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1. SCOPE

This standard covers the precautionary measures to follow when removing asbestos-containing materials as well as legal requirements as mandated by 29 CFR 1926.58, the standard which covers all construction work involving asbestos. The scope of this engineering standard is limited to those requirements and recommendations having to do with asbestos removal. Other requirements of 29 CFR 1926.58 such as the labeling of intact asbestos insulation and the general industry requirements from 29 CFR 1910.1001 will not be discussed here. More than half of the states have laws related to asbestos. Those unique state regulations are not covered in this standard, but whenever state requirements are more stringent, they should be followed over the Federal regulations.

Asbestos was used extensively in the past for insulating boilers, furnace linings, steam pipe covering, duct work, gaskets, brake linings, sound insulation, roofing, floor tiles, and for general fireproofing. When materials are suspected of containing asbestos, assume that they do unless current analytical testing confirms otherwise. Samples of bulk material can be analyzed by the Environmental Health Laboratory at Alcoa Technical Center. Additional discussion of sample analysis is included in Section 2.2 on sampling. For purposes of this engineering standard, materials will be classified as asbestos containing materials (ACM) if they contain greater than 0.1% asbestos.

New limits imposed by 29 CFR 1926.58 are a permissible exposure limit (PEL) of 0.2 fiber/cubic centimeter of air (0.2 f/cc) and an action level of 0.1 f/cc. Many of the requirements of the OSHA asbestos standard for construction are predicated upon levels of airborne asbestos compared to these limits.

ASBESTOS REMOVAL CHECKLIST

1. Industrial hygienist and/or environmental engineer must be contacted prior to removal of any materials suspected of containing asbestos.
2. Obtain current, reliable analysis of materials suspected of containing asbestos.
3. Notification procedures consistent with Federal and local regulations must be followed.
4. Employees involved in asbestos removal operations must have had training or certification where required within the last 12 months.
5. Appropriate medical surveillance as well as employee fitness to wear a respirator must be addressed.
6. Employee respirator fit tests must be current.
7. Appropriate protective clothing must be specified and worn for each job.
8. Regulated areas, with asbestos warning signs, must be established where air concentrations could exceed the PEL.
9. Large Asbestos Demolition/Renovation Projects must be done in negative pressure enclosures whenever feasible.
10. Competent persons must supervise activities within regulated areas of large scale jobs.
11. Initial personal exposure monitoring is required at the beginning of each job.
12. Daily exposure monitoring is required for large scale demolition renovation projects.
13. Work area must receive a thorough visual inspection after the clean-up phase to insure adequate clean-up. Air monitoring may also be warranted to document safe exposure levels.

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14. All waste materials including used disposable protective clothing must be properly containerized and labeled as asbestos.

15. Use Alcoa Form HS-8702 Non-Hazardous Waste Manifest except in states or municipalities where more stringent requirements are in effect.

16. All asbestos waste must be deposited in a permitted landfill with state approval for asbestos disposal. Notification of the disposal facility prior to asbestos waste shipment is recommended.

17. All local regulations concerning asbestos waste disposal must be followed.

2. REQUIREMENTS

2.1 Notification Procedures. The plant industrial hygienist and/or environmental engineer must be contacted prior to removal of any materials suspected of containing asbestos to insure the implementstin of adequate health protection measures and also to arrange for required notification and proper waste disposal. Federally mandated notification rules for asbestos Demolition/Renovation work are found in the USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPs) Asbestos Regulations 40 CFR 61, Subpart M.

Some states, cities, and counties have notification rules in addition to the NESHAPs notification. All legally mandated notifications are to be made in conjunction with each asbestos job.

NESHAP regulations require the owner/operator to notify the Program Administrator before beginning any renovation or demolition involving asbestos removal. Typically, State Pollution Control Agencies have authority for EPA Clean Air Programs including the NESHAPs Program. EP Regional office can be contacted to determine what agency has NESHAPs authority in your location.

The nature of the NESHAPs notification depends upon the quantity of the asbestos to be removed:

- If less than 260 linear feet or 160 square feet of asbestos is to be removed, notification must be provided at least 20 days before the renovation or demolition is to begin.

- If more than 160 linear feet or 160 square feet of asbestos is to be removed, the notification must be provided at least 10 days before the renovation or demolition is to begin.

If there are no standard notification forms required by local regulations, the following form, designed by Pittsburgh Environmental Control, is recommended (Attachment 1). NESHAPs require the following information as a minimum.

