

**MPR 1840.4
REVISION C**

**EFFECTIVE DATE: December 4, 2018
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MARSHALL PROCEDURAL REQUIREMENTS

AS01

MSFC ASBESTOS PROGRAM

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Change/ Revalidation/ Canceled)	Document Revision	Effective Date	Description
Baseline		4/11/2008	[On 7/24/09 at the request of the OPRD and in response to the Center Records Manager's direction, 4.1 and 4.2 retention schedules were corrected.]
Revision	A	7/21/2010	P.1 revised to reflect Operations and Maintenance program, P.2 revised to clarify all classes of asbestos work, 1.Definitions revised to reflect definitions found in EPA's Asbestos Hazard and Emergency Response Act, 2.Responsibilities added/clarified responsibilities of AS and center organizations regarding duties when undertaking jobs in which asbestos may be disturbed, and 3.Procedures clarified training requirements and from whom training may be obtained.
Revision	B	12/14/2011	The content of Operations and Maintenance OI, AS10-OI-045, was moved from OI to MPR due to having broad Center applicability.
Change	1	4/30/2013	On 4/30/13 at the request of the OPRD, administrative changes were made to correct the title of MPR 8500.1, remove all references to MWI 8715.4, and change MPD 1840.3 references to MWI 1840.1
Change	2	6/29/2015	On 6/29/15, at the request of the OPRD, an administrative change was made to updated link at 4. Records.
Change	3	6/16/2016	On 6/16/16, at the request of the OPRD, an administrative change was made to 2.1.1, 2.1.3.4, 2.1.3.8, 2.1.3.12, 3.6.20.6(g), and 3.6.23 to reflect the current Operations and Maintenance program requirements, 2.1.4.8 was revised to clarify notification requirements to the Alabama Department of Environmental Management for planned asbestos removal projects, 2.1.4.14 and Flowchart A was revised to reflect the current method of post-work notification of asbestos removal to the Site Asbestos Coordinator, and 3.5.11 – Table 1 was revised to reflect the current asbestos training requirements for Class IV asbestos activities.
Revalidation	B	10/5/2016	Re-formatted to comply with new required MPR template. No changes were made to technical content.
Change	4	5/30/17	On 5/30/17, at the request of the OPRD, administrative changes were made to modify 2.4.1 and 2.6.12 to reflect the updated web links.
Revision	C	12/4/2018	Updated language for clarification, and updated content to current practice.

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PREFACE

P.1 PURPOSE

To implement NPR 8715.3 for handling, maintenance, use, removal, and disposal of all Asbestos-Containing Materials (ACMs) and debris, friable and nonfriable, at MSFC.

P.2 APPLICABILITY

- a. This MPR applies to Center personnel, programs, projects, and activities, including contractors and resident agencies to the extent specified in their respective contracts or agreements. (“Contractors,” for purposes of this paragraph, include contractors, grantees, Cooperative Agreement recipients, Space Act Agreement partners, or other agreement parties.)
- b. This MPR does not apply to the Michoud Assembly Facility.
- c. This MPR applies the following: all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The following terms also apply: “may” or “can” denote discretionary privilege or permission, “should” denotes a good practice and is recommended, but not required, “will” denotes expected outcome, and “are/is” denotes descriptive material.
- d. This MPR applies the following: all document citations are assumed to be the latest version unless otherwise noted.

P.3 AUTHORITY

NPR 8715.3, NASA General Safety Program Requirements

P.4 APPLICABLE DOCUMENTS AND FORMS

- a. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Construction Work, 29 CFR Part 1910.12
- b. OSHA, Asbestos, 29 CFR Part 1910.1001
- c. OSHA, Definitions, 29 CFR Part 1926.32
- d. OSHA, Asbestos, 29 CFR Part 1926.1101
- e. U.S. Environmental Protection Agency (USEPA), National Emission Standards for Hazardous Air Pollutants, National Emission Standards for Asbestos, 40 CFR Part 61.140 - 61.157
- f. USEPA, Asbestos Model Accreditation Plan, 40 CFR Part 763, Subpart E, Appendix C
- g. MWI 1840.1, Industrial Hygiene Programs
- h. MPR 8500.1, MSFC Environmental Engineering and Occupational Health Program

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- i. Technical Specifications for Repairs and Construction (TSRC), latest version
- j. MasterSpec specifications, latest version
- k. Construction of Facilities (C of F) Renovation or Demolition Specification, latest version
- l. Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming American National Standards Institute (ANSI), Z.19
- m. ADEM Form 496, Notice of Demolition and/or Asbestos Removal
- n. MSFC Form 4542, MSFC Asbestos Containing Material Periodic Inspection Form
- o. MSFC Form 4563, MSFC Asbestos Operations and Maintenance Work Permit
- p. MSFC Form 4587, Regulated Asbestos Material Waste Shipment Record

P.5 MEASUREMENT/VERIFICATION

None.

P.6 CANCELLATION

MPR 1840.4B, MSFC Asbestos Program, dated October 5, 2016.

Original signed by

Jody Singer
Director

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CHAPTER 1. RESPONSIBILITIES

1.1 Office of Center Operations shall:

1.1.1 Be responsible for compliance with this asbestos program. Implementation of this program protects employees from the health hazards related to potential exposure to asbestos in the workplace. The Director of Center Operations or designee commits adequate resources so that all elements of the Asbestos Operations and Maintenance Program are properly implemented and reviews the status of the program on a periodic basis with the Asbestos Control Team (ACT).

1.1.2 Delegate responsibilities assigned to applicable departments in regard to the specific asbestos-related activities within that particular department as follows:

1.1.3 Environmental Engineering and Occupational Health Office (EEOH) shall:

1.1.3.1 Manage and administer a medical surveillance program for applicable civil service and onsite contractor personnel.

1.1.3.2 Provide training, fit testing, and certification of MSFC personnel and onsite contractors requiring the use of respiratory protection equipment in accordance with MWI 1840.1 .

1.1.3.3 Provide applicable air monitoring, air/bulk sample collection, and identification and analysis including transmission electron microscopy (TEM) of potential ACM, as required, and for asbestos-related projects being performed by onsite contractors.

1.1.3.4 Provide procedural monitoring as deemed appropriate during abatement projects to ensure compliance with regulations.

1.1.3.5 Provide oversight to asbestos-related activities performed by non-resident contractors.

1.1.3.6 Maintain results of asbestos bulk and air monitoring.

1.1.3.7 Provide guidance on the requirements of Federal, state and local occupational and environmental health regulations.

