http://imagepc/fd/shemb_tools/manual230_93ver/C_ARS Asbestos Management Program.

SECTION C - ARS INDUSTRIAL HYGIENE FUNCTION

CHAPTER III - ARS ASBESTOS MANAGEMENT PROGRAM

CHAPTER III

ARS ASBESTOS MANAGEMENT PROGRAM

CONTENTS STARTING PAGE

CONTENTS (continued) STARTING PAGE

CHAPTER III - SECTION C

ARS ASBESTOS MANAGEMENT PROGRAM

A PURPOSE OF THE CHAPTER

This chapter

1 Establishes the scope of the Program.

2 Provides policy, general procedures, and outlines responsibilities for the development, implementation, and management of an Asbestos Management Program.

B APPLICABILITY

The contents of this chapter are applicable to all missions under the direction of the ARS Administrator whether accomplished by ARS personnel, cooperators, or contractors within ARS. Exceptions to the provisions of this MANUAL require Office of the Administrator approval. Waivers must be documented and copies furnished to the next higher management level. In all instances, however, program coverage consistent with the intent of the pertinent provision will be provided.

C ABBREVIATIONS

AAO - Area Administrative Officer

ACM - Asbestos Containing Material

AD - Area Director

ARS - Agricultural Research Service

ASHM - Area Safety and Health Manager

CD - Center Director

CDSO - Collateral Safety Duty Officer

CFR - Code of Federal Regulations

EPA - Environmental Protection Agency

FD - Facilities Division

LC - Location Coordinator

LD - Laboratory Director

OSHA - Occupational Safety and Health

Administration

RL - Research Leader

SHEMB - Safety, Health, and Environmental Management Branch

D DEFINITIONS

1 Asbestos - the general term used to describe six distinctive varieties of fibrous mineral silicates: Chrysotile (serpentine); crocidolite (riebeckite);

amosite (cummingtonitergrunerite); anthophyllite; tremolite; and actinolite.

D DEFINITIONS (Continued)

2 Asbestos containing material - any material or product which contains more than one (1) percent of asbestos.

3 Encapsulation - the treatment of ACM with a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent the release of fibers, as the encapsulant creates a membrane over the surface (bridging encapsulant) or penetrates the material and binds its components together (penetrating encapsulant).

4 Fiber release episode - any uncontrolled or unintentional disturbance of ACM resulting in visible emission.

5 Friable - ACM that when dry may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously nonfriable material after such previously nonfriable material becomes damaged to the extent that when dry it may be crumbled, pulverized or reduced to powder by hand pressure.

6 Operations and maintenance program - a program of work practices to maintain friable ACM in good condition, ensure clean up of asbestos fibers previously released, and prevent further release by minimizing and controlling friable ACM disturbance or damage.

E BACKGROUND

The following unusual properties of asbestos have made it useful in a variety of commercial products: 1) non-

combustibility, 2) high tensile strength, 3) high degree of thermal and noise insulation, and 4) resistance to corrosive chemicals and friction. Unfortunately, asbestos is a serious health hazard.

Inhaling asbestos fibers can cause lung disease. Diseases can be asbestosis (a serious fibrotic lung disease), lung cancer, or mesothelioma (a cancer of the lining of the chest cavity). A latency period on the order of 20 years between the first exposure to asbestos and the appearance of the disease may be

anticipated.

The government has established regulations to protect the health of the population from the dangers of asbestos. The EPA and OSHA are the agencies which ensure protection is provided.

F SCOPE

This policy applies to all ARS employees including part-time, seasonal, and temporary. This policy applies to all ARS facilities. Leased facilities, and commercial, state, or local facilities used through cooperative agreements may be exempt from requirements of General Procedures 2 through 5 below, however agreements which will provide the necessary information for protection of ARS employees health should be reached with building owner.

G POLICY

It is ARS policy to protect the health of ARS employees by limiting exposure to asbestos fibers. This policy will established the necessary procedures to provide that protection.

H GENERAL PROCEDURES

Program elements shall include the following:

1 Developing a written plan which will include:

a Methodology for conducting plan.

b Time table for completion of initial evaluation.

2 Assessing the need for corrective action.

a Conduct bulk sampling to determine the presence of asbestos.

b Evaluation of condition of asbestos present.

c Evaluation for the potential for asbestos fiber release.

d Evaluation for the potential for personal exposures to asbestos.

e Establishing the potential for future release from damage, disturbance, or erosion.

3 Ensuring Life cycle projections (changes in building use, renovation , or demolition projects) include appropriate asbestos abatement action.

4 Establishing controls based on results of the assessment. Controls may be:

a Encapsulation.

H GENERAL PROCEDURES (Continued)

b Clean-up and repair.

c Removal.

5 Establishment of an Operational and Maintenance Program.

6 Informing building occupants about the presence, location, condition, and hazards of asbestos.

I AUTHORITIES

1 Public Law 91-596, "Occupational Safety and Health Act of 1970," Section 19, "Federal Agency Safety and Health Programs and Responsibilities," December 29, 1970.

2 Public Law 99-519, "Asbestos Hazard Emergency Response Act", October 22, 1986.

3 Executive Order 12196, "Occupational Safety and Health Programs for Federal Employees," February 26,1980.

4 29 Code of Federal Regulations, Parts 1910.1001 and 1926.58, "Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules; Amendment," September 14, 1988.

5 29 Code of Federal Regulations, Part 1910.1101, Asbestos; 6.40 Code of Federal Regulations, Part 763, Asbestos in Schools.

J RESPONSIBILITIES

1 Administrator will:

a Establish the Program.

b Provide leadership in support of Program goals and policies.

2 AD's will:

a Establish the Area's Program as per this MANUAL and DIRECTIVE 230.0.

b Ensure the availability of funds and resources to implement and maintain the Program objectives.

c Assign ASHM as Asbestos Management Program Coordinator.

J RESPONSIBILITIES (Continued)

3 FD/SHEMB will:

a Establish general procedures and operating criteria for developing, implementing, and evaluating the Program.

b Provide technical advice and guidance to ARS management on methods of implementing the Program.

c Provide assistance in the implementation of this program as requested.

4 AAO's, will:

a Assist line manager in identifying and allocating necessary qualified subordinate staffing, education/training, and financial resources, to develop and manage a comprehensive and viable Asbestos Management Program.

b Provide administrative management assistance to the AD in establishing Area Program.

c Recommend actions that enable the AD to comply with the intent, purpose, and standards of this chapter.

5 Area Engineer, will:

a Ensure all potential sources of asbestos are identified for all projects designed at the Area level.

b Coordinate with ASHM.

