ASBESTOS MANAGEMENT PROGRAM

THE UNIVERSITY OF MICHIGAN
PLANT OPERATIONS

Ann Arbor, Michigan 48109
Plant Operations
Asbestos Management Program
Table of Contents

I. Purpose and Scope 1
II. Definitions 1
III. Responsibilities 1
   A. Department 1
      1. Management 1
      2. Employees 1
   B. Occupational Safety and Environmental Health Department 2
IV. Procedure 2
   A. Adoptions by reference 2
   B. Hazard Assessments 2
   C. Training 3

Annex B: Asbestos Containing Floor Tile Removal Procedure 43
Annex C: Asbestos Containing Caulk on Ductwork 51
Annex D: Asbestos Containing Countertop Removal 56
Annex E: Asbestos Containing Material from Underground High Voltage Vaults 61
Annex F: Asbestos Compliance Checklist 67
University of Michigan Plant Operations
Asbestos Management Program

I. PURPOSE AND SCOPE

A. Purpose: The purpose of this management program is to reduce or eliminate the risk of employee exposure to asbestos containing materials. The requirements and procedures associated with asbestos removal activities are also outlined for those individuals that have been trained to perform those activities.

B. Scope: All general industry and construction industry employees of Plant Operations and its separate departments and for applicable University buildings.

II. DEFINITIONS

See Annex A.

III. RESPONSIBILITIES

A. Department

1. Management

   a. Supervisor will effectively enforce compliance of this program’s procedures, including the use of disciplinary action, for any violations or deviations from the procedures outlined in this program.

   b. Supervisors will assure employees practice safe work procedures in accordance with their training, and use the proper equipment and controls.

   c. Supervisor will insure that the equipment required for compliance with this program is in proper working order when issued to the worker, and made readily available for use by their employees.

   d. Supervisor will periodically reassess the hazards their workers are exposed to. Supervisors will specifically reassess the hazards their workers are exposed to when duties, procedures, or personnel change. Supervisors will change their hazard assessments and conduct additional PPE training, when PPE requirements change.

   e. Supervisors will promptly investigate and report all on-the-job accidents or job related health problems.

   f. Supervisors will provide asbestos awareness training for every Plant employee who may come into contact with asbestos or asbestos containing materials during the normal course of work.
2. Employees
   a. Employees will report any suspect materials to supervisor prior to disturbance.
   b. Employees will report accidental disturbances to your supervisor.
   c. Employees will comply with the procedures of this program, and use the PPE required for their duties, as assessed by this program.
   d. Employees will consult with their supervisor, OSEH, or other knowledgeable personnel, when they have questions regarding their safety.
   e. Employees will report any accidents or job related injuries or illnesses to their supervisor and seek prompt medical treatment, if necessary.

B. Occupational Safety and Environmental Health (OSEH)
   1. OSEH will provide technical assistance on hazard assessment, exposure control and regulatory compliance, when called upon.
   2. OSEH will provide training, training guidance and assistance, as required.
   3. OSEH will make periodic hazard assessments and inspect work sites pursuant to this program, to insure the safety of University employees’

IV. PROCEDURE
A. Adoptions by reference
   1. Plant Operations adopts the University of Michigan’s Asbestos Management Guideline as its base Asbestos Management Program (see Annex A).
   2. Plant Operations adopts the University of Michigan’s Asbestos Floor Tile Removal Procedure as part of its Asbestos Management Program (see Annex B).
   3. Plant Operations adopts the University of Michigan’s Asbestos Compliance Checklist as part of its Asbestos Management Program (see Annex C).
   4. Procedures and requirements for obtaining respirators are outlined in the Plant Operation Respiratory Protection Program and the University of Michigan Respirator Guideline.
   5. Other University or Plant Operations programs may contain additional guidance for selection and use of PPE for specific situations or tasks.

Consult these programs as necessary to insure adequate protection is maintained.
B. Exposure Assessments

Exposure assessments for Plant Operations’ work with asbestos or asbestos containing materials will be performed as delineated under Asbestos Abatement Compliance and Asbestos Surveys, which may be found in Annex A.

C. Training

1. Asbestos awareness training for newly hired employees will be conducted as part of safety orientation training as outlined in the Plant Operations Safety Training Program. Training for employees hired in the past will be done as part of regularly scheduled annual retraining.

2. All asbestos awareness training will be documented as required in the University’s Asbestos Management Program Guideline and the Plant Safety Training Program.

3. All workers that are assigned to conduct work on asbestos or asbestos containing materials will receive training on identification and characteristics of asbestos, the history of its use as a building and insulating material, the potential health hazards associated with asbestos exposure, applicable laws and regulations and appropriate procedures for reporting and removing asbestos hazards.

4. All training will be documented as required in the Plant Ops Safety Training Program.
ANNEX A
This Guideline is issued by the Department of Occupational Safety & Environmental Health to provide guidance and consistency in management of asbestos containing materials at the University of Michigan.

**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary</td>
<td>2</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Reference Regulations</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Definitions</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Responsibility</strong></td>
<td>5</td>
</tr>
<tr>
<td>Supervisors</td>
<td>5</td>
</tr>
<tr>
<td>Employees</td>
<td>5</td>
</tr>
<tr>
<td>UM – Architecture, Engineering &amp; Construction (AEC)</td>
<td>6</td>
</tr>
<tr>
<td>OSEH</td>
<td>6</td>
</tr>
<tr>
<td><strong>Procedures</strong></td>
<td>7</td>
</tr>
<tr>
<td>Asbestos Abatement Compliance</td>
<td>7</td>
</tr>
<tr>
<td>Asbestos Surveys</td>
<td>7</td>
</tr>
<tr>
<td>Asbestos Abatement Contractors</td>
<td>7</td>
</tr>
<tr>
<td>In-House Trained Personnel</td>
<td>7</td>
</tr>
<tr>
<td>Air Monitoring</td>
<td>8</td>
</tr>
<tr>
<td>Notification Procedures</td>
<td>9</td>
</tr>
<tr>
<td>Regulated Areas</td>
<td>10</td>
</tr>
<tr>
<td>Methods of Abatement</td>
<td>10</td>
</tr>
<tr>
<td>Respiratory Protection</td>
<td>10</td>
</tr>
<tr>
<td>Protective Clothing</td>
<td>11</td>
</tr>
<tr>
<td>Hygiene Facilities</td>
<td>11</td>
</tr>
<tr>
<td>Training Requirements</td>
<td>12</td>
</tr>
<tr>
<td>Housekeeping and Disposal</td>
<td>13</td>
</tr>
<tr>
<td>Medical Surveillance</td>
<td>13</td>
</tr>
<tr>
<td>Recordkeeping</td>
<td>14</td>
</tr>
<tr>
<td><strong>Related Documents</strong></td>
<td>14</td>
</tr>
<tr>
<td><strong>Technical Support</strong></td>
<td>15</td>
</tr>
</tbody>
</table>
SUMMARY: Asbestos is a naturally occurring group of fibrous minerals. It was added to many building materials because it is heat and chemical resistant, strong, and not easily degraded. Asbestos was widely used in building materials prior to 1980. Approximately 75% of the University’s buildings were constructed before this time. Asbestos containing materials can also be found in building materials used after 1980, although it is rare. Asbestos is primarily found in insulation around pipes, ducts, and tanks. Other asbestos containing materials are sprayed-on fireproofing, troweled-on plaster, fire doors, wallboard, fume hood linings, linoleum, laboratory countertops, and floor tiles.

Asbestos becomes a concern when fibers become airborne. Materials that can be crumbled or reduced to powder by hand pressure are considered to be “friable”, meaning they have the potential to become airborne. Intact, sealed, and undisturbed materials do not present an exposure risk. When materials are exposed or disturbed, asbestos fibers can become airborne, and exposure may result from fibers being inhaled. Studies have shown that some individuals exposed to asbestos fibers have developed lung cancer, asbestosis (scarring of the lungs), and mesothelioma (cancer of the lining of the lung or abdomen). These diseases have generally been observed after long-term exposures from activities that directly disturb asbestos containing materials (ACM). Typically, the diseases do not develop until 10 to 40 years after exposure.

OSEH, in conjunction with UM–Plant Operations and UM–Architecture, Engineering & Construction (AEC), has maintained an Asbestos Management Program on campus for several years. The UM-Housing Division has also maintained a comprehensive Asbestos Management Program that covers all student housing facilities. The management programs follow the Environmental Protection Agency’s (EPA) philosophy, which is detailed in a document titled “Managing Asbestos in Place”. The agency recommends a pro-active in-place management program rather than requiring removal of all asbestos materials. This strategy involves the identifying ACM, maintaining those materials in good condition and removing ACM as needed during maintenance or renovation activities.
SCOPE:
This Guideline has been developed to inform the University community of the Asbestos Management Program for University buildings. The purpose of a management program is to reduce or eliminate the risk of employee exposure to asbestos containing materials. The requirements and procedures associated with asbestos removal activities are also outlined for those individuals that have been trained to perform those activities.

REFERENCE REGULATIONS:
- **Asbestos for General Industry**: MIOSHA Part 305 and OSHA 29 CFR 1910.1001
- **Asbestos Standards for Construction**: MIOSHA Part 601 and OSHA 29 CFR 1926.1101
- **Asbestos Model Accreditation Plan** (MAP): 40 CFR 763 (Appendix C)
- **Asbestos Workers Accreditation Act**: Michigan Act 440, P.A. of 1988
- **Asbestos Abatement Contractors Licensing Act**: Michigan Act 135, P.A. of 1986

DEFINITIONS:
- **Asbestos** – includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, and actinolite asbestos, and any of these materials that have been chemically treated and/or altered.

*Asbestos Containing Material (ACM)* – is a material that has been tested and determined to contain more than 1% asbestos, or is assumed to be in the absence of testing. Also refer to the definition of **Presumed Asbestos Containing Material** (PACM).

Exposure to asbestos occurs when airborne fibers are inhaled into the lungs. The Michigan Occupational Safety and Health Administration (MIOSHA) set the permissible exposure limit (PEL) at 0.1 fibers per cubic centimeter as a time-weighted average (TWA) over an 8 hour workday. There should be no exposure in excess of the Short Term Excursion Limit (STEL), which is 1.0 fiber per cubic centimeter of air as a 30-minute TWA.

- **Asbestosis** – scarring of lung tissue (around terminal bronchioles and alveolar ducts) resulting from the inhalation of asbestos fibers.

- **Authorized Person** – is any person authorized by the employer and required by work duties to be present in regulated areas.

- **Class I Asbestos Work** – are activities involving the removal of thermal systems insulation (TSI) and surfacing ACM and PACM.

- **Class II Asbestos Work** – is activity involving the removal of ACM that is not thermal system insulation or surfacing material. This includes, but is not
limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding, and construction mastics.

*Class III Asbestos Work* – is repair and maintenance operations, where ACM, including thermal systems insulation and surfacing ACM and PACM, is likely to be disturbed.

*Class IV Asbestos Work* – is maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

*Disturbance* – is activity that disrupts the matrix of ACM, crumbles or pulverizes ACM, or generates visible debris from ACM. Disturbance includes cutting away small amounts of ACM, no greater than the amount which can be contained in one standard sized glovebag or waste bag in order to access a building component. In no event shall the amount of ACM disturbed exceed that which can be contained in one glovebag or waste bag which shall not exceed 60 inches in length and width.

*Enclosure* – means an airtight, impermeable, barrier around an ACM designed to prevent the release of asbestos fibers into the air.

*Fiber* – means a particulate form of asbestos 5 micrometers (µm) or longer, with a length-to-diameter ratio of at least 3 to 1.

*Friable* – means asbestos-containing material that when dry, can be easily crumbled or pulverized to powder by hand pressure and is therefore likely to emit fibers.

*Glovebag* – is not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

*High-Efficiency Particulate Air (HEPA) Filter* – is a filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 µm in diameter.

*Intact* – means that the ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

*Mesothelioma* – is a rare form of cancer of the lining of the lung or abdomen.
**Negative Exposure Assessment** – means a demonstration by the employer, that employee exposure during an operation is expected to be consistently below the Permissible Exposure Limit (PEL) and Excursion Limit (EL). It is job specific and the workplace conditions, type of material, control methods, work practices, and environmental conditions must closely resemble those of the activity to be represented.

**Presumed Asbestos Containing Material (PACM)** – is thermal system insulation and surfacing material found in buildings constructed no later than 1980. All materials meeting this definition must be presumed to be asbestos containing and handled as such unless analytical testing proves otherwise.

**Regulated Area** – is an area established by the employer to demarcate areas where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limits.

**Surfacing Material** – is material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).

**Thermal System Insulation (TSI)** – is ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

**RESPONSIBILITY:** **Supervisors**

Assure employees who are required to be trained receive training in accordance with this Guideline.

Assure employees practice safe work procedures in accordance with their training, and use the proper equipment and controls.

Assure that employees are not disturbing any materials that are suspected to contain asbestos. Contact OSEH for testing at 7-1142 or the UM-Plant Operations Plumbing Shop at 3-4327 for clean-up/repair if ACM is accidentally disturbed.

Follow Work–Connections procedures for any accident, injury, or exposures. [http://www.umich.edu/~connect/forms.htm](http://www.umich.edu/~connect/forms.htm).

Contact OSEH to request technical assistance.

**Employees**

Report any suspect materials to supervisor prior to disturbance.