- Company name and address.
- Contractor name and address.
- Location of renovation or demolition.
- Scheduled starting and completion dates of renovation or demolition.
- Description of facility to be renovated or demolished (including size, age, prior use, amount of asbestos present).
- Nature of the renovation or demolition and method(s) to be used.
- Procedures to be used to insure compliance with Emission Standards (40 CFR 61.22d and Waste Disposal Standards 40 CFR 61.22j).
- Name and address of waste disposal site.
- Name, title, and authority of government agent, if demolition is a result of government order.

2.2 Sampling . This section describes sampling to be conducted during all phases of asbestos jobs from planning, through removal as well as after cleanup. Some of this sampling is required by the OSHA Standard while other aspects of sampling are highly recommended as good practice during conduct of asbestos removal.

2.2.1 Bulk Sampling

During planning phases of asbestos removal jobs, it is recommended that asbestos bulk sampling be conducted to determine the extent of asbestos containing materials (ACM). Bulk sampling conducted previously is sufficient to serve this purpose if the results of that previous sampling were conducted using methods sufficiently sensitive to detect the presence of asbestos at 0.1% and the results are considered by the location Industrial Hygienist to be reliable. Recommended test methods are polarized light microscopy or other methods of equal or greater precision. Alcoa's Environmental Health Laboratory has the capability of conducting this analysis and is involved in an N.B.S.(National Bureau of Standards) quality assurance program to maintain analytical accuracy. Arrangements can be made with EHL to analyze rush samples by contacting them prior to sampling and by sending samples via overnight express mail. Any outside laboratory used for bulk asbestos sample analysis must use comparable analytical methods and maintain a quality assurance program.

2.2.2 Air Monitoring - Personal Exposures

Personal air samples are required by the construction standard. Appendix A, a mandatory appendix to the Asbestos Standard, describes NIOSH Method 7400 including both sampling and analytical procedures. NIOSH Method 7400 utilizes a 25 mm diameter open face cassette with a 50 mm extension cowl. Written justification must be made if another method is used. Additionally, the Asbestos Standard mandates a laboratory quality assurance program to be instituted by laboratories conducting analysis of samples required by this standard. ATC's EHL has instituted a quality assurance program to meet the specific requirements of 29 CFR 1926.58. If other laboratories are used, they must also have acceptable QA programs.

All personal air samples are required to be taken in the employees breathing zone. Sufficient samples should be taken to be representative of each employee's 8-hour (full shift) exposure. Effected employees, or their designated representatives, have the right under the OSHA regulation to observe any monitoring of employee exposure to asbestos. Written results of personal asbestos monitoring are required to be made available to effected employees within 15 days of the receipt of such results. Just as with all personal sampling results, OSHA Record Retention Requirements, 29 CFR 1910-20, mandate that they be kept for the duration of the individual's employment plus 30 years.

Initial monitoring is required at the beginning of each asbestos job to determine the asbestos concentrations to which employees will be exposed. Exceptions to this requirement are when there is objective data to indicate that the ACM cannot release fibers in concentrations exceeding the action level or when there is historical data for closely resembling conditions.

Daily monitoring is required for large scale demolition renovation projects. Large scale demolition renovation projects are defined by examples under Section 2.6 Work Practices. The definition of large scale demolition renovation projects pre-supposes that the employee exposures will exceed the action level of 0.1 fibers per cubic centimeter of air (0.1 f/cc). There must be sufficient samples to represent exposures of each employee assigned to work in the regulated work area. Regulated work areas are also explained further in Section 2.6. EHL recommends minimim sample time of 2 hours at 2 lpm.

2.2.3 Air Sampling - Area Sampling

While area sampling is not required by the asbestos regulations, it may be prudent in some circumstances. Area sampling is recommended in the non-mandatory Appendix E of the OSHA Construction Standard for Asbestos for large scale asbestos removal projects which utilize negative air pressure enclosures. Area samples are recommended in the work area, in the clean change room at the periphery of the restricted area, and in the area of the portable ventilation unit exhaust. Additional area samples are recommended in the asbestos removal area following cleanup. The enclosure should not be dismantled unless final clearance samples are below the OSHA action level of 0.1 f/cc. EPA recommends that these clearance samples be less than 0.01 f/cc for schools. Areas such as offices, lunchrooms, and control rooms should meet the EPA's recommended "clearance level" of 0.01 f/cc. Clearance sampling for the purpose of determining the adequacy of cleanup is done after surfaces in the work area have been allowed to dry thoroughly. Use of forced air equipment is sometimes used to conduct aggressive sampling in order to dislodge any stray fibers from surfaces and thereby represent worst case conditions.

