



*One Team. One Culture.*

## Standards

# PRC-STD-SH-52894

## Asbestos Controls

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Program: Occupational Safety and Industrial Hygiene

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USQ Screen Number:

- 100 K Facility : **Categorical Exclusion:** GCX-8 (Not in Safety Basis Compliance Matrices)  
**Screener:** Williams, James
- Canister Storage Building/Interim Storage Area : Excluded from USQ  
**Exclusion Reason:**
  
- Central Plateau Surveillance and Maintenance : **Categorical Exclusion:** GCX-8 (Not in Safety Basis Compliance Matrices)  
**Screener:** Olsen, Ashley
- Less Than HazCat 3 : Excluded from USQ  
**Exclusion Reason:**  
Exempt from USQ Process per PRC-PRO-NS-062, Scope
- Plutonium Finishing Plant : **Categorical Exclusion:** GCX-8 (Not in Safety Basis Compliance Matrices)  
**Screener:** King, Jeffry
- Solid Waste Operations Complex : **Categorical Exclusion:** GCX-8 (Not in Safety Basis Compliance Matrices)  
**Screener:** Olsen, Ashley
- Transportation : Excluded from USQ  
**Exclusion Reason:**  
N/A per Section 1.3 - < 1 A2
- Waste Encapsulation Storage Facility : **Categorical Exclusion:** GCX-8 (Not in Safety Basis Compliance Matrices)  
**Screener:** Covey, Lori

**CHANGE SUMMARY****Description of Change**

No additional changes, sections of the document were clarified.

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**1.0 INTRODUCTION**

Asbestos is a group of naturally occurring silicate minerals that are resistant to heat and corrosion. Asbestos has been used in products such as insulation, floor tiles, building materials and automobile brake components. Breathing asbestos fibers is hazardous and has caused debilitating conditions which include lung cancer, asbestosis and mesothelioma.

The six minerals which make up the term asbestos are chrysotile, amosite, crocidolite, tremolite, actinolite and anthophyllite. All of them share similar properties and characteristics.

The Occupational Safety and Health Administration (OSHA) has two regulatory standards regarding asbestos. The first is Code of Federal Regulations (CFR), Title 29, *Labor*, 1910.1001, *Asbestos*, (the General Industry standard) and 29 CFR 1926.1101, *Asbestos*, (the Construction standard). Another applicable standard for asbestos is 40 CFR 763, *Asbestos*, Subpart E, (the Asbestos Hazard Emergency Response Act [AHERA] standard under Toxic Substances Control Act of 1976 [TSCA]). The AHERA standard is referenced in the OSHA Construction Standard.

**1.1 Purpose**

The purpose of this standard is to detail the requirements for the safe handling of Asbestos Containing Materials (ACM) and Presumed Asbestos Containing Materials (PACM) using the regulations as promulgated by the OSHA.

OSHA divides asbestos work into General Industry and Construction. In this standard both regulations will be covered. Most work at CH2M HILL Plateau Remediation Company (CHPRC) will fall under the Construction standard. Construction activities include repair, alteration, renovation, demolition or salvage. There is work in operating facilities such as maintenance and normal housekeeping activities which may fall under the General Industry standard.

This standard will outline and detail the requirements for dealing with asbestos from both the General Industry perspective as well as the more common Construction perspective.

**1.2 Scope**

All asbestos work performed by CHPRC or its contractors is subject to this standard. This includes inspections, handling, sampling, repairing and the removing of ACM/PACM.

**NOTE:** *Environmental compliance requirements are not within the scope of this standard. These are addressed in PRC-PRO-EP-15333, Environmental Protection Processes; PRC-PRO-EP-15335, Environmental Permitting and Documentation Preparation; and PRC-GD-EP-52776, Asbestos Guidance Document for D4 Projects Performed Under CERCLA Authority.*

**1.3 Applicability**

This standard applies to all CHPRC and CHPRC subcontractor activities where ACM and PACM will be disturbed.

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**1.4 Implementation**

This standard is effective upon publication

**2.0 STANDARD****2.1 Background**

Many of the buildings and structures found at Hanford were built during the era when asbestos was commonly used. Unless verified by sampling, all buildings and structures built prior to 1984 will be assumed to contain asbestos. All buildings and structures built in and after 1985 will require verification sampling to be conducted prior to activities which may disturb the asbestos.

**2.2 Asbestos Characterization Sampling**

- Facility Manager
  - Contact an Industrial Hygienist (IH) for assistance in developing a sampling plan for the disturbance of PACM.
    - This plan must be developed/approved by an individual who is trained as an accredited AHERA Building Inspector. (Course #170609) and has a current Inspector certification.
    - The IH may contact an Accredited AHERA Building Inspector who is currently qualified to assist with this work.
    - Provide the information regarding the location of the work and the details regarding what material will potentially be disturbed.
- Industrial Hygienist (IH)/ Accredited AHERA Building Inspector
  - Develop a sampling plan based on the potential area and methods of disturbance and the review of the materials within the area of disturbance.
    - This plan should be written with enough details to get the appropriate number of samples to have a statistical basis for the results as defined by AHERA.
  - Contact individuals who are qualified to perform the bulk sampling and arrange for the sampling plan to be sent to them.
  - Make arrangements with the Facility Manager to have access to the area where samples are to be taken.
  - Ensure all individuals who are based in or near the area are informed of the sampling.
  - Obtain samples as prescribed by the sampling plan.
  - Ensure photos are taken to verify location of samples.
  - Ensure specific locations are described accurately as a part of the sampling information.
  - Ensure proper PPE is discussed for the sampling.
  - When obtaining samples, a single pair of disposable coveralls, half-face respirator and disposable gloves as a minimum shall be worn.
    - If a current Negative Exposure Assessment (NEA) is in effect for the samplers, PPE may be reduced in consultation with the project IH.
  - To ensure there is enough data to maintain the NEA, discuss the need for air monitoring with the project IH.

