Environmental Health and Safety Statement

Iowa State University strives to be a model for environmental, health and safety excellence in teaching, research, extension, and the management of its facilities. In pursuit of this goal, appropriate policies and procedures must be developed and followed to ensure this community operates in an environment free from recognized hazards. Faculty, staff, and students are responsible for compliance with established policies and are encouraged to enculturate practices that ensure safety, protect health, and minimize the institution's impact on the environment.

As an institution of higher learning, Iowa State University
- fosters an understanding of and a responsibility for the environment,
- encourages individuals to be knowledgeable about environmental, health and safety issues that affect their discipline, and
- shares examples of superior environmental health and safety performance with peer institutions, the State of Iowa and the local community.

As a responsible steward of facilities and the environment, Iowa State University
- strives to provide and maintain safe working environments that minimize the risk of injury or illness to employees, students and the public,
- continuously improves operations, with the goal of meeting or exceeding required and applicable environmental, health and safety regulations, rules, policies, or voluntary standards, and
- employs innovative strategies of waste minimization and pollution prevention to reduce the use of toxic substances, promote reuse, and encourage the purchase of renewable, recyclable and recycled materials.

The intent of this statement is to promote environmental stewardship, protect health, and encourage safe work practices within the Iowa State University community. The cooperative efforts of the campus community to remain mindful of these goals will ensure that Iowa State University continues to be a great place to live, work, and learn.

Dr. Steven Leath
President
Directory of Service and Emergency Providers

Services

Environmental Health and Safety
2408 Wanda Daley Drive  | (515) 294-5359

Iowa State University Occupational Medicine Department
G11 Technical and Administrative Services Facility (TASF), 2408 Pammel Drive  | (515) 294-2056

McFarland Clinic PC, Occupational Medicine
1018 Duff Avenue  | (515) 239-4496

Thielen Student Health Center
2647 Union Drive | (515) 294-5801

Emergency

Emergency - Ambulance, Fire, Police
911

Department of Public Safety/ Iowa State University Police
Armory, 2519 Osborn Drive  | (515) 294-4428

Mary Greeley Medical Center
1111 Duff Avenue  | (515) 239-2011
# Table of Contents

Directory of Service and Emergency Providers ................................................................. 3

A. Introduction .................................................................................................................. 7

B. University Policy Statement .................................................................................. 8

  Program Responsibilities ....................................................................................... 8
  Environmental Health and Safety (EH&S) .............................................................. 8
  Facilities Planning and Management (FP&M) and Department of Residence (DOR) 9
  Managers and Supervisors ............................................................................... 9
  Individual Employees ....................................................................................... 9
  Abatement Workers ....................................................................................... 10

C. General Information ............................................................................................. 11

  Asbestos - Its Various Uses and Forms ................................................................. 11
    Serpentine Minerals .................................................................................... 11
    Amphibole Minerals .................................................................................. 11
  Asbestos Survey Categories .......................................................................... 12
    Surfacing Materials .................................................................................... 12
    Thermal System Insulation (TSI) .................................................................. 12
    Miscellaneous Materials ........................................................................ 12
  Campus Survey ............................................................................................... 12
  Asbestos Identification .................................................................................. 13

D. Potential Health Effects Related to Asbestos .................................................. 14

  Routes of Entry ................................................................................................ 14
  The Respiratory System ................................................................................ 14
  Asbestos Health Risks .................................................................................... 14
  Smoking and Lung Cancer ........................................................................... 15

E. Regulatory Requirements and Guidelines .................................................. 16

  Federal Agencies ............................................................................................ 16
  Environmental Protection Agency (EPA) ............................................................. 16
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Agencies</td>
<td>18</td>
</tr>
<tr>
<td>Iowa Division of Labor Services</td>
<td>18</td>
</tr>
<tr>
<td>Iowa Department of Natural Resources (IDNR)</td>
<td>18</td>
</tr>
<tr>
<td><strong>F. Control Measures</strong></td>
<td>19</td>
</tr>
<tr>
<td>Notices and Labeling</td>
<td>19</td>
</tr>
<tr>
<td>Activities Involving Potential Exposure</td>
<td>19</td>
</tr>
<tr>
<td>Minimizing Potential Exposure</td>
<td>20</td>
</tr>
<tr>
<td>Damage and Deterioration</td>
<td>20</td>
</tr>
<tr>
<td>Floor Care</td>
<td>20</td>
</tr>
<tr>
<td><strong>G. Asbestos Project Coordination</strong></td>
<td>21</td>
</tr>
<tr>
<td>In-House Abatement Personnel</td>
<td>21</td>
</tr>
<tr>
<td>Hourly Contractor Abatement</td>
<td>21</td>
</tr>
<tr>
<td>Request for Quote (RFQ) Bid Projects</td>
<td>21</td>
</tr>
<tr>
<td><strong>H. Response Actions</strong></td>
<td>22</td>
</tr>
<tr>
<td>Operations &amp; Maintenance (O&amp;M)</td>
<td>22</td>
</tr>
<tr>
<td>Repair</td>
<td>22</td>
</tr>
<tr>
<td>Encapsulation</td>
<td>22</td>
</tr>
<tr>
<td>Enclosure</td>
<td>23</td>
</tr>
<tr>
<td>Removal</td>
<td>23</td>
</tr>
<tr>
<td><strong>I. Asbestos Exposure Risk Perspective</strong></td>
<td>24</td>
</tr>
<tr>
<td>Background Asbestos Levels</td>
<td>24</td>
</tr>
<tr>
<td>EPA's Five Facts Regarding Asbestos</td>
<td>24</td>
</tr>
<tr>
<td><strong>J. Personnel Protection</strong></td>
<td>26</td>
</tr>
<tr>
<td>Medical Surveillance</td>
<td>26</td>
</tr>
<tr>
<td>Personal Protective Equipment (PPE)</td>
<td>26</td>
</tr>
<tr>
<td>Respirator</td>
<td>26</td>
</tr>
<tr>
<td>Exposure Monitoring</td>
<td>27</td>
</tr>
<tr>
<td><strong>K. Emergency Procedures</strong></td>
<td>29</td>
</tr>
</tbody>
</table>
Asbestos Safety Manual