Report accidental disturbances to your supervisor.
Perform asbestos removal activities as trained for in a safe manner following all regulations and this Guideline while wearing appropriate personal protective equipment as necessary for the type of job performed.

**UM – Architecture, Engineering & Construction (AEC)**

Request asbestos surveys during the design phase of any project that may involve the disturbance of suspect asbestos containing materials.

Conduct oversight of projects involving asbestos related activities. This includes ensuring that demolition activities do not disturb asbestos materials.

Ensure that OSEH is notified prior to the start of all abatement activities.

Contact OSEH to report any accidental disturbances of asbestos or to have any suspect materials tested.

**OSEH**

Review and revise the Asbestos Management Program Guideline as necessary.

Coordinate and contract industrial hygiene services to survey and label ACM in buildings and monitor asbestos abatement activities.

Prequalify asbestos abatement contractors and provide information to UM-Architecture, Engineering & Construction and UM-Purchasing Department.

Provide training or coordinate the scheduling of external training as necessary.

Provide technical assistance upon request.

Serve as a University liaison for local, county, and state agencies regarding asbestos issues and inspections.

Review and revise University asbestos contract specifications in conjunction with UM – Architecture, Engineering & Construction Management, as necessary.

Maintain all records of ACM and employee exposures.

Schedule and maintain records of all medical surveillance services, training, air monitoring, and building surveys.
PROCEDURES:  ASBESTOS ABATEMENT COMPLIANCE

A. Asbestos Surveys

An asbestos survey is conducted prior to any renovation of any building, regardless of the date of construction. Representative samples are taken of every suspect material, which are analyzed at an independent laboratory. All surveys are conducted according to the requirements set forth in the MIOSHA Asbestos Standards for Construction. Any thermal systems insulation (TSI) material or surfacing material not tested must be presumed to be asbestos containing and handled accordingly. A scope of asbestos work will be developed for each project that outlines the materials present as well as the abatement techniques to be utilized.

B. Asbestos Abatement Contractors

The majority of renovation projects involving asbestos containing materials are managed by UM-Architecture, Engineering & Construction. An asbestos abatement contractor is usually retained for abatement either by direct contract or as a subcontractor to a general contractor.

All asbestos abatement contractors must be prequalified to bid on University projects. Prequalification of asbestos contractors is conducted through the OSEH Department and approval is submitted to Architecture, Engineering & Construction, Construction Management and Purchasing Department.

All contractors are required to follow “Section 13280- Asbestos Abatement” of the University Master Specification (Appendix A) which would be included in the bid documents. The specification will be modified for each project according to the scope of the abatement work to be affected.

C. In-House Trained Personnel

Renovation and maintenance projects may also be conducted by in-house trained personnel. Several groups within UM-Plant Operations can conduct abatement activities for these projects. There are also other University Departments that have been trained to conduct routine maintenance activities within their respective areas as well.

All workers are trained and accredited as required by the Asbestos Standards for Construction and the State of Michigan Asbestos Worker Accreditation Act.
The following groups at the University have individuals trained as asbestos workers:

**UM-Plant Operations Plumbing Shop** – insulators trained as 40-hour asbestos competent persons capable of performing all classes of work.

**UM-Plant Operations Roofing Department** – trained as 40-hour asbestos competent persons, although work is restricted to roofing repair work.

**UM-Plant Operations Construction Services** – trained for Intact Floor Tile and Counter Top Removal (Class II).

**UM-Housing** – trained for Intact Floor Tile Removal (Class II) and Operations and Maintenance (Class III).

**UM-Athletics** – trained in Operations and Maintenance (Class III).

**UM-Plant Operations Sheet Metal & Construction Services** – trained in Class II Duct Caulk Removal.

### D. Air Monitoring

The OSEH Department hires independent consultants to conduct asbestos air monitoring during ACM removal projects conducted by asbestos abatement contractors as well as in-house personnel. The consultants typically conduct personal, area, and final clearance monitoring to ensure that fiber levels are below established standards.

The method of sampling is [NIOSH Method 7400](https://www.cdc.gov/niosh/nmgi/method7400.html) (Asbestos and Other Fibers by PCM – Phase Contrast Microscopy). The method involves collection of a volume of air on 25 mm Mixed Cellulose Ester filters and on-site analysis using an optical microscope. All consultants are required to complete the NIOSH 582 course for asbestos fiber counting.

The MIOSHA permissible exposure limit (PEL) for employee exposures to airborne asbestos is 0.1 fibers per cubic centimeter of air (f/cc) as an 8-hour time weighted average (TWA). The Excursion Limit (EL) is 1.0 f/cc as a 30-minute sample that should not be exceeded.

The State of Michigan clearance level of 0.05 f/cc is required for any project involving more than 10 linear or 15 square feet or more of friable material that is performed within a negative pressure enclosure. The University strives to ensure that the
clearance levels are below the EPA recommended level of 0.01 f/cc.

University employees’ personal exposures are maintained in a database at the OSEH department. The exposures are categorized by type of removal to serve as a negative exposure assessment as required by the MIOSHA standard. A negative exposure assessment is job specific and the work place conditions, type of material, control methods, work practices, and environmental conditions must closely resemble those of the activity to be represented. The assessment can be used to show that levels for a given job will be below the PEL and EL, so that lower levels of respiratory protection can be used.

E. Notification Procedures

1. Occupant Notification – Every effort should be made to pre-notify individuals who work in or adjacent to areas where asbestos activities will take place. The notification should include the presence, location, and quantity of ACM at the site and can be verbal or written. OSEH accomplishes this task by sending a written notice to the building contact(s) for the area prior to abatement activities. The building contacts are then expected to convey the information to the affected persons.

This notice is also sent to the Construction Project Manager who is instructed to inform other employers of employees, i.e. other contractors, who may be working in the area. The in-house abatement members accomplish notification on their own through the use of a fill-in form that is posted outside the work areas and/or verbally to individuals in area prior to start of work. Refer to Appendix B for examples of these notification forms.

2. State of Michigan Notification – Asbestos abatement contractors are required to submit notification forms to the Michigan Department of Labor and Economic Growth (MDLEG) for all removals of regulated asbestos materials exceeding 10 linear feet or 15 square feet.

They are also required to submit notification to the Michigan Department of Environmental Quality (MDEQ) for removals of regulated material exceeding 260 linear feet or 160 square feet.

The University in-house personnel are required to submit notification to the MDEQ only if their jobs are above the cutoff limits. Notifications must be filed 10 days (calendar days for MDLEG, working days for MDEQ) prior to the start of the job. Copies of all notifications are maintained at OSEH and should be
posted at the job site for the duration of the project. Any changes to the notification must be approved by the agency.

F. Regulated Areas

All Class I – III work must be conducted within a regulated area. A regulated area must have the following:
1. Must be demarcated in a manner to restrict persons from entering and protect from exposure to airborne asbestos.
2. Must have signs posted with the following information:

   DANGER
   ASBESTOS
   CANCER AND LUNG DISEASE HAZARD
   AUTHORIZED PERSONNEL ONLY

   and

   RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA
   (If required for the type of work.)

3. Must require the use of respirators, if required, prior to entry.
4. Must not allow employees to eat, drink, smoke, chew tobacco or gum, or apply cosmetics.
5. Must be supervised by a competent person.

Under no circumstances is a University employee that has not been trained as an asbestos worker allowed to enter a regulated area. Special provisions will be made by OSEH for emergency personnel depending on the situation.

G. Methods of Abatement

All asbestos abatement contractors and in-house employees must follow all requirements for work practices as outlined in Part 3 of “Section 13280 – Asbestos Abatement of the University Master Specification” (Appendix A).

H. Respiratory Protection

Abatement Contractors are responsible for their respiratory protection program and issuance of employee respirators. University employees will be issued respirators by the OSEH department, as required. All employees must be medically cleared
Respirators must be worn when conducting the following:

1. All Class I activities;
2. All Class II activities where ACM is not intact;
3. All Class II and III activities where wet methods are not used;
4. All Class II and III activities that do not have a negative exposure assessment;
5. All Class III work involving thermal systems insulation or surfacing materials;
6. All work where employees are exposed above the PEL/EL;
7. In emergencies.

Respiratory protection that may be issued for asbestos activities includes the following: half-face or full-face tight-fitting air-purifying respirators with HEPA cartridges and Powered Air-purifying respirators (PAPR) with a HEPA filter. All respirators will be quantitatively fit tested at OSEH and all mandatory users will be required to be fit tested annually.

I. Protective Clothing

University employees will be supplied with protective clothing consisting of disposable Tyvek® suits. The suits are required to be worn during Class I operations involving greater than 25 linear feet or 10 square feet, or any operation without a negative exposure assessment, or any operation where exposures will exceed the PEL or EL.

Suits should be routinely inspected for rips or tears while working. Damaged suits should be mended or immediately replaced. All contaminated suits should be disposed as asbestos waste. (Refer to Section L for disposal requirements.)

J. Hygiene Facilities

Decontamination areas must be established for Class I work that is greater than 25 linear or 10 square feet of thermal system insulation or surfacing materials. It must be set up adjacent and
connected to the regulated area. All employees must exit and enter through the decontamination area that must consist of an equipment room, shower area, and clean room in series.

Decontamination is also required for Class I work involving less than 25 linear or 10 square feet, or Class II and III work where exposures exceed the PEL or EL, or where there is no Negative Exposure Assessment. An equipment area must be established adjacent to the regulated area for the decontamination of employees and equipment.

It must consist of an impermeable dropcloth on the floor surface. Work clothes must be HEPA vacuumed before removal, all equipment must also be cleaned prior to removal and employees must enter and exit through the equipment room from the regulated area.

K. Training Requirements

To avoid potential exposure, and in accordance with regulations, only trained and qualified individuals may disturb ACM. Contact OSEH for training, if employees fall into one of these groups or are otherwise likely to disturb ACM:

1. Class I and II Training

Required training for activities that involve the removal of asbestos containing materials which include the following: thermal systems insulation, surfacing materials, wall board, floor tile and sheeting, ceiling tile, roofing materials, and siding. Training is 32 hours for worker level and 40 hours for competent person level.

If individuals are to be trained in Class II operations only, the training will consist of a minimum of 8 hours with hands-on training for the type of material that will be removed. Annual refreshers are required for both classes.

2. Class III Training

Required training for activities that involve the disturbance of thermal system insulation or surfacing materials for the purpose of conducting repair or maintenance activities only. Training is 16 hours with a 4-hour refresher annually.

3. Class IV Training

Required for all maintenance and custodial staff that work in buildings that have asbestos containing materials. Initial training is 2 hours and with refreshers required annually.
L. Housekeeping and Disposal

All asbestos waste and debris must be promptly cleaned up by properly trained workers and disposed in the proper manner. Only HEPA filtered vacuums may be used when vacuuming asbestos materials. All asbestos waste needs to be disposed in an Asbestos-accepting Type II landfill. Refer to the “Section 13280 – Asbestos Abatement of the University Master Specification” for specific waste handling procedures for each type of material (Appendix A).

Abatement contractors are required to arrange for disposal at a proper landfill location and supply OSEH with the final disposition records upon receipt. In-house employees must deliver the waste to the asbestos dumpster located at OSEH’s North Campus Transfer Facility at 1655 Dean Road. A waste shipment record (Appendix C) must be completed and placed in the metal container attached to the dumpster.

All asbestos-containing flooring materials must be maintained in the following manner:

1. Sanding of flooring material is prohibited.
2. Stripping of finishes should be done using low abrasion pads at speeds lower than 300 rpm and wet methods.
3. Burnishing or dry buffing should only be done on flooring that has sufficient finish so that the pad cannot contact the flooring material.

M. Medical Surveillance

The Occupational Safety and Environmental Health Department maintains a Medical Surveillance Program in conjunction with MWorks Occupational Health Services. All employees who engage in Class I, II, or III work, or are exposed at or above the permissible exposure limit for a combined 30 days or more per year will be included in the program for asbestos exposure. Employees otherwise required by this standard to wear a negative pressure respirator, must be physically able to perform the work and use the equipment. This determination shall be made under the supervision of a physician.

OSEH also offers the same medical surveillance examination to employees with significant past asbestos exposure at the University. Involvement is voluntary and is aimed at those individuals who worked with asbestos containing materials routinely, prior to public knowledge of the health effects of asbestos exposure or regulations governing disturbance of ACM. Contact OSEH at 7-1142 if
interested in being included for past exposure or indicate on medical surveillance form.
Medical Surveillance is required upon assignment to a job involving asbestos exposure as indicated previously and annually thereafter. Medical Surveillance will be conducted annually in accordance with the University Protocol for Asbestos Medical Surveillance (Appendix D).

The evaluation can be obtained by indicating that an employee is an asbestos worker on the Medical Surveillance Request Form. The form can be requested from OSEH by calling 5-2140 or downloaded from the OSEH website at: [http://www.oseh.umich.edu/Medical_Surveillance_Request_Form.pdf](http://www.oseh.umich.edu/Medical_Surveillance_Request_Form.pdf).

The completed form will be evaluated by OSEH, and the employee will be contacted directly by the clinic to schedule an appointment.

N. Recordkeeping

All objective data and sampling data for asbestos projects are maintained at OSEH offices. The data will be maintained for as long as it is relied upon. Any information regarding abatement projects will be maintained for the duration of ownership of the building.

All records regarding employee exposures are maintained at OSEH offices. These records must be maintained for 30 years.

Medical Surveillance information regarding asbestos exposures will be maintained by the University’s Health Care Provider. The physician’s written opinion will be maintained in an employee file at OSEH offices. All information will be maintained for the duration of employment plus 30 years.