Minimum Sample Times for Area Samples

Clearance Level	Minimum Sample Volume
0.1 f/cc	120 l
0.01 f/cc	270 l (540 l is preferable)

2.3 Employee Training Training shall be provided annually to all employees involved in asbestos removal operations. All Alcoa employees and outside contractors exposed to asbestos must have completed required training at some time within a 12 month period prior to assignment to any asbestos job. If asbestos work occurs infrequently during the year, JSAs and/or training materials should be available to employees for their review prior to the job. For the purposes of this engineering standard, exposure to asbestos is defined consistently with the OSHA action level of 0.1 f/cc.

The plant industrial hygienist can offer assistance in employee training programs. Attendance at these training sessions should be documented and filed where appropriate to the plant. OSHA requires that records of asbestos training be kept for a period of one year. This should be considered a minimum requirement. The training program should include the following:

(a) Recognition of asbestos.
(b) Health effects associated with asbestos exposures including the relationship between asbestos and smoking.
(c) Nature of job which could result in exposure.
(d) Protective measures including engineering controls, work practices, housekeeping, and personal protective equipment used to reduce potential exposures.
(e) Respirator fitting and use.
(f) Medical surveillance requirements.

Some states have adopted additional regulations requiring standardized training and licensing of asbestos removal contractors. In locations where this additional requirement is in effect, appropriate licenses and certifications must be obtained.

2.4 Medical Surveillance. Employees wearing negative pressure respirators and employees exposed at or above the action level of 0.1 f/cc for 30 or more days a year are required to be in a medical surveillance program as outlined in 29 CFR 1926.58. For Alcoa employees, this periodic evaluation will be conducted according to Alcoa Medical Protocol B7, Occupational Medical Evaluation, Asbestos. Medical records made in accordance with the OSHA Asbestos Standard are subject to record keeping requirements as set forth in 29 CFR 1910.20. Medical records are required to be maintained for the duration of employment plus 30 years.

2.5 Personal Protective Equipment.

2.5.1 Respirators. Respiratory protection used for employees involved in asbestos jobs must be used in accordance with Alcoa Engineering Standard 18.1.1 as well as OSHA regulations (29 CFR 1910.134 (b), (d), (e), and (f). This engineering standard describes minimal requirements of a Respiratory Protection Program including medical evaluation of respirator users, training, and fit testing. Fit testing under the Construction Standard is required prior to the initial job assignment and every six months thereafter. All respirator fit testing done in conjunction with this standard must be carried out according to the provisions of Appendix C to the OSHA asbestos standard for construction, which is mandatory.

The plant industrial hygienist can assist in the selection of appropriate respiratory protection. OSHA does not allow single use disposable respirators to be used to meet respiratory protection requirements of the asbestos standard. The selection of appropriate respiratory protection depends upon the concentration of asbestos in the work environment. An additional consideration in respirator selection is that the OSHA standard gives employees a choice of using a powered air purifying respirator (PAPR) rather than a negative pressure regulator so long as the PAPR provides adequate protection. Although OSHA would not require respiratory protection for employees exposed to less than the PEL, it is a good practice to use respiratory protection in any work situation where accidental exposure might occur due to some event such as rupturing of a glove bag or breakage of an asbestos waste container.

Exposure Level (X)		Respirator Type
X ≤ 10 (PEL)	-	1/2 mask HEPA
10 (PEL) < X ≤ 50 (PEL)	-	Full facepiece HEPA
50 (PEL) < X ≤ 100 (PEL)	-	PAPR HEPA - 1/2 mask supplied air (positive pressure mode)
100 (PEL) < X ≤ 1000 (PEL)	-	Full face supplied air (positive pressure mode)
X > 1000 (PEL)	-	Full face supplied air with auxiliary SCBA

PEL - OSHA permissible exposure limit - 0.2 f/cc
HEPA - High efficiency particulate absolute
SCBA - Self contained breathing apparatus

Reusable respirators should be thoroughly cleaned with a damp rag to remove any asbestos contamination prior to sanitization and storage (refer to Engineering Standard 18.1.1). The rags should be disposed of as asbestos-containing waste.

2.5.2 Clothing Appropriate work clothing is required to be provided to employees when they are exposed to asbestos above the PEL or when the possibility of eye irritation exists. The purpose of special clothing for asbestos jobs is to prevent the contamination of street clothing that will be worn home by the employee. The type of work clothing which is necessary depends on the type of work that will be done.

For large removal operations, where there is a greater possibility of contamination, employees will need whole body coverings including:

Coveralls or Work Clothes - These can be either disposable garments or reusable garments which are dedicated to asbestos work.