6 ASHM's, will:

a Coordinate and provide technical oversight to the implementation of this chapter for all Area employees, cooperators, and visitors.

b Ensure that all Location programs within the Area are consistent with this chapter.

c Establish specific procedures and operating criteria in conformance with this MANUAL, to implement, manage, and evaluate the Asbestos Management Program in their Area.

J RESPONSIBILITIES (Continued)

d Provide technical advice and guidance to Location and Area office personnel on the implementation and operation of the Asbestos Management Program.

e Review and evaluate program implementation and operation at the Locations in their Area during the annual inspection.

f Maintain recordkeeping and reporting procedures consistent with ARS policy.

g Contact FD-SHEMB to obtain guidance and/or notify them if there is a spill, discharge, or other unplanned release into the environment of asbestos.

h Serve as the central location for Area's records on asbestos.

7 Area Supervisory Contract Specialist, will:

a Ensure contracts for maintenance contain language which addresses asbestos to include worker protection and operational and maintenance programs.

b Ensure contracts for building services (i.e. new phone installation, plumbing work) address asbestos.

8 ARS Supervisors, will:

a Advise employees working under their supervision of the location of asbestos in their work area.

b Notify CD's, LD's, and RL's of spills, discharges, or other unplanned releases into the environment of asbestos.

9 CEPS' and OMB Circular A-76 Contractors Providing Safety, Health, and Environmental Support, will:

a Assist manager/supervisor in the development and implementation of the Program for Location employees.

b Assist in the delivery of education/training as required by this Program.

c Assist in the identifying presence of and location of asbestos.

J RESPONSIBILITIES (Continued)

10 CDSO's, will:

a Review and evaluate the implementation and operation of the Location's Asbestos Management Program.

b Provide technical advice and guidance to Location management and employees concerning the policy and procedures of the Location's Asbestos Management Program.

11 ARS employees, will:

a Comply with all provisions of this chapter.

b Avoid handling or disturbing asbestos.

c Maintain the integrity of undamaged asbestos piping, wallboard, or other known sources of asbestos.

d Participate in information and training programs provided by ARS.

e Notify their supervisor of spills, discharges, or other unplanned releases into the environment of asbestos.

K PROGRAM DESCRIPTION

The following provisions explain the ARS Asbestos Management Program.

1 Characteristics of Asbestos

The word asbestos is derived from a Greek adjective meaning inextinguishable. Asbestos is a naturally occurring mineral. It is distinguished from other minerals by the fact that its crystals form into long, thin fibers. Deposits of asbestos are found throughout the world. The primary sites of commercial production are: Canada, the Soviet Union and South Africa. Asbestos is also mined commercially in

the United States.

Asbestos minerals are divided into two groups --serpentine and amphibole. The distinction between groups is based upon its crystalline structure -- serpentine minerals have a sheet or layered structure, amphiboles have a chain-like crystalline structure.

K PROGRAM DESCRIPTION (Continued)

Chrysotile, the only mineral in the serpentine group, is the most commonly used type of asbestos and accounts for approximately 95% of the asbestos found in buildings in the United States. Chrysotile is commonly known as "white asbestos" so named for its natural color.

Five type of asbestos are found in the amphibole group. Amosite, the second most likely type to be found in buildings, is often referred to as "brown asbestos", for its natural state of brown color.

Crocidolite, "blue asbestos", is also an amphibole. Crocidolite was utilized in high temperature insulation applications.

The remaining three types of asbestos in the amphibole group are: anthophyllite, tremolite, and actinolite. These are extremely rare, and of little

commercial value. Occasionally they are found as contaminants in asbestos containing materials.

Once extracted from the earth, asbestos containing rock is crushed, milled (ground) and graded. This

produces long , threadlike fibers of material. What actually appears as a fiber is an agglomeration of hundreds or thousands of fibers, each of which can be divided even further into invisible fibrils.

2 Uses of Asbestos

The unusual properties have made asbestos very useful in a wide variety of products. These properties are:

o Noncombustible

o High tensile strength

o Good noise absorption

o Thermal insulator

o Control Condensation

o Resistant to the effects of corrosive chemicals

o Resistant to the effects of friction

Asbestos has been used in literally hundreds of products. Collectively, these are frequently

referred to as asbestos containing material (ACM). Asbestos gained wide spread use because it is plentiful, readily available, low in cost, and because of its unique properties. Asbestos proved well-suited for many uses in the construction trades.

K PROGRAM DESCRIPTION (Continued)

One of the most common uses for asbestos is as a fireproofing material. It was sprayed on steel beams used in construction of multi-storied buildings. This application helped prevent these structural members from warping or collapsing in the event of fire. Chrysotile was the commonly used asbestos constituent in spray-on fireproofing. Asbestos comprised 5 - 95 percent of the fireproofing mixture, and was used in conjunction with materials such as vermiculite, and cellulose fibers, gypsum and a binder such as calcium carbonate. These materials are soft and may be fluffy in appearance and to the touch. They vary in color from white to dark gray, occasionally they have been painted orencapsulated with a clear or colored sealant. The material may be exposed or concealed behind a suspended ceiling. The application to structural members (beams and columns) often resulted in some material being sprayed on wall and ceilings as well. This is referred to as overspray.

Asbestos is added to a variety of building materials to enhance strength. It is found in concrete and concrete-like products. asbestos cement products generally contain up to 50 percent by weight depending on the use of the product. Asbestos cement products are used as siding and roofing shingle; as wallboard; as corrugated and flat sheets for roofing, cladding, and partitions; and as pipes. Asbestos has also been added to asphalt, vinyl and other materials to make products like roofing felts, exterior siding, floor tile, joint compounds and adhesives.

Fibers in asbestos cement, asphalt and vinyl are usually firmly bound in the cement and will be released only if the material is mechanically damaged, for example by drilling, cutting, or sanding. Roofing shingles and siding may also show slow deterioration due to weathering.

As an insulator, asbestos received wide spread use for thermal insulation and condensation control. It

was usually spray applied, trowel applied, or manually installed after prefabrication.

Asbestos proved valuable as a component of acoustical plaster. The material was applied by trowel or by spraying on ceilings and sometimes walls. It varies in color from white to gray - rarely was it painted as a noticeable loss of acoustical value occurs. Similarly as a decorative

K PROGRAM DESCRIPTION (Continued)

product, asbestos was mixed with other materials and sprayed on ceilings and walls to produce a soft, textured appearance.

3 Friable vs. Nonfriable ACM

U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA) and others distinguish between friable and nonfriable forms of ACM. Friable ACM can be "crumbled or reduced to powder by hand pressure". Nonfriable asbestos cannot be crumbled by hand. Asbestos is most dangerous in the airborne state since the respiratory system is the main target area of the human body. Other things being equal, friable ACM is thought to release fibers into the air more readily. However, many types of nonfriable ACM can also release fibers if disturbed.