Training records will be maintained at OSEH offices for 1 year past the last date of employment.
<table>
<thead>
<tr>
<th>RELATED DOCUMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA – Managing Asbestos in Place – A Building Owner’s Guide to Operations and Maintenance Programs for Asbestos Containing Materials</td>
</tr>
<tr>
<td>OSHA – Asbestos Standard for General Industry – An Overview</td>
</tr>
<tr>
<td>OSEH Respiratory Protection Guideline</td>
</tr>
<tr>
<td>MDEQ – Asbestos Fact Sheet</td>
</tr>
<tr>
<td>MDEQ – Asbestos Guidelines</td>
</tr>
<tr>
<td>ATSDR – Toxicological Profile for Asbestos</td>
</tr>
<tr>
<td>ATSDR – ToxFAQ for Asbestos</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TECHNICAL SUPPORT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>All referenced guidelines, regulations, and other documents are available through OSEH (7-1142).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATTACHMENTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix A – Master Specification “Section 13280 – Asbestos Abatement”</td>
</tr>
<tr>
<td>Appendix B – Example Occupant Notification Forms</td>
</tr>
<tr>
<td>Appendix C – University Waste Shipment Record</td>
</tr>
<tr>
<td>Appendix D – OSEH Protocol for Asbestos Medical Surveillance</td>
</tr>
</tbody>
</table>
APPENDIX A

SECTION 13280 - ASBESTOS ABATEMENT

GENERAL

SUMMARY

Refer to Division 1 Section 01100 for information on Work by Owner. Asbestos Abatement Work specified in this section shall be performed by Owner. Work under this Contract shall include coordinating Asbestos Abatement Work performed by the Owner and Owner's Abatement Contractor.

This Section includes removal and disposal of asbestos-containing materials by full enclosure, glove bag, or entire structures methods as applicable. Demolition and debris removal of all asbestos-containing materials identified by provisions of this Section, or shown on drawings, or identified at the site, shall be executed under the provisions of this Section, and other applicable sections of these specifications.

Extent of asbestos removal work is as follows:

1. Indicated on drawings.
2. Surveyed and listed in "Schedule of Items Containing Asbestos" Article in Part 3 of this Section.
3. Surveyed and listed in "Schedule of Items Containing Asbestos" Article in Part 3 of this Section, as specified in related sections, and as indicated on the drawings. Proceed with Work of this Section simultaneously, and in coordination with, remaining Work of the Project.
4. Marked at the site during the pre-bid inspection "walk through".
5. Limited to that required to connect new plumbing work to existing piping.

RELATED SECTIONS

Unit price items are scheduled with related units of measure in Division 1 Section "Unit Prices."

Work of this Section that is affected by alternates is described in Division 1 Section "Alternates."

Demolition and removal of items not containing asbestos as a component is included in Division 2 Section "Selective Demolition."

Pipe re-insulation is included in Division 15 Section "Mechanical Insulation."

DEFINITIONS

Asbestos Abatement Firm: Firm engaged to perform actual removal and disposal work, either as Contractor or subcontractor.

Asbestos Containing Material: The term "asbestos containing material" is abbreviated ACM.

Owner's Consultant: Firm engaged by Owner to identify and measure asbestos containing materials, or to inspect demolition operations, including monitoring of air quality.
OSEH: Owner's Occupational Safety and Environmental Health Department, 1239 Kipke Drive, Ann Arbor, MI 48109-1010; phone (734) 647-1142.

SUBMITTALS

Initial Submittals: Submit the following documents to Owner's Representative at the pre-abatement meeting:

2. Copy of notification sent to appropriate federal, state, and local agencies.
3. Schedule of removal, specifying work locations, length and number of shifts, foreman's name, and crew size.
4. Disposal Site Certification: Letter, signed by the Contractor, certifying that an approved asbestos-accepting type II landfill will be used for disposal. Include the facility name, address, and phone number.

Waste Disposition Submittals: Submit to OSEH signed waste shipment record stating that asbestos waste has been properly disposed. Submit the following:

1. Receipts (trip tickets) from approved landfill.
2. Asbestos Waste Shipment Record: As follows:
   a. Prior to removing asbestos-containing material from the project site, provide Owner's Representative or Owner's consultant with a completed waste shipment record fully complying with Section 61.150 of the NESHAP standard, and 49 CFR Part 172.200 of the U.S. Department of Transportation, and including all required information.
   b. Ensure that the landfill operator provides a signed copy of the waste shipment record to OSEH within 35 days of the date that asbestos-containing material is removed from the project site. If waste is not transported directly from the project site to the landfill, the waste shipment record shall reflect each transfer.
   c. The Owner will not make final payment prior to receipt of signed waste shipment record.

Contract Closeout Submittals: Comply with the following additional requirements of Division 1 Section "Project Closeout":

1. Asbestos Quantity Removal Report: Submit 3 copies of asbestos quantity removal report to Owner's Representative at least 4 weeks prior to Contractor's application for final payment. Include information in the following format:
   a. Quantities of Asbestos Removed:
      Asbestos insulation removed from _________ ft. of _________ inch diameter pipes.
      _________ square feet of asbestos insulation removed from ducts, chiller surfaces, equipment, etc.
      _________ square feet of asbestos-containing debris removed from project area.
      _________ square feet of asbestos-containing floor covering.

2. Statement of Visual Inspection: Prior to application for final payment, submit to OSEH a statement of visual inspection signed by the Contractor's competent person/supervisor. Include the following:
a. Name of licensed contractor conducting work.
b. Name, signature, and title of on-site supervisor.
c. Name, location, and start and finish date of abatement work.
d. Current date.
e. Statement that the work was completed according to applicable federal, state, and local laws, and these specifications.
f. Statement that the Asbestos Abatement Firm's field supervisor has visually inspected the work site and has found no dust, debris, or other suspect asbestos-containing materials that were part of the scope of work.

QUALITY ASSURANCE

Pre-Qualified Asbestos Abatement Firms: Engage one of the following pre-qualified firms to perform abatement of asbestos containing materials:

1. Air Flo Environmental, Inc.
2. Asbestos Abatement, Inc.
3. Brandenburg Industrial Service Co.
4. BURDCO-LVI Environmental.
5. Certified Abatement Services, Inc.
6. Dependent Insulation Company
8. Downriver Maintenance Corporation
10. Great Lakes Environmental
11. Hazar-bestos Corporation
12. Industrial Waste Cleanup, Inc.
13. Mechanical Insulation Services, Inc.
15. Midwest Environmental Control, Inc.
16. National Environmental Group, LLC
17. Next Generation Environmental, Inc.
18. Northstar Environmental Services, Inc.
19. Premium Abatement, LLC
20. Professional Abatement Services, Inc.
21. Pro-Tech Environmental, Inc.
22. Probe Environmental, Inc.
23. Qualified Abatement Services, Inc.
24. Quality Environmental Services, Inc.
25. Rand Environmental Services, Inc.
26. Trust Thermal Abatement, Inc.
27. Toltest (United Enviro-Tech), Inc.
28. Wolverine Environmental Services, Inc.

Regulatory Requirements: Make all necessary notifications to the appropriate federal, state, and local agencies.
The National Emission Standards for Hazardous Air Pollutants (NESHAP), Asbestos regulation 40 CFR 61, Sub-Part M requires that if at least 80 lin. meters (260 lin. ft.) of friable asbestos materials, at least 15 sq. meters (160 square feet), or 1 cu. meter (35 cu. ft.) of friable asbestos materials, or other facility components are stripped or removed while renovating a facility, all the requirements of section 61.147 apply.

When applicable, notify the Michigan Department of Environmental Quality (MDEQ), the Michigan Department of Consumer and Industry Services (MDCIS), and appropriate state and local regulatory agencies. No work shall be conducted without notification of authorities having jurisdiction.

Pre-Abatement Meeting: Approximately 2 weeks prior to scheduled start of the abatement project, the Owner's Representative will hold a pre-abatement meeting with the individuals indicated below:

1. Contractor's representative.
2. Asbestos Abatement Firm's representative.
3. OSEH representative.
4. Owner's consultant.
5. Owner's Representative.
6. Owner's building maintenance personnel.

The meeting agenda will include:

1. Review of the scope of work.
2. Removal methods to be used.
3. Review of Contractor's initial submittals.
4. A walk-through survey of the site, if appropriate.

For small projects, the meeting may be suspended at the discretion of the Owner's Representative. If the meeting is suspended, deliver required initial submittals to the Owner's Representative's office 2 weeks prior to the start of work.

PRODUCTS (NOT APPLICABLE)

EXECUTION

ASBESTOS ABATEMENT, GENERAL

Conduct asbestos abatement operations in a manner that fully protects Contractor's and subcontractor's employees, the general public, and building occupants from exposure to asbestos and other safety and health hazards.

Asbestos abatement projects shall be directly supervised by a competent person as described in 29 CFR 1926.1101.

The supervisor/competent person must complete responsibility checklists throughout all phases of the project.

Protect adjacent areas, materials and surfaces from damage due to demolition operations, including but not necessarily limited to the following:

1. Water damage.
2. Dirt, dust and debris.
3. Abrasion.
4. Cuts and scratches.
5. Holes from fasteners for temporary barriers.

All asbestos work shall be conducted within a regulated area that complies with the following requirements:

1. Post a sufficient number of signs required by 29 CFR 1926.1101 at the asbestos abatement area and at every work area entrance, so that tenants, Owner's personnel, and other contractor's employees have an opportunity to take protective measures before exposing themselves to asbestos. Place banners if necessary to secure open areas. Include information on signs indicating location and quantity of asbestos-containing material.
2. Allow only authorized, properly protected personnel to enter the regulated area. Immediately report unauthorized individuals entering the work area to OSEH or the Owner's consultant.

When required, provide employees and inspectors authorized to enter the regulated area with protective work clothing consisting of disposable Dupont "Tyvek" (or equivalent) full body coveralls, head covers, boots, and other necessary safety gear, including a hard hat and eye protection.

Provide respiratory protection to employees as required by current OSHA regulations including 29CFR 1910.134 and 1926.1101:

1. Provide asbestos abatement workers with powered air purifying respirators (PAPR) with full facepiece and HEPA filters for adequate protection during asbestos material removal operations. Respiratory protection may be downgraded if negative exposure assessment indicates that less protection is required.
2. A half-face respirator or PAPR must be worn while tearing down and setting up enclosures, while glovebagging, and during pre-cleaning and post-cleaning work.
3. Do not allow respirators to be pulled away from faces while in the work area.
4. Maintain an extra PAPR unit on site at all times for the duration of the abatement project.
5. Provide full facepiece supplied-air respirators operated in pressure demand mode equipped with air auxiliary and pressure self-contained breathing apparatus or HEPA egress filters if required for measured fiber concentrations.

Maintain at each job site and post the following documents:

1. Copy of MDEQ/MDCIS notification.
2. Employee respiratory protection program.
4. Material Safety Data Sheet locator.
5. Company standard operating procedure.
6. This specification section.
7. Material Safety Data Sheets for products used on job.
8. CFR 1926.1101.
10. The foreman's or supervisor's Contractor/Supervisor Accreditation Certificate.
11. State of Michigan Accreditation Certificates and Medical Approval for each worker.
Use the following engineering controls and work practices for all asbestos abatement operations, regardless of measured exposure levels:

1. Vacuum cleaners equipped with HEPA filters to collect all asbestos-containing dust and debris.
2. Wet methods to control exposures during asbestos removal and clean-up, except where proven to be infeasible.
3. Prompt clean-up and disposal of asbestos-contaminated wastes and debris in leak-proof containers.
4. Establish a decontamination area, adjacent and connected to the regulated area, if the Project requires the removal of more than 25 lin. ft., or 10 sq. ft. of thermal systems insulation or surfacing ACM.
5. Establish an equipment area adjacent to the regulated area if the Project requires the removal of less than 25 lin. ft. or 10 sq. ft. of thermal systems insulation or surfacing ACM.

Do not use any of the following equipment or work practices during asbestos abatement operations, regardless of measured exposure levels:

1. High-speed abrasive disc saws not equipped with point-of-cut HEPA ventilation or HEPA filtered exhaust air enclosures.
2. Blowing with compressed air to remove asbestos-containing materials.
3. Dry sweeping, shoveling, or other dry methods to clean up asbestos-containing dust and debris.
4. Employee rotation as a means of reducing employee exposure to asbestos.