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>29</td>
</tr>
<tr>
<td>Minor Fiber Release Episode</td>
<td>29</td>
</tr>
<tr>
<td>Major Fiber Release Episodes</td>
<td>29</td>
</tr>
<tr>
<td>L. Asbestos Waste Collection and Disposal</td>
<td>31</td>
</tr>
<tr>
<td>Appendix A</td>
<td>32</td>
</tr>
<tr>
<td>Asbestos Containing Material (ACM)</td>
<td>32</td>
</tr>
<tr>
<td>Non-discrimination Statement</td>
<td>34</td>
</tr>
</tbody>
</table>
Iowa State University has a responsibility to provide a safe environment for students, employees, and visitors. To meet this obligation, the Department of Environmental Health and Safety (EH&S) identifies potential or existing hazards in university facilities and then determines the best course of action to eliminate or minimize the risks. In this role, EH&S has established an asbestos program to assess campus buildings for the presence and condition of asbestos-containing materials (ACM) and to oversee operations involving ACM for compliance with regulations issued by the Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA).

The Asbestos Safety Manual is the official guide to university policies and procedures that apply to the use, maintenance, and removal of asbestos and asbestos-containing materials. This manual was developed to ensure that asbestos is properly maintained and handled and to provide policies and guidelines that promote the safe management of asbestos at Iowa State University (ISU).

It is the responsibility of university staff who work with asbestos to become familiar with the contents of this manual and to observe the procedures and requirements.
B. University Policy Statement

Iowa State University (ISU) is responsible for both ensuring the safety of its employees and compliance with all related requirements of state and federal regulations. The administration encourages employees at all levels to promote positive attitudes towards safety, to incorporate safety into their work practices and to cooperate fully with the implementation of safety-related programs.

Program Responsibilities

The management of asbestos-containing materials at ISU requires the cooperation of many departments and individuals to ensure that asbestos is properly maintained and handled. The specific activities and responsibilities are delegated to various university entities as outlined below:

Environmental Health and Safety (EH&S)

The development and implementation of proper asbestos management practices at ISU is provided by EH&S. It is the responsibility of Environmental Health and Safety to:

• Develop and implement policies for the proper handling of asbestos at ISU.

• Coordinate applications for federal, state, and local permits to properly remove and dispose of asbestos-containing materials (ACM).

• Ensure that university policies and regulatory guidelines regarding the maintenance, abatement, storage, and disposal of asbestos are followed.

• Prepare, submit, and maintain records, notifications, and manifests required by regulations.

• Develop project specifications, conduct pre-bid tours, and design, manage and supervise abatement projects.

• Operate a certified asbestos fiber counting and identification laboratory.

• Provide awareness training for employees who work near ACM.

• Respond to emergency situations involving asbestos at university facilities on a 24-hour basis.

• Maintain and update asbestos inventories.
Facilities Planning and Management (FP&M) and Department of Residence (DOR)

The maintenance of university buildings and the residence halls is the responsibility of Facilities Planning and Management and the Department of Residence respectively. Custodial and maintenance staff are expected to avoid activities that may result in disturbing ACM. It is the responsibility of these staff to report the location of damaged or deteriorating ACM to their supervisors for repair or removal. Under no circumstances should custodial or general maintenance staff attempt to repair, clean up, or remove ACM themselves. In addition, it is the responsibility of Facilities Planning and Management and the Department of Residence to:

- Ensure that university policies and guidelines regarding the handling of asbestos are communicated and followed.
- Ensure that adequate resources are provided to properly maintain ACM.
- Coordinate abatement actions with EH&S.
- Provide proper training and personal protective equipment for employees working with asbestos.

Managers and Supervisors

It is the primary responsibility of managers and supervisors to ensure that the information and procedures presented in this manual are strictly followed.

Individual Employees

As with custodial and maintenance personnel, general university staff are expected to avoid activities that might result in damage or disturbance of ACM. It is imperative that persons who handle materials or occupy areas containing asbestos be prudent in their efforts to follow the guidelines presented in this manual. Individuals have a responsibility to:

- Take no actions which will result in the disturbance of ACM. Use care when moving furniture near asbestos insulated piping and other ACM to avoid contact damage.
- Report evidence of deterioration, water damage, or delamination to EH&S by calling (515) 294-5359 or Facilities Planning and Management (FP&M) at (515) 294-5100.
- Custodial, maintenance staff, and their supervisors who work in buildings that may contain asbestos-containing materials are required to complete Asbestos Awareness annually. Training may be completed online through Learn@ISU.
• Consult with supervisors regarding the handling of ACM. Contact EH&S with questions or other concerns.