4 Evidence of Health Risks

Most of the information on the health effects of exposure to asbestos have been derived from studies

of workers exposed to asbestos in the course of their occupation. Despite epidemiological studies of workers and laboratory studies of animals, questions remain about which properties of asbestos are responsible for the adverse health effects. It is not known whether the particular properties which produce one disease, for example, lung cancer, are the same as those which produce another disease, such as asbestosis.

Which conditions of exposure are most likely to lead to adverse health effects have not been positively identified. Some characteristics that appear to be important are: the physical size of fibers (long, thin fibers seem to be the most toxic) and their durability. The variation in chemical composition among different types of asbestos does not appear to be as important as difference in physical properties.

5 Diseases Associated with Asbestos Exposure

Asbestosis is a scarring (fibrosis) of the lung. The scarring impairs the elasticity of the lung tissue and hampers its ability to exchange gases. This leads to inadequate oxygen intake to the blood. The disease restricts breathing leading to decreased lung volume and it increases resistance in the airways. These last two impairments make the actual act of breathing difficult. It is a slowly

K PROGRAM DESCRIPTION (Continued)

progressive disease with a latency period of 15 - 30 years. Asbestosis is irreversible and may progress

even after exposure to asbestos has ceased. The earliest symptom of asbestosis is often coughing. As the disease progresses, shortness of breath upon exertion is noted. Changes in pulmonary function (lung function), rales (crackling sounds in the lower half of the lung), and clubbed fingers are disease markers. As the disease advances, x-rays of the chest will help demonstrate the incidence of fibrosis although a lung biopsy provides the only definitive diagnosis. Relatively high doses of exposure are needed before asbestosis is observed. While there is no cure for asbestosis, anyone suffering with the disease should be removed from further exposure as more disabling fibrosis can be prevented by eliminating further inhalation of asbestos fibers.

Lung Cancer is a malignant tumor of the bronchi covering. The tumor grows through surrounding tissue invading and often obstructing the air passages. The earliest symptom is often a persistent cough; a physical exam may attribute the symptoms to chronic bronchitis. Chest x-rays sometimes show shadows that indicate tumors and enlarged lymph nodes. However, the definitive

diagnosis of lung cancer is based upon microscopic examination of lung tissue. The time between exposure to asbestos and the occurrence of lung cancer, is 20-30 years. Although there are many causes of lung cancer, a clear increase in risk has been found among people who work with asbestos. Moreover, there is no threshold or limit of exposure below which the risk of lung cancer is not increased.

Mesothelioma is a cancer of the mesothelium, the lining of the chest or the lining of the abdominal wall. It is considered to be a marker disease for asbestos exposure. Early stages are associated with few symptoms. By the time it is diagnosed, it is

almost always fatal. Effective therapy does not exist. There is no exposure threshold for mesothelioma. This is suggested by the observation

that family members of asbestos workers have contracted mesothelioma when their only exposure was form dust brought home by the worker. Similar to other asbestos-related diseases, mesothelioma has an extended latency period of 30 - 40 years.

K PROGRAM DESCRIPTION (Continued)

Other disease and adverse health effects have been noted among the population exposed to asbestos fibers. Increased incidence of nonrespiratory cancers have been observed in some recent epidemiological studies. Cancers of the larynx, esophagus, stomach, colon-rectum, kidney and

pancreas are present at slightly higher than predicted levels. An abnormality found on x-rays of persons exposed to asbestos is pleural plaque, a fibrous thickening of the lining of the chest cavity. Pleural plaques are found in exposed workers as well as in the members of his or her family. Plaques are also found in people living near mines, shipyards, and manufacturing plants where asbestos in utilized.

6 Synergistic Relationship Between Asbestos and Smoking

Cigarette smoking is the single most important known cause of lung cancer in humans. People who smoke 20 cigarettes per day increase their risk of developing lung cancer by ten-fold (10X) when compared to the non-smoker. Workers exposed to the same level of asbestos as insulation workers historically increase their risk of developing lung cancer by five-fold (5X). These two factors working together have a synergistic effect; the smoker exposed to asbestos

fibers is a least fifty times (50X) more likely to develop lung cancer than the general public.

Lung Cancer Deaths per 100,000 Workers

NO EXPOSURE EXPOSURE

TO ASBESTOS TO ASBESTOS

Non-smoker 5 10

Smoker 60 600

7 Risk Associated with Low Level Exposure

Asbestos is known to be hazardous based on studies of asbestos workers and laboratory animals. However, the risks associated with low level, non-occupational exposure (for example, as an occupant of a building containing ACM) are not well established. Attempts have been made to estimate low level risks by extrapolation from occupational exposure data. This is not a straight forward process and its validity is questionable.

K PROGRAM DESCRIPTION (Continued)

Based on a thorough review of the health effects literature, EPA concludes there is no level of exposure below which the risks of contracting an asbestos related disease are not zero. That is there in no threshold level of exposure.

A 1984 survey sponsored by EPA attempted to assess exposure to ACM in public and commercial

buildings.

According to the data, a lower percentage of public and commercial buildings contain friable ACM than do school buildings (20% vs 35%). However, limitations in the data prevent firm conclusions regarding the number of persons exposed, exposure levels, or the exposure levels of service/maintenance workers in comparison with the public.

A mathematical model was developed by EPA to assess risk. Risk calculations suggest that if asbestos exposure is eliminated in schools, we have the potential to significantly reduce the overall risk for this segment of our population which may later be exposed to asbestos in public and commercial buildings. It should be noted however, that though the elimination of exposure in schools may reduce risk, there remains a risk as the result of exposure to asbestos elsewhere.

Asbestos fibers accumulate in the lungs. As exposure increases, the risk of disease likewise increases. Measures to minimize exposure and consequently minimize the accumulation of fibers, reduces the risk of adverse health effects.

Despite the uncertainties associated with the risk of low level exposure, if the assumption is accepted that there is no safe level of exposure to asbestos, then there is cause to institute measures to control or eliminate exposure; current regulations move in this direction.

8 Regulations

The U.S. Government has recognized the potential harmful effects of asbestos and have instituted regulations to limit occupational and non-occupational exposures to asbestos. OSHA and EPA are the two main government agencies which have promulgated regulations for the control of asbestos

exposure. Regulatory areas of concern fall into the following categories:

K PROGRAM DESCRIPTION (Continued)

- Occupational Standards
- Air Emissions
- Asbestos in School
- Commercial Use of Asbestos
- Waste Disposal

Under 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), EPA has established stringent rules to prevent the release of fibers into the air. NESHAP established no visible emissions standard for milling and manufacturing of asbestos products and demolition of

buildings. Spray application for most uses of friable materials containing more than 1% asbestos have been prohibited. Prohibitions have been extended to cover all uses of friable spray-on material as well as the no visible emissions standard to cover all friable asbestos-containing materials during demolition.

