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Occupational Health Programs Manual – Chapter 2

Asbestos w/Change 2 (9/30/2015)

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**NASA - Glenn Research Center
Cleveland, OH 44135**

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Change Record

Revision	Effective Date	Expiration Date	GRC25, Change Request #	Description
B	5/21/2012	5/21/2017	271	Bi-yearly review. Added grey verification boxes throughout document.
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C	6/15/2015	6/15/2020	14-011	Section 5.6 Contracting Officer's Technical Representative Modification to bullets 1, 2, and 3
Change 2	9/30/15	6/15/2020	N/A	Administrative change to remove hyperlinks.

***Include all information for each revision. Do not remove old revision data. Add new rows to table when space runs out by pressing the tab key in the last row, far right column.*

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Chapter 2—Asbestos

NOTE: The current version of this chapter is maintained and approved by the Safety and Health Division (SHeD). The last revision date of this chapter was June 15, 2015. The current version is located on the Glenn Research Center intranet within the BMS Library. Approved by Chief of Safety and Health Division.

1.0 PURPOSE

This chapter establishes minimum requirements for the handling, maintenance, use, removal, and disposal of all friable and non-friable asbestos-containing materials (ACMs), ACM debris, and presumed asbestos-containing materials (PACMs) at the NASA Glenn Research Center (GRC) at Lewis Field and Plum Brook Station (PBS).

2.0 APPLICABILITY

This chapter is applicable to all GRC personnel at Lewis Field and PBS, including, but not limited to, civil servants, contractor personnel, construction contract personnel, tenants, and students.

3.0 BACKGROUND

Asbestos is a generic term applied to a number of naturally occurring fibrous mineral silicates that, when crushed or processed, break down into smaller fibers that readily become airborne. The most common types of asbestos are chrysotile, amosite, and crocidolite.

Asbestos may be found in valve-stem packing, gaskets, boiler insulation, pipe lagging, brake linings, shielding materials, insulating boards, roofing products, and protective clothing. In the building industry it is used in the manufacture of asbestos cement products, heat insulating and fireproofing materials, patching and taping compounds, roofing products, floor tiles, and ceiling panels and tiles.

Asbestos is not believed to pose a health hazard unless it gets into the air and is inhaled or swallowed. Breathing asbestos fibers increases the risks of developing lung cancer (especially in active smokers), mesothelioma (a cancer of the lung lining), and asbestosis (chronic lung disease). Gastrointestinal cancers have been reported more frequently in asbestos workers, but a direct relationship between ingestion of asbestos and the development of these cancers has not been established.

Asbestos-related activities are strictly regulated. Worker protection is regulated by the Occupational Safety and Health Administration (OSHA) in 29 Code of Federal Regulations (CFR) 1910.1001, Occupational Safety and Health Standards, Asbestos, and in 29 CFR 1926.1101, Safety and Health Regulations for Construction, Asbestos. These standards include requirements for regulated areas, employee exposure monitoring, PPE (including full body coveralls and respirators), work practices and engineering controls, competent persons, employee training, hygiene facilities, housekeeping, and medical monitoring.

Asbestos in the ambient air is covered by 40 CFR 61.140 to 61.157, the U.S. Environmental Protection Agency's (EPA's) National Emission Standard for Asbestos, and is enforced by the U.S. EPA Northwest District in Bowling Green and the Cleveland Division of Air Pollution Control.

4.0 POLICY

It is GRC's policy to comply with all applicable regulations regarding asbestos management and to prevent illness to employees and damage to the environment from the use, removal, and disposal of asbestos.

GRC's policy with regard to asbestos is to:

- Restrict contact with ACM to only those staff members who have been properly trained and properly licensed
- Provide sufficient training and communications so that this policy is effectively implemented
- Ensure that contact with ACM, whether in restricted or non-restricted areas, is conducted in accordance with GRC specifications and OSHA requirements for such work
- Ensure that any job that may disturb ACM is coordinated with the Safety and Health Division (SHeD).

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- Prohibit the new use of ACM except in applications where there is no suitable non-asbestos material
- Ensure that existing ACMs are maintained in good condition (isolated from routine contact by the establishment of regulated areas) or are abated
- Ensure that the levels of asbestos do not exceed 0.01 f/cm³ outside of regulated areas

5.0 RESPONSIBILITIES

It is the responsibility of all civil servants, tenants, and support service contractors to ensure that ACM is removed or handled by properly trained and licensed personnel. A list of specific responsibilities follows:

Occupational Health Branch (OHB)

OHB Industrial Hygiene is responsible for:

- 5.1
- Providing guidance on the requirements of Federal, State, and local environmental regulations
 - Managing the Asbestos Program and worker exposure issues
 - Ensuring, through program design and implementation, that the health of non-asbestos workers and the environment are protected from ACMs at GRC
 - Collecting bulk asbestos samples, where appropriate, to determine the presence or absence of asbestos
 - Maintaining the facility asbestos survey system (FASS) database and files for Lewis Field and PBS
 - Tracking ongoing asbestos abatement activities(GRC Form 10108), overseeing compliance with regulatory requirements, and updating the asbestos survey database

Providing guidance to Safety inspectors for ACM type findings

- Maintaining air monitoring and air sampling exposure data and survey data from asbestos close out reports
 - Auditing contracting officer's representative (COR) and contractor performance in asbestos abatement projects
 - Maintain Asbestos Licensing and certification requirements for asbestos.
 - Providing awareness training
 - Reviewing control measures in operations involving ACM
 - Providing sampling and analysis support to identify ACMs
 - Calibrating air-monitoring equipment
- 5.2
- Obtaining and managing Center-wide blanket notifications
 - Reviewing and approving purchase requests of ACMs in cases where no suitable substitute can be found

Supervisors

Supervisors are responsible for:

- Ensuring that CORs, and others in their organization with responsibility for projects involving asbestos abatement activities, are accountable for compliance with this policy via performance appraisals and/or other means
- Notifying SHeD about operations involving ACM
- Ensuring that employees working with ACM receive the training specified for the engineering, work practice controls, and PPE specified for their operations

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Employees

Employees are responsible for properly using engineering and work practice controls and PPE specified for their operations and for attending required training.