**Abatement Workers**

Individuals designated to remove asbestos are required to take an asbestos training course that meets the standards of the Iowa Administrative Code. This course consists of four days of class and hands-on training for general asbestos workers and five days of class and hands-on training for personnel authorized as supervisors. **Workers who have had this training are the only people authorized to cleanup, repair, or remove asbestos-containing materials.**
C. General Information

Asbestos - Its Various Uses and Forms

Asbestos is a generic term for a group of naturally occurring silicate minerals that are mined primarily in South Africa, Canada, and the former Soviet Union. Asbestos can appear in fibrous crystal form, and when crushed, separates into flexible fibers.

Asbestiform minerals are divided into two groups based on their morphology. Serpentine minerals have a sheet or layered structure while amphiboles have a chain-like structure. Chrysotile, amosite, and crocidolite are the three commercially important types of asbestos.

Serpentine Minerals

- Chrysotile is white asbestos with fine silky fibers. It accounts for over 90 percent of the asbestos used in the United States. Chrysotile is mined in Canada and the Soviet Union.

Amphibole Minerals

- Amosite is known as brown asbestos and is used in heat insulation materials. Amosite is mined primarily in Transvaal, South Africa.

- Crocidolite is known as blue asbestos and is occasionally found with amosite and chrysotile in pipe or boiler wrap. Crocidolite is mined in South Africa.

- Tremolite, Actinolite, and Anthophyllite are rare forms of asbestos with limited commercial value, but can be found as contaminants in other building materials.

Asbestos minerals have the following characteristics in common:

- Separate into smaller and smaller fiber bundles when disturbed or handled
- Resistant to heat, bacteria, and chemicals
- Great tensile strength and stiffness
- Excellent electrical and thermal insulator
- Very good noise insulator
- Resistant to the effects of friction and wear
Asbestos Survey Categories

The Environmental Protection Agency (EPA) has identified three categories for the purposes of evaluating asbestos-containing materials in buildings.

**Surfacing Materials**

- Sprayed or troweled-on asbestos used for acoustical, fireproofing, or decorative purposes on ceilings, walls, and structural members.

**Thermal System Insulation (TSI)**

- Insulation used to inhibit heat transfer or prevent condensation on pipes, boilers, tanks, ducts, and various other components of plumbing and HVAC systems. Materials include pipe wraps (block, batt, and blanket), gaskets and “muds”.

**Miscellaneous Materials**

- Other materials such as floor tile, ceiling tile, adhesives, asbestos-cement products, window glazing, and caulking, textiles, and roofing materials.

By the mid-1970’s under the Clean Air Act (CAA), the EPA banned several kinds of asbestos materials such as thermal, sprayed-on insulation, fireproofing, and acoustical surfacing material because of growing concerns about the health effects associated with exposure to asbestos.

Campus Survey

Asbestos building surveys were conducted at Iowa State University using accredited inspectors following AHERA protocols (exteriors and roofs excluded) to assess the location, quantity, and physical condition of asbestos-containing materials. With the exception of the newest buildings on campus, most contain asbestos in one form or another.

Miscellaneous materials (floor tile, mastic, and caulking) are the most common asbestos-containing materials on campus, followed by surfacing materials (acoustical ceiling treatments) and thermal system insulation on pipes. EH&S completed repair to those asbestos-containing materials with minor damage identified during the building surveys.

Asbestos building survey information is available for the purpose of identifying ACM locations prior to construction activities. Since the asbestos building surveys are not all inclusive and did not include destructive testing, **EH&S requires the survey information be**
field verified for accuracy prior to the start of any renovation and demolition activity. See Appendix A for a representative list of materials likely to contain asbestos.

Asbestos Identification

Asbestos-containing materials are those materials that contain more than 1% asbestos as determined by Polarized Light Microscopy (PLM) following EPA Method 600/R-93/116. Environmental Health and Safety operates an asbestos fiber counting and bulk identification laboratory. Departmental personnel are trained and tested quarterly to meet proficiency standards established by the American Industrial Hygiene Association (AIHA).
D. Potential Health Effects Related to Asbestos

Routes of Entry

While asbestos fibers may gain entry into the body through ingestion, the major route of exposure is inhalation. Asbestos fibers have no odor, and those that you may inhale are invisible to the naked eye.

The Respiratory System

Your respiratory system includes the mouth, nose, wind pipe (trachea), bronchi, and lungs. The lungs are located within the pleural cavity. Lying within the cavity and covering the lungs is a lining called the pleural mesothelium.

The lungs contain air sacks called alveoli. The alveoli are the sites where oxygen is absorbed into the blood and carbon dioxide is removed from the blood.

