

Sample Asbestos Management Plan

[Name of Facility] ASBESTOS MANAGEMENT PLAN

Approval Signature/Date:

Facility Director:

Facility Safety Coordinator:

Facility Building Manager:

This Plan will be reviewed and updated annually, or as new information pertaining to asbestos in the facility becomes available.

The [Facility] Safety Office and Building Management staffs have established a joint Asbestos Management Plan to protect building occupants from exposure to asbestos-containing materials (ACM). This Plan presents procedures for:

- periodic inspections & ACM location list management,
- restrictions on use and contractor activity,
- occupant notifications,
- staff asbestos awareness & safe work practice training, and
- ACM damage reporting and response

This Plan is based on the requirements of SI *Safety Manual* Chapter 22, Asbestos; the Occupational Safety and Health Administration (OSHA) General Industry and Construction Standards for Asbestos, and the U.S. Environmental Protection Agency (EPA) regulations on asbestos control, training and certification, and disposal. Specific codes are listed as References.

ACM is defined (EPA 40 CFR Part 763) as any material or product containing more than 1 percent of any type or mixture of asbestos.

RECORDS and INSPECTIONS (Refer to Att. 2.1)

1. The [Facility] Safety Coordinator and Building Manager will maintain a **listing** of ACM locations and condition, drawn from the following sources: past SI-wide Asbestos Assessment Studies (Versar, Inc. and Hygienetics, Inc.), past Facilities Assessment Branch surveys, OEDC records of environmental surveys and completed abatement associated with its projects, and OSHEM sampling data.
2. A team selected by the [Facility] Safety Coordinator and Building Manager will conduct **periodic visual observations**, at least every six months, of all previously identified ACM to monitor its condition, report any new suspected ACM, and initiate corrective actions for the repair or removal

any ACM determined to be damaged or in poor condition. The team for [Facility] consists of the following individuals:
[as applicable]

Smithsonian Early Enrichment Centers shall be re-inspected as part of the periodic inspection process.

RESTRICTIONS ON PURCHASE, NEW INSTALLATION, ABATEMENT, and SERVICE CONTRACTORS

1. **ACM products** (including but not limited to: vinyl asbestos tile, mastics, equipment components like gaskets, and asbestos automotive brake pads and shoes) will **not be purchased** for any application. **Specifications** for new construction, repair, or renovation shall **prohibit ACM installation**.
2. **Existing ACM building materials will be immediately repaired or removed when found to be damaged.** The SI will take advantage of planned renovation projects to remove ACM building materials (even in good condition) from the project area.
3. All **repair or removal** of ACM (except for patching of inspection sample holes and securing damaged areas with temporary measures as part of a cleanup task) will be **done by licensed asbestos abatement workers**, in accordance with SI Construction Specifications 02800, "Asbestos Abatement".
4. All **service contractors** shall be informed of the locations of suspect ACM (an OSHA requirement) and be required to follow applicable OSHA safety and health provisions in addition to applicable safe work practices from the SI Construction Specifications 02800, "Asbestos Abatement". Contractor work procedures shall in no way cause an exposure hazard for Smithsonian employees nor shall asbestos debris be left behind.
Examples of contractor work that could impact ACM include:
 - carpet or tile replacement,
 - HVAC repair,
 - working above ceiling panels which are suspended under ACM,
 - installation and relocation of electrical conduit and telephone lines,
 - relocation of subdividing partitions,
 - outside contractor repair of mechanical equipment, or
 - patching and painting.

BUILDING OCCUPANT NOTIFICATION (Refer to Att. 2.2 and Att. 2.3)

1. The [Facility] Safety Coordinator] annually distributes an "**Asbestos Fact Sheet for [Facility] Occupants**", to all facility users. This notification is required by OSHA to inform occupants of the location of ACM in their work areas, ways to prevent damage to it, and ways to report damage should it occur. This Fact Sheet will be coordinated and maintained with this Plan.

2. Building **occupants working near a planned major asbestos removal project**, and with a need-to-know, are to be notified 30 days prior to project start, unless superseded by a local/state law. A standard form, included as Attachment 2.3 or equivalent, must be posted or distributed by OEDC COTRs for all asbestos abatement projects at [Facility], describing the nature of the project and associated work controls.