Footwear - Molded rubber boots with safety toes can be washed or wiped clean of asbestos contamination following the job. Disposable rubber shoe coverings can be used to protect work shoes from contamination and they are available in styles of sufficient durability to withstand use in the work environment. Tyvek shoe covers would only be adequate under the most controlled conditions and they do present a greater slipping hazard than rubber shoe coverings. Pant legs should be worn outside any boots or shoe coverings and taped to them around the ankles.

Work Gloves - Work gloves to be used should be selected on the basis of hand protection required. Inexpensive cotton work gloves are a good choice because they can be laundered during the job and disposed of at the job's completion. Sleeves of coveralls should be brought down over gloves and taped at the wrists.

Head Coverings - Disposable head coverings are recommended when jobs involve removal of overhead asbestos or are excessively dusty. Tyvek hoods are available attached to disposable coveralls or as a separate garment.

Eye Protection - Safety glasses, faceshields, vented goggles, or other appropriate eye protection must comply with the provisions of 29 CFR 1910.133.

Small aspestos jobs such as removal of pipe insulation in a glove bag or removal of an entire asbestos covered pipe or structure also requires some protective clothing. Due to the nature of these jobs, appropriate protective clothing may not need to be as extensive as that required for large scale asbestos jobs.

Coveralls - Even though exposures during these small jobs should not exceed the PEL, disposal coveralls are recommended as a precaution against contaminating work clothing with asbestos fibers.

Gloves - Disposable work gloves may be necessary for some small scale asbestos jobs depending on the need for hand protection from sharp or abrasive objects.

Shoe Coverings - The need for protecting work shoes from asbestos contamination will depend on the nature of the job. If there is a risk of contamination, disposable shoe coverings or cleanable work boots are recommended.

2.5.3 Disposal of Personal Protective Equipment. Before leaving the work area, specific procedures should be followed for removal of protective garments so as not to contaminate the employee or the surrounding areas. Section 2.7 of this standard discusses personal hygiene practices and hygiene facilities in more detail.

All disposal protective equipment (garments, gloves, etc.) is to be treated as asbestos-containing material and disposed of accordingly. (See Section 2.8).

2.6 Work Practice and Engineering Controls. Work practices and engineering controls should be used to achieve compliance with the PEL of 0.2 f/cc.

2.6.1 Restricted Areas. OSHA regulations require the establishment of regulated areas whenever concentrations of airborne asbestos exceed or could reasonably be expected to exceed the PEL. The regulated area is meant to keep the number of employees in the work area to a minimum, to restrict access to authorized persons who are properly trained and outfitted in adequate personal protective equipment as well as to protect persons outside the work area from exposure to asbestos.

Warning signs are required to be posted around the perimeter of the regulated area so that employees have the opportunity to read them and take appropriate measures before entering the work area. Unless local regulations require more stringent measures, signs must conform to OSHA Regulation 29 CFR 1926.58 (k)(1), and read as follows:

DANGER

ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

2.6.2 Large Asbestos Demolition/Renovation Projects. All requirements in 29 CFR 1926.58 (g) (1) apply to asbestos removal, renovation, and demolition projects. Exceptions to these requirements are made in the case of small scale short duration operations which are discussed in Section 2.6.3 of this standard. Engineering and work practice requirements for large scale asbestos demolition/renovation projects include the following:

(a) Negative pressure enclosures must be constructed in the regulated area whenever feasible. Feasibility is not determined by cost, rather it relates to factors such as space limitations or greater hazards. It is recommended that this enclosure comply with guidelines in the Appendix F to the Asbestos Construction Standard. This non-mandatory Appendix is entitled "Work Practices and Engineering Controls for Major Asbestos Removal, Renovation, and Demolition Operations". Enclosures may be temporary structures lined with a double layer of 6 mil flame retardant polyethylene sealing all of the seams and penetrations through the plastic sheeting. A single means of access and egress should be provided with all other doors sealed. This doorway should be covered with a double flap of plastic sheeting to separate the work area from the hygiene facility which will be discussed further in Section 2.7. Ventilation is to be provided using a number of HEPA filter units sufficient to achieve three to four air changes per hour in the enclosure. OSHA also recommends a pressure of -0.02 inches of water within the enclosure. By definition, HEPA filters must be capable of removing 99.97% of the asbestos particles from the air. HEPA units are to be operated 24 hours a day during the entire project. Exhaust air must be adequately filtered for asbestos removal and should go, if possible, to the outside of the building where the asbestos project is being conducted.

