



Ames Procedural Requirements

APR 8715.1

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COMPLIANCE IS MANDATORY

Subject: Chapter 30 – Asbestos Management Plan

Responsible Office: Code QH / Occupational Safety, Health & Medical Service Division

CHANGE LOG

Status [Baseline /Revision /Cancelled]	Document Revision	Date of Change	Description
Baseline	0	6/2/2015	Baseline.
Revision	1	5/19/2020	Included definitions for TA Wire and Regulated Area. Added requirement for Asbestos Awareness training for housekeeping staff. Deleted Code JA responsibilities updated contract language in sections 3.1.7 and 3.1.8
Revision	2	4/25/2023	Changed references to BAAQMD notification to BAAQMD notification acknowledgement in section 30.1.5 and 30.1.8.
Revision	2	1/23/2025	Clarified language, specified Civil Service versus contractor roles, removed unused definitions and abbreviations. Removed Appendix E and changed reference to ARC Form 291. No new responsibilities added.

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PREFACE

P.1 PURPOSE

- a. This Asbestos Management Plan derives from the need to comply with six major governmental regulations and guidance documents published by governmental institutions: 15 U.S.C. § 2641-2656, 29 CFR §1910.1001, 29 CFR §1926.1101, 40 CFR Part 61 Subpart M, NPR 1800.1, and BAAQMD Regulation #11, Rule #2.
- b. This directive streamlines these compliance documents into a logical and economically efficient plan. It integrates applicable Federal, State, and local regulatory agency requirements and NASA policy governing asbestos-related work.

P.2 APPLICABILITY

- a. This directive is applicable to ARC and associated facilities, e.g., contractor's facilities, etc.
- b. This directive applies to contractors, grant recipients, or parties to agreements only to the extent specified or referenced in the appropriate contracts, grants, or agreements.
- c. In this directive, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended, but not required, "will" denotes an expected outcome, and "are/is" denotes descriptive material.
- d. In this directive, all document citations are assumed to be the latest version unless otherwise noted.

P.3 AUTHORITY

- a. NPR 1800.1, NASA Occupational Health Program Procedures
- b. Occupational Safety and Health Standards, Asbestos, 29 CFR §1910.1001
- c. Safety and Health Regulations for Construction, Asbestos, 29 CFR §1926.1101
- d. National Emission Standard for Asbestos, 40 CFR Part 61 Subpart M
- e. Asbestos Emergency Response Act (AHERA), 15 U.S.C. § 2641-2656
- f. Asbestos Demolition, Renovation and Manufacturing, Bay Area Air Quality Management District (BAAQMD) Regulation #11, Rule #2¹

P.4 APPLICABLE DOCUMENTS AND FORMS

- a. ARC 291, Asbestos Abatement Project Daily Inspection Log
- b. ASTM Standard 1368, Standard Practice for Visual Inspection of Asbestos Abatement Projects

¹ BAAQMD Regulation #11, Rule #2: <https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-11-rule-2-asbestos-demolition-renovation-and-manufacturing/documents/rg1102.pdf?la=en>

c. California Labor Code § 6501.5, 6501.7, 6501.8, and 6505.5²

P.5 MEASUREMENT/VERIFICATION

a. Verification of conformance to requirements in this directive are measured through Center and Responsible Organizational management reviews, self-assessments, and subsequent analysis and reports of conformance to requirements, as well as periodic internal audits.

P.6 CANCELLATION

APR 8715.1 Chapter 30, Asbestos Management Plan, dated June 2, 2015.

Eugene Tu
Director

DISTRIBUTION STATEMENT:

Internal and external distribution.