Your body’s respiratory system has defense mechanisms to keep foreign particles from causing damage. Amazingly, estimates indicate that these mechanisms are 95 to 98 percent effective. Examples of some defense mechanisms and their functions are:

- The mouth and nose filter out very large particles.
- Coated bronchi filter out smaller particles.
- Cilia, which are hair-like protrusions on cells lining the airways (bronchial tree), move particles up to the back of the mouth where they are swallowed or expelled.
- Alveoli in the lower respiratory system trap the smallest particles. The particles may be attacked by large cells, known as macrophages, which try to digest them. Because asbestos is a mineral fiber, the macrophages are often not successful.

Asbestos Health Risks

Most of the information about asbestos disease comes from studying workers in the various asbestos industries. The bulk of data comes from World War II shipbuilding activities and the asbestos industries in the United States and England. Exposure to very high levels of airborne asbestos typical of asbestos trades prior to 1972 has been linked with the following diseases:

**Asbestosis** is a chronic disease in which the lungs become scarred (fibrosis) as a result of a biological reaction to the inhalation of asbestos fibers. Scarring causes thickening of the walls of the lungs.
and a reduction in the capacity to transfer oxygen to the bloodstream. Asbestosis results after exposure to high concentrations of fibers over a long period of time. Symptoms usually occur 15 to 30 years after the first exposure.

**Mesothelioma** is a cancer of the covering of the lung or lining of the chest or abdominal cavities. It is the rarest form of the asbestos-related diseases. This disease is always rapidly fatal, usually within a year after diagnosis. There is a direct relationship between smoking and the risk of developing Mesothelioma. The latency period is usually 25 to 30 years for Mesothelioma.

**Lung Cancer** is now responsible for roughly one-half of the deaths that occur from past asbestos exposures. Lung cancer usually begins as a tumor in the lower lobes of the lungs. Generally, the earliest symptom is the development of a persistent cough or change in chronic cough. Later symptoms include loss of appetite, weight loss, pain, and general weakness.

Other cancers have been noted in a very small number of individuals who are occupationally exposed to asbestos. These tumors are cancers of the gastrointestinal tract. Contact the American Cancer Society for more information about asbestos-related cancers.

### Smoking and Lung Cancer

The combination of asbestos exposure and smoking greatly increases the risk of developing lung cancer. Smoking in combination with asbestos exposure does not just double the risk, but multiplies it many times in a synergistic effect. Asbestos workers are approximately five times more likely to develop lung cancer than the general population. Smokers are ten times more likely to develop lung cancer than the general population. A person who works with asbestos and also smokes is likely to have a 90 times greater risk of contracting lung cancer.

#### Comparative Cancer Risk

![Comparative Cancer Risk Chart]

- 1x General Population
- 5x Asbestos Workers
- 10x Smokers
- 90x Smoking Asbestos Workers

Smoking cessation resources available in Story County.
E. Regulatory Requirements and Guidelines

Building owners are governed by federal and state regulations in the way they deal with asbestos-containing materials in their buildings. An overview of the regulations governing asbestos follows.

Federal Agencies

The Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) are the two primary federal agencies that have established regulations to prevent contamination of the environment and to protect asbestos workers and the general public from exposure to asbestos.

Other federal agencies involved with regulations pertaining to asbestos control include:

- Department of Transportation (DOT)
- National Institute of Standards and Technology (NIST)
- Consumer Product Safety Commission (CPSC)
- Mine Safety and Health Administration (MSHA)
- Food and Drug Administration (FDA)
- National Institute of Occupational Safety and Health (NIOSH)

Environmental Protection Agency (EPA)

Under the Clean Air Act (CAA), the EPA administers the National Emissions Standards for Hazardous Air Pollutants (NESHAP). The intent of this standard is to prevent “visible emissions” of asbestos into the environment and applies to the university as a building owner. The asbestos NESHAP requires:

- Inspection of building or facility by a certified inspector prior to any renovation activity or demolition.

- Notification in writing to the Iowa Department of Natural Resources (IDNR) postmarked ten-working days prior to start of renovation or demolition.

- Specific removal techniques to minimize fiber release during abatement including HEPA filtration.

- Specific guidelines that regulate the transport and disposal of asbestos waste at an approved landfill.

- The prohibition of the application of acoustical or thermal ACM.
Under the Toxic Substance Control Act (TSCA), the EPA administers the Asbestos-Containing Materials in Schools Rule. Pursuant to the Asbestos Hazard Emergency Response Act (AHERA), the Asbestos-Containing Materials in Schools Rule requires all public and private, non-profit K-12 schools to inspect their school buildings for asbestos-containing building material and prepare response actions to prevent or reduce asbestos hazards. The provision also includes a Model Accreditation Plan (MAP) for persons conducting inspections and response actions in schools.

The Asbestos School Hazard Reauthorization Act (ASHARA) extended AHERA accreditation requirements to cover asbestos abatement projects in public and commercial buildings.

