System Safety: Occupational Safety & Environmental Management

ASBESTOS CONTROL AND HANDLING PROGRAM #3004

ASBESTOS CONTROL AND HANDLING PROGRAM DELIVERABLES AND DUE DATES	**Current Revision: 3**
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1 PURPOSE

This program is intended to serve as a guide for all SEPTA personnel to help them understand the protocols for managing ACM on SEPTA property. The age of SEPTA's infrastructure provides an environment where building materials are prone to the presence of Asbestos Containing Material (ACM). The City of Philadelphia defines ACM as containing greater than 0.7% asbestos by weight while the U.S. Environmental Protection Agency (EPA) defines ACM as containing greater than 1% asbestos by weight. The EPA also distinguishes between friable and non-friable asbestos. Friable means the material, when dry, can be crumbled, pulverized or reduced to powder by hand pressure. The mere presence of ACM should not be considered a major problem as long as it is maintained in good condition and remains undamaged. However, it is important that care be taken to properly manage, protect and maintain any ACM on SEPTA property. Determining the presence of ACM at the planning/design stage of a project is critical for the proper handling of the ACM in a cost effective manner while maintaining compliance with all applicable regulations.

1.1 HISTORY 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 the crystalline structure forms long, thin, separable fibers. Natural geologic deposits are found throughout the world, including the United States. Asbestos is divided into two groups that include a total of six primary sub-classifications. The three most common sub-classifications are Chrysotile (white), Amosite (brown) and Crocidolite (Blue). Asbestos has been used in over 3000 commercial products and it gained widespread use due to it being plentiful, readily available, low in cost and because it possessed unique properties. These properties included fire resistance, high tensile strength, resistance to chemical and heat degradation, poor electrical conductivity and acoustical properties. Asbestos use peaked in the period from World War II into the 1970's.

In 1973, the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) was established and this regulation prohibited the use of several major kinds of asbestos materials, such as spray applied fire proofing, pipe and boiler insulation and acoustical surfacing material. In 1989, the EPA under Toxic Substances Control Act (TSCA) promulgated the Asbestos Ban and Phaseout Rule. The rule applied to the manufacture, importation, processing, or distribution in commerce of ACM and essentially would have banned all the remaining ACMs in the United States. Unfortunately, in 1991 this rule was vacated and remanded by the U.S. Fifth Circuit Court of Appeals. Today, besides the materials that were banned by NESHAP, new products and some types of paper products, asbestos can be found many products that are commercially available to the public.

1.2 HEALTH HAZARDS OF ASBESTOS

Asbestos-related diseases are caused by the inhalation or ingestion of asbestos fibers. Exposure to asbestos may occur at work, in the worker's home or non-occupational, environmental exposure. Exposure can occur when asbestos fibers become airborne if the ACM is damaged or disturbed. Disease symptoms may take from several years to forty years to develop following the initial exposure event; this is called the latency period. If you are concerned about possible exposure, consult a physician who specializes in lung diseases (Pulmonologist).

There are three of the major health effects associated with asbestos exposure includes:

- **Asbestosis** – Asbestosis is a serious, progressive, long-term non-cancerous disease of the lungs. It is caused by inhaling asbestos fibers that irritate lung tissues and cause the tissues to scar. The scarring makes it hard for oxygen to get into the blood (respiration). Symptoms of asbestosis include shortness of breath and a dry, crackling sound in the lungs while inhaling. The latency period is 10-20 years and there is no effective treatment for asbestosis.

- **Lung Cancer** – Lung cancer forms in tissues of the lung and is usually found in the cells lining air passages. People who work in the mining, milling, manufacturing of asbestos, and those who use asbestos and its products are more likely to develop lung cancer than the general population. The most common symptoms of lung cancer are coughing and a change in breathing. Other symptoms include shortness of breath, persistent chest pains, hoarseness, and anemia. Smoking increases the risk of developing illness from asbestos exposure. A smoker has a 50 to 90% greater risk of developing lung cancer then a non-smoker. Smoking appears to increase the retention of asbestos fibers and often results in a faster progression of the disease. The latency period is 20-30 years.