1.1.3.8 Evaluate personnel exposure and recommend inclusion in medical monitoring program, as deemed appropriate.

1.1.3.9 Review and approve abatement plans prior to task commencement.

1.1.3.10 Perform clearance inspections following abatement activities, as deemed necessary.

1.1.3.11 Provide post-abatement clearance monitoring/inspections prior to removal of containment systems, as deemed necessary

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1.1.3.12 Provide post-abatement follow-up air monitoring as deemed appropriate.

1.1.3.13 Provide consultative services for all phases of ACM control including decontamination areas.

1.1.3.14 Oversee compliance with environmental regulatory requirements.

1.1.3.15 Provide guidance and oversight on the disposal of ACM and any air, water, or soil pollution issues.

1.1.3.16 Ensure the asbestos information management system is maintained and updated.

1.1.3.17 Provide a Site Asbestos Coordinator (SAC). The SAC is an onsite person assigned to implement and administer the program. This individual(s) identifies and assesses existing asbestos hazards and selects the appropriate control strategy to minimize the potential exposure of all employees. The SAC has the authority to take prompt corrective measures to eliminate asbestos exposure as necessary. Any construction, renovation, or routine maintenance that potentially disturbs ACM or Presumed Asbestos-Containing Material (PACM) in the facility is reviewed by the SAC before work proceeds. The SAC shall have stop-work authority. If work is stopped by the SAC, then EEOH concurs prior to re-commencement. The SAC will be responsible for ensuring appropriate hazard communication content is present in Facility Asbestos Outage notification and for disseminating all information related to the presence of ACM or PACM at the facility.

1.1.3.18 Provide an Asbestos Inspector(s). The Asbestos Inspector(s) shall be certified by the state of Alabama; provide information and direction on the location of ACM or PACM; be responsible for identifying ACM or PACM suspected to be repaired or removed to avoid human exposure; and ensure that all asbestos repair, removal and clean-up activities conform to State and Federal regulatory guidelines and regulations. As part of the duties, the inspector is authorized to collect bulk samples of ACM or PACM for analytical testing, conduct air monitoring surveillance of facilities where asbestos is located on a periodic base, and make recommendation to the SAC of potential areas of concern that may cause a health problem to employees.

1.1.3.19 Provide an Asbestos Information Monitor. The asbestos information monitor is required to update the Asbestos Information System (AIS) of all related asbestos information and maintain all associated records regarding the removal of asbestos. The asbestos information monitor shall manage and maintain records on the presence and location of all ACM or PACM at the MSFC facilities. This information may be gathered by a visual walk-through of the facility, data on historical uses of asbestos in construction and/or if available, previous asbestos building inspections or blue print drawings. Records are updated if previously unidentified materials are discovered and following the completion of asbestos removal projects.

1.1.3.20 Monitor and track the quantity of asbestos waste disposed of in the Redstone Arsenal landfill.

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1.1.3.21 Provide Industrial Hygiene support. In the event the SAC is not an industrial hygienist, the Industrial Hygienist shall provide consultation and support to the SAC. The Industrial Hygienist may also be consulted to assist with initial exposure assessments and conduct air monitoring where necessary.

1.1.3.22 Provide medical personnel responsible for implementing the Asbestos Medical Surveillance Program and maintaining medical surveillance records.

1.1.4 Facilities Management Office (FMO) shall:

1.1.4.1 Ensure that all construction and maintenance work is evaluated for asbestos prior to work, appropriate asbestos protection is implemented, and asbestos abatement plans are transmitted for coordination, assessment, and package preparation (as required).

1.1.4.2 Ensure that ACM removal is performed by a qualified licensed asbestos abatement contractor in accordance with all governing laws and regulations.

1.1.4.3 Ensure through contract language or other applicable means, that asbestos abatement contractors follow Technical Specifications for Repairs and Construction (TSRC) and MasterSpec specifications.

1.1.4.4 Ensure notification of scheduled asbestos abatement to facility occupants through the 72-hour/11 day schedule, the Building Manager, and/or the Organizational Safety Representatives (as applicable).

1.1.4.5 Ensure notification of scheduled outages within asbestos-containing areas with the Building Manager.

1.1.4.6 Ensure approval of abatement projects with EEOH.

1.1.4.7 Ensure that all ACM is disposed of in accordance with MPR 8500.1 and other applicable laws, ordinances, and regulations, including proper waste shipment records and disposal documents.

1.1.4.8 Provide the Alabama Department of Environmental Management (ADEM) notification of planned ACM removal projects as required. Send copies of the notification and proof of receipt by ADEM to EEOH.

1.1.4.9 Provide signage maintenance and installation. Under direction of the SAC, the FMO is responsible for posting of signs or labels where required to warn of the presence and hazards of ACM/PACM.

1.1.4.10 Provide appropriately-trained and certified Asbestos Workers and assign only such workers to Class III tasks. The Asbestos Worker consists of Facility personnel that have successfully completed an Alabama Safe State-approved Class III asbestos class for the role they will fulfill (e.g., worker or supervisor). The type of work performed by FMO Asbestos Workers

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can include the cutting away of small amounts of ACM or PACM to access mechanical or structural components. The amount of material cut away shall not be more than the amount that can fit into a standard (60" x 60") glove bag.

1.1.4.11 Provide housekeeping employees. These employees are involved in custodial activities where there exists a potential to contact ACM or PACM but the material is not disturbed. Examples of ACM/PACM include floor tile, carpeting and ceiling tile. Custodial work may also involve the clean-up of dust, waste and debris from ACM or PACM due to minor damage or from maintenance or repair operations where ACM or PACM has been disturbed.

1.1.4.12 Provide Construction Management Inspector. This is an FMO construction inspector who inspects the activities associated with the asbestos abatement processes involved in Local, Construction of Facilities (C of F), and operations and maintenance (O&M) projects.

1.1.4.13 Provide Pre-Work Notification. This is notification at least 5 working days prior to start of an abatement project to employees in areas where asbestos abatement is to occur. Details of communication include location of work, duration of work, contractor performing work and a Facilities point of contact for questions.

a. O&M activities shall be reported through MSFC Form 4563 or the Asbestos Operations and Maintenance Work Permit which is filled out by the competent person who is charge of the O&M activity. Pre-work notification of O&M activities to the SAC shall be coordinated through the Facilities outage notification system.

b. Prior to beginning the work, the SAC or their designee may provide to the asbestos abatement contractor, through the FMO, a listing of the current inventory of ACM/PACM in the area to be abated.

c. The asbestos abatement contractor shall note on the listing the changes made and material removed. This annotated report is provided to the FMO.

1.1.4.14 Provide Post-Work Notification. The FMO shall notify the SAC within one week of completion of a Class I or II asbestos abatement activity with the type, location and quantity of asbestos abated. Notification is done using the annotated report obtained during pre-work notification and/or by a marked up floor plan.

