

Asbestos Management Plan



California State University, Chico

Department of Environmental Health and Safety

Asbestos Management Plan Record of Revisions

Revision	By	Date	Description of Revision
1	HS	11-13-19	Review of plan, no changes made.
2	HS	4/1/22	Updated all sections/revamped plan.

Legend:

HS: Industrial Hygienist and Environmental Program Manager

Contents

1.0	INTRODUCTION	1
	1.1 Purpose.....	1
	1.2 Scope	1
2.0	DEFINITIONS	2
3.0	RESPONSIBILITIES	4
	3.1 Environmental Health and Safety (EHS):.....	4
	3.2 Managers/Supervisors/Leads	4
	3.3 Employees	5
4.0	ENGINEERING CONTROLS AND WORK PRACTICES	6
	4.1 Prohibitions	6
	4.2 Regulated Areas.....	7
	4.3 Glove Bag Removal Techniques.....	7
	4.4 Mini-Enclosure Technique.....	8
5.0	PERSONAL PROTECTIVE EQUIPMENT	9
	5.1 Respiratory Protection.....	9
	5.2 Protective Clothing.....	9
6.0	ASBESTOS WASTE PROCEDURES AND LABELS	10
7.0	COMMUNICATION AND TRAINING	12
	7.1 Hazard Communication.....	12
	7.2 Training.....	12
8.0	EXPOSURE ASSESSMENTS	13
9.0	MEDICAL SURVEILLANCE	14
10.0	RECORDKEEPING	15
	APPENDIX A – SPECIFIC WORK PROCEDURES.....	16

Asbestos-containing materials (ACM) were widely used in the construction industry before 1980. While the use of ACM in new building systems has ceased for most major applications, the presence of ACM in older building systems is still widespread. Materials in buildings that were built before 1980 such as, but not limited to, thermal system insulation, sprayed-on fireproofing, wall skim coats, joint compound, and roofing and flooring materials is called Presumed Asbestos Containing Material (PACM). ACM and PACM does not pose a health hazard if left intact and undisturbed.

It is the policy of CSU Chico to conduct all asbestos operations in compliance with applicable regulatory requirements and safety practices. Asbestos containing material will be removed, repaired, and/or protected prior to planned renovations, demolitions, or modifications that may result in its disturbance.

1.1 Purpose

The purpose of this written plan is to describe a program for preventing exposure to asbestos present at university-owned facilities and comply with CCR Title 8, Section 1529. The principal elements of this program involve the following:

- Applicable definitions,
- Responsibilities,
- Engineering controls and work practices,
- Personal protective equipment,
- Waste procedures and labeling requirements,
- Communication and training,
- Exposure assessments,
- Medical surveillance, and
- Recordkeeping.

1.2 Scope

CSU, Chico has decided to include, as part of the work tasks performed by trained employees, Class III asbestos work as defined in Section 2.0 of this plan. Only limited quantities of ACM may be removed when Class III work is performed. The quantity of PACM allowed to be removed by trained employees is limited to that which can fit into a standard asbestos waste bag of 60" x 60" in size. Only those employees certified to perform Class III asbestos work may do so. This certification includes an individual who is up-to-date with their annual Class III asbestos work training and is currently enrolled in the University's Respiratory Protection Program.

Those individuals who perform Class IV work are also included in this plan. Class IV 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.

Class I and II work will not be covered in this plan as those types of activities do not take place by university personnel, however Project Managers oversee those classes of asbestos work and are responsible to ensure contractors follow all camps and regulatory policies.

2.0

DEFINITIONS

Amended water – water in which surfactant (wetting agent) has been added to increase the ability of liquid to penetrate ACM.

Asbestos – includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these materials that has been chemically treated and or/alterd. For purposes of this plan, “asbestos” includes PACM as defined below.

Asbestos-containing material (ACM) – any material containing more than one percent asbestos.

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

Class I asbestos work – activities involving the removal of TSI and surfacing ACM and PACM. Removal means all operations where ACM and/or PACM is taken out or stripped from structures or substrates and includes demolition operations.
This type of work is not performed by Chico State personnel.

Class II asbestos work – activities involving the removal of ACM which is not TSI or surfacing material. This type of work is not performed by Chico State personnel.

Class III asbestos work – repair and maintenance operations where ACM, including TSI and surfacing ACM and PACM, is likely to be disturbed.

Disturbance means activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount which can be contained in one standard sized glove bag or waste bag in order to access a building component.

Repair means overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

Class IV work – 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.

Competent person – in addition to one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them, one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure and has the authority to take prompt corrective measures to eliminate them.

Critical barrier – one or more layers of plastic sealed over all opening into a work area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area.

Decontamination area – an enclosed area adjacent and connected to the regulated area and

consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Employee exposure – exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

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

High-efficiency particulate air (HEPA) filter – a filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

Negative exposure assessment (NEA) – demonstration by the employer that employee exposure during an operation is expected to be consistently below the permissible exposure limits.

Negative pressure - maintain a lower air pressure in the work area than in any adjacent area and to generate a constant flow of air from the adjacent areas into the work area, typically by using a local exhaust/pressure differential unit.