- **Mesothelioma** – Mesothelioma is the rarest form of cancer that is found in the thin lining (membrane) of the lung, chest, abdomen, and heart and almost all cases are linked to exposure to asbestos. The most common symptoms are painful coughing, shortness of breath, unusual lumps of tissue under the skin on the chest, and unexplained weight loss. The latency period is 30-40 years. This is why great efforts are being made to prevent school children from being exposed.

Other health effects associated with asbestos exposure includes:

- **Pleural Plaques -** Pleural Plaques are non-cancerous and can develop on both layers of the pleura, a thin membrane that surrounds the lungs and aids in breathing. The presence of the plaques only indicates exposure to asbestos. Generally pleural plaques do not produce symptoms with the exception of some decreased lung capacity. The latency period is 20–40 years.

- **Asbestos warts -** Asbestos warts are caused when the sharp fibers lodge in the skin and are overgrown causing benign callus-like growths.

- **Gastrointestinal Cancers -** Gastrointestinal cancers are a collective term for cancers that affect the gastrointestinal tract. Asbestos can be found naturally in some drinkable water,

including water from natural sources. Some studies have shown that these cancers can possibly develop from ingesting asbestos fibers. The most common symptoms are abdominal pain and discomfort, nausea, constipation or diarrhea, and weakness and fatigue. The latency period is ten or more years.

1.3 COMMON MATERIALS CONTAINING ACM

Asbestos Containing Materials (ACM) – ACM is a material which contains more than 1% asbestos by weight. The only way to identify ACM is through laboratory analysis. There are two analytical methods used to identify the presence asbestos in bulk samples: polarized light microscopy (PLM) and Transmission Electron Microscopy (TEM). The analytical methods to identify the presence of asbestos in air samples are: phase contrast microscopy (PCM) and Transmission Electron Microscopy (TEM).

Asbestos has been commonly used as an acoustic insulator, thermal insulation, automotive products, fire proofing and in other building materials. The most common materials that have been known to contain asbestos on SEPTA property are as follows:

Asbestos-cement boards (Transite)	Roof materials	Wall and ceiling plaster	Asbestos-cement shingles
Transite Conduits and piping	Floor tile and mastic	Cable insulation	Electrical insulation coatings
Boiler insulation (TSI)	Pipe insulation	Linoleum flooring and glue	Fire doors

2 SCOPE

Reserved.

3 RESPONSIBILITY

In accordance with the Authority's Safety Awareness & Environmental Protection Policy (March 1, 2005), it is every employee's responsibility to comply with this program and all applicable environmental regulations. That being said, different employees within the organization will have specific rolls and responsibilities to ensure that the Authority's interest and Employee's safety is being properly represented.

3.1 System Safety

The System Safety Division will serve as the Authority's internal consultant providing guidance and education to employees regarding the proper handling, protection, abatement and disposal of ACM. Any matter pertaining to asbestos must include System Safety at the earliest point of the project as possible. This will include all construction and design projects as well as any planned renovation or maintenance projects. System Safety is available to test suspect materials for the presence of asbestos and maintains records of previous surveys, testing and abatement projects performed on SEPTA properties. System Safety provides oversight on abatement projects and acts as liaison between all departments, unions and regulatory agencies for asbestos issues.

3.2 Management

System Safety is available to educate managers and building occupants on the presence and management of asbestos at facilities known to contain ACM. Managers are responsible for properly protecting any known ACM and preventing the unplanned damage or destruction of ACM. It is important to remember that the mere presence of ACM should not be considered a major concern as long as it is maintained in good condition and remains intact and undamaged. Managers must not attempt to handle, disturb or remove any material(s) that are known to contain ACM unless they are properly trained. Managers must communicate and coordinate with System Safety to insure that proper steps are taken when managing ACM.

