Exhibit E
8/11/71

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AUG 9 1971

August 6, 1971

TO: AIA/NA BOARD OF DIRECTORS
and
AIA/NA ADMINISTRATIVE SUB-COMMITTEE

CC: G. Earl Parker
C. L. Sheckler
Frank Zimmerman
Ike Weaver

C. Bill

SPECIAL MEETING OF AIA/NA BOARD OF DIRECTORS

Earlier this week, the Federal Environmental Protection Agency sent copies of its proposed National Emission Standards for Asbestos to those individuals who had been previously selected to serve on a committee to review the standards before their official release in late September. Three environmental control experts from AIA/NA member companies are on the document review committee -- E. M. Fenner of Johns-Manville, Ike Weaver of Raybestos-Manhattan, and Frank Zimmerman of National Gypsum. They will meet together with the other committee members in Atlanta on August 17 to review the standards, a copy of which is attached for your inspection.

In order that these men can have the benefit of the thinking of all of the AIA/NA member companies on the proposed standards prior to the Atlanta meeting, a special Board of Directors meeting has been scheduled for August 11, starting at 10:15 A. M., in the 11th Floor Board Room, Johns-Manville Building, 22 East 40th Street, New York City. The meeting will include lunch. Prior to the Board of Directors meeting, Mr. Fenner, Mr. Weaver and Mr. Zimmerman will confer on August 10, and will come to the Board meeting prepared to outline their "game plan" for the Atlanta review committee meeting.

In order to make the August 11 meeting as helpful as possible, we hope that you will review the proposed standards with those people in your companies most knowledgeable in the environmental control field. Ed Fenner, the Environmental Control member of the Administrative Sub-Committee, is of the opinion, after having

studied the standards, that, for the most part, they are reasonable from the standpoint of known technology, with regard to manufacturing operations.

If you have not as yet let us know whether you will be able to attend the August 11 meeting, please do so as soon as possible.

Sincerely,

Bill

W. P. Raines

DRAFT COPY

FOR TECHNICAL REVIEW ONLY
NOT FOR PUBLICATION

NATIONAL EMISSION STANDARD FOR ASBESTOS

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I. Introduction

As empowered by Section 112 of the Clean Air Act as Amended 1970, the Administrator of the Environmental Protection Agency issues the following proposed standard for asbestos emission sources. This action is taken subsequent to naming asbestos as a hazardous air pollutant on March 31, 1971. It is the intent of this standard to reduce the level of asbestos emissions through the application of required control practices. This standard establishes minimum requirements for emission control and should not be construed as limiting more stringent measures.

The scope of uses of asbestos and asbestos containing products is extremely large in the United States. New uses are being developed continually; many without regard to atmospheric emissions. Some uses have been determined by air pollution control officials to generate a degree of atmospheric emissions unwarranted by the value of these uses, and prohibition of such uses is proposed.

No comment

II. Emission Standards

1.1 Asbestos Mining

1.1.1 Drilling

1.1.1.1 Dry Drilling - All air swept or dry drills shall be equipped with fabric filter devices for collection of drilling debris.

1.1.1.2 Wet Drilling - Wet drills shall be equipped with cyclone collectors for collecting entrained mists.

1.1.2 Blasting - Surface blasting of ore deposits (shall/always) be preceded by surface wetting and be limited to the following atmospheric conditions.

or
1. low surface wind velocity (0-3 mph)
2. rain

1.1.3 Road Treatment - Mine roads surfaced with asbestos tailings shall be treated with water or chemical agents to control dust from vehicle traffic.

1.1.4 Ore Hauling

1.1.4.1 Dust Covers - Vehicles used to haul asbestos ore on mine owned property shall be equipped with dust covers.

1.1.4.2 Wetting - Where sufficient water is available the ore shall be wetted thoroughly during transportation.

1.1.4.3 Public Roads - Vehicles used to haul asbestos ores on public roads (must) be of "dust tight" construction.

1.2 Asbestos Milling

1.2.1 Ore Dumping - Asbestos emissions resulting from dumping of asbestos ore shall be minimized by wetting prior to dumping or enclosure of the dumping area.