Under 40 CFR Part 763, Asbestos; Manufacture, Importation, Processing, and Distribution in commerce are prohibited. EPA under section 6 of the Toxic Substance Control Act (TSCA) prohibits, at staged intervals, the future manufacture, importation, processing, and distribution in commerce of asbestos in almost all products.

Under 29 CFR 1910 and 1926, Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; in the Final Rules OSHA has established standards for occupational exposure to asbestos and procedures for safe removal of asbestos during abatement projects. Air monitoring and personal protective equipment standards also were established.

Currently only the Asbestos Hazard Emergency Response Act (AHERA) addresses non-occupational exposure to asbestos. AHERA required EPA to promulgate rules regarding inspection of all public

and private school buildings, identification of circumstances requiring response actions, description of appropriate response actions, implementation of response actions, establishment of reinspection and periodic surveillance programs, establishment of operation and maintenance programs, preparation of management plans and transportation and disposal of waste ACM. Public schools were addressed because children would have a potential lifetime exposure to asbestos and would have greater chances to develop lung diseases.

L PROCEDURES

1 Written Plan

A written plan shall be developed which states the Area's policy on protecting employees from asbestos exposure. The plan should:

a Identify key personnel and their responsibilities.

b Establish a time table for identifying asbestos.

c State how the area will identify asbestos.

d Establish corrective actions for poor asbestos conditions.

e Develop a method of assuring appropriate personnel are notified when asbestos has been identified in constructions projects.

f Provide a central location for maintaining and disseminating information on location and condition of asbestos.

g Provide a method to train employees on:

(1) The hazards of asbestos.

(2) Procedures of working with asbestos.

h Establish an operation and maintenance program for the control of asbestos fiber release.

2 Assessing the Need for Corrective Action

Procedures as established by AHERA will be used to assure standardization of assessing the need. These procedures require an accredited building inspector

to conduct an assessment. Accreditation is obtained

by attending an EPA approved three day training course and obtaining a minimum score of 70 percent on the examination.

The accredited building inspector will conduct an inspection that involves an investigation of records for the specification of the asbestos containing building material (ACBM), an inspection of the building for suspect materials, sampling the condition and location of the ACBM and other characteristics of the building. More specifically the inspection process consists of the following steps:

L PROCEDURES (Continued)

a Review architectural and "as-built" plans, work change orders, and other records for the specification of any materials which contain asbestos.

b Inspect the building for friable materials.

c Delineate homogeneous areas and develop a sampling plan for bulk samples (or assume suspect material contains asbestos).

d Collect samples and have them analyzed for asbestos by an accredited laboratory.

e Collect information on the physical condition and location of all ACBM and on other characteristics of the building which may affect the likelihood that ACBM may be disturbed and that fibers may be released and distributed.

3 Pre-inspection Planning

The process of inspecting a facility for the presence of asbestos-containing materials is complex and involves pre-planning and cooperation. The creation of an inspection team is a first step. The team should consist of the Area Safety and Health Manager, the facilities manager or maintenance director, and the accredited inspector.

The types of buildings must be considered. Area's will have a wide variety of buildings from administrative/laboratory to warehouses. The different types of buildings will affect the ease of inspection. Inspections can range from a quick verification of a single type of suspect ACBM for a

facility renovation, to a complete investigation leading to a comprehensive management plan.

The inspection should be organized by the type of ACM, by floor, and areas within the building. An initial building walk-through will provide a general orientation. The inspection should identify surfacing material, thermal system insulation, and miscellaneous products. Knowledge of the building's layout, structural features, and mechanical systems should be used to assure a thorough inspection.

L PROCEDURES (Continued)

The laboratory should be selected during the pre-inspection planning. Only a laboratory which has interim accreditation by the EPA should be used for polarized light microscopy (the method for analyzing bulk samples) until the National Bureau of Standards develops and administers an accreditation program.

4 General Categories of Building Areas to be Inspected

a Mechanical Area

Basement/sublevel Service Areas

Boiler/Chiller Rooms

Generator Rooms

Elevator Equipment Rooms

Telephone/Electrical Rooms

Mechanical Feed Distribution Rooms

Fan Rooms

Basement

Furnace Rooms

Tunnels and Crawl Spaces

Mechanical Floors including Penthouses (which may contain the above rooms as well)

Attics

Air/Duct Shafts

http://imagepc/fd/shemb_tools/manual230_93ver/C_ARS Asbestos Management Program.

d Special Use Rooms

Kitchens

Dining Rooms

Laundries

Vaults

Athletic Facilities (e.g., pools, gyms, locker rooms)

L PROCEDURES (Continued)

5 Useful Documents for Organizing the Inspection and Recording Information

Document Use

Site Plans Provides overall perspective on the building and site.

- property lines

- location of building

- grading/drainage, etc.

Plans and specifications Provides information on:

(1) building systems,

finishes, and

construction.

(2) specifications of

ACM and substitute

materials.

Previous Inspection Should provide a starting

Reports point.

Identified ACM should be verified. Inadequate parts of the inspection should be repeated.

Abatement Records Indicate disposition of previously identified ACM. All records should be verified in the field.

Floor Plans Can be used to

(1) locate and document

suspect material

which is not sampled (misc. products).

(2) delineate homo-

geneous sampling areas.

(3) identify locations

of bulk samples.

(4) record functional

spaces.

L PROCEDURES (Continued)

6 Inspecting for Friable and Nonfriable ACM

The inspection process focuses on identifying surfacing materials, thermal system insulation and miscellaneous materials, all of which are likely to contain asbestos. The inspection process is summarized as follows:

o Assemble equipment and supplies.

o Obtain copies of the floor plans for the building or draw plans approximately to scale.

o Walk through the building starting at the lowest floor and proceed to the highest floor.

o Enter every room and utility space, including crawl spaces, to look for suspect materials. Include: mechanical rooms (boiler/chiller, generator, elevator equipment, telephone/

electrical rooms, air-handling and fan rooms, cable and equipment vaults), loading docks, attached garages,attics, air shafts and pipe chases, and special use area (laundries, kitchens and dining areas, conference rooms, and auditoriums). Also, be sure to inspect above suspended ceilings wherever observed.

o Locate any materials specified as asbestos-

containing in the construction documents.

o Test (touch) all surfaces (walls, ceilings, structural members) for friability.

o Record the location and a description of all suspect materials assumed to be ACBM.

o For all suspect materials to be sampled, identify and draw homogeneous sampling areas.

o For all friable suspect materials and thermal system insulation, identify (with an I.D. code) and locate appropriate functional spaces on the floor plans.

o Assess friable suspect material and thermal system insulation and record assessment information.