EMPLOYEE ASBESTOS AWARENESS TRAINING

1. **Employees (e.g., maintenance or custodial) working in buildings containing ACM** building materials, whose work may impact these materials, and [Facility] **Safety Committee members** conducting safety inspections in buildings with ACM, are to be provided 2-hour asbestos awareness training to include:
 - a. Location and condition of ACM with which they may come in contact;
 - b. Safe work practices to be used to avoid disturbance of ACM; and
 - c. The name and phone number of the facility point of contact to whom reports of disturbance, damage or changed in condition of ACM are to be made.
2. Personnel **assigned to be asbestos cleanup responders and/or Operations and Maintenance workers**, are to be currently certified as having successfully completed an EPA-AHERA accredited 16hr. Operations and Maintenance class, and be current in the SI Respiratory Protection Program.

SAFE WORK PRACTICES

1. Supervisors and workers are to **suspend work activities** when materials suspected of containing asbestos are encountered and likely to be disturbed without proper controls and personal protective equipment in place.
2. **Methods of Compliance.** The following engineering controls and work practices shall be used, at a minimum, for all asbestos tasks:
 - a. HEPA-filtered vacuum cleaners.
 - b. Wet methods
 - c. Prompt cleanup and disposal.
3. **Prohibited Work Practices.** The following methods shall not be used for work related to or disturbing asbestos, regardless of exposure level:
 - a. High-speed abrasive disc saws that are not equipped with HEPA-filtered exhaust enclosures.

- b. Compressed air, unless used in conjunction with an enclosed HEPA-filtered ventilation system.
 - c. Dry sweeping, shoveling or other dry-cleanup of asbestos-containing dust and debris.
 - d. Employee rotation.
4. Asbestos area **response cleanup** will follow the procedures in Att. 2.4.
 5. General safe work procedures must follow the requirements of Chapter 22, Asbestos, in the SI Safety Manual; minimum recommendations are in Att. 2.5.
 6. **Stripping or cleaning of any asbestos-containing flooring** must be conducted in accordance with established safe work procedures (refer to Att. 2.6).
 7. Written procedures for the safe handling and restoration of artifacts are to be included as part of this plan.

RECORDKEEPING

The following records are to be maintained with this Plan:

1. All records of ACM survey assessments, presumed ACM locations, and abatement records including clearance sampling.
2. SI shall maintain all copies of records related to determinations regarding the rebuttal of PACM/ACM as non-ACM for the duration of ownership. All such records shall be transferred to successor owners.
3. All records of employee personal exposure monitoring.
4. All employee training records for 1 year beyond the last date of employment of each employee, or 5 years, whichever is longer.
5. Documentation of asbestos waste disposal must be maintained by the facility Safety Coordinator indefinitely.

Re-Inspection of Asbestos-Containing Materials

Location of asbestos-containing material: _____
 Versar/Hygienetics/AMA report Page _____ () New location?

Type of Asbestos-Containing Material(s) (check all that apply):

- ____ Sprayed- or troweled-on ceilings or walls
- ____ Sprayed- or troweled-on structural members
- ____ Insulation on pipes, tanks, boilers
- ____ Other (describe): _____

Abatement Status of Material (check one):

____ Encapsulated, ____ Enclosed, ____ Removed, ____ None

If Removed, List Date & Firm/Project Name _____

If Removed, How Much Remains _____

Assessment:

1. Evidence of physical damage: _____
2. Evidence of water damage: _____
3. Evidence of delamination or other damage: _____
4. Accessibility of material:
 ____ high (within reach) ____ moderate (barely reachable)
 ____ low (unreachable)
5. Activity near the material:
 ____ high (daily) ____ moderate (> once/week) ____ low (< once/week)
6. Location in an air plenum, air shaft, or airstream: _____
7. Other observations: _____

Recommendations/Response Code (check all that apply; note priority):

- ____ Response Code A: Immediate removal
- ____ Response Code B: Remove as soon as possible
- ____ Response Code C: Removal should be planned
- ____ Response Code D: Encapsulate or repair
- ____ Response Code E: Monitor for changes in condition
- ____ Response Code F: No action required

(Evaluator/Date) _____

Sample Asbestos Fact Sheet for Building Occupants

ASBESTOS FACT SHEET FOR [facility name] OCCUPANTS**What are “Asbestos-Containing Building Materials” (ACMs)?**