² California Labor Code:

http://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=LAB&division=5.&title=&part=&chapter=&article

CHAPTER 30 ASBESTOS MANAGEMENT PLAN

30.1 Responsibilities

30.1.1 The Occupational Safety, Health, and Medical Services Division (Code QH) shall:

- a. Oversee development and implementation of this directive.
- b. Provide Certified Asbestos Consultant (CAC) to support asbestos-related work activities as requested. This service will be implemented on a budget-reimbursable basis to Ames Research Center (ARC).
- c. Review and evaluate the impact of regulatory changes on ARC.
- d. Review and evaluate asbestos abatement plans, specifications, and abatement contractor submittals prior to abatement.
- e. Verify that personnel who perform asbestos related work on NASA property have appropriate training and credentials to perform their assignment.
- f. Approve the selection of accredited laboratories used to analyze asbestos bulk/air samples.
- g. Determine the need for baseline air monitoring in occupied buildings.
- h. Periodically inspect the abatement area and contractor/subcontractor for compliance with this directive.
- i. Establish criteria for post-abatement clearance testing.
- j. Approve the removal of asbestos work containments upon successful post-abatement clearance testing.
- k. Maintain a central location for asbestos inspection surveys and abatement oversight documentation.

30.1.2 The Ames Health Unit shall:

- a. Provide pre-placement, periodic, and termination of employment medical examinations to ARC Civil Servants who are and/or may be exposed to asbestos as required by the Occupational Safety and Health Administration (OSHA) and NASA Headquarters Environmental Health Program.

Note: This does not apply to accidentally exposed employees.

- b. Offer accidentally exposed employees a complete baseline examination, but no periodic examinations.
- c. Schedule ARC Civil Servants for medical examinations in accordance with OSHA initially, within ten (10) days of exposure and/or potential asbestos exposure, at least annually thereafter, and within 30 calendar days before or after termination of employment.

Note: Only asbestos workers who have been exposed to airborne asbestos in excess of the permissible exposure limit (PEL) (0.1 fibers/cc of air as an 8-hr. Time-Weighted Average (TWA), or the excursion limit (EL) (1.0 fiber/cc averaged over 30 minutes) require chest x-ray surveillance.

30.1.3 The Facilities Engineering Branch (Code JCE) shall:

- a. Maintain an up-to-date asbestos work specification to be included in bids for projects that involve asbestos-related work.

Note: For example, see Ames Standard Specification Section 02080.

- b. Provide in the General Notes of all construction drawings of new buildings a section on Asbestos, stating “Asbestos-containing materials shall not be used in the construction of this building.”

30.1.4 The Acquisition Division (Code JA) shall:

- a. Ensure that notification is provided to prospective employers (successful bidders) of the presence, location, and quantity of Asbestos-Containing Materials (ACM) and/or Presumed Asbestos-Containing Material (PACM) at worksites in NASA buildings and facilities.

30.1.5 Construction Project Managers shall:

- a. Ensure that a demolition/pre-renovation survey to determine the presence, location, and quantity of ACM has been conducted prior to the start of any work.
- b. All Construction Project Managers must be knowledgeable of asbestos work procedures and plans as established in this directive. At a minimum they should have completed Asbestos Awareness training.
- c. Notify the Occupational Safety, Health, and Medical Services Division (Code QH) of construction before the 30-percent design review phase, or ten (10) days prior to maintenance related asbestos work.
- d. Coordinate with the Occupational Safety, Health, and Medical Services Division (Code QH) to ensure that a Certified Asbestos Consultant (CAC) monitors any asbestos-related work activity that involves abating or disturbing ACM and/or PACM.
- e. Monitor compliance with this directive before, during, and after each asbestos-related work activity.
- f. Provide the CAC with accurate drawings and relevant information depicting the locations that will be affected by work that could potentially involve ACM.
- g. Ensure that all construction specification documents that relate to asbestos specify the material, quantity, type, and location(s) of any ACM and/or PACM to be removed.
- h. Provide notification at least five working days in advance to all building occupants prior to asbestos-related work conducted in occupied buildings.
- i. Ensure that the following documents are received from the abatement contractor/subcontractor before any notice to proceed is granted. These documents shall be reviewed by a CAC for regulatory/NASA policy compliance:
 - (1) A copy of the contractor's/subcontractor's Asbestos Abatement Contractors license issued by the California Contractors State Licensing Board where required by California State Law.
 - (2) The contractors/subcontractors Asbestos Related Work Plan.
 - (3) A copy of the contractor's/subcontractor's registration for asbestos-related work issued by California Division of Occupational Safety and Health (Cal/OSHA).