1.1.5 The FMO, EEOH, and contractors likely to contact asbestos by performing Class III or IV work shall provide personnel to fulfill certain roles and responsibilities. One individual may fulfill multiple roles providing they have appropriate knowledge, skills, ability and training to effectively perform the defined duties.

1.2 MSFC Personnel Responsibilities: Personnel across MSFC, regardless of employer or affiliation, shall know the materials they are working with and around, attend any training required, follow established work procedures, and use required protective equipment. Each employee has the responsibility to notify their supervisor of any damaged or significantly damaged ACM or PACM, like pipe insulation. Each employee is aware of and respects all

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warning signs and labels and never enters a regulated area unless properly trained and authorized.

1.2.1 All MSFC Organizations or contractors which engage in Class I, II or III asbestos work shall:

1.2.1.1 Ensure that all suspect ACM that may be disturbed or removed in renovation or maintenance projects are identified prior to initiation of the project.

1.2.1.2 Ensure that any suspect ACM discovered is identified and analyzed through support from EEOH prior to disturbance or removal.

1.2.1.3 Ensure that ACM removal is performed by a qualified licensed asbestos abatement contractor in accordance with all governing laws and regulations.

1.2.1.4 Ensure that EEOH is notified in advance of the date of each step in the asbestos abatement project for monitoring purposes.

1.2.1.5 Submit the asbestos abatement plan to EEOH for approval prior to task commencement.

1.2.1.6 Ensure notification of all asbestos-related and abatement operations to facility occupants through the building manager.

1.2.1.7 Ensure that all ACM is disposed of in accordance with MPR 8500.1 and other applicable laws, ordinances, and regulations, including proper waste shipment records and disposal documents.

1.2.1.8 Ensure all asbestos-related activities are coordinated with FMO to ensure appropriate outages are scheduled.

1.2.1.9 Provide placement of worksite barriers and posting of warning signs for controlled areas during abatement operations and ensure proper use of decontamination areas.

1.2.1.10 Correct any deficiencies and/or any findings entered into the Safety, Health, and Environmental Tracking system (SHETrak) that were noted during EEOH inspections.

1.2.1.11 Ensure standard operating procedures for asbestos abatement work are current and a copy is submitted to EEOH.

1.2.1.12 Ensure a copy of all air and bulk monitoring data and analysis provided by entities other than EEOH is submitted to EEOH.

1.2.1.13 Ensure obligations of section 1.1.4 are fulfilled if activities being performed are similar to those performed by FMO. As an example, if an organization contracts work that either as an end result or as part of a larger project involves Class I, II or III asbestos work, then that organization or contractor is responsible for fulfilling the duties normally addressed by the FMO.

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1.2.1.14 Ensure Class I and II abatement is performed by a licensed asbestos abatement contractor according to the most current version of the TSRC Asbestos Guidelines, Renovation or Demolition Specification and applicable government regulations through the FMO.

1.2.1.15 Ensure appropriate personal protective equipment is provided and worn in accordance with 29 CFR Part 1910.1001 and/or 29 CFR Part 1926.1101.

1.3 Asbestos Control Team (ACT): The ACT shall ensure that all elements of the Asbestos Program are properly implemented, ensuring that all employees receive the appropriate training, monitoring the program and updating the status of the program as necessary.

1.3.1 The ACT core composition is comprised of a representative from EEOH and a representative of the FMO.

1.3.2 The ACT is chaired by the SAC. Ad hoc members from other organizations or contractors may be added at the discretion of core team.

1.3.3 To add an ad hoc member, the SAC notifies the organizations safety Point of Contact that a representative is needed. For contracted services, the Contracting Officer's Representative (COR) is notified with the invitation.

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CHAPTER 2. PROCEDURES

2.1 Asbestos Abatement and Maintenance Activities

The OSHA Asbestos Construction Standard requires that each facility engaging in asbestos abatement work perform that work in accordance with OSHA's requirements. This MPR describes the NASA MSFC Asbestos Abatement and Maintenance Activity. It describes the OSHA asbestos work classifications that apply to abatement and maintenance activities, the implementation of requirements for workers in restricted areas (whether performing abatement or not), and for employers and employees adjacent to restricted areas.

2.1.1 OSHA Asbestos Work Classifications for Abatement and Maintenance Activities

There are three OSHA categories of asbestos activity performed at MSFC which apply to abatement and maintenance activity.

2.1.1.1 Asbestos abatement is the removal, enclosure, or encapsulation of ACM to minimize the risk of asbestos-related illness. Abatements are classified by OSHA as Class I and Class II asbestos activities.

2.1.1.2 Asbestos-related maintenance tasks involving the likely or intentional disturbance of ACM meet the OSHA definition of a Class III asbestos activity. All asbestos-related maintenance activities at MSFC are performed in accordance with an asbestos operations and maintenance plan approved by EEOH.

2.1.1.3 Asbestos spill response and cleanup are the acts of responding to and cleaning up releases of ACM. This work is performed in accordance with the spill response and cleanup procedures described in this MPR, as well as with the requirements of an OSHA Class IV asbestos activity.

2.1.2 Handling of ACM

Asbestos exposure is regulated in all work as defined in 29 CFR Part 1910.12(b), including, but not limited, to the following:

- a. Demolition or salvage of structures where asbestos is present.
- b. Removal or encapsulation of materials containing asbestos.
- c. Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof that contain asbestos.

2.2 Notification

2.2.1 Employers of employees working in and contiguous to regulated areas ensure that the employees comprehend and comply with warning signs.

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2.3 Asbestos Housekeeping Activity

2.3.1 Areas where damaged or significantly damaged ACM or damaged or significantly damaged suspect ACM is present are to be repaired, abated, or cleaned up and disposed of by qualified personnel.

2.3.1.1 Anyone seeing debris from deteriorated suspect material are to immediately leave the area, close any doors to prevent others from entering the area, and contact EEOH at 544-2390.

2.3.1.2 Areas containing suspected asbestos debris shall be barricaded and isolated to prevent employee exposure and the spread of asbestos contamination to other areas and the spill cleaned up in accordance with applicable standards.

2.3.1.3 Barricaded areas shall only be entered by qualified personnel.

2.3.2 If ACM is present, an O&M program shall be implemented to minimize potential exposure of all building occupants and include provisions to:

- a. Maintain ACM in good condition.
- b. Ensure proper cleanup of asbestos fibers previously released.
- c. Prevent further release of asbestos fibers.
- d. Monitor the condition of ACM.