Attending required training.

Motor Pool Supervision

- 5.3 Motor pool supervision (when applicable) is responsible for monitoring brake and clutch maintenance and repair activities, as specified in Appendix B, and ordering automotive parts on an as-needed basis from vendors, specifying they that they are to be asbestos free.

5.4 Facilities Division

Project managers, facility management engineers, and facility operations personnel are responsible for:

- 5.5
- Ensuring that ACM that may be disturbed in any renovation and maintenance activities is identified in the scope of work and removed only by qualified asbestos abatement or maintenance workers
 - Utilizing a close-out checklist that incorporates all the elements of spec section “Final Asbestos Close Report”.
 - Maintaining the final asbestos close-out reports within project documentation and provide copies to the OHB at the end of each project.
 - Ensuring that survey protocols are conducted in accordance with all requirements

Contracting Officer’s Representative (COR) or his designee

- 5.6 **NOTE: This covers organizations including Code H, FT, C and others whose contractors or subs need to perform ACM related work.**

The COR or his designee of contractors engaged in asbestos work is responsible for

- The COR shall ensure that the Ohio Department of Health (ODH) has been properly notified of all asbestos projects impacting greater than 50 square feet or 50 linear feet of friable asbestos material.
- The COR shall ensure that all abatement workers have valid ODH licenses for all asbestos projects impacting greater than 50 square feet or 50 linear feet of friable asbestos material.
- The COR shall ensure that all asbestos permits, notifications, licenses, bulk sample results, final inspections, and final air results are maintained within the project documentation and are accessible for OH programmatic assessments and audit reviews.
- The COR shall notifying OHB, in advance, of the date of each asbestos abatement project
- Identifying suspect ACMs that were not identified in the scope of work during renovation and construction activities, arranging testing of suspect ACM for asbestos content, and if ACM, ensure its removal by a qualified asbestos abatement contractor if it will be disturbed during the project
- Ensuring that asbestos-related work is performed in accordance with this Chapter
- Providing a copy of survey results to OHB.
- Providing a final report to OHB, as appropriate, detailing all ACM removed during abatement and/or repair activities
- Ensuring that building occupants and employers are properly notified in advance of, during, and following the completion of asbestos work

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- Provide the final asbestos close-out report submitted by the asbestos abatement contractor to OHB.
- Posting of OSHA personnel air results of air samples taken during Class I, II, and III work at the entrance to the abatement worksite

Researchers

Researchers are responsible for identifying uses or the presence of ACM on safety permit applications, laboratory standard operating procedures (LSOP) and contacting OHB as appropriate, for operations involving ACM not subject to a safety permit or LSOP.

5.7 **Medical Services**

Medical Services is responsible for

- 5.8 • Maintaining medical surveillance programs for civil servants exposed to hazardous chemicals that require medical monitoring
- Preserving and maintaining the medical records for each employee for at least the duration of employment plus 30 years and discussing results of examinations with employees as needed
- Notifying employees of medical surveillance results
- Notifying OHB Industrial Hygiene about employees who may require an exposure evaluation based on clinical findings

Human Capital Development Division

5.9 The Human Capital Development Division is responsible for scheduling employee training and maintaining records of employees who completed training and any associated examinations.

5.10 **Energy and Environmental Management Office (EEMO))**

- Providing guidance and oversight on the disposal of ACM and on any equipment, air, water, or soil pollution issues.
- Upon request, arranging for the temporary storage and proper disposal of ACM wastes.
- EEMO will maintain original copies of the annual Asbestos Blanket Permit for the Center. OHB will maintain copies of said form and all associated support documentation.

6.0 REQUIREMENTS (OSHA 29 CFR 1926.1101 AND OSHA 29 CFR 1910.1001)

OHB must be kept apprised of all asbestos activities throughout the Center and must be notified when activities are conducted that could disturb ACMs. This section includes procedures for assessing and evaluating potential hazards; methods to reduce and control exposure to asbestos through the use of safe work practices, engineering controls, and PPE; training and medical surveillance requirements; and disposal and recordkeeping requirements.

6.1 6.0 - OHB shall verify requirements for this section to ensure compliance with the Chapter. OHB verification shall be accomplished through a combination of review processes (HASPs, Safety Permits, design reviews, etc.) and/or worksite/building inspections.

Hazard Assessment

All tasks where asbestos may be disturbed at GRC must have a hazard assessment performed by OHB, as appropriate, unless performed by individuals trained and licensed in the State of Ohio to conduct such activities and overseen by a competent person.

The FASS database is not to be used for planning or engineering studies such as demolition, renovation or maintenance activities. An unlisted material does not mean no asbestos exists; it simply means there is no data for

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this material. Only visible and accessible materials were sampled. Only trained and certified personal can accurately determine the presence of asbestos containing materials. Should detailed information be required regarding exact sampling locations, percent asbestos, and homogenous groups, contact the Occupational Health Branch.

6.1 – OHB shall verify requirements for this section to ensure compliance with the Chapter. OHB verification shall be accomplished through a combination of review processes (HASP’s Safety Permits, design reviews, etc.) and/or worksite/building inspections.

Exposure Assessment

6.2 The hazard assessment information is used to identify exposure-monitoring needs according to the activity performed and the potential for exposure. Air sampling shall be conducted by an industrial hygienist or other qualified individual, a contractors’ qualified representative, or a qualified third party. Air sampling may be conducted at the employer’s or employee’s request as a result of a safety permit review, hazard analysis, facility renovation, maintenance activity, or emergency response, such as an uncontrolled release of asbestos. Requests for assistance shall be directed to OHB.

- Ensure that the personnel engaged in asbestos activities are properly trained, equipped, medically monitored, and are not continuously exposed to asbestos fibers in excess of 1/10 of the OSHA personal exposure limits, (0.01 fibers per cubic centimeter (f/cm³) of air), without PPE.