- (4) A copy of the notification acknowledgement for proposed asbestos-related work by the Bay Area Air Quality Management District (BAAQMD), if required.
- (5) A copy of the notification for proposed asbestos-related work provided to the Cal/OSHA, if required.
- (6) A copy of the contractor's site-specific safety plan (SSSP).
- (7) A copy of the contractor's/subcontractor's Hazard Communication and Respiratory Protection Programs.
- (8) A copy of all contractor's/subcontractor's employee Environmental Protection Agency (EPA)-approved asbestos-related training certificates, licensed physician medical evaluations, and respiratory fit-test certifications.
- (9) A copy of the hazardous waste hauler's permits/licenses.
- (10) A copy of the hazardous waste landfill's permits/licenses.

j. Ensure that maintenance personnel do not enter a regulated area without proper Personal Protective Equipment (PPE) and appropriate training.

k. Ensure that asbestos removal projects are performed within a regulated area and have pre and post abatement and daily inspections performed by asbestos trained and qualified personnel. For all asbestos removal projects, a clearance inspection will be performed by the Occupational Safety, Health and Medical Services Division industrial hygienist to ensure area is safe to reoccupy. For all asbestos removal projects located within an interior of a building, air sampling will be included as part of the clearance inspection unless otherwise noted by the Occupational Safety, Health, and Medical Services Division industrial hygienist.

l. Ensure when Class 1 work is performed by Negative Pressure Enclosure (NPE) method that all negative air-pressure manometer recordings are provided. Exhaust from the NPE will be directed outdoors unless otherwise approved by the CAC.

m. Ensure that all personnel air monitoring original laboratory reports and perimeter air monitoring negative air-pressure manometer records are provided to the Occupational Safety, Health, and Medical Services Division.

n. Require, as part of the bid documents, a signed letter from the contractor/subcontractor stating they have read and understand the Ames Asbestos Management Plan, APR 8715.1, Chapter 30.

o. Ensure that copies of all asbestos-related work documents are available, upon request, to the Occupational Safety, Health, and Medical Services Division.

p. Ensure all waste is handled and disposed in accordance with OSHA and EPA requirements.

q. Notify the Occupational Safety, Health, and Medical Services Division if previously unidentified suspect ACM is discovered, and/or the scope of the project changes.

30.1.6 Certified Asbestos Consultants (CACs) shall:

- a. Monitor compliance with this directive.
- b. Conduct bulk/air sampling as requested by the Occupational Safety, Health and Medical Services Division and present findings in a user-friendly format. Assist in planning asbestos abatement projects by reviewing and commenting on bids, specifications, and procedures.
- c. Review contractor/subcontractors submittals for compliance with this directive.

- d. Act as ARC primary health and safety contact for inspection and compliance concerning asbestos-related work activities.
- e. Conduct pre-and post-asbestos abatement and daily inspections of asbestos worksites for compliance with 15 U.S.C. § 2641-2656, 29 CFR §1910.1001, 29 CFR §1926.1101, 40 CFR Part 61 Subpart M, and BAAQMD Regulation #11 Rule #2.
- f. Conduct daily inspections on asbestos related work projects, including cleanup operations, and document these inspections using the format of the ARC 291 Form, Asbestos Abatement Project Daily Inspection Log. Notify the project manager and contracting officer of any contractor/subcontractor deficiencies. Should any deficiency pose an imminent safety and health hazard, the consultant may stop the project and immediately follow up with the project manager and Contracting Officer Representative (COR) or Contracting Officer (CO).
- g. Determine clearance criteria. If the Transmission Electron Microscopy (TEM) method is utilized, a minimum volume of 1199 liters must be collected. The results must average 70 structures per square millimeter (stru/mm²) or below to meet clearance criteria. Prior approval from the Occupational Safety, Health and Medical Services Division must be granted if the Phase Contrast Microscopy (PCM) method is utilized, and the results must be below 0.01 fibers per cubic centimeter (f/cc) to meet clearance criteria. If results by PCM does not meet this criterion, the area may still pass clearance if further TEM analysis does not show detectable asbestos fibers.
- h. Conduct asbestos abatement clearance inspections (using the form ARC 291), provide written documentation of the inspection results, and certify that the area(s) meet the clearance criteria.
- i. Conduct area air monitoring on asbestos abatement projects as requested by the project manager or Occupational Safety, Health and Medical Services Division.
- j. Use only laboratories that are American Industrial Hygiene Association (AIHA)-accredited in the Proficiency Analytical Testing Program (PAT) to perform and report asbestos analysis results. Where asbestos bulk sampling or TEM analysis is required, the laboratory must be accredited by the National Institute of Science and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis.