2.3.3 This O&M program shall remain in effect until all asbestos has been removed.

2.3.4 Controls

2.3.4.1 To avoid the possibility of disturbance of ACM, work above ceilings in buildings containing ACM shall be performed after regular work hours unless approved by EEOH. A utility outage of the heating, ventilating, and air-conditioning system and all other applicable utilities is obtained.

2.3.4.2 All work follows work practices listed in 29 CFR Part 1910.1001 or 29 CFR Part 1926.1101 for the class work being performed.

2.3.4.3 All utility outages are obtained through Center Operations Support Service Outage Coordinators.

- a. Under no circumstance shall a ceiling tile be removed during regular work hours in a building known to contain ACM debris above the ceiling without approval from EEOH.
- b. Prior to the commencement of any work above the ceiling where asbestos is located, notify EEOH to assure appropriate precautions are followed.

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Note: If you are not sure if this pertains to the building where work is to be conducted, contact EEOH at 544-2390 or assume the building does contain ACM.

2.4 Inventory of Asbestos-Containing Building Materials (ACBM): A comprehensive baseline asbestos survey of MSFC was conducted in 2009. Through coordination between the FMO and EEOH, Occupational Health maintains the database to the current asbestos inventory at MSFC.

2.4.1 The database can be viewed at <https://eeoh-portal.ndc.nasa.gov/asbestos>

2.5 Training

2.5.1 Proof of current training of all classes of workers shall be provided to the FMO and EEOH prior to commencement of work and updated as required.

2.5.2 All employees shall complete training necessary for the class work they are performing prior to being assigned to work tasks which involve ACM or PACM.

2.5.3 Workers performing Class I or II abatement work shall complete ADEM accredited training for Class I or II work. Class I or II work involves direct, intentional contact with ACM. This training ranges from 32-40 hours.

2.5.4 Class III Operations and maintenance training for workers shall be ADEM accredited, be at least 16 hours and include “hands-on” activities.

2.5.4.1 Class III workers shall complete appropriate respirator training and successfully be fitted for the required respirator necessary for the task being performed and have successfully passed medical qualifications both for respiratory protection and appropriate asbestos physical.

2.5.5 Employees involved in Class IV Asbestos work shall receive training that includes the location of ACM and PACM in their specific working area, condition of ACM, potential health hazards, safe work procedure for routine housekeeping and maintenance activities involving work with ACM or PACM, special precautions to be followed for proper clean-up of ACM or PACM, and the reporting procedure to be followed when damaged or significantly-damaged ACM or PACM is discovered.

2.5.6 The SAC shall receive a training equivalent to the Environmental Protection Agency’s (EPA’s) 16 Hours Operations and Maintenance Training and training such that they are capable of identifying existing asbestos hazards in the workplace and taking prompt corrective action.

2.5.7 Supervisor of employees who are involved in asbestos-related activities shall receive the appropriate level of training for the type of work activity which is being supervised. As an example, if supervision of Class III work is being done the supervisor would have Class I, II or III training.

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2.5.8 Individuals who are assigned the responsibility for the collection of bulk ACM or PACM materials to test for the presence of asbestos shall attend an EPA equivalent Asbestos Inspector Course and maintain current EPA or State certification.

2.5.9 Any person wishing to keep current certification for Class I-III asbestos work shall complete retraining annually sufficient to meet EPA/OSHA requirements, complete and pass a physical examination for asbestos workers and a physical examination for respiratory protection.

2.5.10 Failure to maintain annual training requirements shall result in the person being removed from consideration for performing Class I-III work.

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2.5.11 The following table describes training requirements:

Table 1

Class Work	Example	Training
<p>Class I Activities involving the removal of Thermal System Insulation (TSI), surfacing ACM and PACM.</p>	<p>Steam line insulation removal</p>	<p>U.S. Environmental Protection Agency (USEPA) Asbestos Abatement Worker 32 hour training or equivalent, with annual 8 hours refresher training.</p> <p>Provided by offsite resource</p>
<p>Class II Activities involving the removal of ACM, which is not TSI surfacing ACM. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.</p>	<p>Floor tile removal</p>	<p>USEPA Asbestos Abatement Worker 32 hour training or equivalent with 8 hours annual refresher training.</p> <p>Provided by offsite resource.</p>
<p>Class III Repair and maintenance operations where ACM, including TSI and surfacing ACM and PACM, are likely to be disturbed.</p>	<p>O&M work shall fit in one standard glove bag/shift/day or a 3' x 3' area of floor tile</p>	<p>USEPA Operations and Maintenance 16 hour training or equivalent with 4 hours annual refresher training. A competent person (as defined by USEPA and OSHA) shall review the curriculum and confirm that it properly prepares the workers for their expected duties.</p> <p>Provided by offsite resource.</p>
<p>Class IV 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.</p>	<p>Custodial activities</p>	<p>2 hours of initial awareness training with annual refresher.</p> <p>Provided through System for Administration, Training, and Educational Resources for NASA (SATERN) or instructor led. Annual refresher can be covered as a monthly safety meeting topic.</p>
<p>Asbestos Awareness Training Training to be given to all MSFC employees to provide a general awareness of the asbestos requirements at MSFC, an understanding of where to find information and who to contact should questions regarding asbestos arise. Material for asbestos awareness training is delivered through SHE 102.</p>	<p>All personnel at MSFC</p>	<p>Covered as part of SHE 102. SHE 237 may be taken by individuals if more training is desired.</p>

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2.6. Asbestos O&M

2.6.1 This section describes the MSFC Asbestos O&M requirements and covers the following ACM or PACM-related activities:

2.6.1.1 Scheduled renovation and facility engineering activities.

2.6.1.2 Routine housekeeping and maintenance.

2.6.1.3 Emergency response.

2.6.2 This section does not cover any processes in regard to abatement or large scale demolition, salvage or abatement activities as defined in the OSHA Construction Industry Standard as Class I, and II Asbestos Abatement Work. Such work shall be performed by a licensed asbestos abatement contractor according to the MSFC TSRC (latest revision of TSRC) Specification Asbestos Guidelines, Construction of Facilities Renovation or Demolition Specification, and applicable government regulations through the FMO. However, the O&M requirements do provide guidelines of reporting information of large abatement projects to appropriate authorities in order to maintain current information regarding the presence, location and quantities of asbestos material at MSFC facilities.

2.6.3 ACM/PACM may be identified by qualified EEOH personnel during annual facility walkthrough inspections, in response to requests for analysis, or by surveying and analysis of materials involved in planned modification projects. The process involves the identification of the type and percentage of asbestos in a material. Concurrently, the condition of the ACM is evaluated to determine its hazard potential. The condition of the ACM relates to its state of deterioration and its friability. Friable ACM is that which can be crumbled by hand pressure and is therefore likely to emit fibers (29 CFR Part 1910.1001 and 40 CFR Part 61, Subpart M).