L PROCEDURES (Continued)

a Surfacing Material

Surfacing material is material that has been sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes. The

friability of a building surface (walls,

ceilings, and or other structural members) can only be determined by touch. If a powder can be generated by a hand rubbing across it, then the material is friable. It must be noted however, material that is otherwise friable may be made non-friable by painting or other methods of encapsulation. This surface must also be tested. Test the surface for friability where it may be damaged or the paint or encapsulant is thinly applied or deteriorated. If the material proves to be friable during any of these tests, then the entire surface should be considered to be friable.

All friable and most non-friable surfacing materials are suspect, which includes hard plaster (sand and smooth finish) as well as acoustical plaster. Textured paints are also suspect. Substrates to which surfacing materials are applied, such as cinder block, wood, and steel are not suspect.

b Thermal System Insulation

Thermal system insulation is material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain, or water condensation, or for other purposes. All thermal system insulation should be considered suspect unless it can be unambiguously identified as non-asbestos. Fiberglass pipe lagging has a characteristic pink or yellow color and a characteristic softness when squeezed. Fiberglass will also resume its shape after being squeezed, as opposed to corrugated asbestos paper - air cell insulation. Rubber and styrofoam can also be

distinguished from other types of insulation by their color and

texture. All block insulation on boiler and breeching, all cements and pipe-fitting muds, and all gasket materials should be considered suspect.

L PROCEDURES (Continued)

c Miscellaneous Material

Miscellaneous material is interior building material on structural components, structural members or fixtures, such as floor and ceiling tiles, and does not include surfacing material or thermal system insulation. The primary materials of concern in this category are floor and ceiling tiles. All lay-in ceiling tile and

all vinyl and asphalt floor tiles are suspect ACM. They must be sampled and analyzed or assumed to contain asbestos. Transite wallboard should also be sampled if present as well as dry wall which is a suspect material.

d Recording Information

Record all suspect materials and homogenous sampled areas on floor plans or approximately to-scale drawings. These materials are either sampled and tested for asbestos or assumed to contain asbestos.

e Physical Assessment

Various methods are used to assess the tendency of ACM found at a particular location in a building to release fibers. Some methods employ numerical scoring schemes often referred to as "algorithms" The advantage of of a numerical scheme is that scores (e.g., 1 -1000) are

automatically produced which can then be used to define the degree of hazard or potential for exposure, and the urgency for response action. Algorithms may not be reliable estimators of hazard or exposure potential because they tend to give the assessment process a false sense of precision.

Non-numerical or quasi-numerical approaches have been developed for conducting physical assessments of ACM. Most use many of the factors as the numerical scoring schemes, however, the difference is that evaluating each factor leads to a categorical outcome (e.g., present/absent, high/medium/low).

The various approaches differ primarily in how the assessment information is tabulated and displayed. The Building Inspector is responsible for correctly categorizing the ACM, the degree of damage, potential for fiber

L PROCEDURES (Continued)

release, and recommendations for corrective actions.

f Condition of the ACM

The condition of ACM is an indicator of its tendency to release asbestos. Damaged or deteriorated ACM suggests a serious loss of cohesion within the material and a subsequent release of fibers. Evidence of damage also reflects previous disturbance and a release of fibers when the disturbance occurred. The following descriptions will help determine the condition of ACM.

Deterioration - ACM may deteriorate with age as a result of either poor quality of installation or environmental influences (e.g., heat, humidity, other atmospheric contaminants). These factors affect the cohesive strength of the ACM or adhesion to the substrate (for surfacing material) or the integrity of the protective covering (for thermal insulation). Deterioration of surfacing material can result in increased dusting or fallout of material from the ACM surface, cracking, delamination (i.e., separation into layers), or adhesive failure where the material pulls away from the substrate. Hanging material or coverings and powder or debris on horizontal surfaces are evidence of deterioration.

Physical Damage - Accidental or deliberate contact with ACM can result in damage. Evidence of physical damage includes finger marks, graffiti, pieces dislodged or missing, scrape marks from movable equipment or furniture, or ripped jackets or protective coverings. Powder or debris on floors, shelves, or other horizontal surface often confirms the damage and may indicate how recently it occurred.

Water Damage - Water damage is usually caused by roof leaks (particularly in buildings with flat roofs or concrete slabs and steel beam construction) or plumbing/piping leaks. High humidity in the vicinity of pools, locker rooms,

and lavatories also can cause water damage. Water can dissolve and wash out binders in ACM causing the material to blister, delaminate, or even break loose from the surface. Water can also act to transport fibers away from the ACM. Subsequent evaporation of the water can leave a

L PROCEDURES (Continued)

dry deposit of fibers which can then be released into the air. Evidence of water damage includes stains or discolorations on the ACM or protective coverings, stains on adjacent walls or floors, buckling of floors and walls, and delamination or adhesive failure of the ACM. In some cases, the area of staining may be much smaller than the water damage itself.

Damaged or deteriorated surfaces are much more likely to release fibers when disturbed by physical contact, vibration, or air movement. Considering only the current condition of the ACM, the potential exposure is lowest for ACM in good condition, higher for ACM with moderate

damage, and highest for ACM with significant damage.

Damage classification by type of material (e.g., surfacing material and thermal system insulation) is also useful in determining what corrective actions may be needed. Typical classifications building inspectors may use follows.

g Surfacing Material

Significant Damage - ACM with one or more of the following characteristics: the surface crumbling or blistered over at least one tenth of the area if the damage is evenly distributed , or at least one quarter if the damage is localized; large areas of material hanging from the

surface, delamination or showing adhesive failure; at least one tenth of the surface water stained or heavily gouged, marred or abraded (or one quarter if the damage is localized); large accumulation of

powder, dust, or debris on surfaces beneath the ceiling or wall.

Moderate Damage - ACM with one or more of the following characteristics: up to one tenth of the surface (if the damage is evenly distributed) or up to one quarter of the surface (if the damage is localized) blistered, crumbling, water stained, or gouged, marred or

abraded; some accumulation of powder, dust or debris on surfaces beneath the ceiling or wall.

Good Condition - ACM with no visible damage or deterioration, or showing only very limited damage or deterioration.

L PROCEDURES (Continued)

h Thermal System Insulation

Significant Damage - ACM with one or more of the following characteristics: mostly missing jackets; water damaged, crushed or heavily gouged or punctured insulation on at least one tenth of pipe runs/risers if the damage is evenly distributed, or at least one quarter if the damage is localized; powder, dust, and debris on surfaces beneath pipe/boilers/tanks/etc.