1.2.2 Ore Dumps - Ore dumps open to the atmosphere must be maintained in a wet state (through the use of permanent sprinkler systems).

1.2.3 Conveyors - All external conveyors used to transport ore, tailings or loose asbestos containing materials must be of the totally enclosed type.

1.2.4 Ore Dryers - Asbestos ore dryer exhaust must be treated in fabric filter installations or by devices of equivalent efficiency as described in Section 2.1.

1.2.5 Ore Crushers - All dust emissions from ore crushers shall be ventilated to fabric filters or devices of equivalent efficiency as described in Section 2.1 prior to discharge into the atmosphere.

1.2.6 Mill Air - All forced exhaust gases from asbestos mills must be treated in fabric filters or devices of equivalent efficiency as described in Section 2.1.

1.2.7 Product Packaging -

1.2.7.1 Individual Packaging - All forms of asbestos fiber must be packaged in dust tight containers, capable of withstanding 4 drops, one each on front, back and ends from a height of four feet without leakage, and labelled as to their asbestos content.

1.2.7.2 Bulk Shipment - Bulk shipment shall be in dust tight vehicles labelled as to their asbestos content. Loading and unloading must be accomplished in a manner which does not exhaust asbestos to the atmosphere without the control equivalent of fabric filters as described in Section 2.1.

1.2.8 Tailings Dumps - Asbestos mill tailings dumps shall be stabilized, watted, or otherwise treated to prevent dust emissions.

1.3 Asbestos Processing

1.3.1 Manufacturing - Manufacturers of products containing asbestos must control all atmospheric discharges of gas streams used for manufacture or dust removal by fabric filtration devices or devices of equivalent efficiency, as described in Section 2.1, except where explosion hazards or materials problems exist, in which case wet collectors, as described in Section 2.1.2 may be used.

Bethlehem steel workers refused to wear fireproof suits, Warnings would help the legal position in that user assumes part of the risk.

1.3 3

1.3.2 Ventilation Air - In operations where in-plant conditions result in the emission of significant amounts of asbestos from general ventilation air, evidenced by presence of visible accumulations of asbestos on surfaces adjacent to the place of ventilation, the ventilation air must be treated by fabric filtration or devices of equivalent efficiency as described in Section 2.1.

1.3.3 Product Shipment

1.3.3.1 Labelling - All products containing asbestos must be labelled as to content.

1.3.3.2 Packaging - Asbestos products must be packaged in dust tight containers except those products such as filled plastics which do not readily dust.

1.3.3.3 Special Products - Those products such as asbestos cement mixes containing loosely bound asbestos must be packaged according to Section 1.2.7.

1.4 Product Use

1.4.1 Block Insulation

1.4.1.1 Pre-molded Insulation - To the maximum extent possible contractors installing asbestos containing block insulation in areas open to the atmosphere shall utilize pre-molded shapes which do not require cutting, ~~or grinding~~.

1.4.1.2 Field Fabrication - Where field fabrication is unavoidable, ~~high velocity~~ hoods exhausting to fabric filters or devices of equivalent efficiency as described in Section 2.1 shall be installed on tools used for cutting, ~~and grinding~~.

1.4.2 Asbestos Containing Powders - Asbestos containing powders shall be wetted prior to exposure to the atmosphere when used in areas without air pollution controls as described in Section 2.1.

1.5 Waste Disposal and Demolition

1.5.1 Removal of Asbestos Containing Insulation - When removing asbestos insulation from structures containing in excess of 50 lbs. of insulation or fireproofing, or when such structures are demolished contractors shall utilize the best available means to limit dust emissions from the operation. Such means may include but not be limited to:

A. Enclosure
B. Wetting

1.5.2 Waste Disposal - Asbestos bearing waste materials shall be segregated from other solid waste and disposed of by a method which prevents release of asbestos into the atmosphere during all phases of the disposal.