**Occupational Safety and Health Administration (OSHA)**

OSHA has responsibility for administering regulations that apply to all workplace activities that involve asbestos, including abatement procedures. The two standards that apply to asbestos operations are 29 CFR 1910.1001 for General Industry, and 29 CFR 1926.1101 for Construction Industry. The major components of these standards include:

- permissible exposure limits (PEL's)
- exposure monitoring
- written program
- trained “competent person”
- personal protective equipment, including respirators.
- annual medical examinations
- regulated work areas
- personal air monitoring and exposure limits
- work practices and standard operating procedures
- hygiene facilities
- recordkeeping
- licensed workers
- annual training
State Agencies

Iowa Division of Labor Services

The *Iowa Occupational Safety and Health Administration (IOSHA)* through the Iowa Division of Labor Services enforces the OSHA regulations within the state. Specifically, the Iowa Division of Labor Services has issued regulations which require:

- Asbestos workers, contractors, and supervisors, project designers, inspectors, and management planners working commercially to successfully complete asbestos training and be licensed by the state for asbestos projects in schools, public, or commercial buildings. In-house workers, such as those employed by ISU, are exempt from the licensing requirement but still must complete the required asbestos training.

- Asbestos contractors make notification in writing to the Division of Labor Services postmarked *ten-working days* prior to the start of each project. ISU in-house projects are again exempt from this requirement.

Iowa Department of Natural Resources (IDNR)

The *Iowa Department of Natural Resources (IDNR)* has responsibility for enforcement of EPA regulations in the state. Renovation and demolition activities require

- Asbestos contractors make notification in writing to the Iowa Department of Natural Resources postmarked *ten-working days* prior to the start of each project. ISU in-house projects are exempt from this requirement unless the project involves abatement of more than 160 square feet or 260 linear feet of asbestos-containing materials.

- A Notice of Violation (NOV) may be issued to building owners or operators who violate the asbestos NESHAP notification requirements, work practices, or waste disposal guidelines.
F. Control Measures

Notices and Labeling

In conjunction with the asbestos building surveys and to meet OSHA requirements, the entrances to mechanical rooms and custodial closets into which employees are expected to routinely enter EH&S has posted one of the following signs:

- **Red Danger Sign** to indicate that asbestos-containing materials are present, their location, and the appropriate work practices to avoid potential exposure.

- **Green Notice Sign** to indicate no suspect materials in the room or whether suspect materials have been tested and determined not to contain asbestos.

Activities Involving Potential Exposure

OSHA regulations define exposure at or above the permissible exposure limit (PEL) of 0.1 fibers per cubic centimeter (f/cc) for 30 or more days a year.

Asbestos-containing materials that can be reduced to powder by hand pressure are considered to be friable. Friable materials are more likely to release fibers into the air where they can be a source of exposure to you. Some non-friable materials may become friable if they are cut, drilled, or damaged by water.

The presence of asbestos alone in a building does not mean that the building occupants are necessarily endangered. As long as asbestos-containing materials remain in good condition, exposure is unlikely.

When damaged, building maintenance, repair, renovation, or other activities may disturb asbestos-containing materials (ACM), creating a potential hazard to building occupants. Some asbestos fibers can take up to 80 hours to settle. An airborne asbestos fiber can move laterally with air currents and contaminate spaces distant from the point of release. Fiber release may occur in several ways:

**Fallout** - Old and/or deteriorated asbestos fibers may become airborne due to damage or destruction of the bonding agents used to hold the asbestos product together. Fallout may result in fibers being deposited on horizontal surfaces over time due to humidity, vibration, or aging.

**Contact** - Striking, cutting, drilling, etc. may release fibers into the environment. Air erosion is also a form of contact and may release fibers to the environment from damaged or exposed material.
**Re-entrainment** - Sweeping, dusting, or unfiltered vacuuming of settled dust may result in asbestos fibers being re-suspended into the atmosphere.

**Minimizing Potential Exposure**

**Damage and Deterioration**

When ACM degrades or is damaged, it may release asbestos into the air.

- Avoid physical damage or disturbing ACM on ceiling, pipes, or floors when moving furniture, equipment, or supplies.
- Do not hang plants or pictures from structures covered with ACM.
- Do not drill, sand, or scrape materials that contain ACM.
- Do not attempt to clean any material that appears to contain asbestos.
- Contact your supervisor immediately to arrange proper cleaning of any material that you suspect may contain asbestos.
- Cleanup of asbestos-containing materials should only be done using a High Efficiency Particulate Air (HEPA) vacuum and/or wet methods by properly trained personnel.

**Floor Care**

In order to minimize the potential for exposure to asbestos during floor care, the following practices are recommended:

- Never sand or scrape asphalt or vinyl flooring that contains asbestos.
- Always strip floor finishes using wet methods and the lowest abrasion pads possible. (Never use coarse black pads on asbestos flooring.) Always use speeds less than 300 revolutions per minute (rpm).
- Burnish or dry-buff asbestos containing flooring only when it has enough finish so that the pad cannot contact the asbestos-containing material.
- Do not dust, dry-sweep, or vacuum dirt or debris in an area that contains damaged thermal asbestos insulation, surfacing or deteriorated ACM. Use only wet methods or HEPA filtered vacuums.

Report evidence of deterioration, water damage, or delamination to EH&S at (515) 294-5359.
G. Asbestos Project Coordination

Environmental Health and Safety provides project management services and oversees all aspects of asbestos abatement operations for Iowa State University, the Iowa School for the Deaf (ISD) and the Iowa Educational Services for the Blind and Visually Impaired (IESBVI). These day-to-day project management services ensure that all applicable state and federal regulations and the ISU Asbestos Abatement Specifications are followed. EH&S will coordinate the services of the Abatement Contractor with Facilities Planning and Management (FP&M) and the requesting ISU department when remodeling, renovation, and demolition projects will disturb asbestos-containing materials. Project design and initial exposure assessment information will be provided by EH&S which identifies job specific requirements and procedures. EH&S will perform air monitoring to assure that asbestos is not released during maintenance and construction activities. Iowa State University has developed several methods of response to respond to projects and incidents that require asbestos abatement.

