E.P.A.

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BACKGROUND INFORMATION — PROPOSED NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS:

Asbestos

Beryllium

Mercury

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CONTENTS

INTRODUCTION 1

TECHNICAL REPORT NO. 1 - ASBESTOS 3

Summary of Proposed Standards 3

Effects on Health 3

Nature of Asbestos Air Pollution Problem 5

Development of Proposed Standards 6

Economic Impact of Proposed Standards 7

References 8

TECHNICAL REPORT NO. 2 - BERYLLIUM 9

Summary of Proposed Standards 9

Effects on Health 10

Nature of Beryllium Air Pollution Problem 10

Development of Proposed Standards 12

Economic Impact of Proposed Standards 13

References 14

TECHNICAL REPORT NO. 3 - MERCURY 15

Summary of Proposed Standards 15

Effects on Health 15

Nature of Mercury Air Pollution Problem 16

Development of Proposed Standards 19

Economic Impact of Proposed Standards 18

References 21

APPENDIX. ATMOSPHERIC DISPERSION ESTIMATES 23

Background Information: Proposed National Emission Standards for Hazardous Air Pollutants: Asbestos, Beryllium... Published by AsbestosClaims.Law
ACL Doc 21591 · Page 2 of 10 asbestosclaims.law/library/21591/2

INTRODUCTION

[illegible] of the proposed national emission standards for asbestos, beryllium, and mercury. The proposed standards, published in the Federal Register under Title 40 CFR Part 61, are being distributed concurrently with this document. The information presented herein was prepared for the purpose of facilitating review and comment prior to promulgation of the standards.

The proposed national emission standards were developed after consultation with specialists, advisory committees, independent experts, and appropriate representatives of the federal government. The National Air Quality Criteria Advisory Committee was consulted on air quality considerations, the assessment of adverse effects, and the approaches and protective philosophy underlying the proposed standards. Members are outstanding scientists and/or administrators concerned with the quality of the environment and resident in universities, State or local governments, research institutions, or industry. They are selected for their recognized expertise and/or interest in the establishment of air quality criteria or for their recognized expertise in the evaluation and interpretation of scientific evidence indicative of adverse and preventable effects of atmospheric pollutants.

Joint meetings were held with the Federal Agency Liaison Committee and the National Air Pollution Control Techniques Advisory Committee. The proposed standards reflect consideration of comments provided by these committees and by other individuals having knowledge regarding the control of these pollutants.

The National Air Pollution Control Techniques Advisory Committee is made up of 16 persons who are knowledgeable concerning air quality, air pollution sources, and technology for the control of air pollutants. The membership includes state and local control officials, industrial representatives, university professors, and engineering consultants. Members are appointed by the EPA Administrator pursuant to Section 117 (d), (e), and (f) of the Clean Air Act of 1970, Public Law 91-604. In addition, persons with specific expertise regarding these pollutants participated in the meeting of the Advisory Committee.

The Federal Agency Liaison Committee includes persons knowledgeable concerning air pollution control practices as they affect Federal facilities and the nation's commerce. The committee is made up of representatives of 19 Federal agencies.

[illegible] emission standards. Furthermore, [illegible] may require revision from time to time [illegible].

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TECHNICAL REPORT NO. 1 —

ASBESTOS

SUMMARY OF PROPOSED STANDARDS

[illegible] testing, standard techniques for sampling and analyzing asbestos emissions, are not available at this [illegible]. Standards for asbestos are not given in terms of numerical values. Instead, the standards are expressed in terms of required control practices that limit emissions to an acceptable level. In part, control of atmospheric emissions would be achieved by:

1. Utilizing [illegible] fabric filters to clean ventilation exhaust gases from asbestos mining, milling, and manufacturing industries and from fabricating operations that involve materials containing asbestos.

2. Eliminating visible emissions of particulate matter from ore dumps, open storage areas, material conveyors, and tailing dumps associated with asbestos mining and milling facilities as well as from manufacturing and fabricating operations carried out with asbestos-containing materials in areas directly open to the atmosphere.

3. Prohibiting certain applications of asbestos fireproofing and insulation by spraying processes.

Also, indirect atmospheric emissions of particulate matter would be controlled at manufacturing and fabricating sites where visible emissions normally result from operations using commercial asbestos. The maximum allowable emissions would be equivalent to those attained by either ventilating an entire work space through a fabric filter or by hooding emission sources and subsequently passing the required dust-control air through a fabric filter.

EFFECTS ON HEALTH

The inhalation of asbestos fibers has been related to a number of human diseases. Among these is asbestosis, which has been related to occupational exposures and is characterized by interstitial fibrosis, pleural fibrosis, and pleural calcification.[1]

Background Information: Proposed National Emission Standards for Hazardous Air Pollutants: Asbestos, Beryllium... Published by AsbestosClaims.Law
ACL Doc 21591 · Page 5 of 10 asbestosclaims.law/library/21591/5

[illegible] asbestosis.