2.6.4 Signs shall be posted at the entrance to mechanical rooms/areas where employees may be reasonably expected to enter and which contain ACM or PACM. The type of sign posted is dependent on the type and nature of the ACM/PACM present. At a minimum, signs include information on the type(s) of ACM or PACM and work practices to ensure that the material is not disturbed.

2.6.5 For areas in which Class I, II, or III work is performed, signs with the following language shall be posted by the group performing the work at the entrance to the work area:

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

2.6.6 Labels shall be affixed to all products containing asbestos and to all containers containing such products, including waste containers.

DIRECTIVE IS UNCONTROLLED WHEN PRINTED
Verify current version before use at <https://dml.msfc.nasa.gov/directives>

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2.6.6.1 Where feasible, installed asbestos products shall contain a visible label that reads as follows:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

2.6.7 Labels shall be placed as close as possible to the ACM/PACM or placed in such a way that personnel attempting to access the area are informed of the hazard. As an example, a small pipe chase contains ACM/PACM. The size of the chase precludes easily entering and placing signs. In this instance placing the appropriate sign on the hatchway with what the hazard is (e.g., insulation or mudded joints) would be acceptable.

2.6.8 Areas requiring signage shall be identified by the ACT with signage acquired and installed by Facilities.

2.6.9 Exposure Assessment and Air Monitoring. Air monitoring shall be conducted on a periodic basis in facilities that have ACM and/or PACM to ensure that the levels of personnel exposure are within the regulatory acceptable limits.

2.6.9.1 An initial exposure assessment by the SAC shall be conducted to review ACM or PACM work activities which are performed by Class III and Housekeeping personnel. The assessment involves the review of:

- a. Air monitoring results, where available;
- b. The techniques used to contain and control ACM or PACM;
- c. The qualifications of employees and supervisors involved;
- d. Any environmental conditions which may impact exposure
- e. The type and condition of ACM or PACM; and
- f. Maintenance or skilled trades' personnel may also be consulted.

2.6.9.2 The initial exposure assessment shall determine whether the OSHA Permissible Exposure Limit (PEL) or Excursion Limit (EL) is or may reasonably expect to be exceeded during the work activity.

2.6.9.3 If the exposure assessment is positive (the OSHA PEL or EL may be exceeded), periodic exposure monitoring is required, additional personal protective equipment may be necessary, and additional asbestos controls shall be used to reduce employee exposure within regulatory limits.

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2.6.9.4 Additional requirements shall be determined by the SAC and Industrial Hygiene and communicated to the affected parties via email or other written communication method.

2.6.9.5 If the exposure assessment is negative (the OSHA PEL or EL is not exceeded), air monitoring is not required. However, established asbestos safe work procedures shall be strictly followed.

2.6.9.6 Affected employees and their representatives shall be allowed to observe exposure monitoring and notified in writing, either individually or by posting results in an accessible location within 15 working days after receiving the analytical results.

2.6.9.7 The following criteria shall be used to assess results of routine, area air monitoring of buildings containing ACM:

- a. If the result is between 0 and 20% in an occupied building inclusive of the Occupational Exposure Limit (OEL) of 0.1 fibers per cubic centimeter (f/cc), the ACM/PACM is maintained in place and monitored at least annually.
- b. If the result is 21 to 50%, inclusive of the OEL the ACM/PACM is maintained in place and monitored at least bi-annually.
- c. If the result is greater than 50% of the OEL, the area is re-sampled within 2 weeks. If both samples are greater than 50% of the OEL, then abatement/mitigation is required.
- d. If the second sample is not above 50%, the area is monitored quarterly. If 2 consecutive quarters are less than 50%, return to normal schedule based on last result.

2.6.10 Employee Notification. Employees shall be made aware that the facility contains ACM/PACM, the identity of the ACM/PACM materials (e.g., floor tiles), the location of these materials, and that when properly maintained and handled, the presence of these materials does not present a hazard.

2.6.11 The FMO and EEOH organizations through the use of items such as, but not limited to, Web-based tools, posters, broadcast emails, and memos shall notify affected employee of the location of ACM/PACM. This information is updated if previously unidentified materials are discovered to be ACM/PACM and following the completion of asbestos removal projects.

2.6.12 The primary communication method for location and type of material as well as air monitoring results shall be through the Web-based general employee access to the AIS interface. The Web site can be found at <https://eeoh-portal.ndc.nasa.gov/asbestos>

2.6.13 When a potential health threat due to asbestos contamination is identified or suspected, the SAC shall be contacted immediately and, in conjunction with Industrial Hygiene, develop, implement or facilitate implementation of corrective measures to prevent access of unprotected personnel to the hazard area.

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2.6.13.1 For normal operations under Class I, II, III or IV asbestos work, the demarcation and mitigation process appropriate to the class of work being performed shall be used.

2.6.13.2 Access to the asbestos abatement work area shall be controlled by barriers and posted with 20" x 14" asbestos danger and respirator-required signs (in accordance with this document) at all entrances/exits to the work area.

2.6.14 The MSFC Asbestos Worker may be assigned repair and maintenance operations where small amounts of ACM or PACM, including TSI and surfacing material are likely to be disturbed. The total material for the entire job shall not exceed an amount that can fit into a standard 60" x 60" glove bag. Only Class III Asbestos Workers with current training are authorized to perform Class III Asbestos Work.

2.6.15 Only employees and their supervisors who have successfully completed training as required in 2.5 of this document may participate in Class III work. Successful completion of training for Class I or II work may be substituted for the requirements of Class III training; however, the scope of work performed may never be allowed to exceed the parameters of Class III work.

2.6.16 All Class III asbestos work and any emergency clean-up of ACM or PACM debris shall be conducted within a regulated area from beginning through the completion of clean-up activity.

2.6.16.1 All regulated areas shall be demarcated with asbestos danger barrier tape and asbestos danger signs to isolate the work areas and protect employees outside of the area from exposure to airborne asbestos.

2.6.16.2 Access to regulated areas shall be limited to authorized persons only. An authorized person is defined as a person who has successfully completed and is current for Class III training.

2.6.16.3 All persons entering a regulated area shall use appropriate respiratory protection and participate in the facility respirator and medical surveillance program.

2.6.16.4 Employees shall be prohibited from eating, drinking, smoking, chewing tobacco or gum or applying cosmetics within a regulated area.

2.6.16.5 A supervisor trained according to section 2.5 of this document shall be designated to direct all asbestos work performed in a regulated area. This person is designated prior to beginning the Class III task and is known to all persons working on the Class III task.