6.2.1 Exposure Limits

GRC’s exposure limit for asbestos is 0.01 f/cm³ of air for an 8-hr time-weighted average and 0.01 f/cm³ for any 30-min period in a shift. The GRC clearance level is 0.01 f/cm³ based on a 1800-liter sample of air.

6.2.2 Air Sampling

The National Institute for Occupational Safety and Health (NIOSH) Method 7400 for fibers will be used to assess worker exposures. Area monitoring shall be conducted. Where possible, sampling should be conducted before, during, and after operations. Sampling conducted during a particular work activity should reflect worst-case exposures for the employee. Supervisors and employees shall be notified of the sample results. Where appropriate, transmission electron microscopy analysis will be performed.

6.3 Clearance and environmental air sampling will be performed by persons with American Board of Industrial Hygiene certification, or persons with an Ohio Department of Health (ODH) certification as an Asbestos Hazard Evaluation Specialist. All indoor asbestos abatement projects consisting of more than 3 sq. ft or 3 linear ft of material require clearance sampling by a licensed, independent third party.

Safe Work Practices

Work involving asbestos should be preplanned to control and minimize employee exposure and to protect against the contamination of work surfaces and equipment. For operations that cannot be accomplished using local exhaust ventilation to control exposures, workers must use PPE, as listed in Section 6.5.

Where necessary, facility and equipment work surfaces will be protected from contamination by plastic sheeting. The area in which work is to be done shall be secured with warning signs and tape to prevent entry of unprotected persons in accordance with the GRC Safety Manual. High-efficiency particulate air (HEPA) filter vacuuming or wet-wiping procedures will be used to clean any debris daily and after a task is completed.

Large-scale tasks involving asbestos abatement of greater than 3 sq. ft or 3 linear ft of material require remediation by an experienced remediation or abatement contractor. All large-scale abatement projects require a final visual inspection and final air monitoring by a licensed, independent third party. Contact OHB for assistance.

GRC has four categories of asbestos activities, each requiring special procedures:

1. Asbestos Abatement and Maintenance Programs (Appendix B)

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2. Asbestos Housekeeping Program (Appendix C)
3. Asbestos Brake and Clutch Repair Programs (Appendix D)
4. Asbestos Records Program (Appendix E)

6.4 **Project Planning and Coordination**

Codes, H and C are responsible for planning and coordinating all asbestos projects at the Center. This includes small scale maintenance projects through large scale abatement projects. Code F, H, and C are responsible for determination of all potential asbestos materials within a work area that is undergoing renovation or demolition.

During the pre-planning process, Code F, H and C shall determine the presence of ACM using a combination of the FASS database (with its limitations) and physically sampling suspect materials. The determination of asbestos materials can only be conducted by an Asbestos Hazard Evaluation Specialist that has been certified by the Ohio Department of Health.

Engineering Controls

- 6.4 To the extent feasible, priority shall be given to reducing employee exposure by the use of engineering controls such as using local exhaust ventilation and wet methods for activities involving ACM such as installation, removal, cutting, grinding, sawing, and operations that generate airborne fibers and dusts.

Engineering controls such as HEPA-filtered ventilation should be used to remove fibers from breathing zones and to maintain adequate airflow within the work area. Where ACM is in place, it must be enclosed and/or encapsulated to prevent the release of airborne fibers that may result from a physical disturbance or from air moving across the exposed surface.

6.5 **Personal Protective Equipment**

The following PPE shall be used to prevent occupational exposure to asbestos:

- Disposable coveralls with head covering
- Disposable shoe covers
- Respiratory protection selected on the basis of a hazard assessment of the proposed work (The minimum respirator is an air-purifying type equipped with HEPA cartridges.)
- 6.6 • Eye protection

Training (29 CFR 1926.1101)

- Class I and Class II—Workers and supervisors require EPA Asbestos Hazard Abatement Worker or Asbestos Hazard Abatement Supervisor training (32 or 40 hr), respectively, with annual refresher training (8 hr). The curriculum must include a hands-on training session applicable to the type of asbestos abatement activities that the worker will be performing on the job. In addition, all workers and abatement supervisors must be licensed by ODH. If the worker is to abate only one type of Class II material (e.g., floor tile), the 32-hr training may be waived in favor of an 8-hr course. This training must include a hands-on session for the specific abatement activity that the worker will perform. For each additional type of Class II material that the worker is expected to abate, an individual 8-hr training session is required.
- Class III—Workers require EPA Operations and Maintenance Training or equivalent (16 hr), with 4 hr annual refresher training. A “competent person” (as defined by EPA and OSHA) must review the curriculum and confirm that it properly prepares the workers for their expected duties. In addition, a competent person shall be certified by ODH as an Asbestos Hazard Abatement Specialist.
- Class IV—Workers require 2 hr of awareness training annually.
- Awareness—General awareness training is required for those working in areas where asbestos is present.

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6.6 - OHB shall verify requirements for this section to ensure compliance with the Chapter. OHB verification shall be accomplished by reviewing SATERN records or other personnel training records, as required.

Medical Surveillance (29 CFR 1910; NASA NPR 1800.1)

Individuals using or handling ACM may be required to receive baseline and routine medical examinations, depending on the material used and the extent of exposure. Medical examinations may also be required for approval to wear PPE. An individual requiring an exam, or their supervisor, can contact OHB Medical Services to receive directions on scheduling the examination.

6.7 Any employee involved in an incident where there is known or suspected excessive exposure to asbestos should contact OHB evaluation and Medical Services to arrange for a post exposure exam. This exam will include tests deemed necessary by the facility physician or the NASA Occupational Medicine Services physician.

6.7 -OHB shall verify requirements for this section to ensure compliance with the Chapter. OHB verification shall be accomplished by reviewing medical records by a qualified individual, as required.

Disposal

Contact Waste Management for the disposal of all ACM and asbestos contaminated debris.