PACM – means presumed asbestos-containing material

Permissible exposure limits (PEL) – maximum amount of concentration that a worker may be exposed to under Cal/OSHA regulations. For asbestos the PELs are as follows:

- Time-weighted average limit (TWA) – 0.1 fiber per cubic centimeter of air as an eight-hour time-weighted average.
- Excursion limit – 1.0 fiber per cubic centimeter of air over a sampling period of thirty minutes.

Regulated area – an area established by employer to demarcate areas where Class I, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos exceed or there is a reasonable possibility they may exceed the permissible exposure limits.

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

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

3.0

RESPONSIBILITIES

3.1 Environmental Health and Safety (EHS):

- Develop and maintain the University's Asbestos Management Plan.
- Coordinate asbestos-related matters not directly associated with abatement or operations and maintenance projects. This includes employee notification efforts and handling inquiries from employees on potential exposure in the workplace.
- Receive, record, and evaluate laboratory results related to airborne asbestos surveys, including those performed during abatement and operations and maintenance projects. Maintain an up-to-date database that includes all known locations of friable and non-friable ACM in university-owned buildings.
- Provide technical assistance to Project Managers and trained staff as requested prior to and during projects that will disturb or abate asbestos.
- Provide training and consultation on the use of personal protective equipment by asbestos workers.
- When applicable, coordinate the medical surveillance of asbestos workers.
- Coordinate and schedule Class III operations and maintenance training.
- Develop and provide Class IV (hazard awareness) training.
- Coordinate negative exposure assessments.
- Coordinate HEPA-vacuum filter efficiency testing.

3.2 Managers/Supervisors/Leads

3.2.1 Competent Person as defined in Section 2.0 (i.e., FMS managers, supervisors, and leads which have completed Class III training)

- Coordinate with EHS to maintain an operations and maintenance program that provides for locating, identifying, and maintaining ACM.
- Oversee Class III work. This includes reviewing workorders which may disturb PACM or ACM; ensuring that employees have proper training, personal protective equipment, tools, and are following work procedures; and performing inspections of worksites.
- Stopping work when unsafe conditions are found.
- Notify EHS of uncontrolled disturbances of ACM, possible employee exposure, or work-related issues when they arise.

3.2.2 Project Managers

- Ensure contractors whose work may involve disturbing or coming into contact with asbestos-containing materials in university-owned buildings are notified of the conditions that may be encountered before any such work is started.
- Ensure asbestos contractors notify the appropriate regulatory agencies, e.g., Air Quality Management District, Cal/OSHA, Environmental Protection Agency.
- Solicit technical assistance from EHS regarding specification development, the planning phase of asbestos projects, and evaluating the credentials of prospective contractors.
- Transmit records of laboratory results related to airborne asbestos surveys,

including those performed during abatement projects, to Environmental Health and Safety for evaluation and retention.

3.3 Employees

3.3.1 Class III employees (as defined in section 2.0)

- Complete Class III operations and maintenance training.
- Class III workers must be respirator qualified, wear personal protective equipment properly, and follow all work and disposal procedures.

3.3.2 AHERA Building Inspector for Asbestos Certified employees

- Complete AHERA Building Inspector for Asbestos course.
- Perform bulk asbestos sampling and submit to EHS for shipment.

3.3.3 Class IV employees (as defined in section 2.0)

- Complete Class IV training and follow procedures outlined in training.

4.0 ENGINEERING CONTROLS AND WORK PRACTICES

When performing asbestos work, employees will utilize the following engineering and work practices regardless of levels of exposure:

- Vacuum cleaners equipped with HEPA filters will be used to collect all debris and dust containing ACM and PACM. HEPA vacuum cleaners must be emptied in a manner that minimized the reentry of asbestos into the workplace.
- Wet methods, or wetting agents, will be used to control employee exposures during asbestos handling, mixing, removal, cutting, application, or cleanup, except when wet methods may cause a safety hazard or equipment malfunction.
- Where the disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation (TSI) or surfacing material, employees will use impermeable drop cloths and isolate the operation using mini-enclosures or glove bag systems.
- Prompt clean-up and disposal of wastes and debris contaminated with asbestos will occur and placed in leak-tight containers.
- To the extent feasible, the work shall be performed using local exhaust ventilation equipped with a HEPA filter dust collection system. Ventilation of the regulated area to move contaminated air away from the breathing zone of employees and toward a filtration or collection device with a HEPA filter will be utilized. Exhaust air shall be vented only to the exterior of the building. Such outlets shall not be near other building intake vents or louvers or at entrances to building.
- Stripping and finished of asbestos containing flooring shall be conducted using low abrasion pads at speeds lower than 300 rpm and wet methods. Burnishing or dry buffing of asbestos containing flooring may be performed only on flooring which has sufficient finish so that the pad cannot contact the flooring material.
- Rubber dustpans and rubber squeegees shall be used for cleanup of asbestos-containing debris.

4.1 Prohibitions

The following engineering controls and work practices shall NOT be used for asbestos related work or for work which disturbs ACM or PACM, regardless of measured levels of asbestos exposure or the results of an exposure assessment:

- High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.
- Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.
- Dry sweeping, shoveling or other dry clean-up of dust and debris containing ACM or PACM.
- Employee rotation as a means of reducing employee exposure to asbestos.
- Sanding of flooring material.

