Environmental Health & Safety Muncie, IN 47306	**Asbestos Awareness Program**

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A. Purpose and Policy

The purpose of this program is to provide information about asbestos, potential health effects associated with exposure, safety procedures that should be followed to reduce exposure, training, and establish responsibility for the program.

Ball State University is committed to the responsibility of providing a work environment that is free from recognized hazards for its employees. Consistent with this duty is the Asbestos Awareness Program, which has been drafted by the Environmental Health and Safety (EHS) Office. The Asbestos Awareness Program will be evaluated and updated on an as needed basis. This program will be made readily available to employees, union representatives, and any individual representing the Occupational Safety and Health Administration (OSHA).

B. Introduction and Scope

The word asbestos is derived from a Greek word that means inextinguishable or indestructible. Asbestos is a naturally occurring mineral that is found throughout the United States and world. Major deposits; however, are found primarily in the U.S., Canada, Russia, and South Africa. Asbestos has several characteristics that make it desirable for many commercial uses. The fibers are extremely strong, flexible, and very resistant to heat, chemicals, and corrosion. Asbestos is also an excellent insulator, and the fibers can be spun, woven, bonded into other materials, or pressed to form paper products. For these reasons and because it is relatively inexpensive, asbestos has been widely used for many years and now is found in over three thousand (3,000) different commercial products.

Exposure to asbestos fibers can cause serious health risks. The major risks from asbestos come from inhaling the fibers. Asbestos is composed of long silky fibers that contain hundreds of thousands of smaller fibers. These fibers can be subdivided further into microscopic filaments that will float in the air for hours or even several days. Asbestos fibers can easily penetrate body tissues by inhalation most common and by ingestion through the mouth. Once inside the body, the fibers can cause disabling and fatal diseases after prolonged exposure.

Although exposure to asbestos is potentially hazardous, health risks can be minimized by understanding and taking simple but effective precautions. In most cases the fibers are released only if the asbestos containing materials (ACM) is disturbed. Intact and undisturbed asbestos materials do not pose a health risk and should be left alone by un-trained employees. The mere presence of asbestos does not mean that the health of occupants is endangered.

When ACM is properly managed, release of fibers into the air is prevented or greatly minimized, and the risk of asbestos related disease can be reduced to a negligible level. However, asbestos materials can become hazardous when they release fibers into the air due to damage, disturbance, or deterioration over long periods of time.

The ability for employees to recognize the kinds of materials that contain asbestos is very important to minimizing exposure incidents. Additionally, knowing under what conditions they are dangerous, and understanding basic safety precautions are all important in keeping exposures to a minimum.

C. Definitions

Asbestos – means an asbestiform variety of the following: Chrysotile, Crocidolite, Amosite, Anthophyllite, Tremolite, Actinolite

Asbestos containing material (ACM) – means asbestos or any material containing more than one percent (1%) asbestos as determined using methods specified in 40 CFR 763, Subpart E, Appendix E, Section I, Polarized Light Microscopy (PLM), including Category I and Category II asbestos containing material and all friable material.

Category I non-friable asbestos containing material – means asbestos containing packing's, gaskets, resilient floor coverings, and asphalt roofing products containing more than one percent (1%) asbestos by using PLM analysis.

Category II non-friable asbestos containing material – means any material, excluding Category I non-friable ACM containing more than one percent (1%) asbestos as determined by PLM analysis that when dry cannot be crumbled, pulverized, or reduced to powder by either hand pressure or mechanical forces reasonably expected to act on the material.

Friable asbestos material – means any material containing more than one percent (1%) asbestos as determined by PLM analysis that when dry can be crumbled, pulverized, or reduced to powder either by hand pressure or mechanical forces reasonably expected to act on the material.

HEPA filter – means a high efficiency particulate air filter capable of trapping and retaining at least ninety-nine and ninety-seven hundredths percent (99.97%) of all mono-dispersed particles of three-tenths (0.3) micrometers in diameter or larger.