30.1.7 General Contractors involved in asbestos-related work shall:

- a. Ensure that all work by the Contractor's employees and subcontractors comply with this directive.
- b. Notify the NASA project manager (or COR or CO) immediately upon discovery of any previously unidentified suspected ACM and/or other material with possible hazards or undetermined contaminants.

30.1.8 Asbestos Abatement Contractors/Subcontractors shall:

- a. Comply with this directive, and all Federal, State, and local regulatory agency laws/guidelines that pertain to asbestos.
- b. All asbestos-related work shall be conducted under the surveillance of a CAC who is a representative of the Occupational Safety, Health and Medical Services Division.
- c. Asbestos abatement contractors who establish a regulated area shall inform other employers on the site of the nature of the work, of the existence of the requirements that pertain to regulated areas, and the measures taken to ensure that employees of the other employer are not exposed to asbestos.
- d. Abate asbestos hazards at the contractor's/subcontractor's worksite which the contractor/subcontractor created and/or controlled the source of. For asbestos hazards the contractor/subcontractor created, clearance testing will be conducted, and results will be

reviewed/approved by a CAC.

- e. Notify the NASA project manager immediately upon discovery of any previously unidentified suspected ACM and/or PACM.
- f. Deliver the ten (10) documents identified in 30.1.5 (i) to the project manager (or COR or CO) and obtain approval of the documents before any asbestos-related work is conducted.
- g. Comply with the contractor's/subcontractor's approved health and safety plan unless prior approval to deviate is provided by the Occupational Safety, Health and Medical Services Division and the NASA Construction Manager.

30.1.9 Competent Person/Certified Supervisor shall:

- a. Conduct daily inspections of the job sites, materials, and equipment in accordance with the SSSP as well as applicable state, federal, and local regulations pertaining to such inspections.
- b. If necessary, establish the NPE, ensure its integrity, and control entry to and exit from the enclosure. Ensure that all personnel working within such enclosures wear the appropriate PPE and are trained in the use of appropriate methods of exposure control and use of hygiene facilities and decontamination procedures.
- c. Establish procedures to control entry to and exit from the enclosures and/or area.
- d. Ensure that employees use the hygiene facilities.
- e. Supervise employee exposure monitoring.
- f. Ensure that required engineering controls are functioning properly.
- g. Ensure that no employee conducts prohibited activities inside the NPE (i.e. eating, drinking, smoking).
- h. Ensure proper signs from Appendix D are posted in the work area.

Note: In addition, the competent person/certified supervisor for Class I and Class II work must have successfully completed an EPA-approved training course for supervisors/contractors, and for Class III and Class IV work must be trained in an Operations and Maintenance (O&M) course developed by the EPA. All EPA-approved courses require annual recertification.

30.2 Prohibited Asbestos-Related Work

30.2.1 The following work practices and engineering controls shall not be utilized for asbestos-related work:

- a. High-speed abrasive disc saws that are not equipped with a point-of-cut ventilator or enclosures with High Efficiency Particulate Air (HEPA)-filtered exhaust air.
- b. Compressed air, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.
- c. Dry sweeping, shoveling, or other dry cleanup of ACM and/or PACM.
- d. Employee rotation as a means to reduce employee exposure to asbestos.