4.2 Regulated Areas

All Class III work must be conducted within a regulated area. Regulated areas must be demarked in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos. This may be in the form of a critical barrier or negative pressure enclosure. Access to regulated areas will be limited to trained, authorized individuals only and must be supervised by a competent person. Employees may not eat, drink, smoke, chew tobacco or gum, or apply cosmetics while inside the regulated area. Signs must be displayed that read:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

Where respiratory protection and protective clothing is required to enter a regulated area, the sign must also read:

WEAR RESPIRATORY PROTECTION AND PROTECTIVE COTHING IN THIS AREA

4.2.1 Decontamination/Equipment Area

Adjacent to the regulated area, a decontamination/equipment area must be set up where employees can remove protective clothing and clean equipment. This decontamination area must be of sufficient size as to accommodate cleaning of equipment and removing of personal protective equipment without spreading contamination beyond the area (as determined by visible accumulations) and be covered by an impermeable drop cloth on the floors and any horizontal surfaces.

Employees must enter and exit the regulated area through the decontamination area. Work clothing must be cleaned with a HEPA vacuum before it is removed. All equipment and surfaces of containers filled with ACM must be cleaned prior to removing them from the equipment area.

4.3 Glove Bag Removal Techniques

The University chooses to restrict the amount of TSI to be removed by staff. Generally, the maximum amount of TSI that will be allowed to be removed by university staff is three linear feet. Where the glove bag technique is to be used for removal of TSI or in those areas where the University opts to use glove bags, the following specifications of the glove bags must be met:

- Made of 6 mil thick plastic and be seamless at the bottom.
- Not modified in any way.
- Be flame-retardant.

In addition, the following work practices must be adhered to when using the glove bag technique:

- At least two persons must perform glovebag removal operations.

- A HEPA-filtered vacuum must be placed in the immediate vicinity.
- All mechanical HVAC systems in the area shall be turned off prior to commencement of work.
- Glove bag must be installed so that it completely covers the circumference of pipe or other structure where the work is to be done.
- Glove bag must be smoke tested for leaks and any leaks sealed prior to use.
- Glove bag must be used only once and not be moved.
- Glove bags are not to be used on surfaces with temperatures that exceeds 150°F.
- Sufficient volume of water must be used on all pipe wrap to be removed while pipe wrap is enclosed in glovebag.
- Prior to disposal, glovebag must be collapsed by removing air with a HEPA vacuum. Upon detachment the glovebag must be placed into at least two 6 mil thick disposal bags and “gooseneck” sealed.
- Where system uses attached waste bag, such bag shall be connected to collection bag using hose or other material which can withstand pressure of ACM waste and water without losing its integrity. Sliding valve of other device shall separate waste bag from hose to ensure no exposure when waste bag is disconnected.

For more for information, reference Appendix A – Specific Work Procedures.

4.4 Mini-Enclosure Technique

A pre-manufactured portable pop-up mini-enclosure or one constructed by staff shall be used to safely access attic spaces. This small walk-in enclosure which accommodates no more than two people may be used if disturbance or removal can be completely contained by the enclosure. The following specifications of the mini-enclosure must be met:

- Be constructed of 6 mil plastic.
- Placed under negative pressure by means on HEPA filtered vacuum or similar ventilation unit.
- Inspected for leaks and smoke tested to detect breaches, and any found breaches sealed.

In addition, the following work practices must be adhered to when using the mini-enclosure technique:

- The mini-enclosure must be pushed up to the underside of the ceiling and seal completely.
- Air movement must be directed away from the employee’s breathing zone within the mini enclosure.
- A negative pressure must exist inside the mini-enclosure.
- All necessary tools and materials (to perform the work or bag the waste) must be inside the mini-enclosure.
- If reused, the interior must be completely washed with amended water and HEPA-vacuumed.

For more for information, reference Appendix A – Specific Work Procedures.

5.0

PERSONAL PROTECTIVE EQUIPMENT

5.1 Respiratory Protection

Respirators must be worn when one of the following circumstances occurs:

- When Class III asbestos work is not performed using wet methods,
- When negative exposure assessments have not yet been conducted,
- When TSI or surfacing ACM or PACM is being disturbed, or
- When work operations will expose employees above the TWA or excursion limit.

All respiratory protection shall be worn in accordance with the University's written Respiratory Protection Plan.

Workers shall at a minimum wear personally issued and individually identified respirators equipped with P-100 (HEPA) filters when performing asbestos work. During encapsulation operations or usage of other organic base aerosols (e.g., spray glue, expanding foam, etc.) workers shall utilize combination organic vapor/HEPA filter respirator cartridges.

5.2 Protective Clothing

The University will provide any protective clothing such as coveralls, gloves, and foot coverings for an employee exposed to airborne concentrations of asbestos that exceeds the TWA and/or excursion limit or if a negative exposure assessment has not yet been product.

Protective clothing should be inspected once per work shift for tears or rips. If tears or rips are detected, they shall be immediately mended or replaced.

Protective clothing must be either disposed of (see section 6.0 for more information) or laundered properly. Asbestos cannot be removed from protective clothing by blowing, shaking, or brushing. Disposal protective clothing is recommended, however, if reusable clothing is used, laundering of clothing will be done in such a way that prevents the release of airborne asbestos in excess of the PEL or excursion limit. as per the standard.