2.6.17 The following are the minimum requirements for personal protective equipment for Class III work at MSFC:

2.6.17.1 Protective clothing shall be coveralls, disposable head covering (hooded coverall is acceptable), impervious gloves and disposable foot coverings impervious to fibers, such as Tyvek.

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2.6.17.2 Where the gloves and foot coverings meet the impervious clothing, the junctions shall be sealed with tape or similar material to prevent infiltration of fibers.

2.6.17.3 The SAC, with the assistance of an Industrial Hygienist and Class III supervisor, shall determine the appropriate respiratory protection with the minimum required protection consisting of a half-face negative pressure respirator with P100 or High Efficiency Particulate Air (HEPA) cartridges.

2.6.17.4 The Class III Supervisor shall visually examine suits worn by employees at least once each shift for rips, tears or other damage to the integrity of the clothing and ensure that rips or tears are immediately repaired or replaced upon discovery of damage.

2.6.18 Work Procedures. The EPA-equivalent 16 Hour O&M Training outlines specific procedures which shall be followed by the Asbestos Workers when working around ACM or PACM. These ACM or PACM removal and repair procedures include items such as, but not limited to, glove bag procedures, mini-enclosure, area isolation and critical barriers. The SAC should be contacted to determine work procedures for unique ACM or PACM projects which are not covered in these procedures.

2.6.18.1 As a minimum, the following work practices shall be followed with any deviations from these practices authorized in writing by the SAC prior to implementing.

2.6.18.2 All asbestos work shall be performed in an established regulated area using wet or equally effective fiber suppression methods.

a. Local exhaust ventilation such as, but not limited to, HEPA vacuums shall be used during asbestos removal or repair work, as required.

b. An impermeable drop cloth shall be placed below the work area, as required.

c. Asbestos work shall be isolated from the surrounding environment using a glove bag or mini-enclosure, as required.

d. Personal protective equipment as specified in 2.6.17 of this document shall be worn by all employees working in a regulated area, as required.

2.6.18.3 The Competent Person or designated representative shall inspect the area when work is complete for the presence of debris or materials and only after the area passes inspection may barriers be removed.

2.6.19 The following general precautions shall be followed when using HEPA vacuums in the course of Class III and IV asbestos work.

2.6.19.1 HEPA vacuums shall never be used in explosion-hazardous areas unless specifically rated for the hazardous location.

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2.6.19.2 Vacuum equipment maintenance, filter replacement and bag change-out shall be conducted within a regulated area.

2.6.19.3 Protective clothing and respiratory protection shall be worn when changing vacuum bags and filters.

2.6.19.4 Used HEPA vacuum bags and filters shall be treated and disposed of as ACM waste.

2.6.19.5 HEPA vacuum equipment shall be decontaminated after each use by wiping down the unit, casters and hose attachments with damp cloth, with hoses and attachments placed in marked bags for storage, and vacuum inlets and hose openings plugged.

2.6.19.6 When not in use, HEPA vacuum equipment shall be stored in a secured area.

2.6.19.7 Consult the manufacturer's equipment manual for specific instructions on the use and care of HEPA Vacuum equipment.

2.6.20 Class IV Asbestos work is defined as sanitation, housekeeping or maintenance activities during which there may be contact with ACM or PACM but the material is not disturbed. Class IV work may also involve the clean-up of dust, waste and debris from ACM or PACM due to minor incidents of damage or from maintenance or repair operations where ACM or PACM has been disturbed.

2.6.20.1 Housekeeping and maintenance employees are not authorized to disturb or remove intact ACM or PACM. Such work, where required, shall be performed by the Asbestos Workers or contracted asbestos abatement company, depending on type and extent of removal required.

2.6.20.2 Personal protective equipment used for general housekeeping is adequate for employees who are working around ACM or PACM but not disturbing these materials. Respiratory protection is not required under normal working conditions.

2.6.20.3 Minor episodes, such as the release of a small section of pipe insulation from a pipe or a small section of building insulation from a beam or the underside of a roof, can be treated with wet methods and HEPA vacuum techniques provided that the area involved at the point of impact is not widely contaminated with debris and no further release of remaining asbestos is anticipated. The quantity of debris shall not exceed an amount which can fit into one 60" x 60" waste disposal bag.

2.6.20.4 The Competent Person shall determine the appropriate clean-up response.

2.6.20.5 If ACM or PACM contamination is suspected, housekeeping and maintenance staff shall notify their immediate supervisor for direction. Individuals who are certified asbestos inspectors are authorized to collect samples of suspect ACM or PACM for analytical testing.

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2.6.20.6 The following procedure should be followed in the event of a small asbestos episode.

- a. Areas where clean-up or repair of ACM or PACM is performed shall be designated as a temporary regulated area during the time work and clean-up occurs.
- b. Restrict access to the area so that employee and vehicle traffic does not disturb the asbestos debris. Place barrier tape and warning signs around the area where ACM or PACM debris is present to minimize the number of persons within the area and protect employees outside of the area from exposure to airborne asbestos. When possible, close any doors to area to minimize drafts and unauthorized access.
- c. Personnel involved in minor episode response are required to wear a minimum of half-face negative pressure respirator with P100 cartridges (a.k.a., HEPA), disposable Tyvek coveralls, head and foot coverings, and gloves.
- d. Wet debris and surrounding area with water (preferably amended water) using a fine mist.
- e. Shut down ventilation equipment and fans to minimize drying and further disturbance of debris.
- f. Pick up the debris by gloved hand or shovel and place the debris in 6-mil plastic bags, properly labeled for asbestos.
- g. Vacuum the affected area using a HEPA- type vacuum. No other vacuum may be used. Sweeping is prohibited.
- h. After the area has been vacuumed, use a damp cloth or mop and clean all exposed surfaces.
- i. All debris and materials used in the clean-up which cannot be cleaned shall be discarded as asbestos waste.
- j. HEPA vacuum all disposable protective clothing and tools. Clean tools with a damp cloth.
- k. Decontaminate the HEPA vacuum by wiping it down with damp cloth. The caster and hose attachments shall be decontaminated also. Follow the manufacturer's instructions for changing vacuum filters when necessary.
- l. Prepare the HEPA vacuum for storage by remove all hoses and attachments and plugging all vacuum inlets and hose openings. Place cleaned hoses and attachments in plastic bags.
- m. The SAC or a designated representative shall inspect the area when work is complete. After the area passes inspection, all barriers are removed.

2.6.21 Asbestos Emergency Response Procedure. This section addresses accidental spills or delaminating ACM or PACM. In the event of such an occurrence, the following procedure minimizes potential safety and health hazards that may exist and assists in-house personnel to

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handle such an event in a timely manner. The procedures outlined should not be interpreted as the only course of action. Episodes beyond the scope of work outlined in these O&M requirements for housekeeping employees are a serious incident and shall require a licensed asbestos abatement contractor to respond.