1.6 Specific Prohibitions

1.6.1 Sprayed Asbestos Insulation and Fireproofing - The application of asbestos containing insulation and fireproofing by means of spraying is prohibited.

1.6.2 Dispersive Uses - Any use of asbestos or asbestos containing materials in powder form which involves dispersing the material in the environment is prohibited.

2.1 Equipment Specifications

2.1.1 Fabric Filters - Fabric filters specified by this regulation shall consist of the following.

2.1.1.1 Construction - The inlet side of fabric filters shall be of leakproof construction or maintained under negative pressure.

2.1.1.2 Bypasses - No control system shall employ bypasses unless such devices are clearly required for start-up purposes.

2.1.1.3 Hoppers - Provisions shall be included for emptying dust hoppers without release of asbestos to the atmosphere.

2.1.1.4 Fabrics

2.1.1.4.1 Natural Fabrics - Natural fiber filter fabrics shall have a maximum flow permeability of 20 cfm/ft^2 at 1/2 in. H_2O.

2.1.1.3.2 Synthetic Fabrics - Synthetic fabrics in high temperature applications shall have a maximum permeability of 30 cfm/ft^2 in. H_2O.

2.1.2 Alternative Devices

2.1.2.1 Scrubbers - Scrubbers used where fabric filters cannot be installed shall be of the high energy venturi type operated with above 40 in. w.g. pressure drop. see note

2.1.2.2 Other Devices - Alternative devices used where fabric filters can be installed must be demonstrated by the user to have control performance equivalent or superior to fabric filters.

2.2 Equipment Maintenance

Control equipment required by this regulation shall be regularly maintained to insure high efficiency. Unannounced maintenance inspections will be performed by authorized personnel and the finding of any of the following conditions will be considered a violation of this regulation.

2.2.1 Fabric Filters

2.2.1.1 External Leaks - The presence of external leaking of untreated asbestos containing gases from duct work, hoppers, discharge valves, seal faces, etc. will be a violation.

2.2.1.2 Ruptured Bags - The presence of torn or ruptured bags in an operating system will be a violation.

2.2.1.3 Improperly Positioned Bags - The presence of any bag not properly positioned to prevent leakage will be a violation.

2.2.1.4 Holes - The presence of any bag containing a hole larger than ¼" diameter will be a violation.

2.2.1.5 Worn Bags - The presence of any bag with more than one pinhole or being badly worn or threadbare will be a violation.

2.2.1.6 Housekeeping - The presence of accumulations of asbestos particles in the clean air side of baghouses after repair or replacement will constitute a violation.

2.2.2 Scrubbers

2.2.2.1 Pressure drop - Any scrubber operating with less than 40" H_2O pressure drop will be a violation.

2.2.2.2 Leaks - Any external leaks of untreated asbestos containing gas from ductwork, flanges, etc. will be a violation.

2.2.2.3 Scrubbing Medium - Any scrubber operating with less scrubbing fluid flow rate than its design requirement will be a violation.

2.2.3 Alternative Devices - Inspection criteria for alternative devices will be established at the time of their certification.

III. Justification

This section was developed to explain the rationale for the standards presented in Section II of this report. It will not be presented in the official publication of the regulations. The justification is given for this type of standard and for each specific standard in the order they are presented in Section II.

Ideally, national emission standards for asbestos would be established on a concentration basis related to health effects and would provide an ample margin of protection to the public health regardless of the number of sources in a given geographic area. There are many practical considerations which prohibit the establishment of a numerical standard in the time frame established by the Clean Air Act of 1970. Foremost of these problems is the lack of data base. This base is lacking from both the health-effects standpoint for non-occupational exposure and the emissions standpoint.

The hazards of exposure to asbestos have been determined sufficient to warrant establishment of a national standard relating to control of exposure. Determination of the level of exposure to be considered safe has been complicated by many factors, not the least of which has been the time periods between exposure and onset of pathogenic effects. The majority of data available on asbestos health effects is related to occupational exposure and cannot be readily extrapolated to non-occupational levels.