6.0 ASBESTOS WASTE PROCEDURES AND LABELS

The following materials may be disposed of as non-friable, non-hazardous asbestos-containing waste if they have not been subjected to sanding, grinding, cutting, or abrading:

- Built-up Roofing & Patch Mastic
- Transite Pipe or Panels
- Sheetrock & Joint Compound (<1% asbestos content when composite analysis performed)
- Base Cove/Cove Mastic
- Vinyl Floor Tile (VFT) and Mastic
- Drop sheets of plastic used by university personnel can be cleaned of all visible dust and debris by wet wiping and HEPA vacuuming

The following materials shall be handled and disposed as friable, hazardous asbestos-containing waste:

- TSI (regardless of asbestos content)
- VFT (severely damaged during the removal process)
- Sheetrock
- Sheet Vinyl (linoleum)
- Skim Coat (surfacing materials)
- Ceiling Tiles
- Fire Proofing
- Acoustic Plaster
- Gasket materials
- Brick Materials and other ACM not specifically mentioned here
- Fire Rated Doors
- Used HEPA filters, disposable coveralls, gloves, and similar disposable supplies

Disposal of all friable asbestos-containing waste must be tracked utilizing a current copy of a Uniform Hazardous Waste Manifest. These manifests are to be properly filled out and signed by an authorized University representative in EHS.

Mastic, and any solvent used to remove VFT mastic shall be handled as a separate waste stream with proper waste characterization. Package all solvent/mastic waste created in sufficient absorbent to eliminate all free liquids and place in an appropriate waste shipping container based on the waste characterization. Label the drum as required, and transport to an approved Class 1 landfill with a separate Uniform Hazardous Waste Manifest signed by EHS.

At a minimum, non-friable non-hazardous asbestos waste shall be placed into clear, six mil thick plastic bags and have a DANGER ASBESTOS warning label as required by 8 CCR 1529. Bags shall be sealed using the gooseneck technique. For large bulky items that won't fit in bags, such as countertops, those items can be burrito wrapped with clear 6 mil plastic sheet and labeled the same way.

At a minimum, friable hazardous asbestos waste shall be placed into clear, six mil thick plastic bags and have a DANGER ASBESTOS warning label as required by 8 CCR 1529, and

appropriate hazardous waste labeling as required by Cal/OSHA and Division of Toxic Substances Control (DTSC). The label shall include the following markings: generator's name, address, EPA ID number, accumulation date, and Hazardous Waste Manifest Tracking number. Bags shall be sealed using the gooseneck technique. Class 9 hazardous materials shipping labels are required on each container at time of shipment.

Any debris or residue observed on containers or surfaces outside of the work area resulting from clean-up or disposal activities shall be immediately cleaned up using HEPA filtered vacuum equipment and/or wet methods as appropriate. If necessary, place damaged waste bags into two new asbestos waste bags. When moving containers, utilize hand trucks, carts, and proper lifting techniques to avoid back injuries. If disposal drums are required, the drums shall be metal or fiber board with locking ring tops. The drums must be approved for use by the selected dump site.

Transport vehicles shall be marked with the sign prescribed by NESHAP during loading and unloading to warn people of the presence of asbestos. Disposal must occur at an authorized site in accordance with regulatory requirements of NESHAP and applicable State and Local guidelines. All dump receipts, trip tickets, waste manifests, and other documentation of disposal shall be delivered to the University, for its records. The manifest should be signed by the University representative from EHS, the hauler, and the Disposal Site Operator as the responsibility for the material changes hands. If a second hauler is employed, his company name, EPA ID number, and signature should also appear on the Uniform Hazardous Waste Manifest.

7.0

COMMUNICATION AND TRAINING

7.1 Hazard Communication

The buildings in which are known to contain ACM or PACM can be found on Environmental Health and Safety's [website](#). In addition, Environmental Health and Safety keeps records of all asbestos sampling of building materials. This information is made available to employees upon request. All PACM will be considered to contain asbestos unless testing from a state-certified lab determines it does not. Individuals who will be working with or around PACM will be notified of testing results prior to starting asbestos work. At the entrance to mechanical rooms/areas, signs will be posted identifying the material(s) which are present that contain asbestos or may contain asbestos. Additional hazard communication information is found in Section 4.0 and Section 6.0 of this plan. Project Managers are responsible for ensuring contractors whose work may involve disturbing or coming into contact with asbestos-containing materials in university-owned buildings are notified of the conditions that may be encountered before any such work is started.

7.2 Training

University employees who perform Class III work will be provided a 16-hour training (which includes hands-on training) prior to initial assignment and at least annually. This training will include the following elements:

- Methods of recognizing asbestos and presumed asbestos-containing materials;
- The health effects associated with asbestos exposure;
- The relationship between smoking and asbestos in producing lung cancer and the names and phone numbers of public health organizations which provide information on smoking cessation;
- The nature of operations that could result in exposure of asbestos, the importance of necessary personal protective equipment to minimize exposure including engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures, and waste disposal procedures, and any necessary instruction in the use of these controls and procedures where Class III work will be performed;
- The purpose, proper use, fitting instructions, and limitation of respirators;
- The appropriate work practices for performing asbestos work;
- Medical surveillance program requirements;
- The requirements for posting signs and affixing labels and the meaning of the required legend for such signs and labels; and
- Any other content covered in the applicable Cal/OSHA standard.