(b) Competent persons must supervise activities within regulated areas, including setting up negative pressure enclosures and ensuring its integrity, ensuring that engineering controls are functioning, controlling access to the regulated area, ensuring that employees entering regulated areas are properly outfitted with PPE, ensuring that employees are adequately trained, sampling exposures, inspecting employees work clothing for rips and tears, ensuring that employees follow decontamination procedures. Responsibilities of competent persons are described in 29 CFR 1916.58 (b),(e) (ii) (A)-(H), and (e) (6) (iii).

(c) Only authorized persons are to be allowed within the restricted area. All such persons must comply with training requirements (Section 2.2), medical surveillance requirements (Section 2.4), and the personal protection requirements including respiratory protection (Section 2.5).

2.6.3 Small-Scale Short Duration Asbestos Jobs. Engineering controls and safe work practices are required to be used to control exposures during small scale asbestos jobs to levels below the action level of 0.1 f/cc. OSHA does not require negative pressure enclosures, supervision by a "competent person" or decontamination facilities for small-scale, short duration tasks. Examples of such tasks include pipe repair, valve replacement, installing electrical conduits, installing or removing drywall, roofing, and other general building maintenance or renovation involving only limited exposure to asbestos. Any asbestos removal which can be accomplished in a glove bag is considered to be a small-scale job. Controls and work practices which can be used to control exposures during small-scale jobs include:

(a) Wet methods - Amended water or removal encapsulants.
(b) Removal methods such as carefully cutting asbestos from pipes or other surfaces.
(c) Glove bags.
(d) Removal of entire asbestos insulated pipe or structure.
(e) Mini-enclosures.

2.6.4 Dust Suppression Techniques. Wherever feasible, wet removal methods are required to be utilized. In a very limited number of situations wet removal is not feasible such as:

1. Situations where electrical hazards exist such as removal of asbestos from a "live" electrical box.

2. Removing asbestos insulation from a live steam pipe.

Where it is not possible to disconnect electricity or to turnoff the steam, asbestos material can be removed in a dry state. Prior to removal, asbestos material should be sprayed with water containing a wetting agent to enhance penetration. Airless sprayers are recommended for application of wetting agents. The wetting agent should consist of 50% polyoxyethylene ester and 50% polyoxyethylene ether in a concentration of one ounce in five gallons of water. The material should be kept wet during all stages of work to minimize exposure to employees and emissions to outside air. Water should not be used if this would introduce other hazards (i.e., electrical, generation of toxic gases, etc.).

2.6.5 Work Practices. Written asbestos removal plan is recommended for large scale asbestos renovation/demolition work in Appendix F. Such a plan will describe the work practices as well as control methods. Such a plan would have information that is also required to be reported as part of the NESHAPS requirements (40 CFR 61, Subpart M).

Asbestos material should be removed in small sections and handled very carefully. While still wet, the pieces of material should be carried and lowered to ground level rather than dropped, and then placed into appropriate waste containers. Section 2.8 has more information on waste disposal.

If the work is regulated under U.S. EPA Clean Air Act regulations, and water cannot practically be used for dust control, a dust collection/exhaust system is required. Such a dust control system may be necessary even if not mandated by regulation, depending on the specifics of the job, and potential for airborne emissions and employee exposure.

2.6.6 Housekeeping and Clean-Up.

(a) All surfaces in the work area must be cleaned using vacuum cleaners equipped with HEPA exhaust.

(b) All waste materials should be placed promptly into labeled containers to reduce asbestos dust hazard in the work area.

(c) When asbestos removal job is complete, all surfaces should be cleaned with a HEPA-filtered vacuum or with damp rags. Do not dry sweep asbestos materials, as they may generate airborne dust.

The asbestos work area must receive a thorough visual inspection after the clean-up phase to insure adequate clean-up. Industrial hygiene monitoring may also be warranted to document safe exposure levels. The EPA recommends that a "clearance level" of 0.01 f/cc be achieved for schools. Clean-up in areas which will be reoccupied by people for more than eight hours a day such as offices, lunchrooms, and control rooms should meet the EPA "clearance level". All plastic sheeting, cleaning materials, clothing, and all other disposable items used in the work area shall be packed into water impermeable containers and properly disposed of as described in Section 2.8.

2.6.7 Prohibitions. The following work practices are specifically prohibited during asbestos jobs.

(a) Employee rotation is not considered by OSHA to be an acceptable way to reduce employee exposures to asbestos.

(b) High speed abrasive disk saws are not permitted to be used for asbestos work unless they are equipped with HEPA exhaust.