Because of the large emphasis on occupational levels of exposure and a lack of simple analytical techniques, emission data is equally as uncertain for using engineering considerations to establish a numerical

[illegible] could be overcome, source testing efforts would have to be placed in a position of establishing, rather than verifying a data base. This would be a formidable task even with contracted source tests and is unlikely to generate a sufficient base prior to promulgation of the standard.

A control practice approach to reducing asbestos exposure levels offers a practical alternative to numerical emission limits. The mainstay of an asbestos control practice standard is the fabric filter which on the basis of semi-quantitative data appears to provide acceptable control at reasonable cost.

While fabric filtration would be a key point in a national emission standard for asbestos, other devices or practices can be required in cases where fabric filters are not practical. Where no effective controls are available, the standard can be extended to ban the use of asbestos, provided a suitable substitute is available.

A major advantage of a control practice standard would be realized in enforcement. Inspectors could be easily trained to certify compliance with control practice regulations. Problems of certifying a numerical standard are enormous. The complexity can be illustrated by examining the state of the art in asbestos sampling and analytical techniques.

Sampling to date has been almost entirely occupational exposure based without regard to air pollution in the general sense. The most common technique in U. S. testing has been a membrane type sampler with light microscopy used to analyze "fibrous particles". Samples are not taken isokinetically as recommended by OAP source testing methodology.

Johns-Manville has reported that attempts at isokinetic sampling of asbestos dust were unsuccessful. It is believed that a considerable amount of work would be necessary to develop an isokinetic procedure with proper nozzle dimensions to permit meaningful sampling of asbestos emission sources.

The fibrous particles" reported by industrial hygienists are by no means specifically asbestos. It is assumed that they are asbestos from the nature of the source of the sample. Specific identification of asbestos requires the use of x-ray diffraction techniques coupled with visual representation by electron microscopy. Analysis of samples collected by membrane techniques and counted by electron microscopy is an involved and costly procedure. Each sample requires about 20 man hours at a cost of about $30 per man-hour for analysis.

Even these sophisticated techniques tend to distort the actual asbestos content of the sample by increasing the number count of fibers during preparation. Thus the analysis is not meaningful in reporting total numbers of particles present in the original sample.

1.1 Asbestos Mining - Asbestos mining was determined by Davis (ref. 1) to be one of the largest sources of asbestos emissions in the U. S. Mining is predominantly surface type which is extremely difficult to control or quantitate emissions. Specific areas requiring control are drilling, blasting, and ore handling.

1.1.1 Drilling - Drilling occurs predominately in hard rock asbestos mining for the purpose of placing blasting charges. It has received considerable attention from persons interested in controlling occupational exposures. Air swept drills are the most common owing to a fast drilling rate, less bit wear, and lack of freezing problems encountered with wet sweeping methods. Emissions from air swept drills have been visibly reduced through the use of fabric filters (ref. 2). Where wet drilling is used a mist is generated which consists of fine asbestos particles and water. Cyclone collectors can collect this type of emission more readily than fabrics which plug when wet gas streams are filtered (ref. 3).

1.1.2 Blasting - The largest instantaneous emission source of asbestos dust is ore blasting. Containment of dust emissions from blasting would be economically unfeasible. Present emission control is limited to minimizing dust generation during blasting. Experienced blasting crews know how to limit and place charges to minimize dust. Wetting of the surface prior to blast provides limited control (ref. 4). As blasting is not a daily occurrence at asbestos mines and most mines stockpile ore, limiting blasting to atmospheric conditions which would not be conductive to dispersion of the involved dust would not be restrictive to the total operation.

1.1.3 Road Treatment - Many mine roads are surfaced with mine mill tailings containing about 10 asbestos by weight. Vehicular traffic, some vehicles carrying up to 200 tons, grinds and corrodes the tailings releasing considerable quantities of asbestos bearing dust. Many treatments have been tried, with water being one of the simplest (ref. 5). In some areas road treatment would produce hazardous driving conditions; however, it is the mining company's option not to surface roads with asbestos mill tailings.