Asbestos is a mineral that was commonly used, between the early 1900s to the 1970s, in a variety of building construction materials. Asbestos is durable, fire retardant, resists corrosion, and insulates well. It was sometimes added, as a durable & flexible binding agent, to decorative art plaster, textured paint, acoustical ceiling treatments, and floor tiles. Asbestos in many of the products was mixed in with other materials such as plaster, fiberboard, or paints. Often the mixture, once applied and set, was coated with paint or canvas wrap as added protection. Some forms, such as sprayed-on or troweled-on insulation (found on walls, ceilings, ductwork, or pipes), was banned (for new application) by the Environmental Protection Agency (EPA) in the 1970s.

What are the Health Risks?

ACM in good condition does not pose a health risk. ACM becomes a problem when, due to damage, disturbance, or deterioration over time, it releases fibers into the air. If inhaled or ingested, asbestos fibers can cause serious health problems, including asbestosis, lung cancer, and mesothelioma. Therefore, the EPA has recommended that ACM either be removed (if significantly damaged or during renovation projects), or be managed in place through periodic inspections and prompt repair when damage is noticed.

How does the Smithsonian Maintain ACM in Good Condition?

Over 20 years ago, the Smithsonian implemented an in-place management program for ACM in its buildings. Comprehensive surveys were conducted by environmental contractors, identifying the locations of ACM, its condition, and the potential for future damage. An abatement priority list was then developed. This program has successfully removed or stabilized ACM throughout SI buildings. Periodic surveys are conducted by certified Asbestos Inspectors. When building areas are scheduled for construction or renovation, a hazardous materials survey is first conducted within the project boundaries and any ACM impacted by the project is removed before work begins. Periodic visual observations and inspections are conducted as part of the [facility name]

Asbestos Management Plan. When damage or deterioration is noted, the Plan has specific steps to follow for prompt cleanup and repair or removal.

Where Can ACM Still Be Found In [facility name]?

Building occupants should be aware of ACM locations that may remain in their areas.

[]

How Can You Prevent Accidental Damage to ACM in Your Work Area?

Be mindful of equipment, broom handles, etc, that you move through the work area and hall ways, so as not to scrape asbestos-containing ductwork or suspect pipes.

Do not store anything atop or near asbestos-containing structures, such as ducts or pipes, to avoid damaging the asbestos material.

Do not hang anything (like planters) from suspect asbestos pipes or ducts.

Do not replace carpeting (which may have been placed over asbestos flooring) or ceiling tiles, or plan room renovations, without first contacting the Building Manager's office.

Who Do You Call If Damage is Noticed?

If you notice any damage to suspect ACM, **contact [facility designated contact and phone number] immediately.**

Sample Abatement Notification to Occupants
[NOTE: NYC REQUIRES SPECIFIC TYPE FACE & SIZE]

NOTICE OF ASBESTOS ABATEMENT

This provides notice that a project will begin on or around (date) to remove asbestos-containing building materials as a routine part of the (describe project and location). The removal will be conducted by (name firm), a licensed asbestos abatement firm, and done in accordance with the safe work practices established by the SI "Asbestos Abatement" specifications. The project has been reviewed by the SI Office of Safety, Health and Environmental Management and daily oversight of the contractor activities, including final clearance air samples, will be conducted on behalf of the SI by (name environmental contractor). Any questions should be directed to the Building Manager (name) at (phone).

**ACM Area Response Cleanup Procedures
Conducted only by workers with minimum of 16-hour Operations and
Maintenance training through an EPA-AHERA accredited provider**

1. Any debris found near friable ACM must be either sprayed with water/surfactant mixture and placed in plastic bags, or removed with a HEPA-filtered vacuum cleaner. Eliminate all visible debris and clean a minimum radius of 5 feet beyond extent of visible debris.
2. Dry sweeping is strictly prohibited.
3. All potentially contaminated carpets shall be removed and disposed of as asbestos waste.
4. All potentially contaminated curtains, books, non-carpeted floors, and horizontal surfaces must be HEPA vacuumed and/or wet wiped.
5. All debris, vacuum cleaner bags, and filters, cloths, mop heads, etc., used to clean ACM areas shall be handled and disposed as asbestos-contaminated waste. These items shall be sprayed with water/surfactant mixture before leaving the job site and discarded in sealed 6-mil-thick plastic bags or leak-tight containers in accordance with Part E, "Waste Disposal," of this Chapter.
6. Supervisors shall inspect the asbestos work area after cleanup has completed. Document that the cleanup took place, and ensure that no visible debris remains.