Non-friable asbestos containing material – means any material containing more than one percent (1%) asbestos as determined by PLM analysis that when dry cannot be crumbled, pulverized, or reduced to powder by either hand pressure or mechanical forces reasonably expected to act on the material.

Regulated asbestos containing material (RACM) – means the following: Friable asbestos material, Category I non-friable ACM that has become friable, Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, abrading, or burning, Category II non-friable 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.

D. Asbestos Types

There are two (2) general types of asbestos, which include serpentines and amphiboles.

Serpentines are snake-like, soft, "S" shaped structures. Chrysotile is the only member of the Serpentine family; however, Chrysotile accounts for approximately ninety five (95) percent of the asbestos used in commercial products. It is the most common form found on the campus of Ball State University. Chrysotile is also called the "White Asbestos" due to its natural white color.

Amphiboles are shorter than the Serpentine family and are more needle-like structures. The Amphibole family is more water resistant and is more brittle than the Serpentine family. There are several members of the Amphibole family that include Amosite, Crocidolite, Anthophyllite, and Tremolite.

Amosite, known as brown asbestos, is the second most likely type found in buildings. It is hard to saturate (make wet) and therefore hard to control. Amosite is commonly found in and on boilers and associated piping. Amosite is commonly mixed with Chrysotile.

Crocidolite, known as the blue asbestos due to its blue appearance is used on high temperature equipment and components. Crocidolite was used on warships to control extreme temperatures associated with the operations of the propulsion devices.

E. Asbestos Use

Asbestos has been used in a wide range of products that includes over three thousand (3,000) different products. Asbestos was used because it was available in the natural environment and had a low relatively low cost to use and manufacture. Asbestos was also attractive because it had unique characteristics including its ability to insulate, not burn, chemical resistant, strong, and ability to be incorporated into products. All of these properties made asbestos an attractive product to use in building materials.

A common use of asbestos in the construction of buildings was in the fireproofing material of structural steel and steel beams. The asbestos fireproofing was used to prevent steel members from warping and/or collapsing during a structural fire. Asbestos comprised of 5-95 percent of the fireproofing mixture, and was used in conjunction with other materials like vermiculite, sand, cellulose fibers, gypsum, and calcium carbonate. Most of the fireproofing was applied by spraying the material onto the structural steel or steel decking.

Asbestos was used in many other products that included insulating, decorative purposes, boilers, tanks and associated pipe insulation. Asbestos was also used in cement to form water and sewer pipes and sheets otherwise known as transite, which was used on commercial and residential properties for heat, sound and weather insulation. Asbestos can also be found in friction products that include clutches, automobile brake pads, plastic, paper and textile products. Many of these products can still be found in homes and businesses today.

F. Friable and Non-Friable Asbestos

The potential for a product containing asbestos to release fibers depends on its degree of friability. Friable asbestos material means any material containing more than one (1) percent asbestos as determined using the polarized light microscopy (PLM), that when dry can be crumbled, pulverized, or reduced to powder either by hand pressure or mechanical forces reasonably expected to act on the material.

Friable ACM is found primarily in building areas not generally accessible to the public, such as boiler and machinery rooms. For example, asbestos insulation around pipes and boilers is considered friable.

Non-friable asbestos material means any material containing more than one (1) percent asbestos as determined using the PLM method that when dry cannot be crumbled, pulverized, or reduced to a powder by either hand pressure or mechanical forces reasonably expected to act on the material. Asbestos that is tightly bound with another material is considered non-friable and will only release fibers if sanded, cut, or broken. Great examples of non-friable materials are floor tiles, asphalt roofing shingles, and mastics.

G. Asbestos Categories Identified by EPA

Surfacing Materials - ACM's that are sprayed or troweled on surfaces for acoustical, decorative, or fireproofing purposes. This would include acoustical plasters.

Thermal System Insulation (TSI) – TSI was used to reduce the heat transfer and/or prevent condensation on pipes, tanks, boilers, ducts, and tunnels. Some examples are corrugated insulation (air cell), calcium/magnesium (mag block), mudded fittings that would include patching compounds.