University employees who perform Class IV work will be provided training prior to initial assignment and at least annually. The training will include the following elements:

- How to obtain information about locations of asbestos in university-owned facilities;
- Materials which may contain asbestos; and
- Instruction in recognition of damage, deterioration and delamination of asbestos containing material.

Exposure monitoring, or utilizing objective data, is required to determine accurately the airborne concentrations of asbestos to which employees may be exposed. This will be done by either initial exposure assessments or negative exposure assessments. Determinations shall be made from breathing zone air samples that are representative of the 8-hour time weighted average (TWA) and 30-minute short-term exposures (STEL) of each employee.

Additional exposure assessments will be performed whenever there has been a change in process, control equipment, personnel or work practices that may result in new or additional exposures above the permissible exposure limit (PEL) and/or excursion limit (EL) or when the University has any reason to suspect that a change may result in new or additional exposures above the PEL and/or EL.

Employees will be notified of exposure assessments that relate to the job duties they perform in writing, no later than 5 days after the University obtains the results. Employees or their designated representative may observe any monitoring of employee exposure to asbestos.

9.0

MEDICAL SURVEILLANCE

Medical surveillance will be made available, at no cost and a reasonable time and place, to those employees who engage in Class III work or are exposed at or above the PEL for 30 or more days per year (called covered employees). The day will not be counted towards the 30 days if the Class III work operations (including cleanup) occurs for one hour or less if work practices spelled out in this written plan are adhered to. All medical examinations will be performed by a physician or licensed health care provider ("PLHCP").

Covered employees will receive medical examinations per the University's Respiratory Protection Program prior to donning a respirator. In addition, covered employees will receive a medical examination within 10 days following the 30th day of exposure as defined above, and at least annually thereafter (or if a PLHCP recommends one at a higher frequency); and at the termination of employment for any employee was exposed to airborne concentrations of asbestos at or above the PEL or excursion limit.

Medical examinations will consist of the following:

- A medical and work history with special emphasis directed to the pulmonary, cardiovascular, and gastrointestinal systems.
- A standardized questionnaire
- A physical examination directed to the pulmonary and gastrointestinal systems, including a chest roentgenogram to be administered in accordance with the table below, and pulmonary function tests of forced vital capacity and forced expiratory volume at one second.
- Any other examinations or tests deemed necessary by examining PLHCP.

YEARS SINCE FIRST EXPOSURE	AGE OF EMPLOYEE	
	Less than 40	40 and older
0-10	Every 3 years	Annually*
10+	Annually*	Annually*

* Oblique x-rays need only be performed every 3 years.

10.0

RECORDKEEPING

Exposure assessments will be kept for at least thirty (30) years. Objective data used in lieu of exposure assessments will be kept as long as the University relies upon such data.

Medical surveillance information will be kept in accordance with Section 3204 of the General Industry Safety Orders.

APPENDIX A – SPECIFIC WORK PROCEDURES

Cleanup of Asbestos Debris and Wipe Down of Associated Dust:

Size of Work:	No size limit for cleaning. Debris collected must be able to fit in one standard-sized waste bag (60 inches by 60 inches).
Cleaning Techniques:	HEPA vacuuming and wet wiping of all effected surfaces in regulated area.
Site Preparation:	<p>The following method should be used:</p> <ul style="list-style-type: none">• Evacuate room(s) where debris and associated dust is present.• Turn off the HVAC system.• Lock the door(s) and post regulated area sign(s).• Clean all horizontal surfaces by HEPA vacuuming and wet wiping techniques.
Personal Protection:	Half-face respirator with P-100 (HEPA) cartridges and disposable coveralls are required.
Air Monitoring:	In the event the work requires air monitoring, a hired consultant will perform the sampling.
Final Visual Inspection:	It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.
Disposal Requirements:	Refer to Section 6.0.

Drilling Holes UP TO TWO INCHES IN SIZE into Sheetrock and Plaster Walls/Ceilings:

Size of Work:	Attachment of screws or drilling small holes which are less than 2" in diameter.
O&M Techniques:	<p>One of the following methods should be used. The selection of method should be based upon building material, location, and availability of materials:</p> <ol style="list-style-type: none">1) Use HEPA vacuum with the intake hose nozzle placed within one inch of the surface of material being drilled. This is the primary choice of method.2) Use water to continually spray the surface of the material being

cut or drilled, making sure there is no visible dust generated. All slurry shall be collected using a rag, sponge, or paper towels and placed into an asbestos waste disposal bag.

- 3) Use shaving cream to cover surface area with foam. Careful attention should be made when drilling and removing the drill from the wall to prevent dust from being released. All slurry shall be collected using a rag, sponge, or paper towels and placed into an asbestos waste disposal bag.