Recommended Safe Practices When Working On or Around ACM

1. Employees who work in areas where asbestos abatement or repair will occur will be notified in advance per this Chapter and re-located until area is cleared for re-occupancy.
2. Jobs shall be scheduled during evening or weekend hours whenever possible.
3. Warning signs shall be posted at the entrance to the area (or at the ends of corridors leading to the area) to restrict entry to authorized personnel only.
4. PPE for asbestos protection shall be used. Minimum respiratory protection shall include a NIOSH-approved half-face air-purifying respirator with HEPA-filter cartridges. Limited-use, disposable respirators are not allowed for asbestos work. Full-body protective clothing shall be used whenever the project offers the potential for contaminating worker clothing. Double-suiting is preferred. If single-suits are used the worker shall HEPA-vacuum the outside of the suit before removing it.
5. Sources of air movement through the O&M work area shall be restricted.
6. Mini-enclosures, glove bags, HEPA-vacuums, and/or wet methods shall be used. Power tools shall be equipped with HEPA filtration devices.
7. HEPA-filtered vacuums shall be used to clean before and after work, including cleaning all equipment, furniture, and surrounding areas that may have been affected by the asbestos work.
8. Resilient flooring shall not be sanded or scraped unless it is determined to be asbestos free.
9. If filters in a central air ventilation system are suspected of being asbestos-contaminated, they shall be sprayed with water/surfactant mixture before they are removed. The filters shall be treated as asbestos-contaminated waste, placed in a 6-mil-thick plastic bag, and sealed for disposal as asbestos waste.
10. There shall be no smoking or consumption of food or beverages in the affected area during ACM work.
11. A maintenance plan and bag-changing procedures shall be established for HEPA-filtered vacuum cleaners in accordance with the manufacturer's instructions. Filter bags shall be treated as asbestos-contaminated waste, placed in a 6-mil thick plastic bag, and sealed for disposal as asbestos waste.
12. Supervisors shall inspect the area after ACM work is completed to ensure and document that all debris has been removed, and no damage to ACM was caused by the work activities.

EPA Guidelines for Stripping Asbestos-Containing Floors

REMEMBER: Improperly removing asbestos-containing floor covering may result in the release of high levels of asbestos. EPA recommends leaving asbestos-containing floor covering in place (provided the material is in good condition), and always follow proper maintenance procedures, as outlined below.

The Environmental Protection Agency (EPA) recommends that building owners and custodial/maintenance staff considers the following basic guidelines when stripping wax or finish coat from asbestos-containing floor coverings:

1. **AVOID STRIPPING FLOORS.** Stripping of floors should be done as infrequently as possible - once or twice per year depending on circumstances. The frequency should be carefully considered as floor maintenance schedules or contracts are written or renewed.
2. **PROPERLY TRAIN STAFF.** Custodial or maintenance staff that strip floors should be trained to safely operate the machines, pads, and floor care chemicals used at the facility.
3. **FOLLOW APPROPRIATE WORK PRACTICES.** Custodial or maintenance staff that strip floors should follow the work practices recommended here, under informed supervision. Directions from floor tile and floor wax product manufacturers on proper maintenance procedures should also be consulted.
4. **STRIP FLOORS WHILE WET.** The floor should be kept adequately wet during the stripping operation. Do NOT perform dry stripping. Prior to machine operation, an emulsion of chemical stripper in water is commonly applied to the floor with a mop to soften the wax or finish coat. After stripping and before application of the new wax, the floor should be thoroughly cleaned while it is wet.
5. **RUN MACHINE AT SLOW SPEED.** If the machine used to remove the wax or finish coat has variable speeds, it should be run at slow speed (about 175-190 rpm) during the stripping operation.
6. **SELECT THE LEAST ABRASIVE PAD POSSIBLE.** EPA recommends that the machine be equipped with the least abrasive pad possible to strip wax or finish coat from asbestos-containing floors.
7. **DO NOT OVER STRIP FLOORS.** Stop stripping when the old surface coat is removed. Over stripping may damage the floor and may cause the release of asbestos fibers. Do NOT operate a floor machine with an abrasive pad on unwaxed or unfinished floors.