3.3 Project Managers / Construction Managers

System Safety must be involved in projects at a very early stage in the planning process. The project staff should work with System Safety to determine if there is any asbestos present within their project boundaries. If ACM is identified through a survey or previous documented reports, System Safety will work with the project staff to schedule the appropriate work. Charge numbers for each project must be supplied to System Safety in order to pay for the appropriate services or work can be included within the project's contract. Sometimes even with the best efforts, unknown ACM is discovered during demolition stage of the project or when the scope of work changes after the initial design/planning phase. It may be necessary to stop work until suspect materials are analyzed and properly handled. Contact System Safety if you have concerns about suspect material.

3.4 Employees

Employees who have knowledge of damaged ACM should contact their manager immediately. No one should attempt to clean up ACM without proper training and equipment.

3.5 Medical Surveillance X-Ray Program

SEPTA Provides chest x-rays to all employees who are or may have been exposed to asbestos at or above the PEL. Employees at SEPTA have not had this kind of exposure to asbestos since the mid-1980's. Employees who have had documented exposure are offered chest x-rays through SEPTA Medical Department.

SEPTA also provides annual respirator fit testing, training on the care and maintenance of the respirator, and pulmonary function testing for all personnel who work with asbestos and for any employee required to wear a respirator.

4 REGULATORY REQUIREMENTS

For the purpose of establishing a program that insures full compliance with State and Federal regulations, the following publications are adopted for reference. At a minimum, compliance with the requirements of the referenced regulations and SEPTA Safety Programs is mandatory.

4.1 EPA

The United States Environmental Protection Agency (EPA) primary mission is to protect human health and the environment. The EPA also has two different asbestos regulations that govern asbestos:

4.1.1 The Clean Air Act (CAA) of 1970

- 40 CFR Part 61 Subpart M, National Emissions Standards for Hazardous Air Pollutants (NESHAP)
- 40 CFR 763, Subpart G, USEPA Workers Protection Rule

NESHAP establishes work practices to minimize release of asbestos fibers during activities involving processing, handling and disposal of asbestos when a building is being demolished or renovated. The NESHAP regulation divides asbestos into three categories:

a. Friable ACM– any material containing more than 1% asbestos by weight and that can be crumbled, pulverized or reduced to powder by hand pressure when dry.
b. Category I – Non Friable ACM containing packings, gaskets, resilient floor covering and asphalt roofing products.
c. Category II – Non Friable ACM of any material excluding those in Category I such as transite.

The NESHAP thresholds are 260 linear feet of pipe or 160 square feet of surface material.

4.1.2 Toxic Substances Control Act (TSCA) of 1976

TSCA regulates all the toxic substance, asbestos being one of these substances. In 1986, the Asbestos Hazard Emergency Response Act (AHERA) was added to TSCA to control asbestos in public and private schools. In 1990, EPA enacted Asbestos School Hazard Abatement Reauthorization Act (ASHARA) for Public and Commercial Buildings**.** Unlike AHERA**,** ASHARA does not require building owners to conduct inspections for ACM in public and commercial buildings**.** However should the owner decide to conduct an inspection, an accredited inspector MUST be used. Prior to renovation and demolition projects, buildings MUST be inspected by an accredited Asbestos Inspector. Should the owner develop specifications for asbestos abatement the specification MUST be written by an accredited Asbestos Project Designer.

4.2 OSHA

The Occupational Safety and Health Administration (OSHA)'s , mission is to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance. OSHA regulates the protection of workers around asbestos under the follow sections.

- 29 CFR 1910.1001, OSHA General Industry Standard for Asbestos

- 29 CFR 1926.58, OSHA Construction Standard, Asbestos, Tremolite, Anthophyllite, and Actinolite. Specific reference is made to Appendix G, Work Practices and Engineering Controls for Small Scale, Short Duration Asbestos Renovation and Maintenance Activities.