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- Industrial Hygienist
  - When requested, perform asbestos monitoring to ensure bulk sampling operations are not producing excess asbestos fibers and that the prescribed PPE is adequate for the job.
- Accredited AHERA Building Inspector
  - As soon as practical after the sampling is conducted, deliver samples to the sample management office following the steps in PRC-PRO-SH-409, *Industrial Hygiene Monitoring, Reporting and Records Management*. Follow radiological procedures for transporting samples collected in radiological areas.
    - All pertinent data and information is included in the Sitewide Industrial Hygiene Database (SWIHD), including photos and any notes.
  - If samples are indeterminate, using Polarized Light Microscopy (PLM), send samples for Transmission Electron Microscopy (TEM).
  - If indeterminate samples are not sent for TEM, consider the material PACM.
  - Once sample results are received develop an inspection report to be presented to the Facility Manager.
    - This report may be developed with the help of an IH or another Accredited AHERA Building Inspector.
- Facility Manager
  - Work with the project IH to determine a course of action with regards to the inspection report.
  - If asbestos is identified, develop plans to have asbestos removed prior to work being performed on the structure or controlled to prevent employee exposure.
  - Assign an individual to maintain an inventory of all identified ACM and PACM at the facility.
  - Update inventory when additional sampling is conducted or when ACM/PACM is removed.

**2.3 Asbestos Work During Construction Activities**

Under the OSHA Construction standard ACM is considered by the type of material, likelihood of fiber release and the work being performed.

**2.3.1 Classifications of Asbestos**

ACM is divided into three classifications of material: Thermal System Insulation (TSI), Surfacing Material (SM) and Miscellaneous materials (MISC). Miscellaneous Materials are all other materials which are not TSI or SM but contain asbestos.

- TSI is that ACM which is used to control temperatures (both hot and cold). This material is often softer or more friable. Friable is a way of describing how easily the asbestos fibers can be separated from its matrix. This is usually described as being crushed between the thumb and fingers. If ACM is friable there is a greater chance that asbestos fibers may be released into the air when it is disturbed. TSI is almost always considered to be friable.

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- SM is material which is troweled or sprayed on a surface. This could be done for fire proofing or for decorative purposes or for other means. This material is often friable, particularly if it has previously become wet.
- Miscellaneous materials are all other ACM. This could be tile or roofing, concrete asbestos piping or lagging. Other examples are concrete asbestos board and gasket material. Floor tiles are another type of miscellaneous ACM. Most miscellaneous materials are non-friable unless they have been modified in some way. For example if concrete asbestos products are exposed to acid over a long period of time then the asbestos fibers may become friable since the matrix material has been compromised.

**2.3.2 Classes of Asbestos Work**

Each job where ACM/PACM has the potential to be disturbed needs to be classified as to the type of work to be performed. The OSHA standard 29 CFR 1926.1101 recognizes 4 specific classes of work, Class I through IV.

- Class I asbestos work means activities involving the removal of TSI and SM ACM and PACM.
- Class II asbestos work means activities involving the removal of ACM/PACM which 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 deals with disturbing asbestos during the performance of other maintenance activities. Almost any type of work can disturb ACM or PACM. The original work must be captured in a JCS work package. Some of these may be "Skill-Based" with only a basic work package to cover the work. Others will have extensive work packages covering all aspects of the asbestos work. Class III work involves the disturbance of limited amounts of ACM/PACM during the performance of these other work activities.
- Class IV asbestos work means 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.
- For maintenance (repair) or janitorial work there are no classifications. These types of work are governed by the General Industry Standard (29 CFR 1910.1001). The General Industry Standard requires controls and training adequate to protect employees from the specific asbestos hazards.

**2.3.3 Developing Asbestos Work Packages**

- The Facility Manager:
  - Determines what work will be performed and what ACM or PACM has the potential to be disturbed during the performance of that work.
  - Reviews any characterization reports to ensure material is properly classified.
  - Contacts a Certified AHERA project designer, if available, to ensure the work is properly planned.

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- The Certified AHERA Project Designer:

Assists in the development of work packages which covers the specific type of asbestos and the specific controls related to the class of the asbestos work. If a CHPRC work planner assigned to develop a work package is not a Certified AHERA Project Designer then they shall enlist a Certified AHERA Project Designer as a reviewer and approver of the work package.

Contacts the project IH or the OS/IH Asbestos Technical Authority (TA) for questions as to the type of asbestos or the class of work.

Includes all crafts which will be a part of the work team, OS/IH, environmental and waste handling professionals (include Radcon if necessary) in the development of work packages to ensure all pertinent hazards and concerns are addressed.

- The Environmental Compliance Officer:

- Performs a review of the proposed work scope to identify and incorporate applicable environmental requirements (e.g. vehicle marking, wetting, thorough survey, labeling, etc.) from Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAPs), Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) response action documents, and other sources in consultation with Environmental Protection subject matter experts as needed.