Site Preparation:	Post a regulated area sign. Until an NEA has been conducted, plastic sheeting must be placed on the floor area immediately below the wall area extending at least five feet in all directions. Once an NEA verifies that no asbestos is being released, no special site preparation is required.
Personal Protection:	Once an NEA has been established, no personal protective clothing or respiratory protection is required for that technique. Prior to the establishment of an NEA, a half-face respirator with P-100 (HEPA) cartridges and disposable coveralls are required.
Air Monitoring:	In the event the work requires air monitoring, a hired consultant will perform the sampling.
Final Visual Inspection:	It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.
Disposal Requirements:	Refer to Section 6.0.

Penetrations/cuts into Sheetrock and Plaster Walls/Ceilings (LESS THAN ONE SQ. FT.):

Size of Work: Small penetration or cuts that are less than one square foot.

O&M Techniques: One of the following methods should be used. The selection of method should be based upon building material, location, and availability of materials:

- 1) Use a mini-enclosure. Ideal method when cutting into ceiling systems. See section 4.4 for more information.
- 2) Wet surface before and during cutting while using reciprocating

hand saw with an attached shroud in conjunction with a HEPA vacuum. Sawing/cutting must be slow and deliberate. Two workers are needed to implement this process. All slurry shall be collected using a rag, sponge, or paper towels and placed into an asbestos waste disposal bag.

- 3) Use shaving cream to cover surface area with foam. Careful attention should be made when cutting and removing the saw from the wall to prevent dust from being released. All the slurry shall be collected using a rag or sponge and placed into an asbestos waste disposal bag.

Site Preparation:	Post a regulated area sign. Plastic sheeting must be placed on the floor area immediately below the wall or ceiling area extending at least five feet in all directions. Staff in work area should not be present in the immediate area.
Personal Protection:	Once a Negative Exposure Assessment (NEA) has been established for this work operation, no personal protective clothing or respiratory protection is required. Prior to the establishment of an NEA, a half-face respirator with P-100 (HEPA) cartridges and disposable coveralls are required.
Air Monitoring:	In the event the work requires air monitoring, a hired consultant will perform the sampling.
Final Visual Inspection:	It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.
Disposal Requirements:	Refer to Section 6.0.

Penetrations/cuts into Sheetrock and Plaster Walls/Ceilings (ONE TO FOUR SQUARE FEET IN SIZE):

Size of Work:	Penetrations or cuts that are greater than one square foot and less than four square feet.
O&M Techniques:	One of the following methods should be used: <ol style="list-style-type: none">1) Use a mini-enclosure. Ideal method when cutting into ceiling

systems. See Section 4.4 for more information.

- 2) Wet surface before and during cutting while using reciprocating hand saw with a HEPA vacuum shroud attached. Sawing/cutting must be slow and deliberate. Two workers are needed to implement this process.

Site Preparation:	Post a regulated area sign. Plastic sheeting must be placed on the floor area immediately below the wall or ceiling area extending at least five feet in all directions. Staff in work area should not be present in the immediate area.
Personal Protection:	Once a Negative Exposure Assessment (NEA) has been established for this work operation, no personal protective clothing or respiratory protection is required. Prior to the establishment of an NEA, a half-face respirator with P-100 (HEPA) cartridges and disposable coveralls are required.
Air Monitoring:	In the event the work requires air monitoring, a hired consultant will perform the sampling.
Final Visual Inspection:	It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.
Disposal Requirements:	Refer to Section 6.0.

Floor Tile, Rubber Base Cove, and Mastic (LESS THAN 15 SQ. FT.):

Size of Work:	Less than 15 square feet.
O&M Techniques:	For quantities less than about 15 square feet, removal can be outside of the mini-enclosure with the floor tiles removed using either a heat gun to loosen the tiles or prying them with a small tool, hand scrapers, and shall be continually wetted as they are lifted in sizeable pieces. The base cove mastic can be removed by scraping the material with a hand scraper onto a plastic drop sheet taped to the floor.
Site Preparation:	Post a regulated area sign. Small quantities of floor tile (<15 sq. ft.) does not need plastic on the adjacent floor. For base cove material

only, place plastic onto the floor surface and tape the plastic to the floor along the edge of the wall to catch the mastic during hand scraping.

Personal Protection:	Half-face respirator with P-100 (HEPA) cartridges and disposable coveralls. Rubber gloves approved for the solvent use and eye goggles shall be worn during solvent application and removal on the floor.
Air Monitoring:	In the event the work requires air monitoring, a hired consultant will perform the sampling.
Final Visual Inspection:	It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.
Disposal Requirements:	Refer to Section 6.0.

Floor Tile, Rubber Base Cove, and Mastic (GREATER THAN 15 SQ. FT. BUT LESS THAN 100 SQ. FT.):

Size of Work:	Greater than 15 square feet but less than 100 square feet.
O&M Techniques:	For quantities of floor tile greater than 15 sq. ft. but less than 100 sq. ft., removal shall be within a mini-enclosure (see section 4.4) with the floor tiles removed using either a heat gun to loosen the tiles or prying them with a small tool, hand scraper, and continually wetting them as they are lifted in sizable pieces. One or more HEPA vacuums or a small negative air unit shall be used to establish a negative pressure. The mastic on the floor can be removed by an approved low odor solvent using brushes, scrapers, and clean rags. The base cove can be removed by scraping the material with a hand scraper onto a plastic drop sheet taped to the lower wall.
Site Preparation:	Post a regulated area sign. A three-foot-high layer of four mil plastic shall be placed on the lower walls as a splash layer for the mastic, and the negative air unit should be installed to establish negative pressure after critical barriers are installed. For base cove material only, place plastic onto the floor surface and tape the plastic to the floor at the edge of the wall to catch the mastic during hand

scraping.