30.3 Procedures for Asbestos Activities

30.3.1 Notifications

30.3.1.1 Periodic Notifications

The Occupational Safety, Health, and Medical Services Division (in coordination with the building managers and supervisors) will periodically notify the following groups of the presence, location, and quantity of ACM and/or PACM at the work sites in NASA buildings and facilities:

- a. Employees of NASA who will work in and/or adjacent to areas that contain such material.
- b. On multi-employer worksites, all employers/employees who will be performing work within and/or adjacent to areas that contain such materials.
- c. Tenants who will occupy areas that contain such material.

30.3.1.2 Posting Signs for Areas or Buildings that Contain Asbestos

Areas or buildings found to contain asbestos shall be posted with a warning notice that is readily comprehended, indicating the presence of asbestos, its location, and work practices that ensure that it will not be disturbed. An example of suitable sign format and content is shown in Appendix D.

30.3.1.3 Installed Asbestos-Containing Material Notification

Hazard warning labels/signs will be posted (with assistance from Facilities Engineering), where feasible, on installed friable ACM that are accessible to employees, contractors, or the general public (see Appendix D for an example of the warning label/sign). At a minimum, these signs will be posted at the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter that contain ACM/PACM.

30.3.1.4 Contractor Notification

All successful bidding contractors (regardless of the contract amount) will be provided with a written Asbestos Notification Summary at the time a contract is awarded. The Asbestos Notification Summary shall list the location and condition of ACM. It is the responsibility of the Acquisition Division (Code JA) or Personnel (such as Project Managers) who write contracts to include the Asbestos Notification Summary in all contracts (involved potential asbestos work).

30.3.2 Basic Procedures for Asbestos Work

30.3.2.1 Basic Procedures for Class I Asbestos Work

This work shall be performed by asbestos abatement contractors meeting the requirements stated in 30.1.8. of this chapter, in accordance with the California Labor Code and BAAQMD Regulation #11, Rule #2.

30.3.2.2 Basic Procedures for Class II Asbestos Work

This work shall be performed by asbestos abatement contractors meeting the requirements stated in 30.1.8. of this chapter, in accordance with the California Labor Code and BAAQMD Regulation #11, Rule #2.

30.3.2.3 Basic Procedures for Class III Asbestos Work

All Class III asbestos work shall be conducted using employees who have current 16-hour EPA O&M training.

30.3.2.4 Basic Procedures for Class IV Asbestos Work

All Class IV asbestos work shall be conducted using employees who at a minimum have current two (2)-hour Asbestos Awareness training. This includes custodial work involving maintenance of asbestos-containing floor tiles. The work activities must be in compliance with the California Labor Code and

BAAQMD Regulation #11, Rule #2.

30.3.3 Procedures for Accidental Release of Asbestos

The following procedures shall be used if asbestos is accidentally released:

- a. Immediately isolate the area by closing doors and/or erecting temporary barriers to restrict air movement and limit access to the site to personnel other than emergency responders.
- b. Notify the Occupational Safety, Health and Medical Services Division and the Facilities Engineering Branch.
- c. Shut down and seal off the Heating, Ventilation and Air Conditioning (HVAC) system if asbestos fibers are suspected to have entered and/or may enter the HVAC system.
- d. Post asbestos abatement warning signs around the area.
- e. Use employees with a minimum of Class IV training to employ thorough cleanup procedures to properly control the ACM by using wet methods, HEPA vacuums, and respiratory protection.
- f. A Competent Person/Certified supervisor will inspect the area before clearance testing in accordance with the ASTM Standard 1368-Standard Practice for Visual Inspection of Asbestos Abatement Projects.
- g. Clearance testing will follow requirements in section 30.1.6(g).