Safe Work Practices for Transite Panels

<i>Locations in this Facility:</i>

Background

Transite is a term for a hard, fireproof composite material, fiber cement boards, typically using in wall construction. Review your facility Asbestos Assessment reports for details; structures that still might contain transite asbestos at the SI include:

- Exterior building siding
- Lining of chemical exhaust hoods
- Cooling towers

Transite surfaces do not pose a hazard if they are intact.

The use of asbestos to manufacture transite was phased out in the 1980s. However, unless manufacturer or previous environmental sampling results prove that a transite material is negative for asbestos, ALL transite materials in the SI must be presumed to contain asbestos and treated in accordance with safe use and handling requirements outlined in Chapter 22, Asbestos, of the SI Safety Manual and the facility's Asbestos Management Plan.

Precautions for Users Working On or Around Transite Surfaces

1. No physical modification (cutting, drilling, sanding, etc.) is allowed.
2. Do **NOT** abrade the surface.

What Damage to Look for and Actions to Take

- Rough and/or powdery edges around bolts, seams, or connections in the transite.
- Siding that is no longer smooth and/or encapsulated with a sealant or paint (i.e., surfaces that can become powdery and air-borne).
- Any cracks/breaks, even if remainder of material is hard and intact.

STOP work on this surface/in this hood should any evidence of damage be identified. Notify your supervisor, Safety Coordinator and/or Building Manager per the emergency response directions of this Asbestos Management Plan.

Periodic Visual Observation, to inspect for transite material condition, will continue as part of the facility semi-annual visual observation program.

The following actions can be accomplished only by licensed asbestos abatement workers (in accordance with SI Constructions Specifications 02800, or by SI staff certified as having successfully completed an EPA-AHERA accredited 16 hr. Operations and Maintenance (O&M) class:

Periodic Maintenance of Transite Panels: Provide periodic repainting or resealing as necessary to prevent rough surfaces that could release fibers. ***No drilling, cutting, or abrading of transite panels.***

Repair of Damaged Transite: Damaged or worn areas (or areas of water-damage and deterioration/erosion) must immediately be repaired or stabilized to prevent debris and fiber release. Use most appropriate methods and materials, such as: repainted/resealing with asbestos encapsulant, or enclosure with glued-on molded fiberglass or other non-ACM corrugated building siding or panels.

Removal of Transite: If transite materials need to be removed, they are to be removed intact with the following measures to minimize fiber release:

- O&M certified workers, approved to wear, and wearing, a respirator (half-mask, air purifying with HEPA filters; not “disposable” masks) may conduct this task. *If there is a potential for transite fiber breakage or other fiber release, removal is to be done by licensed asbestos abatement workers.*
- Areas around bolts, screws, or nails are to be made adequately wet with a surfactant (soapy water) and the hardware is to be carefully removed from the panel, keeping the area saturated or under vacuum (only with a HEPA-filtered vacuum unit).
- Check to see if the access panels in lab hoods are attached with screws that tap into a metal brace behind the panel. If so, these access panels will be easier to remove safely without the danger of fiber release.
- The entire panel is to be wrapped in two layers of 6-mil polyethylene sheeting and securely taped. Hardware should be also wrapped and disposed as asbestos waste.
- The packages are to be clearly labeled “Danger - Asbestos Containing Panels - Do not Damage or Open Wrapping”, and stored safely until disposal through a licensed asbestos waste disposal contractor.

Waste Clean-up and Disposal: Cleanup of any transite panel debris is to be performed only by O&M certified workers, approved to wear, and wearing a respirator (half-mask, air purifying with HEPA filters; not “disposable” masks).

- Dry sweeping is strictly prohibited. Any debris must be either sprayed with water/soap (surfactant) mixture and placed in 6-mil-thick plastic bags or leak-tight containers, or removed with a HEPA-filtered vacuum cleaner.
- All debris and contaminated cleaning items (vacuum bags, cloths, etc) must also be wetted and sealed in proper container for disposal as regulated asbestos waste in accordance with Part F, "Waste Disposal," of Chapter 22, SI Safety Manual.
- Supervisors shall inspect the asbestos work area after cleanup has completed. Document that the cleanup and ensure that no visible debris remains.