(c) Compressed air is not permitted to be used to remove asbestos unless it is used in conjunction with an enclosed ventilation system.

2.7 Personal Hygiene Practices and Hygiene Facilities.

2.7.1 Smoking and eating are not permitted in the work area. Employees should thoroughly wash their hands, faces, and arms before smoking or eating during breaks and upon job completion. Lunchrooms with airborne concentrations less than the action level must be available to employees working in regulated areas.

2.7.2 Decontamination Facilities. Use of decontamination facilities for employees in jobs where they are exposed to concentrations of asbestos greater than the PEL is mandatory. These facilities are comprised of a clean room, a shower room, and an equipment room which is directly connected to the work area. The design of these hygiene facilities is described in non-mandatory Appendix F to the Construction Standard.

(a) Equipment Room - The equipment room, also known as the dirty room, is the area connected directly to the work area with a double flap type doorway. This is the area in which the workers remove contaminated work clothing before proceeding to the shower room. It also serves as an equipment storage area. Asbestos waste containers may also be decontaminated and moved out of the work area via the equipment room. Separated from the equipment room by a double flap is the shower room.

(b) Shower Room - Shower facilities should be contiguous with both the equipment room and the clean room. All workers leaving the work area are required to shower. Showers can also be used to clean contaminated equipment and materials such as respirators and work boots which are being taken out of the restricted area for further sanitization. Shower facilities could also be used to decontaminate the outside of asbestos waste containers. Separated from the shower room by a double flap is the clean room. The subject of contaminated shower water is addressed in Section 2.8.4.

(c) Clean Room - Clean rooms or change rooms should provide for storage of workers' street clothes and personal belongings. They should also be equipped with towels (disposable towels are available) and Clean PPE needed for the job.

When it is not feasible to construct decontamination facilities adjoining the worksite because of space limitations or the lack of water, the Construction Standard allows for some alternative procedures to prevent spread of asbestos contamination between the job site and remote shower facilities.

(a) HEPA vacuum protective clothing at the worksite, then proceed to showers or

(b) Change into new disposable suits at the worksite before proceeding to the showers.

(c) Exposed skin areas should be wiped clean with wet toweling or premoistened towelettes.

2.7.3 Exceptions. Small scale asbestos jobs do not require the use of decontamination facilities, however, practices must be adopted to prevent spread of asbestos away from the job site. HEPA vacuuming disposable clothing is strongly recommended as such a practice. Following this, disposable clothing can be removed and properly discarded with other asbestos waste.

2.7.4 Laundering. Reusable asbestos work clothing or other personal protective equipment (PPE) should be stored in containers labeled with asbestos warning labels. Any person who launders or cleans contaminated PPE or work clothing is required to be informed of the potential harmful effects of asbestos and protective measures that should be taken. Contaminated work clothing should not be shaken or handled in a way that is likely to create airborne fibers.

2.8 Waste Disposal. Federal regulations which deal with asbestos waste are contained in the NESHAPS (40 CFR 61, Subpart M). As part of the notification procedure described in Section 2.1, generators of asbestos waste from renovation/demolition projects are asked to describe the method of containing asbestos waste as well as the name of the waste site to which waste will be taken for disposal.

2.8.1 Containers To reduce generation of airborne fibers, asbestos waste should be placed into disposal containers while wet. The type of container which is appropriate for asbestos waste is dependent upon the type of waste. All asbestos waste containers shall be free of asbestos dust before leaving the restricted area.

OSHA regulations require that asbestos waste containers be labeled with the following:

DANGER

CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

(a) Recommended containers are 6 mil thick polyethylene bags.

(b) Asbestos waste containing metal or other sharp objects should be packaged in sturdier waste containers such as metal drums, fiber drums, or poly-lined plywood boxes.

(c) Pipes and equipment insulated with asbestos being removed in large sections can be wrapped in 6 mil plastic to create leak-tight containers.

2.8.2 Transportation. In the United States, containers should be transported with proper D.O.T. shipping documents and identification. Pittsburgh Environmental Control recommends the use of Form HS-8702 Non-hazardous Waste Manifest except in states or municipalities where more stringent requirements are in effect. There are no Federal regulations concerning the type of vehicles which should be used to transport asbestos waste, however, some state regulations specify that asbestos waste be transported in closed vehicles. As a minimum, the load must be well secured and transported in such a way to prevent damage to containers during transport.

2.8.3 Landfills. Waste asbestos is a "non-hazardous" solid waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA). All asbestos waste must be deposited in a permitted landfill with state approval for asbestos disposal.

