbestos Removal and Control," An Insider's Guide to the Business. Levins Design, Inc. ISBN 0-917097-00-9. 1984.

33. Controlling Asbestos Contamination with Negative Air Filtration Systems. Source Finders, Voorhees, N.J. ISBN 0-917097-01-7. 1984.

34. Recommended Contract Specifications for Asbestos Abatement Projects. Maryland Department of Health and Mental Hygiene, April 1985.

35. Project Protocol for Control Technology Assessment of Asbestos Removal Processes. National Institute for Occupational Safety and Health, February 1985.

36. National Institute of Building Sciences. Asbestos Abatement and Management in Buildings-Guide Specifications. NIBS, Washington, D.C. 1988.

37. U.S. Environmental Protection Agency. Asbestos NESHAP Demolition and Renovation Inspection Procedures Field Manual. Office of Air Quality Planning and Standards, Washington, D.C. July 1990.

38. U.S. Environmental Protection Agency. Asbestos Content in Bulk Insulation Samples: Visual Estimates and Weight Composition. Office of Pesticides and Toxic Substances. Washington, D.C. EPA-560/5-88-011. September 1988.

39. Asbestos: Manufacture, Importation, Processing and Distribution in Commerce Prohibitions; Final Rule. EPA 40 CFR Part 763 Subpart I. (54 FR 29460) July 12, 1989.

## TECHNICAL REPORT DATA
*(Please read Instructions on the reverse before completing)*

| | | |
|---|---|---|
| 1. REPORT NO. 340/1-90-003a | 2. | 3. RECIPIENT'S ACCESSION NO. |
| 4. TITLE AND SUBTITLE Asbestos NESHAP Demolition and Renovation Inspection and Safety Procedures Workshop - Student Manual | | 5. REPORT DATE November 1990 |
| | | 6. PERFORMING ORGANIZATION CODE |
| 7. AUTHOR(S) Stephen G. Piper and Nancy Lebedzinski | | 8. PERFORMING ORGANIZATION REPORT NO. |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS Alliance Technologies Corporation, Boott Mills South, Foot of John Street, Lowell, MA 01852 | | 10. PROGRAM ELEMENT NO. |
| | | 11. CONTRACT/GRANT NO. 68-02-4465 |
| 12. SPONSORING AGENCY NAME AND ADDRESS Environmental Protection Agency, Office of Air Quality Planning and Standards, Stationary Source Compliance Division, Washington, DC 20460 | | 13. TYPE OF REPORT AND PERIOD COVERED |
| | | 14. SPONSORING AGENCY CODE |

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This document provides information regarding inspector safety and the conduction of regulatory compliance inspections of asbestos demolition and renovation worksites and disposal facilities. Detailed information concerning the following is included: 1) health effects of asbestos exposure, 2) identifying asbestos-containing materials, 3) abatement techniques, 4) the NESHAP regulation, 5) inspector safety, 6) inspection procedures, and 7) bulk and air sampling and analysis.

Inspection checklists designed for facility inspections and landfill inspections are appended. The material presented is a summary of information and experience gained by EPA through the inspection and case development experiences of a nationwide representation of regulatory staff responsible for enforcing the asbestos NESHAP.

An instructor manual (340/1-90-003b), slide narrative (340/1-90-003c) and slides, designed to enhance the presentation of material in the student manual, are also available.

17. KEY WORDS AND DOCUMENT ANALYSIS

| a. DESCRIPTORS | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group |
|---|---|---|
| Asbestos Abatement<br>Asbestos Inspections<br>Asbestos Waste Disposal<br>Asbestos Sampling & Analysis<br>Asbestos Health Effects<br>Asbestos-Containing Materials<br>Asbestos Inspector Safety<br>Respiratory Protection<br>NESHAP | | |

| | | |
|---|---|---|
| 18. DISTRIBUTION STATEMENT Available to the Public | 19. SECURITY CLASS (This Report) UNCLASSIFIED | 21. NO. OF PAGES 326 |
| | 20. SECURITY CLASS (This page) UNCLASSIFIED | 22. PRICE |

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