1.1.4 Vehicles - Vehicles hauling asbestos ore are a controllable source of asbestos emissions. Hauling ore results in emissions through the jostling and air attrition of exposed ore. Where hauling is only over company property, dust covers for the ore would be sufficient in reducing hazards. Wetting is also very helpful in lowering emissions but water is not always available in arid regions. Where transportation of asbestos ore over public roads is involved, the hazard presented to the general population warrants more stringent control measures. Special dust tight vehicles are available (ref. 6).

1.2 Asbestos Milling - Asbestos mills were reported by Davis (ref. 7) as the most significant source of asbestos emissions. Mills have numerous points of asbestos emissions including: ore storage, ore drying, ore handling, ore processing, and tailing dumps. Wet milling offers advantages in many areas but is not applicable to all ores. There is one wet mill in the U. S.

1.2.1 Ore Dumping - Dumping of asbestos ores which are not wet results in emission of asbestos to atmosphere. Other industries have adopted special dumping enclosures (ref. 8). The option is open to utilize water sprays or enclosures for dumping.

1.2.2 Ore Dumps - Open ore dumps can be emission sources especially during extremely dry, windy weather. Other industries employ permanent sprinkler systems to control dust emissions (ref. 9). The option is available to provided enclosed storage.

1.2.3 Conveyors - Totally enclosed conveyors can readily prevent these systems from becoming emission sources during periods of high winds (ref. 10).

1.2.4 Ore Dryers - Numerous types of asbestos ore dryers are found. Some types result in more dust emissions than others owing to the degree of agitation and air velocity encountered by the ore within the dryer. Manufacturers have not applied control devices to the Canadian operations and have found insulated baghouses to be the most efficient and not economically prohibitive (ref. 11).

1.2.5 Ore Crushers - Ore crushers are a continuous source of dust emissions. In some operations primary crushing may be separate from the main operation and uncontrolled. The operation can be controlled by enclosure and hooding (ref. 12).

1.2.6 Mill Air - In both wet and dry milling air is used to control dust levels. Dry milling uses air as the separating medium for asbestos fibers from its lost rock. Fabric filter installations are found on all well controlled mills, some handling as much as 4.5 million cfm (ref. 13).

1.2.7 Product Packaging - Many of the containers used to ship asbestos fiber are not dust tight or sufficiently durable to prevent spillage during shipment. As emissions occurring during shipping cannot readily be controlled by capture, a more positive approach to emission control is to prevent leaks from occurring. Some asbestos companies are using extremely strong bags at little cost penalty. Drop tests are commonly used to measure the durability of loaded packages.

Bulk shipments present different problems. Some loading and unloading systems employ air conveying of the material. After separation of the large fibers, the exhausting air must be controlled by fabric filtration to eliminate the invisible sub-micron particles. Dust tight vehicles are a must to prevent emissions during transit.

Labelling as to asbestos content is an important aspect of emission control. In the event of accident, clean-up crews can be advised to use dustless methods to remove spilled material. Shippers and handlers will be aware of the need to avoid rough handling and to minimize spills.

1.2.8 Tailings Dumps - Tailings dumps are most often extensive areas of exposed spent ore. Asbestos content still exceeds that of normal surface materials. Emissions occur during conveying, bulldozing or other distrubances and by natural forces. No clearly superior method has been developed for all tailing dumps. Each operator must decide which method will be best at his location. Wetting, chemical treatment, and reforestation have been used.

1.3 Asbestos Processing - The impact of asbestos processing on asbestos emissions to the atmosphere has not been thoroughly evaluated. Many dust cases for asbestos have been documented. An estimated 100 [illegible] As [illegible] sources are varied and often diffuse, the regulations are limited to emission sources common to most processes.

1.3.1 Manufacturing - Sources of emissions include gas streams used to control dust levels inside plants or as part of the process itself, such as air conveying of material. Fabric filters have been utilized extensively where recirculation of air streams is desired (ref. 14). Low occupational exposures have been achieved by fabric filtration and air recirculation (ref. 15).