(a) Before using a landfill for asbestos disposal, it is recommended that the site be visited and investigated to confirm that it is permitted, operating in accordance with Part 61.25 of the Clean Air Act regulations, and is being operated by reputable management.

(b) Notification of the disposal facility prior to asbestos waste shipment is recommended.

(c) To minimize air emissions during disposal, the EPA recommends that the landfill designate a special area for asbestos waste which is separate and preferably isolated from other activities. It is also recommended that asbestos waste be deposited in trenches or at the "toe" of the slope and covered within 24 hours of disposal with at least six inches of material. Asbestos wastes should be compacted only after being covered.

2.8.4 Other Waste. Contaminated water from asbestos renovation demolition jobs may be regulated in some locations. There are no Federal regulations concerning asbestos in water discharges at this time, however, the EPA has proposed a Recommended Maximum Contaminant Level (MCL) of 7.1 million fibers per liter in drinking water (Nov. 13, 1985 proposed rule under the Safe Drinking Water Act). The generally recommended disposal procedure is to filter the contaminated water through a two stage disposable cartridge type filtering system (20 micron filter followed by a 5 micron filter).

3. OUTSIDE CONTRACTORS

Outside contractors shall be required to follow the provisions of this standard, as well as all Federal, state, and local regulations where applicable for the removal of asbestos-containing materials.

3.1 Selecting a Contractor. Contractors selected for asbestos removal jobs in Alcoa facilities must be knowledgeable of asbestos work and must be capable of performing removal in compliance with the regulations.

(a) Require evidence of contractors' experience and training or certifications. Request evidence of contractor employees' licensing for asbestos removal, if applicable, in the particular job location. Request information concerning contractors' OSHA citations.

(b) Ask for detailed written descriptions of how contractor will satisfy the project specifications.

(c) Ask contractor to supply evidence of their employee protection plans including medical surveillance, respirator fit testing and training programs.

(d) Obtain documentation of contractors' fiscal qualifications including financial performance, assets, liabilities, legal judgements, and insurance.

(e) Have a specific understanding as to what constitutes successful job completion. Recommended is a thorough visual inspection to insure adequate cleaning followed by air monitoring.

3.2 Contractor Requirements

(a) The Construction Standard for Asbestos also requires that contractors/employers inform other employers on the worksite of the nature of asbestos work and the requirements pertaining to regulated areas.

(b) Other Hazard Communication issues relevant to contractors working in Alcoa facilities are covered in Engineering Standard 33.052.4 "Application of the OSHA Hazard Communication Standard for Outside Contractors".

(c) The contractor must supply Alcoa with copies of all documents (notifications, air monitoring results, landfill approvals, etc.) generated by the contractor in accordance with regulatory requirements.

(d) It is recommended that the contractor afford Alcoa the opportunity to review the landfill to be used for disposal of the material.

(e) Some local asbestos regulations require third party oversight of contracted asbestos removal work. While asbestos contractors are responsible for conducting asbestos removal in compliance with all applicable regulations, Alcoa location Industrial Hygienist should be given the opportunity to evaluate asbestos control during removal work as deemed necessary by their professional judgement.

4. REFERENCES

For further information, you may find the following references helpful:

1. Bureau of National Affairs 49 BSP-57, "BNA Special Report, Asbestos Abatement: Risks and Responsibilities", 1987. (800)372-1033

2. EPA Report Number 560/5-85-024, "Guidance for Controlling Asbestos-Containing Materials in Buildings", 1985 June. EPA publications are available by contacting EPA at following toll free number: (800)424-9065.

3. EPA Report Number 530-SW-85-007 "Asbestos Waste Management Guidance: Generation, Transport, Disposal", 1985 May.

4. U.S. EPA Regulations for Asbestos (CFR Title 40, Part 61, Subparts M.)

5. I.H. Technical Bulletin No. 86-4. Available through Pittsburgh Safety and Industrial Hygiene Division.

6. OSHA Safety & Health Standard 29 CFR 1926.58 - Asbestos for the Construction Industry.

The following references are not an endorsement of vendors, but may be of assistance:

1. Vacuum Cleaners --

Nilfisk of America, Inc.
300 Technology Drive
Malvern, PA 19355 (215)647-6420

Euroclean
1186 Stratfield Road
Fairfield, CT 06432 (203)336-5432

Hako Minuteman, Inc.
111 South Route 53
Addison, IL 60101 (312)627-6900

2. Dust Collection/Exhaust System --

Asbestos Control Technology, Inc.
P. O. Box 183
North Pine Avenue
Maple Shade, NJ 08052 (609)779-1300
(Micro-Trap Asbestos Filtration System -
2 models available. Capacity 600 - 1,700 CFM)

Sentry Equipment
2676 Sunset Lane
Allison Park, PA 15101 (800)255-3362 (outside PA)

Global Consumer
1721 N. Highland
Los Angeles, CA 90028 (312)426-6980

Abatement Technologies
3305 Breckenridge Blvd. Suite 118
Duluth, GA 30136 (404)925-2761

3. Wetting Agents --

EPA recommended wetting agent:
50% polyoxyethylene ester,
50% polyoxyethylene ether

Ethylene glycol is the wetting agent recommended for amosite asbestos.