Miscellaneous Materials – Made up of mostly non-friable materials that include floor tiles, ceiling tiles (friable), transite board, mastics, fire brick, fire doors, shingles, joint cloth.

H. Respiratory System

Since the primary health effects due to asbestos exposure are on the lungs, it is important to know how the respiratory system works. An understanding of the mechanics of the respiratory system will aid in preventing exposure and the resulting health effects.

Cells in the body need a constant supply of oxygen. The respiratory system meets this need by bringing in oxygen to the bloodstream and delivers the oxygen to the cells thus carrying away carbon dioxide. The lungs are at center stage of the respiratory system along with the respiratory tract, which allows the air (oxygen) to flow into and out of the lungs.

The exchange of oxygen and carbon dioxide takes place in the alveoli. After the exchange of the gases, carbon dioxide is expelled from the body. Disruptions in respiration can occur when foreign objects like asbestos fibers enter the body. It is important to protect yourself.

When inhaled air passes through the nose where the air is filtered by nose hair and mucus it then passes down the throat and into the trachea. Just above the heart, the trachea divides into two different bronchi. The bronchi lead into the left and right lung where it subdivides into bronchiole's and then even smaller branches. The smaller tubes end in air sacs called alveoli.

I. Asbestos Exposure and Potential Associated Health Risks

Through documented epidemiological studies of occupationally exposed individuals, asbestos as been linked to adverse health effects. Asbestos has been commonly linked to respiratory diseases that are associated with exposure to asbestos over a period of time. Asbestos exposure over time has been shown to cause lung cancer, mesothelioma, and asbestosis. Exposure to asbestos has also been associated with an increased rate of kidney, esophageal (throat), laryngeal, stomach, and intestinal cancers.

Asbestos related diseases are not immediate after exposure and can take up to forty (40) years to show signs of the disease. This delay is called Latency Period, which is the time from exposure to the time an individual is diagnosed with a disease. Generally the latency period for asbestos related diseases is between twenty (20) and forty (40) years.

Asbestosis – Fibrotic lung disease that causes chronic permanent scarring of the lower respiratory tract. The continuous build-up of scar tissue causes a stiffening of the lungs and restricts normal breathing. The disease inhibits the lungs from transferring oxygen to the blood.

Mesothelioma – Cancerous tumors of the membrane lining of the chest cavity or abdominal cavity. This disease is caused by one (1) asbestos fiber and is what gave asbestos the "One Fiber Kills" name. Mesothelioma is only associated with asbestos and is always fatal. However, mesothelioma is a rare cancer to develop.

Lung Cancer – Is the abnormal growth of cells associated with the lungs and bronchial tubes. Asbestos exposure and smoking cigarettes increases the potential to develop lung cancer or lung disease by more than fifty (50) percent.

J. Human Body Defenses

The human body as many natural defenses against asbestos and other respiratory irritants that might cause problems. Nose hair and mucus in the nasal cavity are used to trap and stop foreign objects from entering the body. Cilia are also a hair-like structure that are located in the trachea and bronchi, which trap and push foreign matter out toward the mouth. The third line of defense is the body's ability to cough and sneeze to expel foreign objects from the body. It is important to remember that as the concentration of asbestos fibers goes up, the body's natural defenses have a harder time trapping and expelling the asbestos fibers. Remember that asbestos fibers are indestructible once inside the body.

K. Safety Procedures

When dealing with asbestos containing materials, proper care and handling procedures should always be followed. It is important to understand the difference between friable and non-friable materials and know what condition the materials are in before disturbing. Remember that health risks associated with asbestos are directly related to the amount and frequency of exposure. By decreasing exposure to asbestos will decrease the health risks associated with it. The health risks associated with exposure to asbestos occur when it is disturbed and releases fibers into the air. The goal of this program is to make individuals aware of asbestos and provide a better understanding of it.

The following general precautions will reduce exposure and lower the risk of asbestos related health problems:

1. Drilling, sawing, or using nails on asbestos materials can release asbestos fibers and should be avoided. If the above cannot be avoided then contact the EHS Office for assistance.