6.8 **Recordkeeping (29 CFR 1910.20)**

6.9 In accordance with the requirements of 29 CFR 1910.20, OSHA Employee Access to Medical and Exposure Records Standard, both medical and industrial hygiene sampling records will be made available to affected employees or their representatives. Occupational Medicine Services and/or SHed, as appropriate, will maintain copies of these records.

7.0 RECORDS

- Hazard assessments.—Maintained by SHed
- Exposure assessments.—Maintained by SHed
- Exposure assessment database.—Maintained by SHed
- Medical examinations.—Maintained by Medical Services.
- Facility Asbestos Survey Systems.—Maintained by SHed OHB
- Asbestos blanket permit data.—Maintained by SHed OHB
- Final Asbestos Report and project documentation. – Maintained by Facilities Division

8.0 REFERENCES

Document number	Document name
NPR 1800.1	NASA Procedural Requirement (NPR), NASA Occupational Health Program Procedures
OAC 3701–34	Ohio Administrative Code (OAC), Asbestos Abatement Hazard Rules
29 CFR 1910.20	Occupational Safety and Health Administration, Employee Access to Medical and Exposure Records
29 CFR 1910.1001	Occupational Safety and Health Administration, Occupational Safety and Health Standards, Asbestos

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29 CFR 1926.1101	Occupational Safety and Health Administration, Safety and Health Regulations for Construction, Asbestos
40 CFR 61.140 to 61.157	U.S. EPA, National Emission Standard for Hazardous Air Pollutants (NESHAPS); National Emission Standard for Asbestos
40 CFR 763, Subpart E	U.S. EPA, Asbestos Hazard Emergency Response Act
40 FR 13661; April 5, 1984	U.S. EPA, Federal Register (FR), NESHAPS; Amendments to Asbestos Standard, Final Rule
51 FR 62044A; April 25, 1986	U.S. EPA, Federal Register, Toxic Substances Act; Asbestos Abatement Projects; Final Rule

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APPENDIX A.—DEFINITIONS AND ACRONYMS

Asbestos abatement.—Activity involving the removal, renovation, enclosure, repair, or encapsulation of asbestos-containing material.

Asbestos.—The asbestiform (fibrous) varieties of chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

Asbestos-containing material (ACM).—Material containing more than 1 percent asbestos.

Asbestos-containing building material.—Building material containing more than 1 percent asbestos.

Asbestos Hazard Abatement Specialist.—Ohio-certified person with responsibility for the oversight or supervision of asbestos hazard abatement activities including asbestos project supervisors and foremen.

Asbestos Hazard Abatement Worker.—Ohio-certified person responsible in a nonsupervisory capacity for the performance of an asbestos hazard abatement activity.

Asbestos Hazard Evaluation Specialist.—Ohio-certified person responsible for the identification, detection, and assessment of asbestos-containing materials, the determination of appropriate response actions, or the preparation of asbestos management plans to protect the public from the hazards associated with exposure to asbestos.

Asbestos Hazard Project Designer.—Person who has successfully completed the training requirements for an abatement project designer established by 40 U.S. Code Sec. 763.90(g).

Code of Federal Regulations (CFR)

Class I asbestos work.—Activities involving the removal of thermal system insulation and surfacing asbestos-containing materials and presumed asbestos-containing materials.

Class II asbestos work.—Activities involving the removal of asbestos-containing material that is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III asbestos work.—Repair and maintenance operations where asbestos-containing materials, including thermal system insulation and surfacing asbestos-containing materials and presumed asbestos-containing materials, are likely to be disturbed.

Class IV asbestos work.—Maintenance and custodial activities during which employees contact but do not disturb asbestos-containing materials and presumed asbestos-containing materials; activities to clean up dust, waste, and debris resulting from Class I, II, and III activities.

Competent person.—In addition to the definition in 29 CFR 1926.32 (f), one who can identify existing asbestos hazards in the workplace, can select the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate asbestos hazards. In addition, for Class I and Class II work, they must be specially trained in a manner that meets the criteria of the Environmental Protection Agency's (EPA's) Model Accreditation Plan (40 CFR 763) for supervisors, or its equivalent; for Class III and Class IV work, they must be trained on the EPA requirements for local education agency maintenance and custodial staff according to 40 CFR 763.92 (a)(2).

Contracting officer's representative (COR), or his designee.

Demolition.—Wrecking or removing any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Environmental Protection Agency (EPA)

Excursion Limit.—Permissible level of airborne fibers specified by OSHA: 1.0 fibers per cubic centimeters of air determined as a 30-min time-weighted average.

Facility asbestos survey system (FASS)

Fiber.—Form of asbestos, 5 µm or longer, with a length-to-diameter ratio of at least 3 to 1.

Federal Register (FR)

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Friable asbestos material.—Material containing more than 1 percent asbestos that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Health and safety plan (HASP)

High-efficiency particulate air (HEPA) filter.—Filter that can trap and retain at least 99.97 percent of all mono-dispersed particles of 0.3 µm in diameter.

Homogeneous area.—Area of surfacing material or thermal system insulation that is uniform in color and texture.

NASA Glenn Research Center (GRC)

NASA Procedural Requirement (NPR)

National Emission Standard for Hazardous Air Pollutants (NESHAPS)

National Institute for Occupational Safety and Health (NIOSH)

Non-friable asbestos material.—Material containing more than 1 percent asbestos that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure:

- Category I non-friable asbestos-containing material.—Asbestos-containing packing, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos.
- Category II non-friable asbestos-containing material.—Material, excluding Category I nonfriable asbestos-containing material, containing more than 1 percent asbestos.

National Voluntary Laboratory Accreditation Program (NVLAP)

Occupational Health Branch (OHB)

Occupational Safety and Health Administration (OSHA)

Ohio Administrative Code (OAC)

Ohio Department of Health (ODH)

Personal exposure limit for asbestos.—Level of airborne fibers specified by the Occupational Safety and Health Administration as an occupational exposure standard. It is currently 0.1 fibers per cubic centimeter of air determined as an 8-hr time-weighted average.