In-House Abatement Personnel

In-house abatement personnel are available to conduct abatement projects, which are limited in scope and generally consist of minor repairs, encapsulations, and glove bag operations (removals conducted in sealed enclosures) associated with building maintenance.

Hourly Contractor Abatement

More extensive repair and removal projects are often conducted through the ISU Asbestos Abatement Contract. EH&S will work with departments and/or FP&M to coordinate contractor abatement activities. Contractors are expected to conduct projects to their conclusion and provide for occupant protection.

Request for Quote (RFQ) Bid Projects

Environmental Health and Safety works jointly with Iowa State University’s Purchasing Department to solicit quotations to remove asbestos-containing materials, as specified in bid documents, when abatement projects are larger in scale and/or require an exacting schedule.
H. Response Actions

Iowa State University’s fundamental policy is to manage asbestos-containing materials in place and this method is strongly emphasized by the EPA. Response actions range from in place management with an operations and maintenance (O&M) program when the material is in good condition, to removal if the material is damaged beyond repair or impacted by change in occupancy, building renovations and demolition requirements.

Undamaged asbestos that is properly managed in place poses little health risk.

Operations & Maintenance (O&M)

An operations and maintenance program is a formal set of standard procedures designed to minimize asbestos exposure to building occupants by managing asbestos-containing materials in-place. An O&M program includes work practices to maintain ACM in good condition, ensure proper cleanup of any previously released asbestos-containing dust or debris, prevent inadvertent disturbance to existing ACM, and monitor any changes in the condition of the ACM. Maintenance of any ACM is essential to prolong the life of the material and is required to maintain its continued integrity.

Repair

Minor areas of damaged ACM can be returned to an intact, safe condition using various methods to provide a durable, serviceable coating that involves limited replacement and/or patching and will allow the material to continue in service.

Encapsulation

Encapsulation can be an effective response action that treats ACM with a material that surrounds or embeds the asbestos fibers in an adhesive or bonding material to prevent their release. While encapsulation is often more expedient and less expensive than removal and replacement, the potential for exposure still exists because the asbestos source remains. In addition, the encapsulated ACM is often more difficult to remove. There are two types of encapsulants.

- Bridging encapsulant creates a membrane over the surface of the ACM.
- Penetrating encapsulant “penetrates” through the ACM and binds the components together.
Enclosure

Enclosure involves a permanent airtight, impermeable barrier between the ACM and the building environment that prevents asbestos fibers from escaping into the air. This measure has limited applicability and is typically used only for small amounts of material on isolated columns or beams.

Removal

Removal is the most definitive response action to an asbestos problem. Once asbestos-containing material is removed from the building, the potential for a hazardous fiber release is eliminated, as is the need for surveillance. Removal becomes necessary when in place management is no longer feasible or effective in protecting building occupants, or when renovation or demolition activities will disturb ACM.

Wet it,
Bag it,
Tag it,
Bury it!
I. Asbestos Exposure Risk Perspective

Background Asbestos Levels

Since asbestos has been used in over 3000 commercial products, it has been documented that very small amounts of fiber are present in the atmosphere inside and outside buildings in almost every part of the country. In addition, natural sources of asbestos mineral also contribute a measurable level of fiber to the general environment. At ISU, ambient airborne fiber levels sampled within buildings on campus have always been below the detection limits of the approved analytical method used to measure airborne asbestos fiber concentrations. This has been consistent with measurements reported by the EPA from buildings across the country. Any exposure experienced at these levels is unlikely to produce an increased risk of asbestos health-related problems.

EPA’s Five Facts Regarding Asbestos

Much of the information concerning the health risks of asbestos exposure have been derived from studies of groups that had relatively high occupational exposure. The EPA released a list of five facts intended to put the exposure risk into perspective:

FACT ONE

Although asbestos is hazardous, the risk of asbestos-related disease depends upon the exposure to airborne asbestos fibers. An individual must breathe asbestos fibers in order to incur any chance of developing an asbestos related disease. At very low levels, the risk may be negligible or zero.

FACT TWO

Based on available data, the average airborne asbestos levels in buildings seem to be very low. Accordingly, the health risks to occupants also appears to be very low. Ambient fiber sampling conducted in ISU campus buildings show fiber levels to be extremely low or nonexistent. In fact, EPA surveys of federal buildings showed indoor fiber levels to be approximately the same as levels outside. The average building occupant appears to face very low or no health risks.

FACT THREE

Removal is often not a building owner’s best course of action to reduce asbestos exposure. In fact, an improper removal can create a dangerous situation where none previously existed. Asbestos removals tend to elevate airborne asbestos fiber levels. Unless
properly conducted, a removal operation may actually increase rather than decrease the risk of asbestos-related disease.