Some manufacturing operations generate explosive or fire hazard dusts. Others such as asbestos paper manufacturing ventilate extremely wet gas streams. Such operations are best controlled by high efficiency scrubbers.

1.3.2 Ventilation Air - In general most plants maintain occupationally safe levels within the working areas and where such levels are maintained exhaust of in-plant air to the atmosphere would not constitute a significant emission source. However, some operators prefer to equip personnel with respirators rather than control dust levels and ventilation air from these operations can be significant emission sources. Such sources are readily evident by the accumulation of fibrous particles around exhaust points. It would benefit operators to maintain safe in-plant levels rather than be faced with the prospect of filtering large amounts of ventilation air.

1.3.3 Product Shipment - The large variety of asbestos products require different degrees of packaging to limit emissions during shipping. Some products may not require any special packing, such as filled plastics or vinyl tiles. Others, such as asbestos cement, require dust tight packages equivalent to fiber shipping bags. More important is the requirement of labelling to instruct users to handle with care and to utilize proper disposal methods.

1.4 Product Use - Products containing asbestos are used extensively in the construction industry. Many users never generate dust from the product. This is especially true of products where the asbestos is firmly bound in a matrix of polymeric or cementaticus material. Other users generate significant quantities of asbestos emissions from asbestos containing products where the asbestos is not firmly bound. Regulation and enforcement will be difficult and successful control will depend upon public awareness and concern. Emission controls have been developed for two useful types of products.

1.4.1 <u>Block Insulation</u> - Calcium silicate block insulation is used extensively in thermal insulation applications. This [illegible] a soft [illegible]. Insulation unions have resisted efforts by manufacturers to introduce premolded block for bends and joints which the unions claim will be detrimental to their trade. Premolded insulation would greatly reduce emissions from field shaping of these products. Where cutting is essential special saws have been developed which have fabric filtration of exhausted dust (ref. 15).

1.4.2 Asbestos C[illegible] - Powdered asbestos [illegible] [illegible] industry. [illegible] cement contain 15 to 50 percent asbestos. They are [illegible] in open troughs or buckets, releasing large quantities of asbestos. Special packages have been developed which permit introduction of water and mixing prior to opening (ref. 16).

1.5 <u>Waste Disposal and Demolition</u> - Disposal of asbestos containing [illegible] is a very dispersed emission problem. Wastes containing asbestos include shipping containers, manufacturing rejects, used products, and collected dusts. There is little or no treatment given to waste materials containing asbestos with respect to minimizing emissions during disposal. Such material is discarded on open dumps and becomes a continual source of emissions.

1.5.1 <u>Removal of Asbestos Containing Insulation</u> - As almost every building contains some asbestos, the regulation is limited to structures containing over 50 lbs. The regulation also applies to industrial and ship building operations where large amounts of insulation are being used. British engineers have pioneered in the use of water and special injection nozzles to wet insulation prior to removal (ref. 17). Enclosure has also been used to limit atmospheric contamination. This standard has been left relatively unrestrictive to permit freedom in development of new and improved removal methods.

1.5.2 <u>Waste Disposal</u> - The method of ultimate disposal which minimizes asbestos emission to the atmosphere is subsurface disposal. A well operated disposal program will have to be established in which asbestos wastes are segregated and buried. These programs can be cooperatives between manufacturers, construction contractors, demolition contractors and disposal area managers. This program must include provisions to minimize emissions during all phases, including transportation to disposal sites (ref. 18).

1.6 <u>Specific Prohibition</u> - In establishing rigorous emission standards, consideration must be given to the recommendation of prohibition of those uses of hazardous materials where adequate controls have not been demonstrated or where the hazard presented exceeds the value achieved.

1.6.1 [illegible] Insulation and Fireproofing - Spray [illegible] fireproofing has been the most common [illegible] asbestos. Factors largely ignored by the [illegible] traffic [illegible], San Francisco are considering [illegible] to prohibit the use of asbestos containing spray fireproofing. [illegible] have already instituted prohibition through permit control. Many unproven control systems for spraying have been proposed. Some have been proven inadequate (ref. 19).