30.3.4 Brake/Clutch Maintenance Operations

29 CFR subpart 1910.1001 impacts the Automotive Repair Shop (Motor Pool). These OSHA standards require engineering and work practice controls during brake and clutch repair, inspection, disassembly, repair, and assembly operations on materials that contain asbestos. There are two methods that meet this requirement:

- a. Method 1, Negative Pressure Enclosure with HEPA Vacuum System

The brake and clutch inspection, disassemble, repair, and assembly operations shall be enclosed to cover and contain the clutch or brake assembly and to prevent the release of asbestos fibers into the worker's breathing zone.

- b. Method 2, Low-Pressure/Wet-Cleaning Method

The catch basin shall be placed under the brake assembly and positioned to avoid splashes and spills. The reservoir shall contain water with an organic solvent or wetting agent. The flow of liquid shall be controlled so that the brake assembly is gently flooded to prevent the asbestos-containing brake dust from becoming airborne. The aqueous solution shall be allowed to flow between the brake drum and brake support before the drum is removed. After removing the brake drum, the wheel hub and back of the brake assembly shall be thoroughly wet to suppress dust. The brake support plate, brake shoes, and brake components used to attach the brake shoes shall be thoroughly washed before removing the old shoes. In systems that use filters, the filters, when full, shall be wet with a fine mist of water, then removed and placed immediately in an impermeable hazardous waste container with a hazardous waste label. Any remaining water shall be wiped up with rags and disposed of in the same container as the filter. Any spills of asbestos-containing aqueous solution or any asbestos-containing waste material shall be cleaned up immediately and disposed of as hazardous material. The use of dry brushing during low-pressure/wet-cleaning operations is prohibited.

30.3.5 Procedures for Specific Maintenance Operations

30.3.5.1 Where vacuuming methods are selected, HEPA filtered vacuuming equipment shall be used.

30.3.5.2 Asbestos waste, scrap, debris, bags, containers, equipment, and contaminated clothing for disposal shall be collected and disposed of in sealed, labeled, impermeable bags.

30.3.5.3 Sanding of ACM floor tiles is prohibited.

30.3.5.4 Stripping of finishes shall be conducted using wet methods and low abrasion pads at speeds lower than 300 rpm.

30.3.6 TA Wire Insulation

TA wire for the purpose of repairing electrical connections is classified as Class III asbestos-related work because this work is part of a maintenance and repair operation, and disturbance will occur as an adjunct to the repair and maintenance of the electrical system. This work shall follow the procedures for Class III work of section 3.1.3.

30.3.7 Drilling Holes

Prior to any drilling, personnel planning to drill holes must notify Occupational Safety, Health, and Medical Services Division to determine if the wall or surface contain asbestos.. Drilling holes into asbestos containing material, ACM shall be limited to non-friable ACM such as transite siding, floor tiles, and sheetrock with asbestos-containing joint compound. Since this is considered Class III work by OSHA definition, a minimum of Class III worker training is required. The Class III worker shall use impermeable drop cloths under areas to be drilled. Drilling shall be performed through a wet sponge or by using a drill with HEPA vacuum attachment to prevent airborne fiber release. Upon project completion, the area must be cleaned using wet methods and/or HEPA vacuums. Waste, including PPE and cleaning materials shall be placed in asbestos labeled bags. Personnel or entity wanting to disposal of the waste need to fill out a Form A and send it to arc-dl-hazwaste@mail.nasa.gov. If you have questions about waste management, contact the hazardous waste group at x4-2613.