ASBESTOS REMOVAL BY FULL ENCLOSURE METHOD

A. Preparation of the Work Area: Complete the following preparation work prior to beginning asbestos removal operations:

1. Install critical barriers over each opening into the regulated area. The following requirements are in addition to, not in lieu of, other indicated surface and object protection requirements:
   a. Seal each opening between the work area and adjacent areas with not less than 2 layers of 4-mil polyethylene sheeting. Use an expanding-polyurethane foam gun to seal areas with large numbers of pipes, conduits and beams. Openings include, but are not necessarily limited to, windows, skylights, doorways, elevator hoistway openings, corridor entrances, drains, ducts, grills, grates, and diffusers.
   b. Seal intake and exhaust vents and duct seams within the regulated area with not less than 2 layers of 6-mil polyethylene sheeting.
2. HVAC System Shutdown: Owner's maintenance personnel will shut down heating, cooling, and air conditioning systems when necessary. Coordinate scheduling with Owner's personnel and provide 72 hours notice to the Owner's Representative prior to planned shut-down.
3. Protection of Surfaces and Objects: The following requirements are in addition to, not in lieu of, indicated work area sealing requirements. Cover the following surfaces and objects as follows:
   a. Protect all surfaces beneath all removal activity. Remove moveable objects from the work area, and cover fixed objects with impermeable dropcloths or plastic sheeting with edges securely sealed with tape.
b. Cover open tanks with plywood or other solid material.
c. Provide clean, fresh air to mechanical equipment, where required to maintain proper performance of equipment.
d. Fully pre-clean all covered surfaces with amended water and a HEPA vacuum.
e. Cover walls with not less than 2 layers of 4-mil polyethylene sheeting. Construct free-standing enclosure walls of not less than 6-mil polyethylene sheeting, with supports spaced not more than 3 feet o.c.
f. Cover floors with not less than 2 layers of 6-mil polyethylene sheeting. Avoid seams where possible. If seams are necessary, overlap not less than 12 inches and tape joints. Extend sheeting 12 inches up the side walls leaving no seams at the wall and floor joint. Immediately repair punctures and leaks, and clean up seepage.

B. Cleaning:
1. Do not use cleaning methods that raise dust, such as sweeping or using vacuum cleaners not equipped with HEPA filters.
2. Do not disturb asbestos materials during pre-cleaning phases.
3. Treat water removed from the enclosure as asbestos contaminated waste. Fully seal floor drains.

C. Deactivate or install ground-fault circuit interrupters on each electrical circuit within the enclosure.

D. Construct a three-chambered decontamination facility that is adjacent to and connected to the regulated area, and that consists of a dirty room, a shower room, and a clean room in series. Construct decontamination facilities that are exposed to weather of lumber and exterior grade plywood. Secure the facility when not in use. The facility should be equipped with the following:
   1. Supply the equipment room with properly labeled, impermeable bags and containers for the containment and disposal of contaminated protective equipment.
   2. Construct showers that comply with the requirements of 29 CFR 1910.141 (d) (3), with the shower room adjacent to both the equipment room and the clean room. Filter water waste and shower water through a 5 micron filter, or remove water from site as asbestos waste.
   3. Equip the clean room with a locker or appropriate storage container for each employee.

E. Employee Decontamination Facilities: Comply with the following requirements:
1. Access the work area only through an approved decontamination system. Lock or block other entrances. Seal emergency exits (for use during a fire or accident) with polyethylene sheeting and tape.
2. Seal the waste pass-out, except during the removal of asbestos waste from the enclosure.
3. Entrance To The Regulated Area: Employees shall enter the decontamination area through the clean room, remove and store clothing, and put on protective clothing and respiratory protection before passing through to the equipment room.
4. Exit From The Regulated Area: Employees shall exit the regulated area by removing gross contamination and debris from their protective clothing. The clothing shall be removed and disposed of in the equipment room into labeled impermeable bags or containers. Employees shall then shower and enter the clean room before changing into street clothes.

F. Local Exhaust Ventilation: Maintain portable air filtration units with a HEPA filter in use during asbestos abatement operations requiring enclosures. Units shall conform to OSHA Standard 1926.1101, Appendix F, and shall be designed in accordance with 40 CFR 61, Subpart M, Section 61.153:

1. Exhaust directly to building exterior. Provide a backup portable air filtration unit at each removal enclosure. Start up ventilation units prior to initiating asbestos removal operations and run until the Owner's consultant has approved their shut-down after cleaning, sampling, visual inspection, and tear-down.

2. Direct air movement within the enclosure away from the employees' work area and toward the air filtration device.

3. Provide not less than 4 air changes per hour within the enclosure.

4. Within the enclosure, through the period of its use, maintain a pressure differential of not less than minus 0.02 water gage with respect to ambient conditions outside the enclosure.

Visually inspect the enclosure for breeches and smoke-test for leaks before work begins, and before the start of each work shift. Make all modifications to the enclosure prior to starting removal work.

G. Asbestos Removal Operations: Comply with the following requirements for asbestos removal operations:

1. Immediately preceding asbestos removal, apply a fine mist of amended water (water and wetting agent) to the asbestos materials and the surrounding area. Keep surrounding areas wet by spraying periodically with amended water. Maintain a high humidity environment to assist in fiber settling.

2. Remove asbestos material using two-person teams, on staging platforms, if necessary.

3. Remove the wet asbestos material as intact sections or components. Carefully lower the material to the floor or place directly into container. Never drop or throw asbestos material on the floor.

4. At working heights between 15 and 50 feet above the floor, place removed asbestos materials in containers at the elevated levels and lower to floor, or place onto inclined chutes or scaffolding for subsequent collection and placement into containers. Clean all debris at the completion of each workday.

5. Once the asbestos material is at ground level, pack in labeled 6-mil polyethylene bags, wet and, if appropriate, hold in drums prior to starting the next section.

6. Use 2 sealed and labeled 6-mil thick bags for storage and transportation of asbestos waste. Standing water shall be in each bag.

7. Wrap large components removed intact in two layers of 6-mil polyethylene sheeting, label, and secure with tape for transport to the landfill. Comply with all wetting requirements.

8. Treat wires, hangers, steel bands, nails, screws, metal lath, tin sheeting, and similar sharp objects removed with asbestos material as asbestos waste. Place in drums for disposal.
9. Label containerized asbestos waste in accordance with OSHA, EPA, and Department of Transportation regulations, as follows:
Label each container with OSHA label that contains the following information:

**DANGER**
**CONTAINS ASBESTOS FIBERS**
**AVOID CREATING DUST**
**CANCER AND LUNG DISEASE HAZARD**

a. Label each container with Owner's and Asbestos Abatement Firm's names and addresses as required by NESHAP. Owner's address is OSEH, 1239 Kipke Drive, Ann Arbor, MI 48109-1010.

b. Label each container with Class 9 Label required by DOT and identify waste as "RQ, Asbestos NA 2212."

10. Prepare a complete and accurate NESHAP Waste Shipment Record (special manifest). Assure all information required by the U.S. Department of Transportation regulation is included. Under "special handling instructions" provide the required DOT identification information: RQ Asbestos 9, NA 2212, PG III.

a. Do not remove waste from site until Owner's Representative has signed and verified the shipment record.

11. Remove containerized asbestos waste daily from site, or store on site in a locked or secured location until ready for final disposal. Obtain approval of Owner's Representative and OSEH representative of the location of disposal containers. Outdoor waste containers shall be fully enclosed and locked. Mark vehicles used to transport waste during the loading and unloading of asbestos waste with a visible sign, as required by NESHAP.

12. Each container shall have excess water evident, or the asbestos waste shall be mixed in a slurry.

H. Post-Removal Operation Requirements: After completion of asbestos removal and clean-up operations, comply with the following requirements:

1. The Asbestos Abatement Firm representative, in presence of Owner's consultant, shall inspect the entire work area for asbestos. Include decontamination unit, all plastic sheeting, seals over doorways, windows, and all other openings.
   a. If any suspect asbestos is found, repeat final cleaning operation, until the visual inspection is satisfactory to the Owner's consultant and the asbestos removal firm. Asbestos not scheduled to be removed as part of the project is exempt.

2. Encapsulate all walls, floors, ceilings, other exposed surfaces, and decontamination facilities after completing the work area inspection.
   a. Remove the inner polyethylene barrier that is not integral to maintaining negative pressure in the enclosure at this time, and post-abatement air samples will be collected by Owner's consultant. Immediately clean any asbestos-containing materials observed behind these secondary barriers.

3. When post-abatement fiber levels are greater than either 0.01 fiber/cc or background level, repeat cleanup operation until the area is below either 0.01 fibers/cc or background level.

4. When the post-abatement samples are in compliance, and the Owner's consultant or OSEH has completed the visual inspection, the enclosure shall be removed.
a. Turn off HEPA filter exhaust units only after all barriers have been removed.
b. A final visual inspection will be conducted by the Owner's consultant or OSEH representative before the Contractor is released from the removal site. The final inspection will include tape, polyethylene sheet, debris, and equipment.

REMOVAL BY NEGATIVE PRESSURE GLOVE BAG SYSTEMS
A. Equipment and Materials: Use the following equipment and materials for each glovebag procedure:
   1. Glovebags fabricated of 6-mil thick plastic without seams at the bottom.
   2. HEPA vacuum system attached to the glovebag and run continuously during operation.
   3. Protective suits and respirators.
   5. Wetting agent.
B. Procedures: Comply with the following glovebag method requirements:
   1. Wrap loose and friable material adjacent to the removal area in 2 layers of 6-mil thick plastic, or otherwise render intact.
   2. Place plastic sheeting on the floor and equipment beneath each glovebag.
   3. Wet-wipe or HEPA vacuum dust and dirt from insulation to be removed.
   4. Install glovebags to completely cover the circumference of pipe or other structure where work is to be done.
   5. Smoke-test glovebags for leaks. Seal leaks prior to use.
   6. Insert and seal equipment that penetrates the bag (spray wands, vacuum nozzles) before insulation is disturbed.
   7. Wet the insulation to be removed before, during, and after the removal.
   8. Provide only bags capable of withstanding constant wetting and evacuation through a HEPA filtered device.
   9. During the performance of glovebag operations removing thermal systems, insulation, or surfacing materials, employ not less than 2 persons, working simultaneously, for each task.
   10. Wipe insulation residue from the pipe prior to application of an encapsulant.
   11. Spray the pipe and glovebag with an encapsulant before the bag is removed from the pipe.
   12. Seal exposed insulation ends with a heavy grade mastic.
   13. Follow glovebag manufacturer's instructions.
   14. Comply with requirements for asbestos waste disposal indicated in "Removal by Full Enclosure Method" of this Section.

C. Unacceptable Conditions and Procedures and Conditions: In general, do not use the glovebag method in conditions that prevent safe completion of the removal process. The following procedures are not allowed during glovebag removal:
1. Removing severely damaged insulation.
2. Overloading glovebag.
3. Sliding or moving insulation or glovebag along pipe.
4. Squeezing bags to remove air.
5. Placing glovebags on pipes or other surfaces that exceed 150 deg. F.
6. Using a glovebag more than once.

**REMOVAL BY ENTIRE STRUCTURES METHOD**

The removal of entire structures without disturbing the asbestos is encouraged. An example is removal of asbestos covered pipe fittings by cutting out the entire pipe section scheduled for demolition.

Obtain Owner's Representative's approval of removal by entire structures method prior to starting the project.

D. Required Procedures: Comply with the following requirements applicable to removal of entire structures:

1. Properly wet all asbestos materials before starting procedure. Ensure that material stays adequately wet throughout the entire procedure by continuing application of water as needed.
2. Properly and fully wrap and label the structure before it is moved or cut out.
3. Provide the equipment necessary for asbestos debris cleaning on site during the procedure.
4. Comply with requirements for asbestos waste disposal indicated in "Removal by Enclosure Full Method" Article of this Section.

**FIELD QUALITY CONTROL**

A. Pre-Notification of OSEH Representative: To permit adequate time to schedule air monitoring, notify the OSEH representative not less than 10 calendar days prior to planned start of all removal operations.

B. Air Monitoring: Except for roofing removal work Owner will retain a professional independent industrial hygiene consultant to collect air samples and oversee the project to insure that compliance with applicable codes, regulations, and ordinances, including 29 CFR 1926.1101, NESHAP, and P.A. 135. The consultant will collect background, contiguous, work area, personal, and post-abatement air samples. OSEH will provide one copy of the report to the Contractor.

1. If contiguous sampling indicates airborne fiber concentrations above 0.01 fibers/cc or background level, work will be stopped unless otherwise approved by OSEH. Work may resume when the source of contamination has been corrected and the contamination has been cleaned to the satisfaction of the OSEH.
2. Glovebag, entire structures, and full enclosure clearance sampling will be by the aggressive PCM method when feasible. Enclosures must be fully dry before sampling.
3. Roofing removal Contractors may provide their own air monitoring in compliance with roofing removal requirements of this Section.

C. Inspection: If during the project, OSEH representative or Owner's consultant determines that work practices either violate applicable rules and regulations or endanger employees, the Contractor's on-site representative shall stop operations
immediately and take corrective action. Cooperate fully with OSEH representative and Owner's consultant.

REMOVAL OF NON-FRIABLE ASBESTOS-CONTAINING MATERIALS

A. Removal of Non-Friable Materials, General: For each type of non-friable asbestos-containing material indicated, comply with the following requirements:

1. Comply with requirements of Article 3.1 of this Section.
2. Conduct non-friable material removal operations to prevent the material from becoming friable during the removal and disposal process. No visible emissions are permitted. If the material does not remain substantially intact, comply with the requirements for friable asbestos removal specified in Articles 3.2 of this Section (except roofing removal).
3. Place impermeable dropcloths on surfaces beneath removal activity.
4. Do not conduct asbestos removal unless the Owner's Consultant is present at the site and OSEH has been notified. For roofing removal projects, notify OSEH prior to start of work.
5. Labeling Containerized Waste: Comply with the requirements of Article 3.2, paragraphs B.9.a. through c. of this Section.