2.6.21.1 The SAC shall determine the appropriate response action to an ACM or PACM release. Minor episodes of ACM or PACM debris may be cleaned-up by housekeeping staff who have received asbestos awareness training. More extensive ACM or PACM damage may require response action by the Asbestos Workers.

2.6.21.2 If clean-up action is beyond the scope of Class III Asbestos Work, then a licensed asbestos abatement contractor is contacted to perform the work.

2.6.21.3 The following precautions and procedures shall be observed to avoid excessive release of asbestos fibers into the air during an asbestos emergency event.

- a. Notify immediate supervisor of the location and condition of suspect damaged or significantly-damaged ACM or PACM. The supervisor shall notify the SAC of the incident.
- b. Areas where clean-up or repair of ACM or PACM is performed, shall be designated as a temporary regulated area.
- c. Restrict access to the area. Housekeeping or Asbestos Workers shall isolate the area with asbestos danger tape, and if possible, lock the room and post warning signs at all entry points to the area. Avoid walking through the damaged or significantly-damaged material as this may cause asbestos fibers to become airborne.
- d. Personnel involved in minor episode response shall be appropriately trained (e.g., current Class III/IV) and are required to wear a minimum of half-face negative pressure respirator with P100 cartridges (a.k.a., HEPA), disposable Tyvek coveralls, head and foot coverings, and gloves.
- e. Wet affected areas and debris with water (preferably amended water) using a fine mist.
- f. Shut down ventilation equipment and fans to minimize drying and further disturbance of debris. Close any doors to minimize drafts and unauthorized access.

2.6.22 Contractors shall be notified of the presence of ACM/PACM during the project bidding process in writing.

2.6.23 O&M activities shall be reviewed by the ACT and revised as necessary. The following information is addressed during the review:

2.6.23.1 On-going reporting by site personnel of damaged or significantly damaged ACM/PACM.

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2.6.23.2 Facility inspections and asbestos abatement activities performed in conjunction with renovation or demolition work.

2.6.23.3 Asbestos Workers and Housekeeping/Maintenance, Class III and IV work records.

2.6.23.4 Employee training records.

2.6.23.5 Exposure assessment records.

2.6.23.6 Medical surveillance records

2.6.24 A periodic reassessment shall be done by EEOH at least once every 3 years for each building at MSFC which contains asbestos. Assessments may be done by either a complete re-verification of ACM or a statistical random sampling. If statistical random sampling is used, the methods of sampling are consistent with the latest edition of ANSI Z1.9, "Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming." Results of re-assessment are recorded on MSFC Form 4542.

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APPENDIX A

DEFINITIONS

Abatement. Procedures used to control fiber release from asbestos containing material(s), including encapsulation, encasement, or removal.

Asbestos. Chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these groups of naturally occurring silicate minerals that are known for heat and chemical resistant properties.

Asbestos Containing Material (ACM). Any material containing more than 1 percent asbestos.

Asbestos Workers. The asbestos worker is authorized to perform Class I, II, and/or III Asbestos Work and respond to asbestos emergencies. The asbestos worker has the proper equipment and training to safely handle ACM or PACM.

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 for the purpose of demolition or renovation.

Class II Asbestos Work. Activities involving the removal of ACMs that are not TSI or surfacing material for the purpose of demolition or renovation. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III Asbestos Work. Repair and maintenance operations where ACMs, including TSI and surfacing ACM and PACM, are likely to be disturbed. Any work regarding asbestos is incidental to the operation being performed. As an example, removal of pipe lagging to access a leaking valve is Class III work. Gross removal of pipe lagging to remove piping is not Class III work. Any work done under Class III cannot be more than one 60" x 60" glove bag.

Class IV Asbestos 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. One who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR Part 1926.32 (f) in addition, for Class I and Class II work who is specifically trained in a training course which meets the criteria of USEPA's Model Accreditation Plan (40 CFR Part 763) for supervisor, or its equivalent, and for Class III and Class IV work, who is trained in a manner consistent with USEPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR Part 763.92 (a)(2).

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Critical Barrier. One or more layers of plastic sealed over all openings 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.

Damaged ACM or Presumed Asbestos-Containing Material (PACM). May refer to a friable miscellaneous and surfacing material with the surface crumbling, blistered, water-stained, gouged, marred or otherwise abraded over *less than* 10 percent of the surface if the damage is evenly distributed or 25 percent if localized damage or to damaged TSI material with a few water stains or less than 10 percent of insulation with missing jackets and/or crushed insulation or water stains, gouges, punctures, or mars on less than 10 percent of the insulation if the damage is evenly distributed or less than 25 percent if the damage is localized.

Decontamination Area. An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which are used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition. The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Disturbance. 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 and PACM, no greater than the amount that can be contained in one standard-sized glove bag or waste bag in order to access a building component.

Excursion Limit (EL). OSHA has established an EL for asbestos of 1.0 f/cc of air averaged over a sampling period of 30 minutes.

Fiber. A particulate form of asbestos, 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

Friable ACM (also known as “friable asbestos” or “friable PACM”). Term used to describe any asbestos-containing material that when dry can be easily crumbled or pulverized to powder by hand pressure and includes previously nonfriable material after such previously nonfriable asbestos-containing material becomes damaged or significantly damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

Glove bag. 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. A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

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

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Nonfriable. Term used to describe any asbestos-containing material typically bound up with cement, vinyl, asphalt, or some other type of hard binder. Some examples of nonfriable asbestos building materials are cement/transite siding, vinyl floor tiles and stucco. Nonfriable asbestos-containing material may become friable if it is crushed, crumbled, pulverized, or subjected to sanding, drilling, grinding, cutting, or abrading.

PACM. Presumed Asbestos Containing Material. TSI, surfacing, and miscellaneous material found in buildings constructed no later than 1980 presumed to contain asbestos fibers.

Permissible Exposure Limit (PEL). OSHA has established a PEL for asbestos of 0.1 f/cc of air as an 8-hour time weighted average (TWA).

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

Removal. All operations where ACM and/or PACM are taken out or stripped from structures or substrates and include demolition operations.

Renovation. The modifying of any existing structure or portion thereof.