APPENDIX A. DEFINITIONS

Abatement	Any operation that is designed to permanently (last 20 years or more) remove, encapsulate, or enclose (airtight) asbestos- containing materials.
Asbestos	Six fibrous magnesium silicate minerals: chrysotile, crocidolite, amosite, and the fibrous forms of actinolite, tremolite, and anthophyllite.
Asbestos-Containing Material (ACM)	Any material that contains more than one-tenth of one percent of asbestos.
Asbestos-Related Work	Any work that involves asbestos-containing material and may result in the release of any quantity of asbestos fibers into the air.
Category I Nonfriable Asbestos	Asbestos-containing packings, gaskets, resilient floor coverings, asphalt roofing products, pliable sealants, and pliable mastics (NESHAP definition).
Category II Nonfriable Asbestos-Containing Material	Asbestos-containing material, excluding Category I nonfriable asbestos- containing material, that, when dry and in its present form, cannot be crumbled, pulverized, or reduced to powder by hand pressure (Transite Trademark (TM), cement products, stucco). (NESHAP Definition).
Certified Asbestos Consultant (CAC)	Any person who contracts to provide professional health and safety services that relate to asbestos-containing materials. The activities of an asbestos consultant include building inspection, abatement project design, contract administration, sample collection, preparation of asbestos management plans, clearance monitoring, and supervision of site surveillance technicians. Asbestos-containing material, excluding Category I nonfriable asbestos- containing material, that, when dry and in its present form, cannot be crumbled, pulverized, or reduced to powder by hand pressure (Transite Trademark (TM), cement products, stucco). (NESHAP Definition)
Class I Asbestos Work	Activities that involve the removal of Thermal System Insulation (TSI) and surfacing ACM and Presumed ACM (PACM). (OSHA definition).

Class II Asbestos Work	Activities that involve the removal of ACM that is not TSI 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 (OSHA definition).
Class II Asbestos Work	Activities that involve the removal of ACM that is not TSI 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. (OSHA definition)
Class III Asbestos Work	Repair and maintenance operations where up to one standard glovebag or one waste bag of ACM (60"x60") is likely to be disturbed.
Class IV Asbestos Work	Maintenance and custodial activities during which employees contact, but do not disturb, ACM or PACM, and activities to clean up minimal waste and debris that contains ACM or PACM – (OSHA definition) (Air concentration of asbestos must not exceed the OSHA PEL or EL. If work is expected to release airborne asbestos fibers, which may cause the employee exposure in excess of the OSHA PEL or EL, work must be considered Class III work. The Occupational Safety, Health, and Medical Services Division shall determine this potential.)
Clean Room	An uncontaminated room that has facilities for the storage of employees' street clothing and uncontaminated materials and equipment.
Competent Person/Certified Supervisor	An individual who is capable of identifying asbestos hazards in the workplace and who has sufficient experience, training, and authority to take prompt corrective measures to eliminate them.
Demolition	Any operation that involves the wrecking or removal of any load- supporting structural members of a facility.
Demolition/Renovation Survey	A survey conducted by an EPA-accredited asbestos building inspector to check for the presence of asbestos-containing materials prior to any demolition/renovation activities.
Disturbance	Contact with any material that contains ACM or PACM that causes release of fibers. This term includes activities that disrupt the matrix of ACM or PACM, render ACM or PACM friable, or generate visible debris. Disturbance includes cutting away small amounts of ACM and PACM.

Employee Exposure	The exposure to airborne asbestos that occurs or would occur - if the employee were not using respiratory protective equipment.
Encapsulation	A method that utilizes sealers, paints, or special bridging/encapsulating compounds to control airborne asbestos fibers, that is expected to last a minimum of 20 years.
Enclosure	An airtight, impermeable, permanent barrier constructed to surround asbestos-containing materials and prevent the release of asbestos fibers into the air, that is expected to last a minimum of 20 years.
EPA-Approved Building Inspector	An individual who has successfully completed an EPA-approved building inspector course for collecting asbestos bulk samples and conducting AHERA quality surveys. An EPA building inspector is not a construction inspector; primary responsibilities include collecting bulk samples for asbestos analysis and conducting surveys for asbestos.
Fiber	A particulate form of asbestos, 5 micrometers or longer, with a length- to-diameter ratio of at least 3-to-1.
Friable Asbestos-Containing Material	Any material that contains more than one-tenth of one percent asbestos that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
High Efficiency Particulate Air (HEPA) Filter	A high-efficiency particulate air filter capable of removing particles 0.3 micrometers in diameter or larger with 99.97-percent efficiency.
Intact	ACM that has not crumbled, been pulverized, or otherwise deteriorated so that it is no longer likely to be bound with its matrix.
Permissible Exposure Limits (PEL)	Are established by the Occupational Safety and Health Administration. According to OSHA, the employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter (f/cc) of air as an eight (8) hour time-weighted average (TWA), as determined by the National Institute of Occupational Safety and Health (NIOSH) method 7400 Phase Contrast Microscopy (PCM). In addition, the employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 f/cc as averaged over a sampling period of 30 minutes, as determined by NIOSH method 7400 PCM, known as the excursion limit (EL).