Section 29 CFR 1926.1101 of the standard is the primary section covering most of the requirements. The standard for the construction industry regulates asbestos exposure for the following activities:

- Demolition or salvaging structures
- Abatement (Removal or encapsulation)

- Construction, alteration, repair, maintenance or renovation of asbestos or substrates
- Installation of products containing asbestos
- Asbestos spill/emergency cleanup
- Transportation, disposal, storage, containment of and housekeeping activities involving asbestos or products containing asbestos, on the site or location at which construction activities are performed.

The Standard defines four specific types of Work Classifications.

- Class I: Removal of asbestos-containing thermal system insulation (TSI) and surfacing materials.
- Class II: Removal of other asbestos-containing materials that is not TSI.
- Class III: Maintenance and repair of TSI and surfacing materials.
- Class IV: Maintenance/custodial work involving contact but does not disturb ACM and activities to clean up dust, waste and debris.

The standard defines the Permissible Exposure Limit (PEL) and Excursion Limit (EL)

- PEL 0.1 fiber per cubic centimeter (f/cc) (8-hour time weighted average)
- EL 1.0 f/cc (maximum concentration in a 30-minute period)

And provides indication on how to assess for exposures via

- Initial Exposure Assessment
- Negative Exposure Assessment
- Periodic Exposure (OSHA monitoring)

The standard also requires Medical surveillance be provided to employees performing Class I, II or III work for more than 30 days per year, or any employees exposed at or above the PEL or EL.

4.3 PADEP

The Pennsylvania Department of Environmental Protection (PADEP) regulates the removal, collection, transportation and disposal of asbestos-containing materials (ACM). The PADEP air quality program has adopted and enforces the EPA 40 CFR Part 61 Subpart M, the Asbestos NESHAP regulations, as amended on November 20, 1990. Should a project be subject to the NESHAP regulations, a minimum ten-day notification of the project is required to be made to both EPA and PADEP. The EPA and PADEP do not regulate the removal of ACM from private residences unless the residence is an apartment with five or more units.

State regulations stipulate that it is illegal for anyone to engage in any asbestos occupation (worker, supervisor, project designer, inspector, management planner or contractor) without proper certification from the PA DLI. These requirements, along with a five-day notification prior to the start of any abatement or demolition/renovation project where regulated ACM is present, are outlined in the Pennsylvania Asbestos Occupations Accreditation and Certification Act of 1990

(Acts 194 and 161). Additional regulations exist for the demolition or renovation of any building containing ACM in Philadelphia and Allegheny Counties.

4.4 AMS

The City of Philadelphia Department of Public Health, Air Management Services (AMS) Division, Asbestos Control Unit (ACU), regulates all asbestos related activities for any project located within the City of Philadelphia. The ACU enforces the Philadelphia Asbestos Control Regulation, all applicable state and federal regulations, and responds to all questions, complaints, and certification/licensing inquiries. Projects involving abatement of friable asbestos or non-friable material which will be rendered friable by the method of removal must meet the requirements of the Asbestos Control Regulations enforced by AMS. Similar to NESHAP the City of Philadelphia License and Inspection (L&I) will not issue a demolition permit for a partial or complete demolition of a building if an Asbestos Inspection Report (AIR) is not attached. This report MUST be prepared by a City of Philadelphia licensed Asbestos Investigator.

5 SAFETY/PERSONAL PROTECTIVE EQUIPMENT

Reserved. See section 7.1.1.1.

6 FREQUENCY OF CONDUCT

NA

7 PROCEDURE

7.1 Management Of Identified ACM

7.1.1 Friable ACM

Friable ACM is found in surfacing material such as plaster and thermal system insulation such as pipe insulation and boiler insulation. Personnel working on or around these materials must exercise extreme caution so that the material is not damaged. If the ACM is damaged then only a licensed abatement contractor can remove the ACM.