**FACT FOUR**

The EPA only requires asbestos removal in order to prevent significant public exposure to airborne asbestos fibers during building demolition or renovation activities. Asbestos removal prior to demolition or renovation activities is needed to protect public health. The EPA believes that an improperly conducted removal operation can actually increase the health risk.

**FACT FIVE**

EPA does recommend a proactive, in-place management program whenever asbestos-containing material is discovered. A program to manage the day-to-day operations of a building must be in place to prevent the accidental or unintentional release of asbestos fibers into the air. An operations and maintenance program ensures proper control and cleanup procedures are implemented.
J. Personnel Protection

Medical Surveillance

The Iowa State University Occupational Medicine Program is designed to minimize personnel health risks from working with hazardous materials through monitoring and prevention. The program is also intended to enhance the efficiency of existing safety and health programs and keep the university in compliance with all applicable regulations. EH&S coordinates the participation of Iowa State University personnel in the program.

Participation in the Occupational Medicine Program requires completion of a Hazard Inventory Form. The Hazard Inventory form must be completed by all employees who are exposed to biological, physical, or chemical hazards (i.e. asbestos) in the workplace. A new Hazard Inventory should be filled out for both new and current employees who have had changes in job hazards or work conditions.

Following receipt of the Hazard Inventory form by EH&S, personnel with workplace hazards requiring medical monitoring will be sent a questionnaire titled “Information Request.” EH&S will use this information to determine the need for enrollment in the Iowa State University Occupational Medicine Program.

Asbestos exposure requires annual medical exams including completing an OSHA Asbestos Medical Questionnaire.

Personal Protective Equipment (PPE)

The proper use of personal protective equipment (PPE) will reduce exposure to asbestos fibers during abatement and other activities that may disturb asbestos. Environmental Health and Safety will initiate safe work practices and engineering controls during asbestos abatement projects to reduce and maintain employee exposure levels at or below the OSHA permissible exposure limits. EH&S can help ensure that the proper personal protective equipment is selected based on the hazards.

Respirator

The OSHA Respiratory Protection Standard (29 CFR 1910.134) requires medical evaluation, fit testing, and training for individuals who intend to wear respiratory protection. Iowa State University employees who are required to wear respiratory protection according to their job description or research protocol must participate in the ISU Respiratory Protection Program.

Respirator certification consists of three steps:
1. Medical Evaluation

• Review workplace hazards with your supervisor and complete the Hazard Inventory Form. Email the completed form to EH&S.

• Call Occupational Medicine at (515) 294-2056 to schedule a medical evaluation.

• Complete the Medical Questionnaire for Respiratory Protective Equipment. Take the questionnaire with you to your Occupational Medicine evaluation.

• Approval to wear a respirator is granted by the Occupational Medicine physician and you will be given a Medical Approval for Respirator Use form.

2. Training and Fit Testing

• Sign up for a Respirator - Initial Certification class by calling EH&S at (515) 294-5359. Bring the Medical Approval for Respirator Use form obtained at Occupational Medicine to class.

• Respirator – Initial Certification class will include training and individual fit testing. All respirator models available at Central Stores are available for fitting at EH&S. At the successful completion of the class, EH&S will issue a Respirator Prescription, listing respirator type, size, and cartridge type.

3. Purchase Your Respirator

• Present the Respirator Prescription and a Central Stores requisition at Central Stores (192 General Services Bldg) to purchase a respirator.

Continued required use of a respirator will require you to attend Respirator Recertification class annually. EH&S will notify program participants of their recertification due date.

Exposure Monitoring

Environmental Health and Safety is responsible for monitoring asbestos abatement projects to quantify exposure levels to ensure that employees are not exposed to airborne asbestos fiber concentrations in excess of the OSHA Permissible Exposure Limit (PEL) of 0.1 fibers per cubic centimeter (f/cc) over an 8-hour time-weighted average (TWA) or 1.0 f/cc for a 30-minute, short-term excursion limit (STEL), as determined by NIOSH Method 7400. University abatement personnel and contracted abatement workers are notified of these monitoring results in accordance with OSHA regulatory requirements.
Environmental Health and Safety periodically collects ambient air samples to evaluate the potential hazards posed by asbestos to building occupants and to ensure that asbestos fibers have not been released from the regulated work area during asbestos abatement projects. Following abatement activities and successful completion of a visual inspection of the work area, EH&S will conduct clearance air testing to determine that the area is documented safe for re-occupancy. All clearance testing samples must indicate fiber concentrations of 0.01 f/cc or lower, with a 95% upper confidence limit for release of the work area. Areas exceeding clearance testing limits will be re-cleaned and re-tested until satisfactory levels are measured.
K. Emergency Procedures

General

Responses to emergency situations are pre-planned during asbestos abatement projects. Emergency situations that may occur will be covered by the contractor and EH&S prior to any project. Specific emergency references are listed in the University Asbestos Abatement Specifications and should be present on the construction site.

Minor Fiber Release Episode

In the event of any uncontrolled or unintentional disturbance of less than 3 linear or 3 square feet of falling or dislodged asbestos-containing material (ACM), resulting in a visible emission, the following procedures need to be followed:

- Restrict access into the area.
- Do not attempt to clean.
- Notify EH&S at (515) 294-5359.