B. Removal of Resilient Flooring Materials:

1. Prior to removal, critical barriers shall be placed over openings to the regulated area. During removal, air in the regulated area shall be filtered through the use of air filtration device(s).
   a. Removal of floor tile with an infrared heat machine eliminates the critical barrier and negative pressure requirements.
2. Prior to removal, clean floors of dirt and debris with vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (brush tools are not permitted). Control odors and fumes with engineering controls.
3. Sanding the floor or related backing is not permitted.
4. Mechanical chipping of vinyl floor tile is prohibited, except when performed in a negative pressure enclosure.
5. Thoroughly wet vinyl floor tile with amended water. Use a slip scraper or equivalent to loosen the floor tile from the floor. Remove the floor tile in an intact state. Keep the floor tile wet throughout the removal and cleanup.
   a. Removal of floor tile using an infrared heat machine eliminates the wetting requirement.
6. Remove vinyl sheet flooring by cutting while wetting the snip-point. Wet sheet flooring during delamination. Rip-up of resilient flooring material is not permitted.
7. Clean resilient flooring of all debris using a HEPA vacuum, wet sweeping, mopping or equivalent and allow time to dry. Dry sweeping is prohibited.
8. Place the resilient flooring material and debris in an asbestos disposal bag. Seal the bag and place it in a properly labeled drum. Comply with the disposal and labeling requirements of this Section.

C. Asbestos Mastic Removal:

1. Clean the floor of all debris using a HEPA vacuum, wet sweeping, mopping or equivalent.
2. Remove as much mastic as possible using an OSEH approved solvent. Control odors and fumes with engineering controls.
3. Perform scraping of residual adhesive and backing using wet methods.
4. After all debris is removed, thoroughly mop the floor and allow time to dry.
5. If shot blasting is used to remove mastic, comply with requirements for friable asbestos removal specified in Article 3.2 of this Section.
6. Properly dispose of all asbestos and solvent waste according to all applicable regulations, and comply with the disposal and labeling requirements of this Section.

D. Asbestos-Containing Siding, Transite Panels, and Laboratory Counter Tops: Remove non-friable asbestos-containing siding, shingles, transite panels, and laboratory counter tops using the following technique:

1. Cutting, abrading, or breaking material is not permitted.
2. Wet material with amended water prior to removal.
3. Carefully disassemble material such as to prevent breakage.
4. Wrap and seal material in two layers 6-mil thick polyethylene, asbestos disposal bags, or equivalent. Seal bags or packages and properly label them with appropriate asbestos warning signs as indicated in "Removal of Non-Friable Materials, General" Article of this Section.
5. Immediately lower to the ground unwrapped or unbagged materials via covered, dust-tight chute, crane, or hoist; or place in an impervious waste bag or wrap in plastic sheet and lower to the ground no later than the end of the work shift.
6. Clean the floor of all debris using a HEPA vacuum, wet sweeping, mopping or equivalent and allow time to dry.
7. Dispose of asbestos waste in accordance requirements of this Section.

E. Non-Friable Asbestos-Containing Roofing Materials: Non-friable asbestos-containing roofing materials may be removed in a non-friable state. This specification does not apply to removal of intact cements, coatings, or mastics. Obtain OSEH review and approval of planned removal operations prior to beginning. Remove non-friable asbestos-containing roofing materials in using the following technique:

1. Each employee who is likely to disturb or handle asbestos material shall have completed an 8-hour training class, and the project shall be supervised by a competent person who has completed the appropriate contractor/supervisor course.
2. Isolate roof level heating and ventilation air intake sources within the regulated area and others that will be affected; or arrange for shut-down the affected ventilation system during removal operations. Acceptable isolation techniques include the following:
   a. Use 20-foot or larger buffer zones.
   b. Installation of HEPA filters over the air intakes.
   c. Erection of horizontal or vertical extensions that relocate the opening of the intake outside or above the regulated area.
   d. Covering the intake with plastic sheeting or other appropriate barrier.
3. Personal protective equipment (PPE), including disposable coveralls and NIOSH approved appropriate high efficiency particulate absolute (HEPA) respirators, shall be worn by personnel if the asbestos containing material is not removed in an intact state.
4. Remove roofing material in an intact state.
5. Use wet methods to remove materials that are not intact, or that are rendered not intact during removal, except where wet methods will create a safety hazard or are otherwise not feasible.
6. Continuously apply a water mist to the blade of power cutting tools, unless a competent person determines that misting will substantially decrease worker safety.

7. When removing roofing felts, collect the dust generated by power roof cutters with a HEPA-filtered dust collector; or immediately vacuum using a HEPA-filtered vacuum along the cut line. For smooth surfaces only, gently sweep wet dust generated from cutting operations, and carefully and completely wipe up the still-wet dust and debris.

8. For removal and repair operations of intact roofing less than 25 sq. ft. in area, the use of wet methods or HEPA vacuuming is not required, provided manual methods do not render the material non-intact and no visible dust is created.

9. Do not drop or throw to the ground asbestos-containing roofing material that has been removed. As soon as practicable, but not later than the end of the work shift, lower debris to ground either by passing or carrying by hand, or by lowering to the ground in a covered, dust-tight chute, crane or hoist.
   a. While on the roof, keep non-intact asbestos-containing materials wet; or seal in impermeable waste bags, or wrap in plastic sheeting.
   b. While on the roof, intact asbestos-containing material is not required to be kept wet, bagged, or wrapped.

10. Upon being lowered to the ground, transfer unwrapped material to a closed receptacle in manner that precludes the dispersion of dust. Dispose of the material in an asbestos-accepting Type II landfill. Notify the landfill that the roofing material contains asbestos and provide waste shipment records to OSEH within 35 days.

11. For removal of intact pipeline asphaltic wrap or roof flashings that contain asbestos, engage a competent person to examine the material and determine whether the material is intact and likely to remain intact during removal. Remove the material using manual methods. Sanding, grinding, or other abrading operations are not permitted. Do not throw or drop materials to the ground. Lower the material in a covered, dust-tight chute, crane, or hoist. Remove debris from the roof at the end of the work shift.

F. Non-Friable Asbestos Containing Exterior Sealant, Caulk, Putty and Window Glazing: Remove exterior non-friable asbestos-containing sealants, caulks, putties and window glazing using the following technique:

1. Any existing loose material shall be HEPA vacuumed prior to removal.
2. The material shall be thoroughly wetted prior to and during its removal.
3. The material should be removed as intact as possible. Manual methods such as scraping or raking shall be used, unless power tools are used that are equipped with HEPA ventilation. If power tools are used comply with Article 3.2 (Asbestos Removal by Full Enclosure Method) of this Section.
4. Asbestos containing materials removed, shall be immediately bagged or wrapped and kept wetted until transferred to a closed receptacle.
5. The removal of windows and other whole building components without disturbing the asbestos is encouraged. An example of this would be removing a window with asbestos containing glazing or caulk by cutting out the entire window scheduled for demolition. Comply with Article 3.4 (Removal by Entire Structures Method) of this Section when removing entire building components containing asbestos.
6. If the material becomes friable during the abatement process, comply with the requirements for friable asbestos removal specified in Article 3.2 (Asbestos Removal by Full Enclosure Method) of this Section.
7. Dispose of all asbestos containing materials, including those removed by the entire structures method, per the requirements of this Section.

SCHEDULE OF ITEMS CONTAINING ASBESTOS

A. Bidding Requirements: Comply with the following requirements related to bidding:

1. Survey quantities provided are approximate. Bidders are required to field investigate as necessary and assume all responsibility to verify the work required and quantities involved for complete asbestos abatement.
2. The building is open for field inspection by all bidders during the bidding period.
3. A "pre-bid orientation meeting" will be conducted to familiarize prospective bidders with site conditions and provide for verification of marked and scheduled quantities, as applicable.

B. The following items have been surveyed and determined to have asbestos as a component:

1. Roofing felts and base flashing.
2. Roofing underlayment.
3. Spray applied insulation.
5. Fire proofing materials.
6. Fire doors.
7. Drywall and drywall taping compounds.
8. Acoustic and decorative plaster.
9. Vinyl asbestos floor tile.
10. Composition sheet flooring.
11. Shaft wall construction.
12. Flooring adhesives.
13. Textured paints and coatings.
14. Laboratory countertops, sinks and shelves.
15. Cabinet liners and bottoms.
16. Laboratory fume hood interior.
17. Vinyl wall coverings.
18. Cement pipes.
20. Piping insulation.
24. Electrical panel partitions.
25. Electrical wiring insulation and electrical cloth.
   a. Assignment of Responsibility: Removal of wire covered with non-friable, asbestos-containing, insulation shall be performed by the electrical (sub)contractor. Electrical (sub)contractor shall accumulate wire in containers furnished by the asbestos abatement contractor. The asbestos abatement (sub)contractor shall seal and dispose of containers as asbestos waste.
26. Underground electric ductbank insulation.

END OF SECTION 13280
## APPENDIX B
EXAMPLES OF OCCUPANT NOTIFICATION FORMS

### NOTICE

**Building:** Kellogg Institute

<table>
<thead>
<tr>
<th><strong>Type of Work:</strong></th>
<th>Removal of Thermal Systems Insulation from piping and Ducts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Floor Tile Removal</td>
</tr>
<tr>
<td></td>
<td>(Removal will be conducted within Full Enclosure for majority of work and selected areas of piping will be removed utilizing the glovebag method.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Quantity:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>7,500 Linear Feet of Pipe Insulation</td>
</tr>
<tr>
<td>18,000 Square Feet of Duct Insulation</td>
</tr>
<tr>
<td>10,800 Square Feet of Floor Tile</td>
</tr>
<tr>
<td>3385 Square Feet of Floor Mastic</td>
</tr>
<tr>
<td>580 Square Feet of Lab table tops</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Location:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Floor: 1501, 1501A, 1503, 1503B, 1504, 1504A, 1505, 1506, 1507, 1507B, 1507C, 1508, 1510,1512, 1516, 1517</td>
</tr>
<tr>
<td>2nd Floor: 2501, 2502, 2503, 2503A, 2504, 2505, 2508, 250A, 2512, 2514, 2515, 2515A, 2516, 2518, 2519, 2519A, 2520</td>
</tr>
<tr>
<td>Attic, Tunnel, 3rd Floor Mechanical Room</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Schedule:</strong></th>
<th>08/10/98 – 09/03/98</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hours:</strong></td>
<td>4:00 pm – 2:30 am</td>
</tr>
</tbody>
</table>

**Abatement Contractor:**
Industrial Waste Cleanup, Inc.
12838 Gavel
Detroit, MI 48227
313-933-3060

**Air Monitoring Company:**
NOVA Environmental, Inc.
5340 Plymouth Road
Ann Arbor, MI 48105

The asbestos containing material listed above will be removed by the asbestos abatement contractor listed above which is licensed and accredited by the State of Michigan to conduct abatement activities. All proper work practices and engineering controls will be followed in accordance with all State and Federal regulations.

NOVA Environmental Services, Inc. will be on-site to conduct air monitoring and oversight to ensure that work is conducted in the proper manner.

Questions or concerns should be directed to:
- Dorothy Smith-Fesl at 6-3694, or
- Ty Patton (OSEH) at 3-9112.
a) PLANT DEPARTMENT NOTICE

Building: 

Location: 

Quantity: 

Type of Work: 

Date: 

Schedule: 

Workers: 

The asbestos containing material listed above will be removed by University of Michigan employees that have been trained as competent persons in the area of asbestos abatement and are licensed by the State of Michigan as such. All proper work practices and engineering controls will be followed in accordance with all State and Federal regulations.

Depending on the nature of the work, the Occupational Safety and Environmental Health Department (OSEH) may have arranged for a consultant to be on-site to conduct air monitoring.

Questions or concerns should be directed to:

- Fred Riecks (Plumbing Shop Foreman) at 3-4327, or
- Doug Forsyth (OSEH) at 7-6673.
# APPENDIX C

## THE UNIVERSITY OF MICHIGAN

### WASTE SHIPMENT RECORD

<table>
<thead>
<tr>
<th>Work Site Name</th>
<th>Owner's Name and Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Regents of the University of Michigan OSEH Dept. 1239 Kipke Drive Ann Arbor, MI 48109-1010 734/647-1142</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Waste Disposal Site</th>
<th>Waste Disposal Site Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Brent Run</td>
<td>(810) 639-3077</td>
</tr>
<tr>
<td>Mailing Address: 8335 Vienna Rd., Montrose, MI 48457</td>
<td></td>
</tr>
<tr>
<td>Physical Site Location: 8335 Vienna Rd., Montrose, MI</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name and Address of responsible agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality Division-MiDEQ</td>
</tr>
<tr>
<td>P.O. Box 30028</td>
</tr>
<tr>
<td>Lansing, MI 48909</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description of Materials</th>
<th>Containers</th>
<th>Total Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>m³ (yd³)</td>
</tr>
<tr>
<td>Friable Asbestos Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non Friable Asbestos Material</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special Handling Instructions and Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>In event of emergency, contact UM Public Safety (24 hours) at (734) 763-1131.</td>
</tr>
</tbody>
</table>

**OPERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

<table>
<thead>
<tr>
<th>Printed name and title</th>
<th>Signature</th>
<th>Month Day Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3/13/07</td>
</tr>
</tbody>
</table>

Discrepancy indication space
APPENDIX D

OSEH PROTOCOL FOR ASBESTOS MEDICAL SURVEILLANCE

DATE: October 02, 1997
TITLE: Asbestos Medical Surveillance

POLICY: All employees involved in asbestos removal activities will receive a certified examination and will be included in the medical surveillance program, as required. This includes individuals conducting Class I, II, or III work, as defined by the MIOSHA Asbestos Standards for Construction, for more than 30 days per year, any individual exposed over the PEL or STEL for asbestos, or anyone required to wear a respirator under the MIOSHA standard Asbestos for General Industry.