Personal protective equipment (PPE)

Plum Brook Station (PBS)

Presumed asbestos-containing material (PACM).—Thermal system insulation, surfacing material, and other materials found in buildings that have not been properly sampled and are assumed to contain asbestos.

Regulated asbestos-containing material.—(1) Friable asbestos-containing material, (2) Category I non-friable asbestos-containing material that has become friable, (3) Category I non-friable asbestos-containing material that will or has been subjected to sanding, grinding, cutting, or abrading, or (4) Category II non-friable asbestos-containing material that has a high probability of becoming, or has become, crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

Regulated area.—Area established by an 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 accumulate; 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.—Operations where asbestos-containing materials and/or presumed asbestos-containing materials are taken out or stripped from structures or substrates, including demolition, renovation, maintenance, and repair operations.

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Renovation.—Altering a facility or one or more facility components in any way, including the stripping or removal of regulated asbestos-containing material from a facility component. Operations in which load-supporting structural members are wrecked or taken out for demolition.

Repair.—Overhauling, rebuilding, reconstructing, or reconditioning structures or substrates, including encapsulation or other repair of asbestos-containing materials or presumed asbestos-containing materials attached to structures or substrates.

Safety and Health Division (SHeD)

Standard Operating Procedure (SOP)

Surfacing.—Asbestos-containing material that is sprayed, toweled-on, or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustics, fireproofing, and other purposes).

Thermal system insulation.—Asbestos-containing material that is applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

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APPENDIX B.—ASBESTOS ABATEMENT AND MAINTENANCE PROGRAMS

B.1 Introduction

The Occupational Safety and Health Administration’s (OSHA’s) construction standard for asbestos, 29 Code of Federal Regulations (CFR) 1926.1101, requires that each facility engaging in asbestos abatement work perform that work in accordance with OSHA’s requirements. This document describes the NASA Glenn Research Center (GRC) Asbestos Abatement and Maintenance Program. It also describes the OSHA asbestos work classifications that apply to abatement and maintenance activities, and the implementation of requirements for workers in restricted areas (whether performing abatement or not) and for employers and employees adjacent to restricted areas.

B.2 OSHA Asbestos Work Classifications for Abatement and Maintenance Activities

Three OSHA categories of asbestos activities performed at GRC and Plum Brook Station (PBS) apply to abatement and maintenance activity:

1. Asbestos abatement is the removal, enclosure, repair, or encapsulation of asbestos-containing materials (ACMs) to minimize the risk of asbestos-related illness. OSHA classifies abatements as Class I and Class II asbestos activities.
2. Asbestos-related maintenance tasks involving the likely or intentional disturbance of ACM meet OSHA’s definition of a Class III asbestos activity. All asbestos-related maintenance activities at GRC must be performed in accordance with this appendix. Asbestos-related maintenance at PBS will be performed in accordance with the PBS Asbestos Maintenance Program.
3. Asbestos spill response and cleanup is the act of responding to and cleaning up releases of ACM. This work must be performed in accordance with the spill response and cleanup procedures described in this appendix, as well as with the requirements of an OSHA Class IV asbestos activity.

B.3 Inventory of Asbestos-Containing Building Materials

An inventory of asbestos-containing building materials is maintained by the Safety and Health Division (SHeD). The inventory has been provided to each building manager and is available on computer disks. The inventory is upgraded by reports from the Facilities Division following their actions to further identify and remove ACMs.

B.4 Handling of Asbestos-Containing Materials

This appendix regulates asbestos exposure in all work as defined in 29 CFR 1910.12(b), including, but not limited to, the following:

- Demolition or salvage of structures where asbestos is present
- Removal or encapsulation of ACMs
- Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain asbestos
- Installation of products containing asbestos
- Asbestos spill and emergency cleanup
- Transportation, disposal, storage, containment, and housekeeping activities involving asbestos or products containing asbestos, on the site or location at which construction activities are performed

B.5 Responsibilities of the NASA Responsible Person

The individual planning asbestos abatement tasks (typically, the contracting officer’s representative (COR) or his designee must develop OSHA-compliant written procedures specific for the tasks and submit them to SHeD for

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review. All asbestos abatement work will be designed by an Asbestos Hazard Project Designer certified by the Ohio Department of Health (ODH). SHeD may be consulted for assistance in developing the procedures. The Asbestos Hazard Project Designer shall approve the procedures prior to initiating work. The Asbestos Hazard Project Designer's review will include the following:

- Compliance with applicable OSHA requirements
- Initial exposure assessment
- Provisions for notifying affected employers of employees in areas adjacent to the asbestos-related work
- Details of control methods that will be used to minimize the release of asbestos fibers into the air and that will be used to decontaminate equipment and workers
- Procedures for proper disposal of all ACM

A copy of the written procedures will be maintained in SHeD along with a copy of the initial exposure assessment and the Asbestos Abatement and Maintenance Program.

The Asbestos Hazard Project Designer and the COR shall review the contractor's work to ensure that the work is being performed in accordance with established procedures, the specifications, and OSHA standards.

If the control method used has been modified from OSHA requirements, the NASA responsible person ensures that the control method is approved by a Professional Engineer or Certified Industrial Hygienist that is qualified as an Asbestos Hazard Project Designer. SHeD has developed a review check list which may be used as guidance.

Prior to conducting the activity, provide copies of plans for renovation and maintenance to SHeD for review.