Ensures all regulatory agencies are properly notified.

- The Waste Management Representative:

- Ensures all waste documentation and permits are identified for the proposed work

Ensures plans for the proper disposal of the waste is completed.

- The Industrial Hygienist (IH):

- Develops the sampling plan for the proposed work and the Industrial Hygiene Exposure Analysis (IHEA).
- Contacts the analytical lab if samples will require rush analysis due to nature and complexity of the asbestos work.

#### **2.3.4 Planning Class I Asbestos Work**

Class I asbestos work deals with TSI and SM and has the highest probability for the asbestos to be friable. This material needs to be handled with the most care and have the highest level of control to adequately protect the workers, the environment and the public.

Class I removal is normally performed either within a Negative Pressure Enclosure (NPE) or within an engineered barrier such as a glove bag. These methods keep the asbestos fibers within the barrier and protect the environment outside the engineered barriers.

All Class I work shall be supervised by an individual who is a Certified Asbestos Supervisor (CAS) and who has a current certification.

All individuals who will remove Class I material (TSI or SM) shall be a Certified Asbestos Worker (CAW) with a current certification.

Areas where Class I removal shall be performed will have a regulated area established to separate the work area from the rest of the building. All openings into the regulated area shall



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be covered with critical barriers, except when work is outdoors or within an engineered barrier such as a glovebag. Properly post all access points into the regulated areas.

Vacuum cleaners equipped with High-efficiency particulate air (HEPA) filters shall be used to collect all debris and dust from ACM and PACM. Vacuums shall be properly labelled as a warning of their potential contents.

Wet methods with amended water (1oz to five gallons) shall be used to control worker exposures to asbestos during handling, removal, cutting and cleanup, except where it has been demonstrated that wet methods are infeasible due to the creation of additional hazards (i.e., electrical). If wet methods cannot be used additional controls (i.e., push/pull high volume air) shall be established to protect workers from asbestos hazards. Waste and debris from asbestos work shall be promptly cleaned up and disposed in leak-tight containers.

Water Spray Process Systems shall not be used unless prior approval is obtained from the OS/IH Asbestos TA.

All other methods of dealing with Class I material (TSI/SM) will be considered as alternative methods and required the development of a job specific work package which requires the approval of a Certified Industrial Hygienist (CIH) or a Professional Engineer (PE) who is a Certified Asbestos Project Designer.

Any alternative method of asbestos work must be approved by the CHPRC Environmental Protection - Asbestos TA/SME and the OS/IH Asbestos TA.

**2.3.5 Class I Work Packages**

The Work Package Planner ensures that all Class I Asbestos work packages include the following information when appropriate:

- The Facility Manager has made arrangements for the area where Class I work to be performed is fully available and is secured by the asbestos team.
- Collocated workers know about the upcoming work and understand the need to stay out of regulated areas.
- The Certified Asbestos Supervisor has clearly delineated the work area.
- The area is properly placarded.
- Ensure documented evidence of the supervisor's asbestos qualification training, such as a Hanford Site Workers Eligibility Tool (HSWET) roster or CAS card will be available at the work site.
- Instructions state that the area is pre-cleaned removing obstructions and any PACM on floor and surfaces.

Include the use of wet methods and HEPA vacuum cleaners to clean area.

- Work instruction clearly describes proper PPE for the work to be performed.
- Instructions are written for the work team to remove and bag waste.

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- If cleaning up disturbed material, instructions are written to indicate that all materials are handled gently and double bagged before removing from the regulated area. Wet methods and HEPA vacuums are used to reduce potential fiber release.
- The enclosure is designed to provide adequate entry and exit rooms and enough room to work around abatement area. (Glovebags will be covered in Section 2.3.6)
- Instructions for the work team to erect NPE should include the following information:
  - NPE with a negative air system which will run 24 hrs. a day from the time prior to the first disturbance of asbestos until final sampling results are obtained which clears the NPE.
  - Negative air is filtered through a Di-Octyl Phthalate (DOP) tested negative air machine (in the case of a glovebag this can be a DOP tested HEPA vacuum).
  - Negative air machines are monitored and the negative pressure maintained at a -0.02 inches of water (minimum). This ensures the air flow will always move toward the negative air machine and move fibers away from the workers in the NPE and the exits of the NPE.
  - NPE has a minimum of 4 air exchanges per hour.
  - To prevent the spread of asbestos fibers:
    - ACM/PACM is removed as gently as possible to reduce the spread of asbestos fibers.
    - ACM/PACM is removed using wet methods unless other safety hazards preclude the use of water.
    - Amended water is used to enhance the ability of the water to be absorbed.
    - Hand tools are used to remove ACM.
    - Areas are cleaned within the enclosure as needed and at the end of each day or when the buildup of material creates the potential for the migration of asbestos contamination into other areas of the containment.

**NOTE:** *The negative air for the enclosure must not be turned off until the area has passed the clearance sample. NPEs must be designed and constructed to ensure no air movement outside of the enclosure in the unlikely event of a total shutdown of electrical power.*

- Once a final cleanup has been completed in a containment area:

Sampling is performed to make sure the area has been cleaned to an acceptable level. Clearance sample must be at a level of 0.01 fiber/cc or less to be considered clear unless air monitoring was taken prior to the removal. Then levels only have to be below the amount identified in those samples.