Moderate Damage - ACM with one or more of the following characteristics: a few water stains or sections of missing jackets; crushed insulation or water stains, gouges,punctures, or mars on up to one

tenth of the insulation if the damage is evenly distributed, or up to one quarter if the damage is beneath pipes/boilers/tanks/etc.

Good Condition - ACM with no visible damage or deterioration, or showing only very limited damage or deterioration.

7 Asbestos Control Options

After an assessment of the building for ACM has been completed the next step is corrective/control actions. The options are do noting, enclosure, encapsulation, removal, and develop an Operation and Maintenance Program.

a Enclosure

Enclosure is the construction of airtight walls and ceilings around ACM. While no enclosure is totally airtight, the practice will greatly reduce air movement across the enclosure boundary. Precautions must be taken in the construction of enclosures to prevent unnecessary fiber releases.

Drills should be equipped with HEPA-filtered vacuums. Underlying structures must be able to support new walls and ceilings. New construction

material should be impact-resistant and assembled to be airtight. If lights are recessed into ACM, they

should be removed carefully to minimize fiber release.

Advantages of enclosure are:

L PROCEDURES (Continued)

1) Reduces exposure in area outside enclosure.

2) Initial cost may be lower.

Disadvantages of enclosure are:

3) Asbestos source remains.

4) Operations and Maintenance Program must continue.

5) Fiber release continues behind enclosure.

b Encapsulation

Encapsulation is spraying ACM with a sealant. This action is taken to reduce the rate of deterioration. The sealant should bind together the asbestos fibers and other material components and offer some resistance to damage from impact. Encapsulation should be used only on undamaged granular, cementitious material.

Damaged, delaminating, or deteriorated ACM shall not be encapsulated.

Advantages of encapsulation are:

1) Reduces asbestos fiber release from material.

2) Initial costs may be lower than for removal (average cost is approximately 75% of that for removal).

3) Does not require replacement material.

Disadvantages

4) Asbestos source remains.

5) If material is not in good condition, sealant may cause material to delaminate.

6) Operations and Maintenance Program must continue.

7) Encapsulated surfaces are difficult to remove.

L PROCEDURES (Continued)

c Removal

Removal of ACM is the only complete solution to asbestos hazards. Provided removal has been conducted in accordance with current regulations and state of the art removal techniques, the potential for personnel exposure has been eliminated.

1) Advantages of removal:

a) Eliminates asbestos source

b) Eliminates need for Operations and Maintenance Program.

2) Disadvantages of removal:

a) Replacement with substitute material may be necessary.

b) Porous substrates will require encapsulation.

c) Improper removal will create major problems.

d) Initial costs are high.

The above control options should be only performed by qualified asbestos abatement contractors. Coordination with the Area Safety and Health Manager (Asbestos Management Program Coordinator), Area Contracting Specialist, and Area Engineer will be necessary. Large projects ($100,000 or above) should be coordinated through Headquarters Safety, Contracting, and Engineering. Operational and Maintenance Programs are most suited for area level development and implementation.

8 Operations and Maintenance Program

The Operations and Maintenance (O&M) is a set of specific procedures and practices applied to building cleaning, maintenance, renovation and

general operation to maintain the building as free of asbestos contamination as possible. The O&M program extensively uses the information from the building survey.

The three primary objectives of the O&M program are:

L PROCEDURES (Continued)

o Clean up existing contamination.

o Minimize future fiber release by controlling access to ACM.

o Maintain ACM until it is eventually removed.

a Elements of the Operations and Maintenance Program

o Notification and labeling

o Training

o Employee protection and medical surveillance programs

o Specialized cleaning procedures

o Maintenance/renovation permit system

o Special work practices for maintenance activities

o Emergency response procedures

o Periodic ACM surveillance

o Recording

b Notification and Labeling

After the survey has determined the presence of ACM in the building, a notification and warning program shall be established. This program will alert affected parties to a potential hazard in the building and provide basic information on avoiding the hazard. Building occupants, employees and others who are aware of the

presence of ACM are less likely to disturb the material and cause fiber releases.

c Notifying Personnel

Two common methods of notifying personnel are:

o Distributing notices.

o Awareness training sessions.

L PROCEDURES (Continued)

Distribution of notices is an effective means of alerting building occupants about the presence of asbestos. Memos can be tailored to specific parties. Verification that notification was received can also be accomplished.

d Awareness training sessions can be designed to follow written notification. They serve to expand on relevant information while allowing attendants to raise questions. The training session should address the following:

1) What asbestos is and how it is typically used.

2) Heath effects associated with exposure.

3) What type(s) of ACM are present in the building.

4) The exact location(s) of these materials.

5) How to recognize and report damage.

6) How custodial and maintenance personnel are dealing with these materials to prevent fiber release.

7) What will be done periodically and over the long run to protect the health and safety of building occupants.

8) Name and telephone number of the person responsible for asbestos related activities at the location.

e Labeling and Signs

Warning signs shall be posted adjacent to any friable and non-friable ACBM or suspected ACBM in routine maintenance areas (such as boiler rooms). Labeling, as opposed to notification, is not intended for general information. It serves as a final line of defense to prevent unprotected individuals from disturbing ACM, or entering areas where repair or renovation activities involving ACM are underway.

Labeling is usually in the form of posted signs or notices, which are often attached directly to the ACM or at the entrance to areas where ACM is prevalent. Warning signs shall be used in conjunction with small renovation or repair work

L PROCEDURES (Continued)

that involves the disturbance of ACM. Signs shall be posted at the entrances and around the perimeter of the project and in accordance with the OSHA 29 CFR 1926.58.

f Training

Training of custodial and maintenance workers serves to establish proper awareness and understanding of work practices that are vital to the success of the program. All service personnel who work in a building that contains friable ACM must receive a two hour awareness training course. The course must include at minimum all the information outlined in the awareness training sessions above.

Service personnel who conduct any activities that will result in the disturbance of ACM must receive the two hour awareness training and 14 hours of additional instruction. The additional training should include proper cleaning techniques, appropriate practices for handling ACM, proper use of respirators and other protective equipment, and hands on training.

Maintenance workers may be required to use specialized asbestos control procedures when working around ACM. If maintenance involves the possibility of significant disturbance of ACM, workers should receive more extensive training (16 hours). This training should include:

1) Local isolation of the HVAC system.

2) Isolation of the work area from non-work areas (through the use of barriers and warning signs, etc.).

3) HEPA Vacuuming.

4) Methods to reduce fiber release.

5) Glovebag techniques for working around pipe insulation.