2. Floor tiles and adhesives that contain asbestos should never be sanded dry.

3. Use care not to damage asbestos when moving furniture, ladders, or any other objects on campus or within your work areas.

4. Know where asbestos is located in your work area. Use common sense when working around products that contain asbestos. Avoid touching or disturbing friable asbestos containing materials.

5. Report any damaged or loose asbestos containing material to a supervisor.

6. All removal or repair work involving asbestos must be done by Indiana licensed asbestos contractor and personnel. OSHA and EPA regulations are very specific about work practices and equipment required to safely remove asbestos. These requirements may include proper respirators, special enclosures, training, exposure monitoring, long term record keeping, and medical surveillance.

7. Asbestos should always be handled wet to help prevent fibers from being released. This will help reduce the potential for exposure.

8. A dust mask is <u>not</u> acceptable because asbestos fibers will pass through it. The use of respirators must be approved by the EHS Office.

9. Dusting, sweeping, or vacuuming dry asbestos with a standard vacuum cleaner is prohibited. A vacuum cleaner with a special high efficiency filter (HEPA) must be used to vacuum asbestos dust. Contact the EHS Office for assistance.

10. If a HEPA vacuum is not used, cleanups must be done with a wet cloth or mop. The only exception to this would be if the moisture presents an additional hazard such as around electricity. For further information contact the EHS Office.

11. Contact the EHS Office for proper disposal of asbestos waste.

Workers involved in cleaning up small quantities of asbestos dust must receive training in asbestos awareness before performing the task. You are encouraged to contact the EHS Office for clean-up jobs that may contain asbestos dust. Never dry sweep the suspected asbestos dust.

The following practices should be used:

1. Always use wet methods when cleaning up asbestos fibers. Dry sweeping or dusting can result in asbestos fibers being released.

2. Wet cloths, rags, or mops used to pick up asbestos fibers, should be properly disposed of as asbestos waste while still wet.

The following procedures should be used when dealing with asbestos containing floor tiles.

1. Sanding of asbestos containing floor tiles is prohibited.

2. Stripping of finishes shall be conducted using wet methods and low abrasion pads at speeds lower than 300 rpm.

3. When high speed buffing is done, ensure that there is adequate sealer and finish on the floor. Always keep the machines moving.

4. Do not remove or attempt to repair loose floor tiles. Improperly removed asbestos containing floor tiles could result in the release of asbestos fibers.

5. Report loose floor tiles to your supervisor. Avoid running the machine over loose tiles. Contact the EHS Office for further assistance.

Special procedures are needed to reduce the spread of asbestos fibers after a release has occurred. Contact the EHS Office of any potential fiber release. The EHS Office will assess the situation and determine if an Indiana licensed asbestos contractor is needed for the clean-up. If fibers are released through an incident, personnel should take the following steps to reduce asbestos exposure to occupants until trained asbestos personnel arrive:

1. Prevent access to the contaminated area if possible.

2. Shut and lock doors.

3. Report the damaged ACM to supervision and to the EHS Office.

4. Do not attempt to clean-up a release.

In the event of a large asbestos fiber release contact your supervisor and the EHS Office. A large asbestos fiber release is anything over three (3) linear feet, three (3) square feet, or seventy-five hundredths (0.75) cubic feet of asbestos. The EHS Office will contact an Indiana licensed asbestos contractor to secure and clean-up the asbestos. The following should be done immediately after the fiber release is reported.

1. Secure the area and post signs to prevent unauthorized personnel from entering the area.

2. HVAC system should be shut down and sealed.

3. If authorized use respiratory protection.

4. Leave area.

L. References

Occupational Safety and Health Administration (OSHA) 1926.1101 Asbestos

EPA Asbestos Web-Site http://www.epa.gov/asbestos/

Indiana Department of Environmental Management (IDEM) State Rule 326 IAC 14-10

http://www.radford.edu/fpc/Safety/asbestos/awareness_prog.htm

http://www.facilityinformation.com/media/pdfs/Dillett/Asbestos_Awareness_Program_5_05.pdf