- If the levels do not reach the clearance levels listed above, include instructions to re-clean and resample the area until clearance levels have been obtained.
- Instructions are written for the certified asbestos worker to perform the asbestos cleanup or removal as directed by the CAS, in a manner which reduces the potential for fiber release.

If questions or concerns arise during the work process the CAS or the project IH should be contacted.

- Instructions are written for the industrial hygienist to perform air sampling during all aspects of the asbestos removal process, as follows:

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- Excursion and full shift samples are to be obtained.
- Area and clearance samples need to be taken when the situation warrants the sampling.
- NIOSH 7400 methods for collection and analysis are to be followed.
- For samples identified as having greater than 50% of the respective limit, samples are sent out for TEM using NIOSH Method No.7402 (*Asbestos by TEM*).
- A sampling plan is developed for all asbestos work to ensure samples are properly taken and an adequate number of samples are obtained.
- A NEA is developed when sampling data for a specific type of work with a specific duration is obtained. The NEA must have at least 5-7 samples of a similar work.

**2.3.6 Class I Work Using Glovebags**

If the Class I work will be performed using a glovebag, the glovebag is installed on the area where the ACM/PACM will be removed.

A Glovebag is a plastic containment structure normally used to enclose a length of piping or pipe structures and which is used to contain fibers and waste created during asbestos removal. Glovebags can either be custom made or purchased ready-made.

Glovebags:

- Are made of 6 mil plastic with a seamless bottom.
- Used on elbows or other connections which are designed for that purpose.
- Must be designed to go completely around the pipe or pipe-structures.
- Must be smoke tested to ensure it is properly sealed. Once attached the glovebags cannot be moved.

In glovebag systems which have an integral waste bag, the bag shall be able to withstand the addition of ACM/PACM waste and water without losing integrity.

There must be a device integral to the glove bag to prevent exposure when the glovebag and HEPA vacuum is disconnected.

The glovebag system can be used to remove all the insulation from the piping or it can be used as a part of a "cut and wrap" technique.

Glovebags can be designed for other items besides piping runs. Specialized glovebags must be specifically created for the structures they will enclose.

- When developing work packages for Class 1 Work Using Glovebags, the Work Package Planner ensures the following:
  - The Facility Manager has made arrangements where Class I work is to be performed to be fully available and secured by the asbestos team.
  - Collocated workers know about the upcoming work and understand the need to stay out of regulated areas
  - The Certified Asbestos Worker has clearly delineated or defined the work area.
  - The area is properly placarded.

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- Documented evidence of the supervisor's asbestos qualification training, such as a HSWET roster or CAS card, will be available at the work site. Instructions state that the area is pre-cleaned removing obstructions and any PACM on floor and surfaces.
    - Include the use of wet methods and HEPA vacuum cleaners to clean area.
  - Work instruction clearly describes proper PPE.
  - Instructions are provided for the work team to remove and bag waste.
- Instructions clearly state at least two (2) individuals are working on each glovebag used.
- Each may be working with separate glovebags, but help must be readily available when needed to safely perform the work.
  - Prior to installation, the glovebag area needs to be inspected, all loose or damaged insulation needs to be wrapped and sealed to protect the insulation to be removed.
  - Instructions clearly state that glovebag is smoke tested. AND-
    - DO NOT move glovebag after installation.
    - DO NOT place glovebag on surface with a surface temperature above 150 F°.
  - Upon completion and prior to disposal, glovebag is to be collapsed using a HEPA vacuum.
  - If the glovebag system used has an integral waste bag, the bag is able to withstand the addition of both the ACM/PACM waste as well as the water used without losing integrity.
  - ACM/PACM is kept wet while being removed.

**2.3.7 Alternative Class I Work**

Any ACM/PACM Class I removal method not specifically identified in 29 CFR 1926.1101 is considered an alternative method of Class I work. To perform this type of work, there must be a specific work plan with instructions and details of how the work will be performed and how the method chosen will maintain the level of fibers to levels below the current occupational exposure limit (OEL) which of 0.1 f/cc.

The Alternative control method must be designed to enclose, contain or isolate the process or source of airborne asbestos dust or otherwise capture or redirect the dust prior to its entry into the breathing zone of the employees.

Additionally all alternative Class 1 work must be reviewed and approved by the OS/IH Asbestos TA and be reviewed by the CHPRC Environmental Protection Asbestos TA/SME.

A CIH or a PE who is trained as a Certified AHERA Project Designer must approve this work method. The review and certification of the work methods must be done in writing. The work must pass AHERA clearance sampling numbers after it has been completed. Additionally perimeter sampling will need to be performed to ensure the efficacy of the control methods. Levels must be maintained at less than 0.01 fibers per cubic centimeter. If levels are higher immediately send the samples out for TEM to ensure the levels are correct.

Personal Sampling shall be conducted for Alternative Class I Work and shall be based on the worst case employee exposure by individuals who are representative of training and experience equivalent to those who are performing the work. The use of a NEA is not appropriate for Alternative Class I Work. A minimum of 25% of the workers in the removal zone must be sampled.

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An open air cleanup of spilled TSI is one type of removal which may be performed as an alternative Class I work method. In an open air cleanup the perimeter samples will serve the same purpose as a clearance sample. TEM is recommended for the analysis of these perimeter samples.

**2.3.8 Class II Work**

All Class II Work shall be performed under the supervision of a CAS. All Class II Work shall be performed by a CAW.