The individual planning asbestos abatement tasks (typically, the COR and Asbestos Hazard Project Designer) must also notify SHeD of all asbestos abatement activities at least 30 days in advance so that the activity may be tracked. This period is also needed to review control procedures and notify the appropriate Government agencies where applicable. If the project does not permit 30-day advance notice (i.e., in an emergency) SHeD must be notified as soon as possible, but no later than the filing of the Environmental Protection Agency (EPA)/OSHA notifications. SHeD will

- If using a control method modified from OSHA requirements for Class I work, notify OSHA, EPA, and ODH in writing 10 days in advance of project startup.
- If performing Class II work for which OSHA has specified a negative pressure work practice, and for which an alternative control method is contemplated, notify OSHA, EPA, and ODH in writing 10 days in advance of project startup.
- Provide information on the location and quantity of ACMs and presumed asbestos-containing materials present in a work area to potential bidders on construction work in the area

B.6 Responsibility of Others

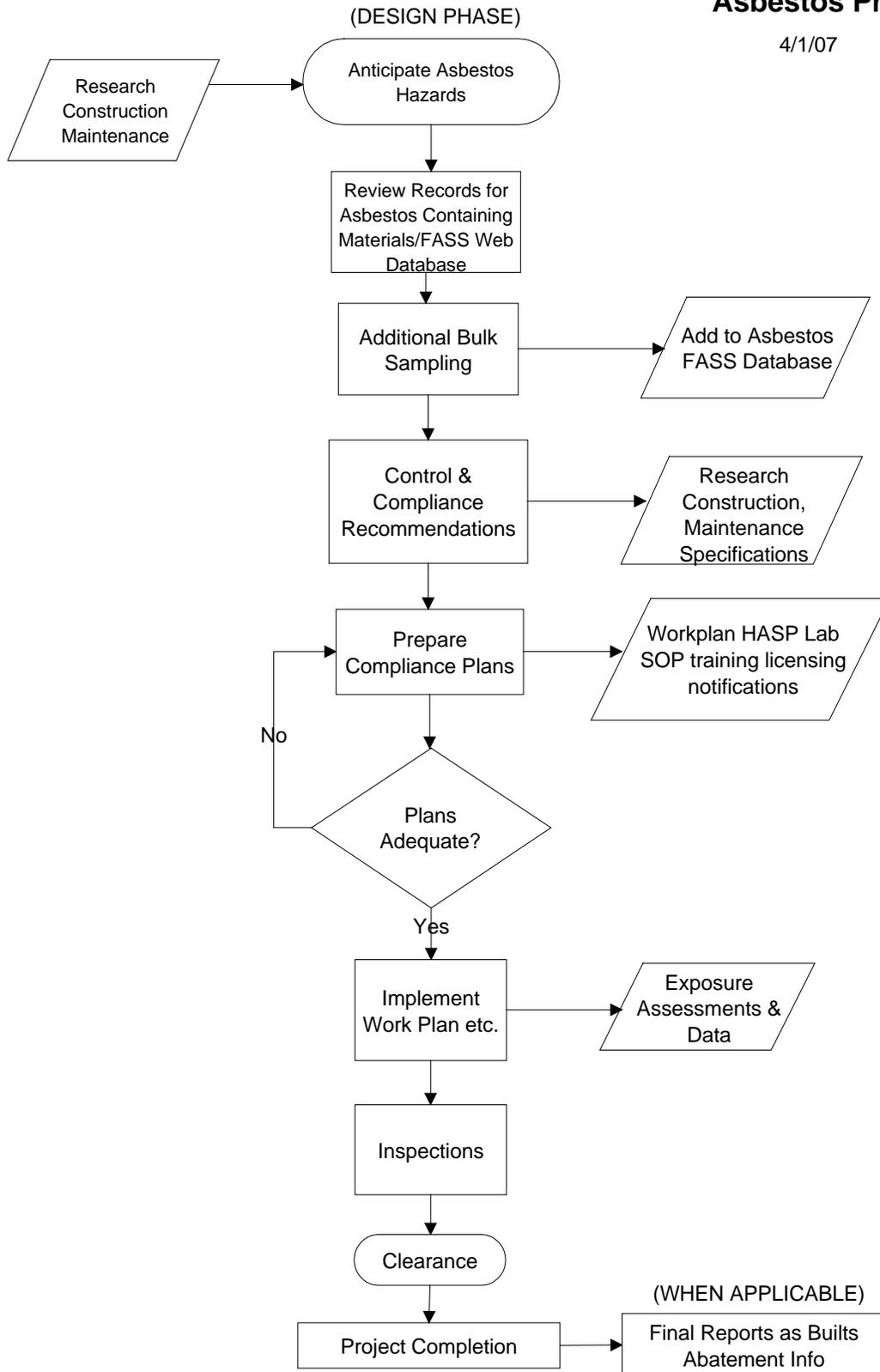
Employers of employees adjacent to construction activities in restricted areas shall be responsible for notifying and protecting their employees under the requirements of 29 CFR 1926.1101.

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Asbestos Program

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B.7 Notification

The COR or his designee shall be responsible for informing building staff and their employers of asbestos-related activities covered by this rule.

The abatement contractor shall post warning signs at each regulated area.

Employers of employees working in and contiguous to regulated areas shall ensure that employees comprehend the warning signs. GRC shall assist employers by providing annual training for site employees (see the following).

B.8 Additional Information

Any questions concerning asbestos or this asbestos abatement program should be directed to the SHeD.

B.9 References

Document number	Document name
Chapter 3701–34 OAC	Ohio Department of Health, Ohio Administrative Code (OAC), Asbestos Abatement Hazard Rules.
29 CFR 1926.1101	Occupational Safety and Health Administration, Safety and Health Regulations for Construction, Asbestos
29 CFR 1910.1001	Occupational Safety and Health Administration, Occupational Safety and Health Standards, Asbestos
40 CFR 61.140 to 61.157	U.S. Environmental Protection Agency (EPA), National Emission Standard for Hazardous Air Pollutants (NESHAPS); National Emission Standard for Asbestos

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APPENDIX C.—ASBESTOS HOUSEKEEPING PROGRAM

C.1 Introduction

In 29 Code of Federal Regulations (CFR) 1910.1001, Occupational Safety and Health Standards, Asbestos, the Occupational Safety and Health Administration (OSHA) places certain notification and action requirements on employers and their employees who work in areas where asbestos-containing materials (ACMs) and/or presumed asbestos-containing materials (PACMs) are present. The applicable requirements for workers in nonrestricted areas are the subject of this program.