7.1.1.1 Abatement of Friable Materials

The abatement of asbestos containing materials is highly regulated and must be conducted by licensed professionals. Abatement workers can remove ACM using several types of methods depending on the size of the removal area. Glove bags and mini containments can be used for smaller projects, while larger projects require full containment and decontamination chambers with shower facilities for the workers. The area inside the containment is put under negative pressure by means of negative air machines with three filters including a HEPA filter. The abatement workers are also required to don proper personal protection equipment (PPE) including respiratory protection. In occupied areas, the City of Philadelphia also requires an eight foot high 3/8 inch plywood wall to separate the work area. The work area is off limits to anyone who does not have the appropriate licenses and appropriate protection.

7.1.2 Non- Friable ACM

Category I and Category II Non–friable ACM such as gaskets, resilient flooring (floor tile or sheeting), roofing materials and transite are not regulated materials unless the materials are rendered friable. The acts of grinding, sanding, drilling or cutting by mechanical means will render these materials friable.

7.1.2.1 Abatement of Non-Friable Materials

Removal of non-friable ACM is not regulated as long as the material remains non friable. For large scale Capital projects, System Safety recommends air monitoring during the removal activities of non-friable materials to insure that the material did not become airborne during these activities and potential violate the NESHAP regulations.

7.2 Air Monitoring Requirements

Third party air monitoring is required for all abatement projects on SEPTA property. The air monitoring firm conducting this work cannot be affiliated with the abatement contractor. Air monitoring is conducted at three stages in the abatement process: prior to the start of the project to establish background data; during the abatement (project samples); and at the conclusion of the abatement activities (clearance samples). During the abatement process air monitoring is conducted outside and inside of the containment. Clearance samples are collected when the abatement is complete and a through visual inspection is conducted by the licensed API or Building Inspector. This air monitoring and inspection is conducted to insure that the abatement contractor has thoroughly cleaned and removed all the ACM within the work area thus allowing for containment to be removed. If the clearance samples fail the regulated level, it is the abatement contractor's responsibility to re-clean the entire area at no additional cost to SEPTA. A second type of air monitoring is also conducted in the breathing zone of the asbestos workers to determine the proper level of respiratory protection. This an OSHA requirement and is the contractor's responsibility and should not be confused with the third party air monitoring.

7.3 Third Party Construction

If a project will require the contractor to perform the removal of any asbestos containing material it is important that the project documents not only identify the presence of the asbestos but the documents must also indicate SEPTA's intent to have the material removed. The type of material, the location of the material and its friable or non-friable status will ultimately determine how detailed the contract documents need to be to inform the contractor of SEPTA's requirements. System Safety is available to will work with the project staff to provide guidance with this stage of the process.

In addition to the incorporation of a specification it is important that the documents require the contractor to provide an Asbestos Abatement Plan and a Site Specific Health and Safety Plan (HASP) as part of the project submittals. This plan shall include the contractor's means and methods for the removal of asbestos, the methods to protect the workers, SEPTA employees and building occupants, the public and the environment, the disposal of the material and the notification of the abatement to the State or City. This plan must be submitted prior to the start of work (minimum of three weeks) and should be submitted to System Safety as part of the internal review process.

Third party air monitoring is required for all abatement projects, regardless of the type of ACM on SEPTA property. Air monitoring results shall be read onsite when applicable or shall have a minimum turnaround time of 24 hours. The daily results shall be submitted to System Safety for record and a

record of results shall be kept onsite for the duration of the project. This requirement should not be confused with OSHA sampling.

7.4 Disposing Of ACM Waste

Friable ACM must be disposed of in accordance with Federal, State and local regulations and at an EPA approved land fill. The requirements are, the material must be properly wetted, properly packaged and the waste hauler must provide a waste manifest. The abatement contractor must provide SEPTA with a copy of the waste manifest within 30 days of disposal and it must be fully completed.

Non friable ACM may be disposed as construction debris. The land fill must be notified that the debris contains non-friable ACM. Many abatement contractors dispose of non-friable ACM as friable ACM that has the potential to become friable during the disposal process.