Employees who were exposed to asbestos during past University work projects are also eligible for asbestos medical surveillance, even if they are not currently conducting asbestos removal activities. Employees who fall into this category will be identified on the Medical Surveillance Request Form under “Other.”

Procedures for administering, evaluation and follow-up of asbestos surveillance shall be in compliance with the MIOSHA standard Asbestos for General Industry and the MIOSHA Asbestos Standards for Construction.

PROCEDURE: (1) Prior to placement in a job that involves asbestos removal activities, employees will be provided with a certified physical examination. The examination will include at a minimum, a medical and work history; a complete physical examination, with emphasis on the respiratory, cardiovascular and digestive systems; completion of an MWorks initial asbestos questionnaire; a chest x-ray (posterior-anterior 14 x 17 inches); pulmonary function testing (FVC and FEV1); and any other tests deemed appropriate by the examining physician.

Interpretation and classification of chest x-rays will be conducted in accordance with Appendix E of the above-referenced regulations.

(2) Medical examinations shall be made available on an annual basis. This examination will be conducted according to the above protocol, with the exception of the chest x-ray, which will be administered at the discretion of the physician according to the regulations. An MWorks periodic asbestos questionnaire shall be completed annually.

(3) Information provided to the examining physician by OSEH shall include:

- A copy of this standard and appendices.
- A description of the employee's duties in relation to the exposure.
- The anticipated exposure level.
• A description of any personal protective and respiratory equipment used.
• Information from previous medical examinations of the employee that would not be available otherwise.

(4) MWorks will submit to OSEH an Asbestos Medical Surveillance Examination Form from the examining physician which includes the following:

• The physician's opinion as to whether the employee has any detected medical conditions that would place him at an increased risk of health impairment from exposure to asbestos.
• Any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators.
• A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions resulting from asbestos exposure that require further explanation or treatment.
• A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

(5) The written opinion given to the University shall not reveal specific findings or diagnoses unrelated to occupational exposure to asbestos.

(6) The University, through MWorks, is responsible for establishing and maintaining an accurate medical record for each employee covered by this program. The record shall include at a minimum the information resulting from the physical examinations and any employee medical complaints related to exposure to asbestos. These records must be maintained for the duration of employment plus thirty (30) years.

(7) OSEH will provide a copy of the physician’s written opinion to the employee within 30 days of receipt.

All MWorks testing protocols are summarized in the following document: http://www.oseh.umich.edu/MWorks_Testing_Protocols.pdf.
ANNEX B
Plant Department
Intact Flooring Removal Program per Settlement Agreement

Overview
Asbestos containing flooring is considered a Class II removal as defined in 29 CFR 1926.1101 Asbestos in Construction. All resilient floor coverings installed before 1981 are Presumed Asbestos Containing Material (PACM).

Floor tile typically contains 5-10% asbestos and is usually considered an intact material. OSHA defines intact material, “as a material that has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix”. Incidental breakage of material is not considered to be rendering the material non-intact.

Prohibited activities
- Sanding
- Drilling
- Cutting

Scope
Pursuant to the Settlement Agreement with OSHA, personnel can remove any amount of intact floor covering with at least eight hours of training in the proper methods that includes hands-on activities. A competent person is needed for each site that has at least 12 hours of training. Annual refreshers are required.

This training does allow individuals to remove carpeting with asbestos containing flooring attached as long as material remains intact.

This training does NOT allow individuals to drill or nail into asbestos containing flooring or mastic. This includes materials underneath carpeting as well.

Equipment Required
- Safety Glasses
- Respirators- Not Required
- Suits- Not required
- OSHA Warning signs/Barrier Tape
- Asbestos Disposal Bags
- Fiber Drums - Available through OSEH Hazmat at 763-4568
- Scraper
- HEPA Vacuums
- Spray Misters
- Duct Tape
- OSHA, DOT, and Generator Labels – Available through your supervisor

NOTE: asbestos warnings signs, barrier tape, and disposal bags can be obtained from Plant Stores or Aramso at 1-800-767-9981 or NorCan at (734) 632-0750. These are not available through OSEH- Hazmat.

Negative Exposure Assessment
The asbestos settlement agreement is based on submittal of many measurements, collected under a variety of worksite conditions, showing worker exposures during removal of asbestos-containing floor tile, sheet vinyl floor covering, and flooring adhesive. The data show that use of certain work practices during
removal of flooring material consistently result in worker exposures below the TWA and excursion limit established by the OSHA Asbestos Standard. Therefore, OSHA has concluded that the negative exposure assessment can be relied upon instead of air monitoring when the following are in place:

1. The work practices outlined below are used,
2. all workers engaging in the removal are properly trained, and
3. a competent person assesses the job prior to removal and determines that the flooring material is "intact" and likely to remain "intact" throughout the removal process.

A copy of the settlement agreement and worker exposure data is available at OSEH. It is not required to be present for each job.

However, in order to ensure that the negative exposure assessment data can be relied upon, a NEA checklist should be used for each job. The NEA checklist will verify that all proper controls are in place and will document the competent person assessment that the tile is intact and is believed likely to remain intact for the job. Please see the NEA checklist attached. It should be present at the job site and collected by supervisors for submittal to OSEH for inclusion in employees exposure files.

**Removal Procedures**

**Floor Tile:**

1. Vacuum the entire floor using a HEPA vacuum with a metal floor attachment.
2. Mist tiles to be removed with water.
3. Pry each floor tile up **individually** using a stiff bladed scraper. If a tile does not release from the adhesive when the scraper is forced under the tile by hand, the scraper may be struck with a hammer to cause the tile to release and/or the tile can be heated (e.g. using a hot air gun) to soften the adhesive and facilitate removal.
4. Alternatively, heat can be applied (instead of prying) to the floor tile from a heat source (e.g. infrared heat machine) and the tiles removed by hand or by using a scraper. Wetting of the tiles is not required when using heat for removal.
5. After the tile is removed, place in an asbestos disposal bag or other closed leak-tight container without further breakage. See Disposal Section for further information.
6. After the entire floor has been removed and has dried, vacuum the area using a HEPA vacuum with a metal floor attachment.

**Adhesive (Asbestos containing):**

1. As small areas of floor are cleared of tile, residual adhesive should be removed, to the extent necessary to prepare the surface for installation of new flooring material, by being wetted and scraped using a stiff bladed floor scraper.
2. Alternatively, residual adhesive can also be removed by using a low speed floor machine and wetted sand or a removal solution.
3. If solvent is to be used, remove as much mastic as possible. Control odors with engineering controls. Wet methods must be used for all scraping of adhesive and backing.
4. Adhesive residues should be placed while still wet in an asbestos disposal bag or other closed leak-tight container.
5. The area from which the adhesive has been removed should be vacuumed using a HEPA vacuum with a metal floor attachment.
Resilient Sheet Flooring:
1. Before removal begins, the entire floor should be vacuumed using a HEPA vacuum with a metal floor attachment.
2. The material should be sliced with a sharp edged instrument, such as a utility knife, into strips approximately 4 to 8 inches wide.
3. Each strip should be rolled up tightly from end to end.
4. As each strip is rolled up, a constant mist of water or amended water should be sprayed into the point where the material separates from the backing.
5. After a strip has been removed, place in an asbestos disposal bag or other closed leak-tight container.
6. After three strips of flooring material are removed, any residual felt, after being thoroughly wetted, should be removed with a stiff-bladed scraper. Place the felt scrapings (while still wet) in an asbestos disposal bag or other closed leak-tight container.
7. As removal progresses, areas from which the flooring has been removed should be vacuumed using a HEPA vacuum with a metal floor attachment.
8. After the entire floor has been removed and has dried, vacuum using a HEPA vacuum with a metal floor attachment.

Disposal
Plastic-lined fiber drums should be used for disposal of all flooring materials. Drums can be obtained through the OSEH Hazardous Materials Department at 763-4568.

The drum requirement can be waived if there are only a few tiles for disposal. Place the tile inside two asbestos disposal bags and seal with duct tape. Asbestos disposal bags can be obtained through Plant Stores.

Each drum needs to be sealed with duct tape and labeled with the following labels: OSHA Warning Label, DOT Label, and generator label. See attached sheet. **Labels are available through your supervisor.**

A waste shipment record should be filled out for each load of asbestos waste. Record the location where the waste was removed from, the amount of materials (i.e. 2 drums), and sign. See Attached Form.

Asbestos waste should be delivered to the asbestos dumpster located at the west perimeter of the North Campus Transfer Facility (NCTF) at 1655 Dean Road. The waste should be placed inside dumpster and the shipment record should be put in the metal container located on the side of the dumpster. **OSEH-HAZMAT is not responsible for transport of waste materials to NCTF.**

HEPA Vacuum
Please refer to the Owner’s manual for proper installation of HEPA filter into unit, maintenance and usage. The filter must be in place for proper filtration and capture of asbestos fibers. It is recommended to place duct tape over the hose ends when not in use and the vacuum inlet if the hose is removed.

When the vacuum needs to be emptied or when the HEPA filter needs replacement, contact the Plant Asbestos Crew for assistance at 763-4327. These activities fall outside of the level of training for flooring removal and must be conducted by accredited individuals.
NEA Checklist for Intact Removal of Asbestos-containing Flooring

Date: __________________

(A) Competent Person Requirement

I have successfully completed the 12 hour competent person training course in accordance with the provisions of the OSHA Standard and am qualified to conduct the negative exposure assessment (NEA) and supervise the removal activities on this job. As competent person, I will conduct an “on-site” NEA inspection prior to start of job and will be available during the removal operations to inspect the job site at employee request or as necessary as a result of changed conditions that may prevent completion of the work using the recommended work practices (RWP) outlined in the Intact Flooring Removal Program.

___

Initials

(B) Negative Exposure Assessment (NEA)

Job site has been surveyed to confirm that the flooring material is intact, that the RWP can effectively be used to remove flooring on this job, and that the flooring is likely to remain intact throughout removal process. (Intact meaning that the flooring has not crumbled, been pulverized, or deteriorated so that it is no longer likely to be bound within its matrix. Incidental breakage of floor tiles during removal operations using the RWP does not mean that the material is not removed in an intact condition.

___

Initials

Conditions of removal work to be completed on this job closely resemble the processes, type of material, control methods, work practices, and environmental conditions in the jobs outlined in NEA materials presented in training course.

___

Initials

The TWA and excursion limits during proposed job are anticipated to resemble those outlined in NEA materials presented in training.

___

Initials

This form will be readily available at the job site for inspection by OSEH or OSHA officials.

___

Initials

The RWP will be followed.

___

Initials

If workplace conditions on the job change during the removal of resilient floor covering, and do not resemble those removal jobs presented in training or the RWP are no longer used on the job, I understand that the NEA is no longer valid and additional protective steps (regulated area) must be taken in accordance with the OSHA Asbestos Standard. This would be beyond that allowed for the intact floor removal training.

___

Initials

(C) Worker Training Requirements

All individuals who will be performing the resilient floor covering removal work have successfully completed an approved 8-hr training course (or more) covering asbestos subjects as well as training in the use of the RWP in accordance with provisions of the OSHA Standard.

___

Initials

Training records available at OSEH offices.
(D) Notification and Demarcation

Before the start of this removal job the following individuals must be notified of the presence and location of ACM and of the planned removal activity: (1) employees performing the removal work, (2) employers of employees working in adjacent areas (not separated from the work area by either a wall, closed door or window, or other impermeable barrier), and (3) the building facility contact.

Initials

Warning signs have been posted and area has been demarcated.

Initials

Job Information (page 2)

Job/Order Number: __________________________________________

Date of Work Operation: ______________________________________

Building: ___________________________________________________

Specific Location within Building: ______________________________

Description of work operation: _________________________________
(include type and size of resilient floor covering materials removal methods used and duration of removal activity.)

List names of all employees involved in Work Operation:

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

___________________________________________________________

Signature of Competent Person

Date

Maintain this form at the job site and turn into your supervisor at job completion. This checklist should be forwarded to OSEH.
LABELS

1. OSHA Label: Order via Label Master 1-800-621-5808.

![OSHA Label Image]

Label Master Item Number CU-LB35RV or Aramsco 1-800-767-9981.

2. Generator Label: Custom Order through Printing Services or generate your own.
Include the following information:

![Generator Label Image]

3. DOT Label: Order via Label Master 1-800-621-5808
Label Master Item Number HML51 or Aramsco 1-800-767-9981.

Need to order as a custom label:

Class 9 Label with a Custom Descriptor: ASBESTOS, NA 2212, RQ
## THE UNIVERSITY OF MICHIGAN
### WASTE SHIPMENT RECORD

<table>
<thead>
<tr>
<th>Work Site Name</th>
<th>Owner's Name and Telephone Number</th>
</tr>
</thead>
</table>
|                | The Regents of the University of Michigan  
|                | OSEH Dept.  
|                | 1239 Kipke Drive  
|                | Ann Arbor, MI 48109-1010  
|                | 734/647-1142 |

<table>
<thead>
<tr>
<th>Waste Disposal Site Name: Brent Run</th>
<th>Waste Disposal Site Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailing Address: 8335 Vienna Rd., Montrose, MI 48457</td>
<td>(810) 639-3077</td>
</tr>
</tbody>
</table>

| Physical Site Location: 8335 Vienna Rd., Montrose, MI |

### Name and Address of responsible agency

<table>
<thead>
<tr>
<th>Air Quality Division-MiDEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.O. Box 30028</td>
</tr>
<tr>
<td>Lansing, MI 48909</td>
</tr>
</tbody>
</table>

### Description of Materials

<table>
<thead>
<tr>
<th>Containers</th>
<th>Total Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RQ, Asbestos, 9,NA 2212 PG III</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Friable Asbestos Material</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Non Friable Asbestos Material</th>
</tr>
</thead>
</table>

### Special Handling Instructions and Additional Information

In event of emergency, contact UM Public Safety (24 hours) at (734) 763-1131.

OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

### Printed name and title

<table>
<thead>
<tr>
<th>Signature</th>
<th>Month</th>
<th>Day</th>
<th>Year</th>
</tr>
</thead>
</table>

### Discrepancy indication space
ANNEX C
University of Michigan
Procedure for Removal of Asbestos Containing Caulk Material on Ductwork

Pursuant to the OSHA Asbestos Construction Standard, Class II Asbestos Work is defined as activities involving the removal of ACM which is not thermal system insulation or surfacing material. The includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Caulk found on sheet metal ductwork is classified as a Class II asbestos material.

The training necessary to conduct Class II Asbestos Work is the 12 Hour Competent person Class II Training Program. The purpose of this training is to provide the ability to remove sections of ductwork containing asbestos caulk without disturbing the caulk itself.

The following is a set of procedures and practices that outline the methods used to conduct removal of caulk material associated with ductwork.

**Equipment Needed:**
- Regulated Area Signs
- Barrier Tape
- Plastic Drop Cloth
- Respirators (optional after NEA is established)
- Disposable Coveralls (optional)
- Wetting Agent/Applicator (airless sprayer)
- HEPA vacuum
- Disposable wet wipes/paper towel
- Asbestos Disposal Bags (or plastic sheeting for wrapping) and all required disposal labels*

*Note: asbestos danger signs, barrier tape, and labels can be obtained from the link to Fisher Scientific on the Wolverine Access M-Marketsite website (See attached page).

**Procedures:**
1. Verify that the caulk material affected meets the definition of an intact material. If it does not, the work must be conducted by the Plant Asbestos Crew or an Asbestos Contractor.
2. Contact OSEH (Doug Forsyth 647-6673 or Brett Goecke 647-2306) prior to scheduling work to arrange for air monitoring to establish a negative exposure assessment. This needs to be repeated on an annual basis.
3. Establish regulated area in accordance with 29 CFR Part 1926.1101(e) of OSHA Construction Standard in location of planned disturbance. This includes the use of regulated area signs and barrier tape;
4. Place drop cloth on floor immediately below planned disturbance location;
5. Don respirator, disposable coveralls and any other necessary personal protective equipment (PPE). The disposable coveralls are optional.
6. Mist area of caulk.
7. Wrap the section of ductwork containing the asbestos caulk with plastic sheeting and tape to secure it.
8. Perform cut on ductwork at sections on either side of the caulk area.
9. Bag or fully wrap section of ductwork that has been cut to seal. Label appropriately.
10. Take off PPE.
11. Remove regulated area signage and barrier tape.
12. Fill out waste shipment record.
13. Take asbestos waste to Asbestos Dumpster.

2. Disposal

All duct work being disposed of as asbestos waste must be sealed in a leak-tight container. This can be done by wrapping the duct work in plastic sheets and sealing the seams with tape, placing the duct work into labeled asbestos waste bags and sealing the opening with tape, or some other appropriate container that will adequately contain all of the material removed. Fiber drums are also available from OSEH if needed. Drums can be obtained through the OSEH Hazardous Materials Department at 763-4568.

Each container needs to be sealed with duct tape and labeled with the following labels: OSHA Warning Label, DOT Label, and generator label. See the attached page for ordering information through the Wolverine Access M-Marketsite.

A waste shipment record should be filled out for each load of asbestos waste. Record the location where the waste was removed from, the amount of materials (e.g., 2 sealed packages of duct, 2 bags, 2 drums, etc.), and sign the form. See Attached Form.

Asbestos waste should be delivered to the asbestos dumpster located at the west perimeter of the North Campus Transfer Facility (NCTF) at 1655 Dean Road. The waste should be placed inside dumpster and the shipment record should be put in the metal container located on the side of the dumpster. **OSEH-HAZMAT is not responsible for transport of waste materials to NCTF.**

HEPA Vacuum

Please refer to the Owner’s manual for proper installation of HEPA filter into unit, maintenance and usage. The filter must be in place for proper filtration and capture of asbestos fibers. It is recommended to place duct tape over the hose ends when not in use and the vacuum inlet if the hose is removed.

When the vacuum needs to be emptied or when the HEPA filter needs replacement, contact the Plant Asbestos Crew for assistance at 763-4327. These activities fall outside of the level of training for Class II removal and must be conducted by accredited individuals.
Signs and Labels


![Danger sign](image)


![Warning sign](image)

3. Generator Label: Custom Order through Printing Services or generate your own. Include the following information.

   Operator: U of M  
   Site: U of M Campus (734) 647-1143  Ann Arbor, MI 48109-1002  
   Owner: Regents of the University of Michigan  
   326 E. Hoover  Ann Arbor, MI 48109-1002

## THE UNIVERSITY OF MICHIGAN

### WASTE SHIPMENT RECORD

<table>
<thead>
<tr>
<th>Work Site Name</th>
<th>Owner's Name and Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Regents of the University of Michigan OSEH Dept. 1239 Kipke Drive Ann Arbor, MI 48109-1010 734/647-1142</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Waste Disposal Site</th>
<th>Waste Disposal Site Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Brent Run Landfill</td>
<td>(810) 639-3077</td>
</tr>
<tr>
<td>Mailing Address: 8335 Vianna Road, Montrose, MI 48457</td>
<td></td>
</tr>
<tr>
<td>Physical Site Location: 8335 Vianna Road, Montrose, MI</td>
<td></td>
</tr>
</tbody>
</table>

### Name and Address of responsible agency

Air Quality Division-MiDEQ
P.O. Box 30028
Lansing, MI 48909

### Description of Materials

<table>
<thead>
<tr>
<th>Description</th>
<th>Containers</th>
<th>Total Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ, Asbestos, 9,NA 2212 PG III</td>
<td>Number Type</td>
<td>m³ (yd³)</td>
</tr>
<tr>
<td>Friable Asbestos Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non Friable Asbestos Material</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Special Handling Instructions and Additional Information

In event of emergency, contact UM Public Safety (24 hours) at (734) 763-1131.

OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

<table>
<thead>
<tr>
<th>Printed name and title</th>
<th>Signature</th>
<th>Month Day Year</th>
</tr>
</thead>
</table>

Discrepancy indication space
ANNEX D
University of Michigan
Asbestos Countertop Removal Procedure

Overview

Removal of asbestos containing laboratory countertops is considered as Class II removal as defined in 29 CFR 1926.1101 Asbestos in Construction. All countertops installed before 1981 are presumed to be asbestos containing material (PACM).

Countertops typically contain 10-50% asbestos and are usually considered an intact material. OSHA defines intact material, “as a material that has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix”. Incidental breakage of material is not considered to be rendering the material non-intact.

Personnel can remove intact countertops with at least eight hours of initial training that includes hands-on activities. Individuals trained for floor tile removal can remove intact countertops with an additional 4 hours of training that includes hands-on countertop removal. Annual refresher training is also required.

Prohibited activities
- Sanding
- Drilling
- Cutting

Equipment Required
- Safety Glasses
- Respirators- Optional after NEA established
- Suits- Optional after NEA established
- OSHA danger signs/barrier tape
- Plastic Sheeting
- HEPA Vacuums
- Spray Misters
- Labels

*Note: asbestos danger signs, barrier tape, and labels can be obtained from the link to Fisher Scientific on the Wolverine Access M-Marketsite website (See attached page).

Removal Procedures
1. Mist countertop to be removed with water.
2. If glued, pry the countertop up using a crowbar or similar lifting device. Have HEPA vacuum positioned to vacuum any small material that results during lifting.
3. If countertop is screwed to the cabinet, remove screws while holding a HEPA vacuum to capture any dust resulting from the process.
4. After the countertop is removed, wrap it in plastic sheeting to seal without further breakage. See the Disposal Section for further information.
5.
Negative Exposure Assessment

Workplace monitoring must be done to create a negative exposure assessment (NEA). Once established, the NEA can be relied upon to show that exposures are expected to be below the OSHA PEL and therefore, the work practices are valid to control the asbestos.

In order to rely upon the NEA once established, the following must be met:

1. The job is within 12 months of the date collected on prior job monitored;
2. The job closely resembles the prior job monitored in terms of process, type of material, control methods, work practices, and environmental conditions;
3. The work practices outlined above are used, and;
4. All workers engaging in the removal are properly trained.

3. Disposal

Each countertop wrapped in plastic sheeting needs to be sealed with duct tape and labeled with the following labels: OSHA Warning Label, DOT Label, and generator label. See the attached sheet for ordering information from the M-Marketsite. Countertops can be wrapped at the dumpster if it will pose a safety hazard for handling.

A waste shipment record should be filled out for each load of asbestos waste. Record the location where the material was removed from, the amount of materials (i.e. 1 countertop), and sign.

Asbestos waste should be delivered to the asbestos dumpster located at the west perimeter of the North Campus Transfer Facility at 1655 Dean Road. The waste should be placed inside dumpster and the waste shipment record should be put in the metal container located on the side of the dumpster. **OSEH-HAZMAT is not responsible for transport of waste materials to NCTF.**
Signs and Labels


![OSHA Demarcation Sign](image)


![OSHA Warning Label](image)

3. Generator Label: Custom Order through Printing Services or generate your own.

<table>
<thead>
<tr>
<th>Include the following information.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator: U of M</td>
</tr>
<tr>
<td>Site: U of M Campus (734) 647-1143 Ann Arbor, MI 48109-1002</td>
</tr>
<tr>
<td>Owner: Regents of the University of Michigan</td>
</tr>
<tr>
<td>326 E. Hoover Ann Arbor, MI 48109-1002</td>
</tr>
</tbody>
</table>


![DOT Label](image)
# WASTE SHIPMENT RECORD

<table>
<thead>
<tr>
<th>Work Site Name</th>
<th>Owner's Name and Telephone Number</th>
</tr>
</thead>
</table>
|                | The Regents of the University of Michigan  
|                | OSEH Dept.  
|                | 1239 Kipke Drive  
|                | Ann Arbor, MI 48109-1010  
|                | 734/647-1142 |

<table>
<thead>
<tr>
<th>Waste Disposal Site</th>
<th>Waste Disposal Site Telephone Number</th>
</tr>
</thead>
</table>
| Name: *Brent Run Landfill*  
| Mailing Address: *8335 Vianna Road, Montrose, MI 48457*  
| Physical Site Location: *8335 Vianna Road, Montrose, MI*  
|  | (810) 639-3077 |

<table>
<thead>
<tr>
<th>Name and Address of responsible agency</th>
<th></th>
</tr>
</thead>
</table>
| Air Quality Division-MiDEQ  
| P.O. Box 30028  
| Lansing, MI 48909 |  |

<table>
<thead>
<tr>
<th>Description of Materials</th>
<th>Containers Number</th>
<th>Type</th>
<th>Total Quantity m³ (yd³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ, Asbestos, 9,NA 2212 PG III</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Friable Asbestos Material</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Non Friable Asbestos Material</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Special Handling Instructions and Additional Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In event of emergency, contact UM Public Safety (24 hours) at (734) 763-1131.</td>
<td></td>
</tr>
</tbody>
</table>

**OPERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

<table>
<thead>
<tr>
<th>Printed name and title</th>
<th>Signature</th>
<th>Month Day Year</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Discrepancy indication space</th>
<th></th>
</tr>
</thead>
</table>
University of Michigan
Procedure for Removal of Asbestos-Containing Insulation/Debris from Underground High Voltage Electrical Vaults

Overview
Asbestos-containing fire-proofing being removed from high voltage electrical lines, and the clean-up of debris from the deteriorated fire-proofing, is considered to be a Class I removal as defined in the Asbestos in Construction Standard, 29 CFR 1926.1101 (MIOSHA Part 602, Asbestos Standards for Construction). Individuals performing this work must be trained as Asbestos Workers or Asbestos Contractor/Supervisors and be accredited by the State of Michigan.

The asbestos-containing insulation in these locations was added on to the outside of the electrical lines strictly as fire-proofing. The electrical lines are already insulated for protection from electric shock, and the addition of the asbestos-containing material to the outside of the line is strictly for protection from potential fire.

These underground vaults are considered enclosed/confined spaces and also have live high voltage lines. Workers entering these spaces need to be protected from both the electrical hazards and the enclosed/confined space hazards. This procedure will address the requirements for the abatement of the fire-proofing material according to the asbestos regulations as well as the confined space entry and electrical power generation, transmission and distribution standards.

Equipment
The following equipment is required for abatement and cleanup of asbestos-containing fire-proofing:

1. Respirators w/ HEPA (N100) cartridges (available from OSEH)
2. Disposable protective clothing (available from Stores)
3. Demarcation-asbestos danger signs and warning barrier tape (see attached)
4. Asbestos Glove Bags (available at Stores)
5. Asbestos disposal bag(s) (available at Stores)
6. Fiber drum(s) if needed (available from OSEH)
7. HEPA vacuum
8. Asbestos Labels (see attached)
9. Water source/water spray bottle
10. Waste Shipment Record (see attached)
11. Air filtration device (AFD) w/ flexible intake duct and man-hole adapter.
12. Plastic sheeting
13. Ladder (for entering and exiting the vault)
14. Emergency communication (e.g., two-way radio, telephone, etc.)
15. Confined space air meter w/ oxygen, lower explosivity level (LEL), and carbon monoxide sensors (minimum)
16. Confined space entry permit

*Note: asbestos danger signs, barrier tape, and labels can be obtained from the link to Fisher Scientific on the Wolverine Access M-Marketsite website (See attached page).
Fiber drums can be obtained from the OSEH Hazardous Materials Department North Campus Transfer Facility (NCTF) at 763-4568.