Class II work consists of the removal and/or cleanup of non-friable miscellaneous ACM/PACM. If there is no NEA for the proposed Class II work or if it is anticipated that there may be an exposure above the OEL then one or more of the following controls shall be used:

- Critical barriers shall be placed over all openings to the regulated area (outdoor exempted).
- There shall be another barrier or isolation method to prevent the migration of airborne asbestos from the regulated area, as verified by perimeter area monitoring and/or clearance monitoring which has levels below 0.01 f/cc.
- Impermeable drop cloths shall be placed on surfaces beneath all Class II removal activities.
- All Class II asbestos work shall be performed using the following work practices and requirements:

HEPA vacuums shall be used whenever possible to collect ACM/PACM debris and dust.

Wet Methods shall be used whenever possible to control employee exposures during asbestos activities, except when wet methods are demonstrated to have the potential to create another hazard such as electrical hazard or equipment malfunction.

Prompt clean-up and disposal of wastes and debris contaminated with asbestos in leak-tight containers.

**2.3.9 Additional Class II Work Controls**

Class II asbestos work shall also be performed by complying with the work practices and controls designated for each type of asbestos work performed as set out in this section. Where one control methods is to be used for a type of asbestos work, the project, with consultation of the project IH, may choose one or a combination of designated control methods (i.e., the use of glovebags within a negative pressure enclosure). Class II work also may be performed using a method allowed for Class I work. Glovebag and glovebox methods must fully enclose the Class II material to be removed.

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When removing vinyl and asphalt flooring which is ACM or if the building was constructed in 1984 or prior and the flooring is PACM; the facility manager shall ensure that employees comply with the following work practices and they are trained in those work practices.

- Flooring or its backing shall not be sanded
- Vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brushes) shall be used to clean floors
- Resilient sheeting shall be removed using amended water and mechanical snips. Rip-up of resilient flooring is prohibited.
- All scraping of residual adhesive and/or backing shall be performed using wet methods.
- When tiles are heated and can be removed intact, wet methods can be omitted.
- Resilient flooring materials including associated mastic and backing shall be considered PACM unless sampling determines that it is asbestos free using recognized analytical techniques.

**2.3.9.2 Removing Cementitious Asbestos**

When removing cementitious asbestos containing siding and shingles or transite panels containing ACM on building exteriors (other than roofs) the facility manager shall ensure that the following work practices are followed:

- Cutting, abrading or breaking siding, shingles, or transite panels, shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release cannot be used.
- Each panel or shingle shall be sprayed with amended water prior to removal
- Unwrapped or unbagged panels or shingles shall be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift.
- Nails shall be cut with flat, sharp instruments.

**2.3.9.3 Removing Gaskets Containing ACM/PACM**

When removing gaskets containing ACM/PACM, the facility manager shall ensure that the following work practices are followed:

- If a gasket is visibly deteriorated and unlikely to be removed intact, removal shall be undertaken within a glovebag as described in section 2.3.6 of this standard.
- The gasket shall be immediately placed in a disposal container.
- Any scraping to remove residue must be performed wet.
- If the gasket is being removed from an operating system it is considered Class III work. If the gasket is being removed for abatement or for demolition it is considered Class II work.

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**2.3.9.4 Performing any other Class II Removal of ACM/PACM**

When performing any other Class II removal of ACM/PACM which does not have specific controls listed in this section, the facility manager shall ensure that the following work practices shall be followed:

- The material shall be thoroughly wetted with amended water prior to and during its removal.
- The material shall be removed in an intact state unless the facility manager demonstrates that intact removal is not possible.
- Cutting, abrading or breaking the material shall be prohibited unless the facility manager can demonstrate the other methods, which are less likely to result in asbestos fiber release, are infeasible.
- ACM/PACM removed, shall be immediately bagged or wrapped, or kept wet until transferred into a closed receptacle, no later than the end of the shift.

**2.3.10 ACM/PACM Class II Roofing Work**

While ACM/PACM roofing work is considered Class II work, this type of material has controls different than those listed above.

ACM/PACM Roofing material is normally considered nonfriable. OSHA recognizes the difference with the types of work by giving it a separate section in the construction standard.

**2.3.10.1 Removing ACM or PACM Roofing Materials**

When removing ACM or PACM roofing materials the facility manager shall ensure that the following work practices are followed:

- Roof level heating and ventilation intake sources shall be isolated or the ventilation system shall be shut down and the intakes blocked.
- Roofing material shall be removed in an intact state to the extent feasible
- Wet methods shall be used to remove roofing materials that are not intact or rendered not intact during the removal process. Wet methods can be discontinued if they are not feasible or create a safety hazard.
- Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.
- When removing built-up roofs with ACM or PACM felts and an aggregate surface using a power roof cutter, all dust resulting for the cutting operation shall be collected by a HEPA dust collector or shall be HEPA vacuumed by vacuuming along the cutting line.
- When removing built-up roofs with ACM/PACM roofing felts and a smooth surface using a power roof cutter, the dust resulting from the cutting operation shall be collected either by a HEPA dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still wet dust and debris left along the cut line.

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- ACM/PACM that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or wrapped in plastic sheeting.
- Any ACM/PACM that is not intact shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the workshift. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag or wrapped in plastic sheeting.
- Intact ACM/PACM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.
- Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.