Presumed Asbestos-Containing Material (PACM)	All thermal system insulation and spray-on or troweled-on surfacing materials in buildings or substrates constructed before 1980, and all resilient flooring material including associated mastic and backing, regardless of age, shall be identified as asbestos-containing, unless a certified industrial hygienist or certified asbestos consultant determines that it is not ACM using recognized techniques.
Regulated Area	An area established by the employer to demarcate areas where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limits.
Regulated Asbestos-Containing Material (RACM):	<p>One of the following categories of ACM:</p> <ul style="list-style-type: none"> • Friable asbestos-containing material, • Category I nonfriable ACM that has become friable, • Category I nonfriable ACM that will be or has been ground, sanded, cut, or abraded, or • Category II nonfriable ACM that has a probability of becoming or that 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 by the asbestos NESHAP.
Removal	All operations where ACM and/or PACM is taken out or stripped from structures or substrates, including demolition operations.
Renovation	Any operation that involves altering a facility or one or more facility components in any way.
Surfacing Material	Material that is sprayed, troweled-on, or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).
TA Wire	Thermoplastic asbestos wire, often used for electrical insulation at the wind tunnels at NASA Ames.
Thermal System Insulation (TSI)	ACM applied to pipes, fittings, boilers, breaching, tanks, ducts, or other structural components to prevent heat loss or gain.

APPENDIX B. ACRONYMS

ACM	Asbestos-Containing Material
AIHA	American Industrial Hygiene Association
ARC	Ames Research Center
ASTM	American Society for Testing and Materials
BAAQMD	Bay Area Air Quality Management District
CAC	Certified Asbestos Consultant
Cal/OSHA	California Division of Occupational Safety and Health
cc	Cubic centimeters
CFR	Code of Federal Regulations
CO	Contracting Officer
COR	Contracting Officer Representative
EL	Excursion Limits
EPA	Environmental Protection Agency
f/cc	Fibers/cubic centimeter
HEPA	High Efficiency Particulate Absorption
hr	hour
HVAC	Heating, Ventilation and Air Conditioning
NASA	National Aeronautics and Space Administration
NIST	National Institute of Science and Technology
NPE	Negative Pressure Enclosure
NVLAP	National Voluntary Laboratory Accreditation Program
O&M	Operations & Maintenance
OSHA	Occupational Safety and Health Administration
PACM	Presumed Asbestos-Containing Material
PCM	Phase Contrast Microscopy
PAT	Proficiency Analytical Testing
PEL	Permissible Exposure Limits
PPE	Personal Protective Equipment
RACM	Regulated Asbestos-Containing Material
RPM	Rotations Per Minute
SSSP	Site Specific Safety Plan

stru/mm ²	Structures per square millimeter
TA	Thermoplastic Asbestos
TEM	Transmission Electron Microscopy
TWA	Time-Weighted Average

APPENDIX C. REFERENCES

- C.1 Respirator Protection Standard, 29 CFR § 1910.134
- C.2 California Business & Professions Code § 7058.5³
- C.3 Ames Standard Specification Section 02080
- C.4 NIOSH 7400 Asbestos and Other Fibers by Phase Contrast Microscopy

³ C.5: <http://www.search-california-law.com/research/ca/BPC/7058.5./Cal-Bus--Prof-Code-Section-7058.5/text.html>

APPENDIX D. ASBESTOS LABELS/SIGNS FOR INSTALLED ASBESTOS-CONTAINING MATERIALS