Personal Protection:	Half-face respirator with P-100 (HEPA) cartridges and disposable coveralls. Rubber gloves approved for the solvent use and eye goggles shall be worn during solvent application and removal on the floor.
Air Monitoring:	In the event the work requires air monitoring, a hired consultant will perform the sampling.
Final Visual Inspection:	It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.
Disposal Requirements:	Refer to Section 6.0.

Penetrations/cuts into Roofing Materials:

Size of Work:	Various sized typical for HVAC systems, roof vents, light wells, electrical, etc.
O&M Techniques:	Razor blade cutting by hand shall be the primary method of cutting roof materials. A power saw may be used only if a HEPA vacuum is attached to the saw. Slightly wet the roofing material to prevent visible dust emissions. Do not drop roofing material to the ground.
Site Preparation:	Post a regulated area sign. Close adjacent windows within 15 feet of the cutting area and turn off any HVAC systems with outside air intakes immediately adjacent to the penetration cuts. As an alternative, seal the outside air opening at the HVAC system with plastic temporarily during the roof penetration cuts.
Personal Protection:	Once a negative exposure assessment (NEA) has been established for this work operation, no personal protective clothing or respiratory protection is required. Prior to the establishment of an NEA, a half-face respirator with P-100 (HEPA) cartridges and disposable coveralls is required.
Air Monitoring:	In the event the work requires air monitoring, a hired consultant will perform the sampling.

Final Visual Inspection: It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.

Disposal Requirements: Refer to Section 6.0.

Pipe Insulation and Thermal System Insulation (TSI) Repair and Patch:

Size of Work: No limit to the amount of patching and repair work.

O&M Techniques: Very small cracks, holes, nicks, and cuts can be repaired with joint compound or with a single layer of wettable cloth (hard cast) and an appropriate bridging encapsulant. Large sections of damaged pipe wrap will require at least two layers of wettable cloth, particularly where pipe hangers or metal channel have damaged the insulation. Where the pipe wrap cannot be removed completely from penetration in the walls, floors, or ceilings, the pipe wrap shall be removed at least 1" into the opening and sealed with a bridging encapsulant to the surrounding surface level. On tanks and boilers, the wettable cloth shall be placed onto the damaged areas and secured to the surrounding metal edges. Multiple layers shall be applied and extended several inches beyond the damaged section. The wettable cloth must wrap completely around the pipe diameter.

The plastic sheeting below the work area shall be cleaned by wet wiping after the work is completed and placed into a clear waste bag with Cal/OSHA warning label. The floor below the patch and repair area shall be HEPA vacuumed following the repair.

Site Preparation: Post a regulated area sign. If work is performed indoors, the ventilation system shall be off in the areas worked in to prevent fiber distribution. The floor area immediately below the damaged pipe or TSI work area should be HEPA vacuumed prior to any repair work. A drop sheet of four or six mil plastic shall be placed onto the floor immediately below the area of work and extend at least five feet beyond the area of repair in all directions.

Personal Protection: Half-face respirator with P-100 (HEPA) cartridges and disposable coveralls shall be worn whenever disturbing TSI.

Air Monitoring: In the event the work requires air monitoring, a hired consultant will perform the sampling.

Final Visual Inspection: It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.

Disposal Requirements: Refer to Section 6.0.

Pipe Insulation and TSI Removal (LESS THAN THREE LINEAR FT. OR LESS THAN THREE SQ. FT.):

Size of Work: Less than three linear feet or less than three square feet of TSI.

O&M Techniques: All pipe insulation removal shall be by glovebag technique following the manufacturer's directions. **Refer to section 4.3 for more information.** Before beginning, loose and friable material adjacent to the glovebag operation must be wrapped and sealed in two layers of 6 mil poly sheeting or otherwise rendered intact. After all pipe insulation is removed, the upper section of the glovebag and all exposed sections of piping must be thoroughly cleaned using scrub pads, brushes, and Hudson-type sprayer with water. The exposed ends of the remaining pipe insulation shall be sealed using wettable cloth to completely cover exposed ends of the pipe insulation. Where pipes enter walls, floors, or ceilings which are not within the scope of the project, the pipe wrap shall be removed at least 1" into the structure and the pipe wrap end must be sealed with bridging encapsulant and/or wettable cloth such as Hardcast. After removal of the glovebag, the repaired ends of pipe shall be examined, and additional wettable cloth shall be added for additional coverage if needed.

For TSI other than pipe insulation, all work shall be within a mini-enclosure under negative pressure established with a HEPA vacuum.

The floor shall be HEPA vacuumed following all abatement.

Site Preparation: Post a regulated area sign. The HVAC system should be turned off and locked out before any work begins in the work area. The floor immediately below the work area shall be pre-cleaned using a

HEPA vacuum. The floor shall be covered with a layer of four to six mil black colored plastic extending at least five feet in all directions. A HEPA vacuum shall be present in the immediate area.