6) Clean-up and decontamination procedures.

7) ACM disposal.

8) Respiratory protection.

9) Medical surveillance programs.

L PROCEDURES (Continued)

Outside contractors (e.g., electrical, plumbing, and construction) shall have a complete understanding of O&M program requirements. Contractors shall provide proof of training of their personnel for working around ACM.

g Medical Surveillance Programs and Employee Protection

(1) Medical Surveillance

Asbestos Standard for the Construction Industry 29 CFR 1926.58, the OSHA Asbestos Standard for General Industry 29 CFR 1910.1001, and EPA Worker Protection Rule 40 CFR 763.120 require employees be involved in a medical surveillance program if they are exposed to at least 0.1 f/cc of asbestos (8 hour time weighted average, as measured with phase contrast microscopy) or who wear a negative pressure respirator. The O&M program may expose employees to 0.01 f/cc of asbestos or require the wearing of negative pressure respirators, therefore custodial and maintenance workers could be enrolled in a medical surveillance program.

The purpose of the medical surveillance program is to establish fitness of employees to wear negative pressure respirators, to establish a cardiopulmonary system baseline, and to detect any changes to the system which may have resulted from exposure to asbestos. The baseline is needed as a reference point

to which detected changes can be compared.

Examinations shall be performed by or under the supervision of a licensed physician. The examinations will be provided at no cost to the employee. The medical examinations shall be provided prior to assignment in an area where negative pressure respirators are worn.

The examination shall be given annually unless the examining physician determines

a need for more frequent examinations. An employee can be exempted from the initial examination if it can be documented such

examination has been provided within the

L PROCEDURES (Continued)

last 12 months. Completion of OSHA required questionnaire forms shall be included in the documentation of examinations.

Each examination must include at a minimum:

o A medical and work history with special emphasis on pulmonary, cardiovascular, and gastrointestinal system.

o A physical examination directed to the pulmonary and gastrointestinal systems.

o A pulmonary function test of vital capacity (FVC) and forced expiratory volume at one second (FEV).

The examining physician also may require other tests as part of the medical examination. Chest x-rays can be administered at the discretion of the physician, however, it is recommended during the initial examination to establish a baseline.

The physician shall provide a written opinion which shall include :

o The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at increased risk of material heath impairment from exposure to asbestos.

o Any recommended limitations on the employee or on the use of personal protective equipment such as respirators.

o A statement that the employee has been informed by the physician of the

results of the medical examination and of any medical conditions that may result from asbestos exposure.

L PROCEDURES (Continued)

The physician shall limit the written opinion to only findings or diagnoses related to occupational exposure to asbestos. The employee shall be provided a copy of the physician's written opinion within 30 days of its receipt.

h Respirators

When respirators are deemed necessary they shall be provided at no cost to the employee. Selection shall be in accordance with appropriate OSHA Asbestos Standard for the Construction Industry 29 CFR 1926.58, the OSHA Asbestos Standard for General Industry 29 CFR 1910.1001, and EPA Worker Protection Rule 40 CFR 763.120, and in accordance with the table below:

Airborne Concentration of

Asbestos, tremolite, Required Respirator

Anthophylite, actionlite, or

a combination of these minerals

Not in excess of 2 f/cc 1. Half-mask air-purifying

(10 x PEL) respirator equipped with high-efficiency filters.

Not in excess of 10 f/cc 1. Full facepiece air

(50 x PEL) purifying respirator equipped with high efficiency filters.

Not in excess of 20 f/cc 1. Any powered air purifying

(100 x PEL) respirator equipped with high efficiency filters.

2. Any supplied-air respirator operated in continuous flow mode.

Not in excess of 200 f/cc 1. Full facepiece supplied

(1000 x PEL) air respirator operated in pressure demand mode.

Greater than 200 f/cc 1. Full facepiece supplied

(>1,000 x PEL) air respirator operated or unknown concentrations in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

L PROCEDURES (Continued)

Note: a. Respirators assigned for higher environmental concentrations may be used at lower concentrations. b. A high-efficiency filter means a filter that is at least 99.97 percent efficient against momo-dispersed particles of 0.3 micronmeters in diameter or larger.

A respirator program shall be implemented when respirators are used. This program shall be in accordance with 29 CFR 1910.134(b),(d), and (f).

Requirements for a minimal acceptable program are as follows:

(1) Written standard operation procedures which establish the selection and use of respirators.

(2) Respirators shall be selected based on exposure hazard.

(3) Instructions on proper use of respirators and their limitations must be provided to the wearer.

(4) Respirators shall be regularly cleaned and disinfected.

(5) Respirators shall be stored in a convenient, clean, and sanitary location.

(6) Routine inspection during cleaning to replace worn or deteriorated parts.

(7) Appropriate surveillance of work area conditions.

(8) Medical determination of fitness to wear a respirator.

(9) Only respirators that have been approved by Department of Mines or National Institute of Occupational Health shall be considered for selection.

WARNING:

SINGLE USE DISPOSABLE RESPIRATORS (I.E.,SURGICAL MASK SHALL NOT BE USED FOR ANY ASBESTOS WORK.

L PROCEDURES (Continued)

i Protective Clothing

Protective clothing is worn to keep gross amounts of asbestos containing debris off the body. Protective clothing, along with showers will also decrease the chance of removing

asbestos contamination outside the work area and into non-contaminated areas. Protective clothing usually consist of disposable impervious coveralls, foot, and head covering. Single piece suits, those with the foot and head covering attached, are preferred because it eliminates the need for taping them on the body. Gloves and goggles (if half-mask respirators are used) should also be worn.

9 Specialized Cleaning Procedures

Cleaning up existing asbestos contamination is a prime objective of an O&M Program. Specialized equipment and procedures must be used to prevent spread of asbestos contamination. Dry brooms, mop, dust cloths and standard vacuum cleaners can not be used because these re-suspend fibers back into the air.

Workers in proper protective clothing, i.e., respirators with HEPA filters and disposable suits, should use a combination of wet mopping/wiping and vacuuming to clean all surfaces within the building. The vacuum shall be equipped with HEPA filters and meet OSHA and EPA safety standards for the control of asbestos.

Walls, non-carpeted floors, light fixtures, equipment housings, the exterior of air handling ducts, and other surfaces shall be cleaned using mops and/or dust cloths and rags that are wetted with amended water. Amended water is a mixture of water and a non-sudsing surfactant. Carpets and other irregular surfaces such as curtains, books, furniture shall be HEPA vacuumed.

Periodic or routine cleaning shall be instituted after the initial cleaning and need not be as detailed as the initial. It can be conducted on a as needed basis or may be scheduled depending on the condition of the ACM. Surfaces shall be wet wiped/mopped with amended water or HEPA vacuumed. Workers shall wear respirators and protective suits.