**2.3.11 Alternative Class II Work**

Instead of the work practices and controls listed above, the facility manager may use different or modified engineering and work practice controls if the following provisions are complied with:

- The facility manager shall demonstrate by data representing worker exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used, that employee exposure will not exceed the Permissible Exposure Limits (PELs) under any anticipated circumstances.
- A competent person (CAS) shall evaluate the work area, the projected work practices and the engineering controls and shall certify in writing that the different or modified controls are adequate to reduce direct and indirect worker exposure to below the PEL under all expected conditions of use and that the method meets the requirements of this standard.

The evaluation shall include and be based on data representing the worker exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used for the current job, and by workers whose training and experience are equivalent to the workers who are to perform the current job.

An example of this documentation would be a write-up in the work package including the competent person's signature.

**2.3.12 Class III Asbestos Work**

Class III asbestos work shall be conducted using engineering and work practice controls which minimize the exposure to workers performing the asbestos work and to bystander employees.

- The work shall be performed using wet methods.
- To the extent feasible, the work shall be performed using local exhaust ventilation.
- Where the disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing material, the employer shall use impermeable drop cloths, and shall isolate the operation using mini-enclosures or glove bag systems pursuant to Section 2.3.6 or another isolation method. Glovebags in Class III work are limited to a 60" length.



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- Where no "negative exposure assessment" is available for a job, or where monitoring results show the PEL has been exceeded, the employer shall contain the area using impermeable drop cloths and plastic barriers or their equivalent, or shall isolate the operation using a control system listed in and in compliance with Section 2.3.5.
- Workers performing Class III jobs, which involve the disturbance of thermal system insulation or surfacing material, or where a "negative exposure assessment" cannot be produced or where monitoring results show a PEL has been exceeded, shall wear respirators which are selected specifically for this work.
- Bulk sampling for the purpose of building characterization is considered a type of Class III work.

**2.3.13 Class IV Asbestos Work**

Workers performing Class IV asbestos jobs shall be trained to an Asbestos Awareness training program. All Class IV jobs shall be conducted in compliance with the requirements for the use of:

- DOP Tested Vacuum Cleaners with HEPA filter to clean up dust and debris from ACM/PACM work.
- Wet methods shall be used to reduce worker exposure to asbestos fibers. Wetting agents or amended water shall be used whenever possible. If water cannot be used due to additional safety considerations, other methods to reduce worker exposure shall be devised.
- ACM and PACM dust and debris shall be cleaned up promptly in a manner which minimizes the potential exposure to asbestos fibers.

Workers cleaning up debris and waste in a regulated area where respirators are required shall wear respirators which are selected, used and fitted according to the provisions of DOE-0352 *Hanford Site Respiratory Protection Program*.

Workers who clean up waste and debris areas where friable TSI or SM is accessible shall assume that such waste and debris contain asbestos.

Workers performing Class IV work within a regulated area comply with the hygiene practices required of employees performing work which has a higher classification within that regulated area. Workers cleaning up debris and material which is TSI or surfacing ACM/PACM shall be provided decontamination facilities.

Other examples of Class IV workers within a regulated area who do not perform asbestos removal would be RadCon Techs, IHs and Industrial Hygiene Techs working in the same environments as the CAW but are not working directly in the area of the removal process.

**2.4 Maintenance and Janitorial Work (1910.1001)**

29 CFR 1910.1001 is OSHA's General Industry Standard for Asbestos. While it focuses primarily on the manufacture of asbestos containing products it also covers maintenance work on equipment which have asbestos containing parts and janitorial work on materials which are ACM/PACM.

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**2.4.1 Maintenance on Equipment Containing ACM/PACM**

On occasion there is equipment controlled by CHPRC which has or may have asbestos containing parts (i.e., brakes/clutches). These parts must be handled properly and the employees protected from potential fiber release.

The changing out of brakes or clutches or other maintenance must include written instructions and must have engineering controls instituted to the highest degree possible. Work practices to reduce the potential of creating airborne asbestos are to be included in the work instructions. A HEPA vacuum system must be considered as an integral part of the maintenance of the brake and clutch systems.

The specific methods to control asbestos removal must be included in the work instructions.

**2.4.2 Janitorial Work on Material Containing ACM/PACM**

Controls involving the Janitorial Work on ACM/PACM are based on the reduction of the potential to release asbestos fibers from the materials matrix. While specific tasks are not normally performed by CHPRC personnel, awareness of what controls are required is needed.

Personnel requested to clean up ACM/PACM or to perform maintenance on ACM, must have current training.

- When developing work packages for the performance of Janitorial Work on Material Containing ACM/PACM, the Work Package Planner ensures the following is identified in the work package:
  - ACM is identified prior to janitorial work being performed in the area.
  - Training is current for janitorial staff.
  - The identity of the material is communicated to the janitorial staff and the facility occupants.
  - Compressed air is never used as a method of cleaning up ACM/PACM or the dust accompanying it.
  - The use of a DOP-Tested HEPA Vacuum.
  - All surfaces are maintained as free as practicable of ACM/PACM waste, debris and accompanying dust.
  - Cleaning is done, as soon as possible, on all spills and sudden releases of material containing asbestos.
  - Sanding of ACM/PACM floor is never performed.
  - When stripping finishes from ACM flooring,
    - Low abrasion pads are used and the speed lower than 300 rpm,
    - Wet methods are a part of the stripping process.