Under the requirements of the regulations, selected areas in each building may be restricted. These are areas in which GRC has not determined that exposure to airborne asbestos can be maintained below applicable standards.

Housekeeping activities in areas where damaged ACM or damaged suspect ACM is present may be conducted under the procedures outlined in this appendix. If not conducted in accordance with this appendix, they shall be conducted in accordance with the stricter standards of Appendix B.

C.2 Inventory of Asbestos-Containing Building Materials

An inventory of ACMs is maintained by the Safety and Health Division (SHeD). The inventory has been provided to each building manager and is available from SHeD. The inventory is upgraded by reports from the Facilities Division following their actions to further identify and remove ACMs.

C.3 Reporting and Management of Asbestos Spills

- **Asbestos spill prevention.**—Asbestos spill prevention is key to preventing unnecessary employee exposure to asbestos. There are two primary strategies for effective spill prevention: periodic inspection of ACM with prompt repair of any ACM in a deteriorated condition and careful planning to prevent damage to ACM.

An inspection of the condition of suspect ACM should be included in an organization's periodic safety inspections. Anyone seeing deteriorated suspect ACM should report the damage. Housekeeping staff are especially encouraged to report such deterioration.

- **Reporting asbestos spills.**—Anyone seeing spilled material from deteriorated suspect material should immediately leave the area, close any doors to prevent others from entering the area and dial 911 to report the spill. Please tell the person answering your call that you are reporting an asbestos spill and give the location of the spill and your name and telephone number.
- **Barricades.**—Areas involved in an asbestos spill will be barricaded and isolated by the spill responders in accordance with the GRC Safety Manual to prevent employee exposure and the spread of asbestos contamination to other areas. The spill will then be cleaned up in accordance with applicable standards. Do not enter a barricaded area!

These barricaded areas are restricted areas, as defined by OSHA. If essential work must be done inside a barricaded area, contact SHeD so that procedures can be implemented to ensure that the work is done safely.

C.4 Asbestos Spill Cleanup and Disposal

Any spill response work proposed to be done by a support service contractor, outside contractor, NASA employees, or any other group or organization must be approved by SHeD.

The individual planning spill cleanup tasks (typically, the contracting officer's representative (COR)) must develop OSHA-compliant specific written procedures for the tasks and submit them to SHeD for review. SHeD may be consulted for assistance in developing the procedures and shall approve the procedures prior to initiating work. SHeD's review will include

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- Compliance with applicable OSHA requirements.
- Initial exposure assessment completed and submitted for work practice and control approval before the activity starts
- Provisions for notifying affected employers of employees of the asbestos-related work
- Details of control methods that will be used to minimize the release of asbestos fibers into the air and that will be used to decontaminate equipment and workers
- Procedures for proper disposal of all ACM

SHed will maintain a copy of the written procedures.

The competent person and COR are accountable for ensuring that the work is performed in accordance with established procedures and OSHA standards.

Spill-response tasks will be performed only by adequately trained personnel. The work must be supervised by an individual meeting OSHA’s competent person requirements (29 CFR 1910.1001). Workers must be provided training, exposure monitoring, respiratory protection, and medical surveillance programs that meet OSHA requirements (29 CFR 1926.1101).

Although SHED will provide oversight, the competent person and COR are accountable for ensuring that the work is performed in accordance with established procedures and OSHA standards.

C.5 Housekeeping in Areas with Asbestos-Containing Spills

By definition, dust and debris in areas that have damaged materials that are OSHA-presumed asbestos must be treated as ACMs. For this reason, areas with significant damage are made inaccessible. Accessible areas that have been and are routinely maintained present an opportunity for management by housekeeping staff who have received 2 to 4 hr of specialized training and who have appropriate equipment. Specifically, SHED has determined that

- Housekeeping in areas where no damage is present is not an asbestos-related task.
- Housekeeping in areas with damaged ACM or PACM shall not be allowed. Housekeeping staff shall report the damage and cease housekeeping in the area until the damage is assessed, repaired, and cleaned up, or until the material is determined to be asbestos free.

C.6 Notification

Building managers shall inform building staff and their employers, and the CORs or their designee shall notify housekeeping staff and their employers, of the presence and location of ACM and PACM. SHED shall provide the inventory (see the preceding section). Building managers shall post warning signs at each regulated area. SHED shall provide such signs for posting. Employers of employees working in and contiguous to regulated areas shall ensure that the employees comprehend the warning signs.

C.7 Additional Information

Any questions concerning asbestos or this asbestos maintenance program should be directed to SHED at 3–3073.

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APPENDIX D.—ASBESTOS BRAKE AND CLUTCH REPAIR PROGRAMS

D.1 Introduction

Occupational Safety and Health Administration's (OSHA's) 29 CFR 1910.1001, Occupational Safety and Health Standards, Asbestos, mandates specific preferred or equivalent work practices and engineering control methods that must be implemented during automotive brake and clutch activities where employees may be exposed to elevated levels of airborne asbestos fibers.

Although the continued use of asbestos in brake pads and linings has been reduced over the last decade, there are still circumstances where no adequate substitute is available. Therefore, during automotive maintenance and repair work on brake and clutch systems, exposure to airborne asbestos is still possible.

D.2 Policy

This appendix details work practices and control methods that must be implemented by automotive maintenance and repair management and staff to protect against 8-hr time-weighted average personal exposures to airborne asbestos in excess of 0.01 fibers/cubic centimeters of air.

D.3 Inventory of Asbestos-Containing Automotive Maintenance and Repair Materials

This inventory of all asbestos-containing materials (ACMs) must be updated when, new materials are received or identified which contain asbestos, parts in which asbestos content has been eliminated, or when the use of an asbestos-containing part has been discontinued. For assistance in obtaining information about a product's asbestos content contact Chemical Management at 3-6627 or the Safety and Health Division (SHed) at 3-5501.