- Personal Protection: Half-face respirator with P-100 (HEPA) cartridges and disposable coveralls shall be worn whenever disturbing TSI.
- Air Monitoring: In the event the work requires air monitoring, a hired consultant will perform the sampling.
- Final Visual Inspection: It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.
- Disposal Requirements: Refer to Section 6.0.

Fireproofing and Surfacing Material Removal (LESS THAN THREE SQ. FT.):

- Size of Work: Less than three square feet.
- O&M Techniques: All fireproofing material shall be removed within a mini-enclosure if the material is accessible. If the fireproofing material is in an attic space, a mini-enclosure shall be used to access the work area. All work is to be performed by a team of two trained workers. Small sections of fireproofing shall be wetted with amended water using a Hudson-type sprayer to thoroughly wet the material and allow the fireproofing to soak up the water and become saturated. Small sections shall be carefully scraped and within inches of the fireproofing. The second person shall continuously spray the fireproofing material as the first person is scraping the material with a hand scraper. Apply an approved encapsulant to the surface of the substrate that was cleaned and to the edges of the adjacent fireproofing. See Section 4.4 for more information.
- Use HEPA vacuum to clean up floor and surfaces after work is complete
- Site Preparation: Post a regulated area sign. The floor immediately below the work area shall be covered with a layer of six mil plastic extending at least five in all directions. (Realize that the "floor area" may be the floor of the attic space or the top of the ceiling system). The HVAC

	system should be turned off and locked out. A HEPA vacuum shall be present in the immediate work area.
Personal Protection:	Half-face respirator with P-100 (HEPA) cartridges and disposable coveralls, and eye protection (goggles) are required.
Air Monitoring:	In the event the work requires air monitoring, a hired consultant will perform the sampling.
Final Visual Inspection:	It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.
Disposal Requirements:	Refer to Section 6.0.

Repair and Removal of Transite Pipe and Laboratory Tables and Benches:

Size of Work:	Less than 100 linear feet
O&M Techniques:	Snap cutting of transite pipe is the preferred method to cut sections of transite pipes. Any beveling that is required must be done wet and collection of all wet debris shall be contained on a sheet of plastic four to six mil placed on the ground immediately below the area of work. The plastic shall be carefully placed under the section of transite pipe requiring filing of the edges to capture all water and transite debris. When whole sections of transite sheeting, roof tiles, or wall shingles are to be removed, they are to be removed intact by carefully removing the nails or screws that hold them in place.
Site Preparation:	Post a regulated area sign. Four to six mil plastic shall be placed under the transite pipe being cut or beveled. Laboratory benches or tables should not be cut inside of buildings. If possible, the laboratory tables or benches should be removed from the room and placed into a mini-enclosure under negative pressure prior to being saw cut using a HEPA equipped saw. Transite wall or roof shingles or transite sheets being removed intact shall have the work area below covered with six mil plastic extending at least five feet in all directions.
Personal Protection:	Once a Negative Exposure Assessment (NEA) has been established for this work operation, no personal protective clothing

or respiratory protection is required. A half-face respirator with P-100 (HEPA) cartridges and disposable coveralls is required until NEA is established.

Air Monitoring: In the event the work requires air monitoring, a hired consultant will perform the sampling.

Final Visual Inspection: It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.

Disposal Requirements: Refer to Section 6.0.

Removal of Asbestos Containing Electrical Wire:

Size of Work: Less than 100 linear feet

O&M Techniques: When there is asbestos containing electrical wire to be removed from a light fixture it will generally be removed by either unscrewing the nut or bolt to release the electrical wiring, or it may be necessary to cut the wiring using a wire cutter. Sometimes older asbestos containing electrical wiring is damaged and in a friable condition, which must be determined by the electrician. If the electrical wire is a large woven type of braid insulation and is determined to be friable, it may be necessary to remove the entire light fixture, place it into a six-mil plastic bag and conduct the removal of the electrical wiring inside of a sealed mini-enclosure. Other small diameter wiring that contains asbestos and is not considered friable can be cut with the wire cutters after either electrical tape or duct tape has been wrapped around the wiring where it will be cut; thereby minimizing any release of potential asbestos while snipping the wire wrapped with tape. The asbestos containing wire removed shall be placed into a six mil plastic waste bags with the asbestos warning label and shall be wetted with a spray bottle.

Site Preparation: Post a regulated area sign. Four to six mil plastic shall be placed under the work area below covered with six mil plastic extending at least five feet in all directions.

Personal Protection: Once a Negative Exposure Assessment (NEA) has been established for this work operation, no personal protective clothing or respiratory protection is required. A half-face respirator with P-

100 (HEPA) cartridges and disposable coveralls is required until NEA is established.

Air Monitoring: In the event the work requires air monitoring, a hired consultant will perform the sampling.

Final Visual Inspection: It is recommended the area be visually inspected by a Competent Person prior to the release of the area for occupancy by unprotected personnel. The visual inspection will include an evaluation of all surfaces within the regulated area, with emphasis placed on the completeness of cleaning. Any remaining three-dimensional debris shall be removed with the use of a HEPA vacuum or by wet wiping prior to the approval of the area for re-occupancy.

Disposal Requirements: Refer to Section 6.0.