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**2.5 ACM/PACM Maintenance and Surveillance**

Facility Managers have the responsibility to maintain an asbestos inventory on characterization sampling which has occurred in their facility. This includes sampling performed on buildings which were built after 1984. Asbestos was banned from most building materials in 1980. However manufacturers and distributors were able to sell existing stocks of asbestos containing building materials after that date. The year 1984 is used as the cut-off as a conservative measure to take into account those post-1980 stocks of materials.

If asbestos abatement has occurred in a facility, then the Facility Manager is required to maintain a list of what areas in the facility have been abated.

**2.6 Asbestos Waste Handling**

All ACM and PACM waste must be handled gently to prevent material from breaking up and releasing fibers.

Waste must be placed in a 6 mil plastic bag marked with the required warning language.

Double bagging of the asbestos waste bags is required if there is a potential for the material inside the bag piercing the waste bag.

The outer bag shall have the same labeling information.

In addition the bags shall be labeled with the name of the generator (US Department of Energy) and the location where the waste was generated (Hanford Site, Richland WA), if stored for transport to an offsite facility.

The bags shall be labeled with the following language:

<p style="text-align:center"><b>Danger</b></p> <p style="text-align:center"><b>Contains Asbestos Fibers</b></p> <p style="text-align:center"><b>May Cause Cancer</b></p> <p style="text-align:center"><b>Causes Damage to Lungs</b></p> <p style="text-align:center"><b>Do not Breath Dust</b></p> <p style="text-align:center"><b>Avoid Creating Dust</b></p>
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Waste material shall be gently handled when placing into the transport container.

Containerized Waste shall be appropriately placarded to ensure the asbestos hazard is properly communicated to those individuals who are handling the container.

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All individuals who are working with or around asbestos must be trained to the degree needed to safely and compliantly perform their work. Training shall be provided prior to or at the time of initial assignment and at least annually thereafter.

In 29 CFR 1926, OSHA refers to AHERA with regards to training and requires individuals to become trained to the levels identified in the AHERA standard.

The individuals who support the asbestos work as a supervisor must be trained in a 40 hour Certified Asbestos Supervisor (AHERA) course (HAMMER #170060) and have a current supervisor's card. Annual refreshers are required to maintain the CAS certification.

All individuals who perform asbestos characterization inspections and sampling must be trained and certified as an Accredited AHERA Building Inspector course (HAMMER #170609). This includes having an annual refresher for this training.

Those individuals who plan work and design negative pressure enclosures for the removal of asbestos should be a Certified AHERA Project Designer (HAMMER #170579) and current on their annual refresher. If a CHPRC work planner is not a Certified AHERA Project Designer they shall enlist a Certified AHERA Project Designer to review and approve the work package in question.

Individuals who perform Class I operations or Class II operations that require the use of critical barriers (or equivalent isolation methods) and/or negative pressure enclosures under this section shall be equivalent with the EPA Model Accreditation Plan for asbestos abatement worker training. This training includes 32 hours of classroom and hands on training. Upon completion of this course the individual would be a Certified Asbestos Worker (HAMMER #170055).

For all other Class II operations including work with roofing material, floor material, siding material, ceiling material or Concrete Asbestos Board, training shall include as a minimum the following elements:

- Methods of recognizing asbestos, including the requirement to presume that building materials used prior to 1984 may contain asbestos;
- The health effects associated with asbestos exposure;
- The relationship between smoking and asbestos in producing lung cancer;
- The nature of operations that could result in the exposure to asbestos, the importance of the required protective controls to minimize exposure to asbestos including (as applicable) engineering controls, administrative controls, PPE (including respiratory protection), housekeeping requirements, hygiene facilities, decontamination procedures, emergency procedures and waste disposal procedures.
- The appropriate work practices for performing the asbestos job;
- Medical Surveillance Program requirements;
- The content of 29 CFR 1926.1101 (including appendixes);

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- The name, addresses and phone numbers of public health organizations which provide information regarding smoking cessation (including classes).
- Requirements for posting signs and affixing labels and the meaning of such signs and labels.

This training consists of a specific 8-hour training course which focuses on a specific type of Class II material as the material relates to the above information. There will be a specific training class developed for each type of material. Individuals who have a higher level of training (i.e. Class I) can perform all types of Class II work without additional training if they are current on the training.

Where Class III work will be performed workers will have as a minimum an Asbestos Operations and Maintenance Training class (HAMMER #170056) including annual refreshers. Individuals who have a higher level of training (i.e., Class I or Class II) can perform Class III work without additional training.

Where Class IV work will be performed workers will have as a minimum a Class Asbestos IV Training class (HAMMER #170050) including annual refreshers. Individuals who have a higher level of training (i.e. Class I, Class II or Class III) can perform Class IV work without additional training.

Those individuals who work in buildings where asbestos is contained and do not work with the material should have an Asbestos Awareness Class (HAMMER #02206L) which outlines the hazards of asbestos exposures and details what individuals should do if they identify a potential asbestos spill.

## **2.8 Waste and Environmental Requirements**

Ensure a Waste Planning Checklist (WPC)/Waste Packaging and Labeling Instruction is prepared in accordance with PRC-PRO-WM-52692 for the identified waste.

Ensure controls identified in the WPC are included in the work instructions.

Ensure the requirements in PRC-PRO-EP-15333 Sections 5.3, 5.27, 5.37, 5.38, 5.43, 5.71, and 5.84 have been reviewed by the Responsible Manager for applicability to the work being performed.

Implement applicable environmental requirements in the work instructions for the work being performed.