The log of brake and clutch maintenance and repair activities will be used to determine the required asbestos control methods that will be employed for these activities (see the next section). If asbestos content cannot be positively confirmed in any suspect part, it must be assumed to be present until a thorough evaluation is completed. In cases where the presence of asbestos in parts cannot be ensured, control methods as specified in the next section must be followed.

D.4 Control Methods for Brake and Clutch Activities

For facilities that can prove, through documented repair and maintenance records, that there are never more than five pairs of brakes or five clutches that are inspected, disassembled, reassembled, and/or repaired per week, a wet control method as specified by OSHA is acceptable. Requirements follow:

1. A spray bottle, hose nozzle, or other implement capable of delivering a fine mist of water or amended water or other delivery system capable of delivering water at low pressure, shall be used to first thoroughly wet the brake and clutch parts. Brake and clutch components shall be wiped clean with a cloth.
2. The cloth shall be placed in an impermeable container and properly marked or labeled as asbestos-containing waste. After this is accomplished, Waste Management shall be notified at 3-5109 for proper disposal.
3. If a vacuum is to be used during this operation, it must be equipped with high-efficiency particulate air (HEPA) filters. The filters, when full, shall be first wetted with a fine mist of water, then removed and placed immediately in an impermeable container. The container must be properly marked or labeled as an asbestos-containing waste and Waste Management must be notified at 3-5109 for proper disposal.
4. Any spills of aqueous solutions or any asbestos-containing waste shall be cleaned up immediately and put in a properly labeled container. After this is accomplished, Waste Management shall be notified at 3-5109 for proper disposal.

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5. The use of dry brushing is prohibited during wet method operations.
6. The use of compressed air to clean dust and debris from surfaces is prohibited during brake and clutch repair.
7. Before attempts are made to dislodge a frozen brake drum, the drum must be thoroughly wetted.

For shops that perform more than five brake or clutch repair or maintenance activities per week, OSHA specifies, and GRC adopts, a low-pressure, wet-cleaning method to control airborne levels of asbestos during automotive brake and clutch repair and maintenance activities. Requirements for this type of control method include the following:

1. A catch basin must be placed under the brake assembly, positioned to avoid splashes and spills.
2. The reservoir shall contain water containing a wetting agent. The flow of liquid shall be controlled such that the brake assembly is gently flooded to prevent the asbestos-containing brake dust from becoming airborne.
3. The aqueous solution shall be allowed to flow between the brake drum and brake support before the drum is removed.
4. After the brake drum is removed, the wheel hub and back of the brake assembly shall be thoroughly wetted to suppress dust.
5. The brake support plate, brake shoes, and brake components used to attach the brake plate shall be thoroughly washed before the old shoes are removed.
6. If a vacuum is to be used during this operation it must be equipped with HEPA filters. The filters, when full, shall be first wetted with a fine mist of water, then removed and placed immediately in an impermeable container.
7. The container must be properly marked or labeled as an asbestos-containing waste and Waste Management must be notified at 3-5109 for proper disposal.
8. Any spill of aqueous solutions or any asbestos-containing waste material shall be cleaned up immediately and put in a properly labeled impermeable container. After this is accomplished, Waste Management shall be notified at 3-5109 for proper disposal.
9. The use of dry brushing is prohibited during low-pressure, wet cleaning operations.
10. The use of compressed air to clean dust from surfaces is prohibited during brake and clutch repair.
11. Before attempts are made to dislodge a frozen brake drum, the drum must be thoroughly wetted.

D.5 Training

All persons who may be required to handle asbestos-containing materials will receive initial training as required by OSHA and Environmental Protection Agency regulations. See Section 6.6.

D.6 Additional Information

Any questions concerning asbestos or this asbestos maintenance program should be directed to SHED at 3-3073

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APPENDIX E.—ASBESTOS RECORDS PROGRAM

E.1 Introduction

Occupational Safety and Health Administration’s (OSHA’s) asbestos standards (29 Code of Federal Regulations (CFR) 1910.1001 and 29 CFR 1926.1101) require NASA to know the presence, extent, and condition of asbestos-containing materials (ACMs) in the workplace. Significant efforts have gone into developing an inventory of asbestos-containing building materials. This document describes the steps to be taken to maintain a coordinated asbestos inventory.

E.2 Inventory of Asbestos-Containing Building Materials

An inventory of ACMs is maintained by OHB The inventory has been provided to each building manager and is available from SHeD. The inventory is updated by SHeD using reports from the Facilities Division following their actions to further identify and remove ACMs.

E.3 Bulk Sampling Requirements

The existing inventory of bulk samples, air samples, and building materials is maintained by SHeD and shall be made available on hard copy and electronically. Maintenance of the inventory requires cooperation and support by everyone who samples and/or abates ACMs.

In support of this need, those conducting sampling are required to consult the inventory prior to sampling to ascertain the known condition of the homogeneous area(s) to be sampled and the extent of the homogeneous areas, in order to plan a sampling program that is cost effective for attaining long-term goals. Only an Asbestos Hazard Evaluation Specialist who certified by the Ohio Department of Health is qualified to collect suspect samples for asbestos analysis.

- All bulk sampling results of building materials collected for analysis of asbestos shall be reported to SHeD.
- Samples collected to document a negative finding of asbestos shall, at a minimum, include three samples of randomly selected locations of the homogenous area. The bulk sample submittal shall note the homogeneous area, sample location, analysis method, and results.
- Sample locations shall be marked and photographed and the material shall be tagged as asbestos if the results show a positive finding in at least one sample.
- All analyses must be done by a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

E.4 Approval of Asbestos Sampling Plan

Before any remediation or abatement activities commence, the contracting officer’s representative (COR) shall submit a copy of the contractor’s asbestos sampling plan (bulk and air) for approval by SHeD.

E.5 Coordination of Abatement Results

The COR of any abatement activity shall forward a copy of the final abatement report to SHeD. This report shall document the location and extent of abatement work. The report shall be sufficiently detailed to allow the asbestos inventory to be updated.

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