EH&S will do the following:

- Post signs and demarcate the restricted area.
- Ensure only trained personnel enter the restricted area.
- Thoroughly saturate the debris using wet methods.
- Clean the area using HEPA filtered vacuums and wet methods.
- Place any asbestos debris in a leak tight sealed container.
- Repair the area of damage using non-asbestos containing materials.

Major Fiber Release Episodes

In the event of any uncontrolled or unintentional disturbance of more than 3 linear or 3 square feet of falling or dislodged asbestos-containing material, resulting in a visible emission, the following procedures need to be followed:

- Restrict entry into the area.
- Do not attempt to clean.
- Notify EH&S at (515) 294-5359.
EH&S will do the following:

- Post signs and demarcate the restricted area.
- Ensure only trained personnel enter the restricted area.
- Shut off or modify air handling systems to prevent migration of fibers to other areas.
- EH&S will design a response action in accordance with the severity of the situation.
L. Asbestos Waste Collection and Disposal

Collection and disposal of asbestos-containing waste generated by removal activities at Iowa State University must comply with state and federal regulations and the ISU Asbestos Abatement Specifications.

Asbestos-containing waste must be sealed in leak-tight packaging while wet, labeled, and disposed of in a local EPA-approved landfill. Polyethylene bags require double bagging, with a minimum thickness of 6-mils for each bag. Drums may be metal, plastic or fiber. All bags and containers of asbestos-containing waste must be labeled accordingly:

- OSHA danger label
- EPA waste generator identification label
- DOT hazard class label

Asbestos waste generated by in-house and hourly contract projects is accumulated in a secure, closed-top dumpster coordinated by EH&S. When the asbestos dumpster is full, EH&S will prepare a manifest describing and listing the amount of waste for transport and burial at the Boone County Landfill. Disposal fees are the responsibility of the department generating the ACM waste.

Request for Quote (RFQ) bid projects contractually specify the awarded abatement contractor is responsible for the safe and legal storage, transportation, and disposal of asbestos waste generated by the project, and is responsible for all disposal fees.
Asbestos Safety Manual

###Appendix A

**Asbestos Containing Material (ACM)**

Note - The following list of materials is intended as a general guide to represent which types of materials may contain asbestos and is by no means all inclusive.

<table>
<thead>
<tr>
<th>ACM Material</th>
<th>ACM Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement Asbestos Pipes</td>
<td>Laboratory Hoods</td>
</tr>
<tr>
<td>Cement Asbestos Wallboard</td>
<td>Laboratory Gloves</td>
</tr>
<tr>
<td>Cement Asbestos Siding Racks</td>
<td>Laboratory Bench Tops/Drying</td>
</tr>
<tr>
<td>Vinyl Floor Tile</td>
<td>Electric Wiring Insulation</td>
</tr>
<tr>
<td>Linoleum</td>
<td>Electrical Ducts/Vaults</td>
</tr>
<tr>
<td>Floor Backing</td>
<td>Electrical Panel Partitions</td>
</tr>
<tr>
<td>Construction Mastics (floor tile, ceiling tile, etc.)</td>
<td>Cooling Towers</td>
</tr>
<tr>
<td>Acoustical Plaster</td>
<td>Elevator Brake Shoes</td>
</tr>
<tr>
<td>Decorative Plaster</td>
<td>Elevator Equipment Panels</td>
</tr>
<tr>
<td>Textured Paints/Coatings</td>
<td>Pipe Insulation/Wraps</td>
</tr>
<tr>
<td>Ceiling Tiles</td>
<td>Pipe Fittings</td>
</tr>
<tr>
<td>Fireproofing</td>
<td>Duct Insulation</td>
</tr>
<tr>
<td>Sprayed-on Insulation</td>
<td>Duct Seam Tape</td>
</tr>
<tr>
<td>Troweled-on Insulation</td>
<td>Vibration Dampening Cloth</td>
</tr>
<tr>
<td>Blown-in Insulation</td>
<td>Window Glazing</td>
</tr>
<tr>
<td>Poured-in Insulation</td>
<td>Calking/Putties</td>
</tr>
<tr>
<td>Fire Blankets</td>
<td>Thermal Paper Products</td>
</tr>
<tr>
<td>Fire Curtains</td>
<td>Roofing Shingles</td>
</tr>
</tbody>
</table>
Asbestos Containing Material (ACM)

<table>
<thead>
<tr>
<th>Fire Door Insulation</th>
<th>Roof Flashing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve Packings</td>
<td>Rolled Roofing</td>
</tr>
<tr>
<td>Drywall/Wall Board</td>
<td>Built-up roofing</td>
</tr>
<tr>
<td>Drywall Tape</td>
<td>Roof Patching Cement/Tar</td>
</tr>
<tr>
<td>Joint/Taping Compounds</td>
<td>Adhesives</td>
</tr>
<tr>
<td>High Temperature Gaskets</td>
<td>Stage Lighting</td>
</tr>
<tr>
<td>Boiler/Tank Insulation</td>
<td>Chalkboards</td>
</tr>
<tr>
<td>Boiler Refractory</td>
<td>Breeching Insulation</td>
</tr>
<tr>
<td>Mortar</td>
<td>Vinyl Stair Treads</td>
</tr>
</tbody>
</table>
Non-discrimination Statement

“Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3350 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515 294-7612, email eooffice@iastate.edu”