**Procedures for Insulation Removal**

1. Only 32 or 40 hour accredited asbestos worker or contractor/supervisor trained staff can use these procedures. Only staff trained to perform confined space entries can enter underground electrical vaults. All workers entering underground electrical vaults must be accompanied by at least one worker from the Plant Ops High Voltage Electrical Shop (this worker may remain outside the vault during the asbestos abatement process). Notify OSEH - Call Doug Forsyth (647-6673) or Brett Goecke (647-2306) to schedule air monitoring.

2. The electrical lines that will actually be abated will be de-energized and locked out before any abatement work begins. Other electrical lines in the vicinity of the line to be abated will be protected sufficiently to ensure that abatement workers are protected from electrical hazards. Generally, underground high voltage lines are sufficiently protected from accidental contact without additional protective barriers. The High Voltage Electric Shop worker on-site will make the determination as to the need for additional barrier protection for energized lines in the area of the abatement work.

3. Conduct a pre entry briefing and complete the confined space entry permit.

4. Perform initial air monitoring of vault entrance for hazardous gases and vapors (specifically, oxygen, flammable vapors, carbon monoxide, and hydrogen sulfide). If air is not hazardous, open vault and monitor the air inside the vault. Continue periodic air monitoring inside the vault until it is closed. Annotate the air monitoring results on the confined space entry permit form.

5. Set up the AFD at the entrance to the vault and extend the intake duct down into the vault. The duct intake should be placed in the part of the vault that is farthest from the vault entrance and still in the vicinity of the planned abatement work. A special man-hole adapter should be used to allow the AFD intake to be extended into the vault while still allowing for unhindered entry and exit from the vault.

6. Establish a regulated area pursuant to OSHA regulations. This includes demarcation with barrier tape and asbestos danger signs.

7. Don necessary PPE for abatement. The worker(s) performing the abatement should enter the vault with a confined space air meter.

8. Secure glovebag to the line to be abated and seal all openings to completely isolate area where insulation is to be removed.

9. Glovebags may be only used once and may not be moved down the line.

10. Insert water hose through bag and fully saturate insulation.

11. Remove fire-proofing inside glovebag.

12. Clean line until free of all residual insulation materials.

13. Spray the inside of the glovebag down to rinse all debris to bottom of bag.

14. When insulation removal is complete, insert HEPA vacuum to collapse bag and remove from line. Seal the bag and remove the HEPA vacuum.

15. Place glovebag in an asbestos disposal bag.

16. If small sections of insulation are to be removed to perform whole removal of line, remove portions as indicated above and remove glovebags. Wrap remaining
insulation with polyethylene sheeting and seal with duct tape. Perform cut at bare section and dispose of in a fiber drum.

17. Drums must be sealed and properly labeled with DOT, OSHA, and Waste generator label (See attached sheet for ordering information from U of M M-Marketsite).

18. A waste shipment record must be filled out for all asbestos waste.

19. Waste should be placed in the dumpster at NCTF and the waste shipment record placed in the box on the side.

Procedures for Debris Cleanup

1. **Only 32 or 40 hour accredited asbestos worker or contractor/supervisor trained staff can use these procedures. Only staff trained to perform confined space entries can enter underground electrical vaults. All workers entering underground electrical vaults must be accompanied by at least one worker from the Plant Ops High Voltage Electrical Shop (this worker may remain outside the vault during the asbestos abatement process).** Notify OSEH - Call Doug Forsyth (647-6673) or Brett Goecke (647-2306) to schedule air monitoring.

2. The electrical lines that will actually be abated will be de-energized and locked out before any abatement work begins. Other electrical lines in the vicinity of the line to be abated will be protected sufficiently to ensure that abatement workers are protected from electrical hazards. Generally, underground high voltage lines are sufficiently protected from accidental contact without additional protective barriers. The High Voltage Electric Shop worker on-site will make the determination as to the need for additional barrier protection for energized lines in the area of the abatement work.

3. Conduct pre entry briefing and complete the confined space entry permit.

4. Perform initial air monitoring of vault entrance for hazardous gases and vapors (specifically, oxygen, flammable vapors, carbon monoxide, and hydrogen sulfide). If air is not hazardous, open vault and monitor the air inside the vault. Continue periodic air monitoring inside the vault until it is closed. Annotate the air monitoring results on the confined space entry permit form.

5. Set up the AFD at the entrance to the vault and extend the intake duct down into the vault. The duct intake should be placed in the part of the vault that is farthest from the vault entrance and still in the vicinity of the planned abatement work. A special manhole adapter should be used to allow for the AFD intake to be extended into the vault and still allow for unhindered entry and exit from the vault.

6. Establish a regulated area pursuant to OSHA regulations. This includes demarcation with barrier tape and asbestos danger signs.

7. Don necessary PPE for abatement. The worker(s) performing the abatement should enter the vault with a confined space air meter.

8. Mist area to be cleaned with water.

9. HEPA vacuum debris. Large sections may be picked up and placed into an asbestos disposal bag. Seal disposal bags when clean up is complete.

10. A waste shipment record must be filled out for all asbestos waste.

11. Waste should be placed in dumpster at NCTF and the waste shipment record placed in the metal box on the side.
Signs and Labels


   ![DANGER
   ASBESTOS CANCER AND LUNG DISEASE HAZARD
   AUTHORIZED PERSONNEL ONLY
   RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA](image)


   ![DANGER
   Contains Asbestos Fibers
   Avoid Creating Dust
   Cancer and Lung Disease Hazard](image)

3. **Generator Label:** Custom Order through Printing Services or generate your own. Include the following information.

<table>
<thead>
<tr>
<th>Operator: U of M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site: U of M Campus (734) 647-1143 Ann Arbor, MI 48109-1002</td>
</tr>
<tr>
<td>Owner: Regents of the University of Michigan</td>
</tr>
<tr>
<td>326 E. Hoover Ann Arbor, MI 48109-1002</td>
</tr>
</tbody>
</table>


   ![DOT Label](image)
# WASTE SHIPMENT RECORD

<table>
<thead>
<tr>
<th>Work Site Name</th>
<th>Owner’s Name and Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Regents of the University of Michigan OSEH Dept. 1239 Kipke Drive Ann Arbor, MI 48109-1010 734/647-1142</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Waste Disposal Site</th>
<th>Waste Disposal Site Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Brent Run Landfill</td>
<td>(810) 639-3077</td>
</tr>
<tr>
<td>Mailing Address: 8335 Vianna Road, Montrose, MI 48457</td>
<td>Physical Site Location: 8335 Vianna Road, Montrose, MI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name and Address of responsible agency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality Division-MiDEQ</td>
<td></td>
</tr>
<tr>
<td>P.O. Box 30028</td>
<td></td>
</tr>
<tr>
<td>Lansing, MI 48909</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description of Materials</th>
<th>Containers Number Type</th>
<th>Total Quantity m³ (yd³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ, Asbestos, 9,NA 2212 PG III</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friable Asbestos Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non Friable Asbestos Material</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special Handling Instructions and Additional Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In event of emergency, contact UM Public Safety (24 hours) at (734) 763-1131.</td>
<td></td>
</tr>
</tbody>
</table>

| OPERATOR’S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations. | |

<table>
<thead>
<tr>
<th>Printed name and title</th>
<th>Signature</th>
<th>Month Day Year</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Discrepancy indication space</th>
<th></th>
</tr>
</thead>
</table>
ANNEX F
Asbestos Compliance Checklist

Location: ____________________________________________________ Date: _____________

I. Activity Class:    Ia ___    Ib ___    II ___    III ___    IV ___                  Yes       No      NA

II. Preparation
a. Regulate Work Area (all classes)                     ___      ___       ___
b. Signs Posted and Access Limited (all classes)         ___      ___       ___
c. Staged Decon Facility (e.g., clean room, dirty room, etc.) (classes Ia & Ib only)      ___      ___       ___
d. Hygiene Facilities Available (all classes)           ___      ___       ___
e. Shower Available (class Ia only)           ___      ___       ___

III. Work Area
a. Pre-cleaning Done (all classes) ___ ___ ___
b. Movable Objects Cleaned and Removed (all classes) ___ ___ ___
c. Non-working Horizontal Surfaces Covered (all classes) ___ ___ ___
d. Critical Barriers Erected (class Ia only) ___ ___ ___
e. Ventilation Systems Covered (all classes) ___ ___ ___
f. Double Sealed Full Containment Erected (class Ia only) ___ ___ ___
g. Negative Pressure Established (class Ia only) ___ ___ ___
h. Barricades Erected (outdoors, all classes) ___ ___ ___

IV. Exposure Controls
a. Dust Control Used (e.g., water) (all classes) ___ ___ ___
b. HEPA Vacuums Used (all classes) ___ ___ ___
c. HEPA Filtered Local Exhaust Ventilation Used (class Ia only) ___ ___ ___
e. Respiratory Protection Used (all classes) ___ ___ ___
   List Type(s): __________________________________________________
f. Disposable Coveralls Used (all classes) ___ ___ ___
g. Head and Foot Covers Used (all classes) ___ ___ ___
h. Other PPE Used (list):___________________________________       ___     ___     ___

V. ACM Affected (all classes, be specific)

   __ sq.ft. ____ lin.ft. ____ items  Desc: _____________________ Loc: ___________________
   __ sq.ft. ____ lin.ft. ____ items  Desc: _____________________ Loc: ___________________
   __ sq.ft. ____ lin.ft. ____ items  Desc: _____________________ Loc: ___________________
   __ sq.ft. ____ lin.ft. ____ items  Desc: _____________________ Loc: ___________________
   __ sq.ft. ____ lin.ft. ____ items  Desc: _____________________ Loc: ___________________

VI. Clean-up
a. Waste Material Collected in Leak Tight Containers (all classes) ___ ___ ___
b. Waste Containers Properly Labeled (all classes) ___ ___ ___
c. Barrier Materials Cleaned or Handled as ACM Waste (all classes) ___ ___ ___
d. PPE cleaned or disposed of as ACM Waste (all classes) ___ ___ ___
e. Waste Materials Delivered to Storage Dumpster (all classes) ___ ___ ___
f. Waste Shipment Record Completed & Posted at Dumpster (all classes) ___ ___ ___

VII. Workers and Personal Monitoring (all classes)(Include additional worker’s names on a separate page.)

<table>
<thead>
<tr>
<th>Name</th>
<th>Number</th>
<th>Air Monitoring Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Name: _________________________________ Signature: ______________________________

AsbestosChecklist3.doc  5/11/00
Instructions

Complete the heading of the form and select the appropriate class for the project or activities being documented.

Class Selection

Class Ia Projects/Activities: Removal of more than 25 linear or 10 square feet of thermal system insulation (TSI) or surfacing asbestos containing material (ACM) or presumed asbestos containing material (PACM).

Class Ib Projects/Activities: Removal of 25 linear or 10 square feet or less of thermal system insulation (TSI) or surfacing asbestos containing material (ACM) or presumed asbestos containing material (PACM).

Class II Projects/Activities: Removal of non-TSI or non-surfacing ACM or PACM, including ACM or PACM wallboard, flooring, roofing, siding, or construction adhesives.

Class III Projects/Activities: Repair or maintenance activities (i.e., not removal) of ACM and PACM, including TSI and surfacing materials.

Class IV Projects/Activities: Activities to clean-up dust waste or debris resulting from class I, II or III activities.

Once the activity has been classified, proceed through the check list marking each item either “Yes”, “No” or not applicable (“NA”). Typically, each item on the checklist that is noted as applying to a certain class of work should be followed and checked “Yes”. If for some reason an applicable item is not checked “Yes”, then a reason or comment why that item was not followed should be included on the checklist. For example, item III.a. “Pre-cleaning” applies to all categories, but it probably wouldn’t be done if the project is a clean-up of debris on the floor.

Be sure to include accurate descriptions of the ACM and PACM impacted by the work and the names of all of workers exposed to ACM or PACM during the project. Include the amounts of linear feet (e.g., “10” lin.ft. of pipe insulation), square feet (e.g., “20” sq.ft. of floor tile) and item count (e.g., “3” fire doors or “7” pipe fittings). Include a specific description of the materials removed (e.g., “steam supply” or “duct insulation”). Include a specific location of where the materials were removed (e.g., “northeast corner of mechanical room 2200”).

If personal air monitoring is conducted for the project that day, enter the results on the line corresponding to the worker monitored.

The checklist should be started at the beginning of each workday or shift and be completed by the end of each workday or shift.

If a project includes more than one work site, or activities which fall into different classes, or use different control measures or workers, then a separate checklist should be completed for each work site or activity.

Once work is completed for the day, the checklist should be signed by the competent person for the project. Checklists should be kept on file until the project is completed, and then forwarded to OSEH.

If there are any questions about this checklist, the proper procedures or controls that should be used, or any other safety or health issues concerning asbestos containing materials, contact OSEH at 764-3141 or 647-1142.