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

Significantly Damaged ACM or PACM. May refer to a friable miscellaneous and surfacing that contains surface crumbling or blistered over *at least* 10 percent of the surface if the damage is evenly distributed or 25 percent if the damage is localized; and/or material hanging from the surface, deteriorated, or showing adhesive failure on 10 percent of the surface if the damage is evenly distributed 25 percent if localized; and/or water stains, gouges, or mars over at least 10 percent of the surface if the damage is evenly distributed or 25 percent if the damage is localized or to TSI that contain missing jackets on at least 10 percent of the of the piping if the damage is evenly distributed, or 25 percent if the damage is localized, and/or crushed or heavily gouged or punctured insulation on at least 10 percent of pipe runs/risers, boiler, tank, duct, etc., if the damage is evenly distributed or 25 percent if the damage is localized.

Surfacing Material. Material that is sprayed, troweled on, or otherwise applied to surfaces such as acoustical plaster on ceilings, 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, tanks, ducts, or other structural components to prevent heat loss or gain.

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APPENDIX B

ACRONYMS

ACBM – Asbestos-Containing Building Material

ACM – Asbestos-Containing Material

ACT – Asbestos Control Team

ADEM – Alabama Department of Environmental Management

AIS – Asbestos Information System

C of F – Construction of Facilities

CFR – Code of Federal Regulations

COR – Contracting Officer’s Representative

EEOH – Environmental Engineering and Occupational Health

EL – Excursion Limit

EPA – Environmental Protection Agency

f/cc – Fiber per cubic centimeter

FMO – Facilities Management Office

HEPA – High Efficiency Particulate Air

O&M – Operations and Maintenance

OEL – Occupational Exposure Limit

OSHA – Occupational Safety and Health Administration

PACM – Presumed Asbestos-Containing Material

PEL – Permissible Exposure Limit

SAC – Site Asbestos Coordinator

SATERN – System for Administration, Training, and Educational Resources for NASA

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SHETrak – Safety, Health, and Environmental Tracking system

TEM – Transmission Electron Microscopy

TSI – Thermal System Insulation

TSRC – Technical Specifications for Repairs and Construction

TWA – Time-Weighted Average

USEPA – United States Environmental Protection Agency

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APPENDIX C

VERIFICATION MATRIX

None.

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APPENDIX D

RECORDS

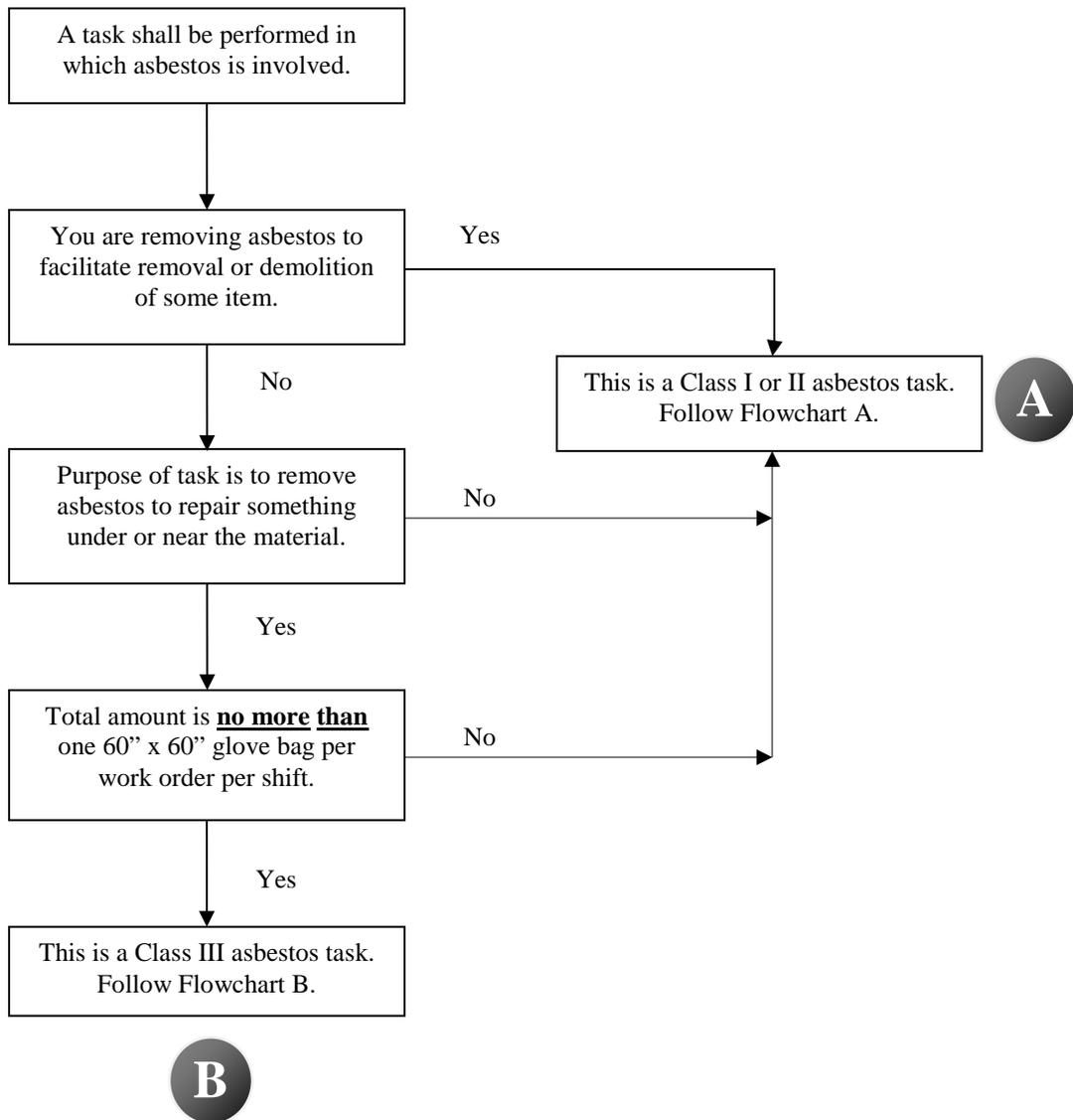
The following records will be maintained according to the “List of Occupational Health Records” located at the following link: (<https://explornet.msfc.nasa.gov/community/msfc/office-of-center-operations/as10>).

- D.1 Asbestos-related air monitoring records.
- D.2 ADEM notifications.
- D.3 Asbestos Abatement Plans and Records.
- D.4 Asbestos waste disposal records and manifests.
- D.5 Personnel training records for civil service employees (maintained in SATERN).
- D.6 Personnel training records for contractor employees.

APPENDIX E

FLOW DIAGRAMS

Decision Logic to Determine Scope of Asbestos Activity (see Definitions for Class I, II, and III Asbestos Work)



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Flowchart A: Class I and II Asbestos Work

(From sections 1.1.3, 1.1.4, and 1.2.1)