Spray fireproofing manufacturers have responded rapidly to the cities objections by introducing non-asbestos containing [illegible] which are commercially competitive. Substitute materials used such as expanded vermiculite, fiber glass and [illegible] can be applied using the same equipment as used for asbestos containing compositions. No additional operator training is required.

Cities are also concerned with asbestos emissions which will be generated when asbestos fireproofed buildings are demolished. Asbestos fireproofing of structural steel was not introduced until the late 1940's and few buildings treated in this manner have been demolished. Officials estimate the year 2000 will be the beginning of demolition problems.

The presence of suitable substitutes at little or no increase in cost and difficulty of emissions control during both application and demolition indicate that prohibition is warranted.

1.6.2 Miscellaneous Uses - The finely divided nature of asbestos fibers and shorts combined with the absorbitivity and chemical inactivity make these forms likely candidates for absorbing systems and dispersing mediums. Other inert materials are available for such purposes, the use of asbestos is highly unwarranted in view of its hazardous nature. This prohibits such uses as insecticide dispersants and oil absorbants (ref. 20).

2.1 Equipment Specifications - Specifications on required control equipment are intended to insure equivalent asbestos removal efficiency. Most of the specifications are based upon best current installations.

2.1.1 Fabric Filters - Fabric filters are the primary control device required by this regulation. They have been reported to be better than 99.00 percent efficient on a mass basis collecting asbestos mill dust (ref. 21). Many reports of tests on return air from fabric filters show that the devices can control dust below occupational threshold values.

Baghouses have many years of demonstrated performance including over 20 years of use in the asbestos industry. The devices are [illegible] and [illegible] ex. [illegible] manufacturers [illegible] selling [illegible] 7,000 units per year. Over [illegible] units are in use today (ref. 22).

2.1.1.1 Construction - Construction is specified to prevent emissions of untreated dust.

2.1.1.2 Bypasses - The prohibition of bypasses insures that plants will not operate in an uncontrolled manner.

2.1.1.3 Hoppers - Many filter users have no provisions for emptying hoppers without re-releasing the dust to the atmosphere. Fabric filter manufactures have developed many systems to handle collected dust.

2.1.1.4 Fabrics - Fabric efficiency is highly dependent upon air flow permeability. Low air permeability implies that the fabric will have high collection efficiency. The rating 20 cfm/ft² at 1/2 in. H_2O is equivalent to standard cotton bags which have attained 99.99 percent efficiency. The rating of 30 cfm/ft² at 1/2 in. H_2O is an equivalent rating for orlon fabrics used successfully by industry. Fabrics having higher permeabilities will not be permitted.

2.1.2 Alternative Devices - There are certain conditions where fabric filters are not applicable. These include very humid ambient temperature gas streams and explosive or flamable dust loads. Scrubbers are better suited for these cases but must be specified to guarantee equivalent efficiency. In addition, other devices installed at the option of the manufacturer must be certified for compliance.

2.1.2.1 Scrubbers - High energy venturi scrubbers are the most efficient type of scrubber for submicron particles. The pressure drops necessary for good efficiency are high and vary somewhat with scrubber design. Forty inches of pressure drop will obtain 95% efficiency for .25u particles in well designed units (ref. 23).

2.1.2.2 Other Devices - Alternative devices installed where fabric filters are applicable must be certified to be at least equivalent to fabric filters. This regulation is not intended to prevent development of improved devices but is designed to provide equivalent control of emissions.

It is not possible at this time to clearly define equivalency because of the long standing lack of performance data for fabric filters in the asbestos industry. Through the years the fabric filter has developed a

[illegible] superiority for control of asbestos emissions. [illegible] no [illegible] performance and no performance testing. Therefore, the presentation of equivalency data will have to incorporate data from both fabric filters and the intended alternative device under similar operating conditions.

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