L PROCEDURES (Continued)

10 Maintenance/Renovation Permit System

The prevention of fiber release is the most effective method for controlling re-contamination after an area has been cleaned. Uncontrolled maintenance and renovation operations can be responsible for fiber release episodes. Establishing a permit system for work orders or request can be an effective

method of fiber release prevention.

The work orders or request would be channeled through a designated person responsible for asbestos abatement at the location. The designated person would check the initial or subsequent asbestos survey reports of the building for possible disturbance of ACM. The designated person shall also

perform an onsite survey to ensure validity and accuracy of the report.

If the project would not disturb ACM, the work order would be approved and work could proceed. Projects which would disturb ACM would be halted until preventive measures have been developed and thoroughly explained to the worker(s) performing the project. Preventive measures may be removal of the asbestos prior to start of the job, isolation of the ACM by enclosure or other methods, or using wet methods of working. Workers shall always be fitted

with proper personal protective equipment (respirators and suits) when performing work on ACM.

11 Special Work Practices for Maintenance Activities

After the permit has been approved, work on ACM shall be conducted following the procedures below:

o If possible work should be scheduled after normal working hours (nights or weekends). If this is not possible the work area should have restricted assess. Doors, except emergency doors, should be locked from the inside and signs posted to prevent unauthorized entry. The signs should read "MAINTENANCE WORK IN PROGRESS, DO NOT ENTER".

o The air handling system should be shut/cut off or modified to prevent unnecessary movement of air into the area or the release of fibers outside the area.

o A 6-mil plastic dropcloth shall be placed underneath the work area.

L PROCEDURES (Continued)

o The ACM surrounding the maintenance work shall be lightly misted with amended water. A mister that produces a very fine mist shall be used. Ensure electrical systems in the spray area are shut off at the circuit breaker.

o After completion of the maintenance work the fixtures and surrounding area shall be wiped with a damp cloth. HEPA vacuum the dropcloth and surrounding area. The dropcloth shall also be wet wiped with amended water.

o Workers shall be using HEPA-vacuum respirators and protective clothing at the work site prior to removal.

o All debris, dropcloth, disposable suits, and filters shall be disposed of as asbestos contaminated waste.

12 Emergency Response

The presence of ACM debris on the floor, water or physical damage to the ACM, or other signs may indicate the release of asbestos fibers. A fiber release episode may occur despite specific preventive actions.

Employees shall be informed on what constitutes a fiber release incident and how to report such an incident during their awareness training.

Pre-planning for such an incident is a must. Correct response is needed to contain the spread of ACM

debris, clean-up the debris, and repair or remove source of ACM.

Emergency planning shall indicate if response will be from in-house personnel or from an outside contractor. A determining factor in this decision is the availability of trained in-house personnel.

If a trained personnel pool is not available then local abatement contractors shall be identified for response action.

Initial response steps to take on site should include:

o Isolation of the area as soon as possible after the debris is discovered. If possible, doors should be sealed to prevent entry into the area. Signs should be posted which state ("DANGER

L PROCEDURES (Continued)

ASBESTOS; CANCER AND LUNG DISEASE HAZARD; AUTHORIZED PERSONNEL ONLY; RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA").

o The air-handling system for that area should be shut off or modified to prevent the further disturbance of the debris. Door windows and air registers should be sealed with 6-mil plastic sheets and tape.

o Personnel shall be removed from the immediate area for minor episodes; minor being less than three linear feet of pipe insulation or three square feet of surfacing material. Major episodes, those of greater than three linear

feet or square feet, may require removal of personnel from an entire floor.

Minimum corrective requirements to be conducted involve the steps above and as follows:

Minor Episodes (Less than three linear feet or three square feet)

o Extreme care shall be taken to prevent the disturbance of dry ACM. Workers shall saturate the debris with amended water using a mister with very fine spray. An alternative is to use a HEPA vacuum for clean-up of debris, then wet wipe/mop with amended water.

o The debris shall be placed in 6 mil plastic bags for disposal as asbestos waste.

o The damaged ACM shall be repaired with asbestos free materials or sealed with an encapsulant.

Major Episode (Greater than three linear feet or three square feet)

o Procedures of a large scale abatement project shall be followed. Containment barriers of at least 4 mil plastic shall be constructed around the area in conjunction with negative pressure ventilation systems.

o Air monitoring shall be conducted during clean up. Air sampling shall also be conducted to ensure area is "clean" from asbestos prior to removing barriers and reoccupation.

L PROCEDURES (Continued)

o Workers shall wear self contained breathing apparatus (SCBA) or "type C" respirators in addition to protective clothing.

o Repairs shall be made with the barriers in place. Asbestos free materials shall be used. Spray encapsulation may be required.

o Decontamination of the entire floor or effected area of the building may require cleaning with HEPA vacuums and wet mopping/wiping with amended water.

o The filters of the ventilation system shall be replaced. Depending on air sample results and other factors related to the fiber release episode (amount, condition prior to incident, or

location in the building) it may be necessary to decontaminate the ventilation system.

Documentation shall be prepared and maintained for each fiber release episode. At minimum each report shall include the following:

o Location, building room numbers.

o Who reported the episode.

o Description of the episode.

o Description of the clean-up.

o Sample results.

In addition all sample reports shall be maintained with the release episode report.

13 Periodic Surveillance

A schedule shall be established for reinspecting previously identified ACM. Reinspection shall be conducted at least annually or more frequently if ACM condition was identified as poor. The initial

report and all additions to the report shall be reviewed and used for the reinspection. Corrections and additions shall be recorded and maintained.

The reinspection is necessary to reevaluate the condition of ACM. The condition of ACM determines what corrective actions may be required. If dust is found under the ACM then recleaning is required. ACM that has greatly deteriorated will require some

L PROCEDURES (Continued)

type of corrective action such as enclosure or may require immediate removal.

14 Recordkeeping

Asbestos documentation shall be maintained at the location and at a central location for each area. Asbestos documentation shall include:

o The written plan

o Survey data

o Copies of notification and warning programs

o Descriptions, time, dates, and attendants of training programs

o Written respiratory plan

o Copies of all work permits and documentation of maintenance and renovation work

o Copies of emergency responses and corrective action

Medical records shall be maintained for each employee who received a physical for working with asbestos. Copies of exposure data and sample analysis shall also be included in medical records. Records shall be maintained indefinitely due to the long latency of asbestos disease.

15 Reserved.

M EXHIBITS

1 Glossay

2 Medical Questionnaires

a Part 1 - Initial Medical Questionnaire

b Part 2 - Periodic Medical Questionnaire