Ensure vehicles are visibly marked during loading and unloading of asbestos waste with an approved sign that conforms to 40 CFR 61.145 (d) and 40 CFR 61.149 (d), as applicable. (Magnetic signs meeting these requirements can be ordered through MSA, sign number G1401401.)

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Much of the Hanford Site has been deemed a CERCLA site under the National Priorities List. This means that much of the work may be considered being under the auspices of the CERCLA heading and rules.

Many areas on the Hanford Site are former building sites or waste sites which have the potential to contain ACM and PACM. Activities in these areas range from walking through these areas to performing intrusive sampling.

Most former building areas do not contain visible ACM/PACM. In some cases pieces of Concrete Asbestos Board (CAB) and other miscellaneous materials are found spread across the area. These pieces of material are not normally in a form which pose a hazard to employees. If identified, the pieces should be gathered by a trained individual and properly disposed of as asbestos waste.

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**3.0 FORMS**

None

**4.0 RECORD IDENTIFICATION**

None

**5.0 SOURCES****5.1 Requirements**

29 CFR 1910.1001, *Asbestos, General Industry Asbestos Standard*

29 CFR 1926.1101, *Asbestos, Construction Industry Asbestos Standard*

40 CFR 61.145 (d), *Standard for Demolition and Renovation*

40 CFR 61.149 (d), *Standard for Waste Disposal for Asbestos Mills*

40 CFR Part 763, Subpart E, *Asbestos Hazard Emergency Response Act (AHERA)*

40 CFR PART 763, *Subpart E - Asbestos-Containing Materials In Schools*

15 USC 2651, *Public Protection Subchapter II - Asbestos Hazard Emergency Response*  
(Sections 2641 - 2656)

NIOSH Manual of Analytical Methods (NMAM) – *Asbestos and Other Fibers by PCM, Method 7400*

**5.2 References**

DOE-0352, *Hanford Site Respiratory Protection Program*

PRC-PRO-SH-409, *Industrial Hygiene Monitoring, Reporting and Records Management*

PRC-GD-EP-52776, *Asbestos Guidance Document for D4 Projects Performed Under CERCLA Authority*

PRC-MD-EP-52837, *Additional Asbestos Controls*

PRC-PRO-WM-52692, *Waste Planning, Packaging and Labeling*

PRC-PRO-EP-15333, *Environmental Protection Processes*

PRC-PRO-EP-15335, *Environmental Permitting and Documentation Preparation*

NIOSH Method No.7402, *Asbestos by TEM*

**5.3 Bases**

PRC-PRO-SH-40482, *Surveillance of Asbestos Containing Materials*

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## Appendix A - Glossary

Asbestos-containing Material (ACM)	Any material or product composed of asbestos of any type and in an amount greater than 1% by weight, either alone or mixed with other fibrous or non-fibrous materials.
Excursion limit (EL)	The maximum level of airborne asbestos fibers an employee may be exposed to when measured as a 30-minute time limit. The EL is 1.0 f/cc. Also see <b>PEL</b> .
Fiber	A particulate form of asbestos, five micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.
Intact	An ACM that has not been crumbled, pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.
Permissible exposure limit (PEL)	The maximum level of airborne asbestos fibers an employee may be exposed to when measured as an eight-hour time weighted average (TWA). The PEL is 0.1 f/cc. Also see <b>excursion limit</b> .
Regulated area	A work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the PEL.
Surfacing Material (SM)	Spray-applied or troweled-on ACM surfacing treatments installed for the purposes of fireproofing, acoustical insulation, or architectural finishes. Examples include structural fireproofing, acoustical ceiling textures, and various plasters.
Thermal System Insulation (TSI)	ACM insulating materials associated with heating, ventilation, and air conditioning (HVAC) equipment that have the purpose of reducing heat gain or loss. Examples include insulation on piping, boilers, tanks, and ducts.
Miscellaneous Materials (MISC)	All remaining ACMs used in construction that are not characterized as surfacing materials or TSI. Common examples include floor and ceiling tile, roofing felt, exterior siding, concrete pipe, electrical insulators, cement-asbestos board materials, and gasket material.



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## Appendix B - Acronym List

ACM	Asbestos Containing Material
AHERA	Asbestos Hazard Emergency Response Act
CAB	Concrete Asbestos Board
CAS	Certified Asbestos Supervisor
CAW	Certified Asbestos Worker
CHPRC	CH2M Hill Plateau Remediation Company
CIH	Certified Industrial Hygienist
DOE	Department of Energy
DOP	Di-Octyl Phthalate
HEPA	High Efficiency Particulate Air
HSWET	Hanford Site Workers Eligibility Tool
IH	Industrial Hygienist
IHEA	Industrial Hygiene Exposure Assessment
MISC	Miscellaneous Materials
NEA	Negative Exposure Assessment
NESHAP	National Emission Standard for Hazardous Air Pollutants
NIOSH	National Institute of Safety and Health
NPE	Negative Pressure Enclosure
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
OS/IH	Occupational Safety/Industrial Hygiene
PACM	Presumed Asbestos Containing Material
PE	Professional Engineer
PEL	Permissible Exposure Limit
PLM	Polarized Light Microscopy
PPE	Personal Protective Equipment
SM	Surfacing Material
SWIHD	Site Wide Industrial Hygiene Database
TA/SME	Technical Authority/Subject Matter Expert
TEM	Transmission Electron Microscopy
TLV	Threshold Limit Value
TSI	Thermal System Insulation