Liquid dishwashing detergents such a liquid Joy make effective and economical wetting agents.

Aquatrols Corporation of America
Pennsauken, NJ

Rohm & Haas
W. Philadelphia, PA

BWE/Better Working Environment
380 Stevens Road, Suite 206
Solana Beach, CA 92075 1(800)654-6792
(Asbestos removal encapsulant BWE 5000
recommended for amosite)

This engineering standard is provided solely for the purpose of designing Alcoa's approach and is not intended to be a recommendation for any equipment other than Alcoa. No warranties, warranties or representations, express or implied are made as to the utilities or other benefits of the methods, processes, products or procedures described or recommended herein.

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4. Disposable Protective Garments --

Dupont Type 14 "Tyvek"; available through area distributors.

Kimberly Clark Corp.
1400 Holcomb Bridge Road
Roswell, GA 30076 (404)587-8114
(Disposable coveralls, hoods, towels and wipers)

MSA
PO Box 426
Pittsburgh, PA 15230 (412)273-5000
(Protective clothing, gloves and headwear)

5. Decontamination Units --

Aerospace America, Inc.
900 Truman Parkway
Bay City, MI 48706 (517)684-2121
(Showers and water filtration)

Creative Inovations
PO Box 3257
West Chester, PA 19381 (215)696-4952
(Decon Chamber, Spot Shot Shower, and Water Filtration)

Personal Protection, Inc.
PO Box 737
Crystal Lake, IL 60014 (312)658-2321
(Contaminent and decontaminatin systems)

Pezanni & Reid Equipment Co.
3960 West Ford Street
Detroit, MI 48216 (313)554-4000
(Decontamination trailers)

Evergreen Safety Systems, Inc.
14045 W. 66th Ave.
PO Box 1207
Arvada, CO 80001 (303)422-2185
(Portable decontamination units)

NON-HAZARDOUS WASTE
BY RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REGULATIONS

Please print or type (Form designed for use on elite (12-pitch) typewriter.)

A NON-HAZARDOUS WASTE

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of | Information in the shaded areas is not required by Federal law

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

5. Transporter 1 Company Name | 6. US EPA ID Number

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address | 10. US EPA ID Number

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol
a				
b.				
c.				
d.				

J. Additional Descriptions for Materials Listed Above | K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

Printed/Typed Name | Signature | Date (Month Day Year)

GENERATOR

17. Transporter 1 Acknowledgement of receipt of Materials

Printed/Typed Name | Signature | Date (Month Day Year)

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date (Month Day Year)

TRANSPORTER

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19

Printed/Typed Name | Signature | Date (Month Day Year)

FACILITY

HS-8702

ORIGINAL—RETURN TO GENERATOR

ATTACHMENT 1

ASBESTOS DEMOLITION/RENOVATION NOTIFICATION

Check appropriate block(s).

☐ Demolition/renovation greater than or equal to 260 linear ft. or 160 square ft. (10 day notification required before demolition, if planned).

☐ Demolition/renovation less than 260 linear ft. or 160 square ft. (20 day notification required before demolition). Complete items (1) thru (5) only.

☐ Demolition ☐ Renovation

1. Name of owner:
   Address:

   Name of operator (contractor):
   Address:

2. Description of facility (include size, age and prior use).

3. Estimate of amount of friable asbestos _____ linear ft. _____ square ft.
   Explain techniques of estimation if less than 260 linear ft. or 160 square ft.

4. Location of facility.

5. Scheduled starting date _____ Completion date _____

6. Nature of planned demolition or renovation and methods to be used.

7. Procedures to be used to insure compliance with 40 CFR §61.22(d).

8. Name and Location of waste site where asbestos will be dumped.

   Solid Waste Permit No. _____

9. If ordered demolition, the name, title and authority of State or local governmental representative who has ordered the demolition.

   Number of days to demolish _____ .

Delivered (date stamp)