Safe Work Practices for Asbestos-Containing Counter Tops and Sinks

<p><i>Locations in this Facility:</i></p>
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Background

- Many laboratory counter tops in SI facilities have been identified by asbestos assessment reports as containing or presumed-to-contain asbestos, which would have been added in the manufacturing process to render the materials resistant to chemicals and heat.
- Many grey/black sinks and counter tops throughout the SI are made from soapstone, a rock having a talc base. True soapstone is inert, will not be affected by alkalis or acids, and has commonly been used for laboratory and building fixtures for these reasons.
- Non-friable, hard counter tops and sinks, presumed to contain asbestos, will not pose a hazard if they are intact.
- **However**, talc and other asbestiform minerals are part of the same metamorphic family of rocks and often exist in the same area. Therefore, unless bulk sampling or manufacturer analytical statements prove the material to be non-asbestos, quarried soapstone fixtures are presumed to be asbestos-containing for the purpose of maintenance activities and removal, and must be treated in accordance with safe use and handling requirements outlined in Chapter 22, Asbestos, of the SI Safety Manual and the facility's Asbestos Management Plan.

Precautions for Users Working On or Around of Counter Tops and Sinks

3. No physical modification (cutting, drilling, sanding, etc.) is allowed.
4. Do **NOT** abrade the surface.

What Damage to Look for and Actions to Take

- Rough and/or powdery edges around bolts, seams, or connections.
- Surface that is no longer hard and smooth
- Surfaces made from quarried rock such as soapstone, which has deteriorated, become friable, or is crumbling (i.e., surfaces that can become powdery and air-borne).
- Any cracks/breaks, even if remainder of material is hard and intact.

STOP work on this surface. Notify your supervisor, Safety Coordinator and/or Building Manager per the emergency response directions of the facility Asbestos Management Plan.

Periodic Visual Observation, to inspect for material condition, will continue as part of the facility semi-annual visual observation program.

The following actions can be accomplished only by licensed asbestos abatement workers (in accordance with SI Constructions Specifications 02800, or by SI staff certified as having successfully completed an EPA-AHERA accredited 16 hr. Class III Operations and Maintenance (O&M) class:

Periodic Maintenance of Counter Tops and Sinks: Provide periodic resealing as necessary to prevent rough surfaces that could release fibers. ***No drilling, cutting, or abrading is permitted unless as part of an approved O&M project.***

Repair of Damaged Counter Tops and Sinks: Damaged or worn areas (or areas of water-damage and deterioration/erosion) must immediately be repaired or stabilized to prevent debris and fiber release. Use most appropriate methods and materials, such as sealing with asbestos encapsulant.

Removal: If countertops or sinks need to be removed, they are to be removed intact with the following measures to minimize fiber release:

- O&M certified workers, approved to wear, and wearing, a respirator (half-mask, air purifying with HEPA filters; not “disposable” masks) may conduct this task. *If there is a potential for transite fiber breakage or other fiber release, then this removal is to be done by licensed asbestos abatement workers.*
- Areas around bolts, screws, or nails are to be saturated with soapy water and the hardware is to be carefully removed from the panel, keeping the area saturated or under vacuum (only with a HEPA-filtered vacuum unit).
- The entire counter top or sink sections are to be wrapped in two layers of 6-mil polyethylene sheeting and securely taped. Hardware should be also wrapped and disposed as asbestos waste.
- The packages are to be clearly labeled “Danger - Asbestos Containing Panels - Do not Damage or Open Wrapping”, and stored safely until disposal through a licensed asbestos waste disposal contractor.

Waste Clean-up and Disposal: Cleanup of any debris is done only by O&M certified workers, approved to wear, and wearing a respirator (half-mask, air purifying with HEPA filters; not “disposable” masks).

- Dry sweeping is strictly prohibited. Any debris must be either sprayed with water/soap (surfactant) mixture and placed in 6-mil-thick plastic bags or leak-tight containers, or removed with a HEPA-filtered vacuum cleaner.
- All debris and contaminated cleaning items (vacuum bags, cloths, etc) must also be wetted and sealed in proper container for disposal as regulated asbestos waste in accordance with Part F, "Waste Disposal," of Chapter 22, SI Safety Manual.
- Supervisors shall inspect the asbestos work area after cleanup has completed. Document the cleanup and ensure that no visible debris remains.