[illegible] disease, which has been noted in asbestos workers, typically [illegible] a prolonged period of time following exposure and is frequently accompanied by [illegible] fibrosis, i.e., asbestosis. The minimum dosage that causes [illegible] has not been established; however, occupationally exposed [illegible] have exhibited substantial incidences of such disease.[2,3]

[illegible] since 1967 that among industrial employees asbestos workers [illegible] risk of cancerogenic disease.[4] For populations exposed to [illegible] air, there are no data that define the cancer risk, if any, [illegible].

[illegible] asbestos exposure and mesothelioma, a total malignant tumor [illegible] chest or abdomen, was established in 1960 by a study of 33 cases of [illegible] in South Africa.[1] Seventeen of the patients were occupationally [illegible] and most of the rest lived in the vicinity of asbestos mines. No history of asbestos [illegible] was known for one patient. A subsequent study of mesothelioma [illegible] identified patients with minimal or no known exposure to asbestos. The [illegible] of a prolonged period, averaging 40 years, between initial exposure and [illegible] of a resultant clinical tumor complicates the study of this disease. There [illegible] to quantify the minimum amount of asbestos exposure associated with [illegible] risk of developing mesothelioma.

A quantitative definition of the asbestos air pollution problem can not be formulated at this time because of the lack of a dose-response relationship between levels of airborne asbestos and the resulting human diseases. Nevertheless, available evidence clearly implicates asbestos as a serious air pollution threat. This evidence includes the discovery of asbestos fibers in lungs of nonoccupationally exposed persons,[1] the qualitative demonstration that asbestos fibers are present in ambient air,[5] and the [illegible] epidemiologic studies relating asbestos exposure to disease.

Research efforts directed toward the establishment of a dose-response relationship for human exposure to airborne asbestos are in progress. The only measure available at this time to protect the public health from airborne asbestos is to control asbestos emissions to the greatest degree practicable for the following reasons:

1. A safe exposure level to asbestos has not been established.

2. Exposure to asbestos in community air may produce disease.

asbestos fibers enter the atmosphere from a wide variety of sources extending from [illegible] the disturbance of natural deposits of asbestos-bearing materials to [illegible] the manufacture or processing of asbestos products. Such sources include asbestos mining and milling sites, manufacturing facilities [illegible] asbestos-containing products, and construction sites employing asbestos-[illegible], insulation, and structural materials. More than 3,000 products contain [illegible]. As many products are used, asbestos is frequently released [illegible] during these products' manufacture, use, and disposal. Asbestos is also present as a natural component of [illegible] geologically-occurring materials, such as talc. The airborne particles [illegible] are of respirable size, it can be significant.

Asbestos fiber is exceptionally resistant to thermal degradation and chemical [illegible], and fibers are persistent in the environment and subject to resuspension [illegible]. It can readily be fashioned into flexible fibers of [illegible] which can remain airborne for long periods of time. Exposure to asbestos, [illegible] with the presence of large numbers of respirable fibers in the air, [illegible] the presence of a background level of asbestos in the ambient [illegible]. Epidemiological data confirm this conjecture and show that [illegible] and concentration [illegible] significantly larger than ambient ones.

Emissions of asbestos are now being controlled to a limited extent, primarily from [illegible] and handling operations to which gas-cleaning devices are readily applicable. The formulation of recommended codes of trade practice governing such operations as the transport, fabrication, application, and disposal of asbestos-containing materials has not proved to be an effective emission control technique. Control of asbestos emissions from some sources, for example, spray-applied asbestos fireproofing, has been made possible by the use of substitute materials for asbestos. It is also true, however, that there is interest in expanding the already vast number of applications for asbestos fibers.

DEVELOPMENT OF PROPOSED STANDARDS

The intent of these proposed standards is to minimize asbestos emissions into the atmosphere from all clearly identifiable stationary sources, subject to the availability of a sufficiently definitive characterization of emissions from such sources and subject to the availability of feasible control techniques. Where practical, these control techniques include direct prohibition of activities that generate asbestos emissions.

Background Information: Proposed National Emission Standards for Hazardous Air Pollutants: Asbestos, Beryllium... Published by AsbestosClaims.Law
ACL Doc 21591 · Page 7 of 10 asbestosclaims.law/library/21591/7

incorporate commercial asbestos into products have been identified as significant

other asbestos-containing products, would be subject to these proposed standards. [illegible] among the many end uses of asbestos-containing products, a relatively small number has to date been singled out as contributing significantly to the overall problem of air pollution. The field fabrication of asbestos-bearing products, particularly insulation materials, and the spray application of asbestos fireproofing are two specific end uses that would be controlled by the proposed standards. The direct evaluation of asbestos emissions from textile operations, and those associated with the relining of automotive brake linings, has [illegible] asbestos-containing materials, and the disposition of foundry sand asbestos-containing materials, [illegible] utilize the authority of Section 112 of the Clean Air Act. A program for determining the extent and nature of asbestos emissions from area sources [illegible] is now in progress in the Office of Air Programs. Future proposed standards for these and other area sources will be based on the study and possible inclusion within proposed standards at a future date. Included in these area sources are road surfacing with asbestos-bearing concrete and talc mines, in which asbestos occurs as a natural contaminant.

Current standard reference test techniques for asbestos, namely those for testing friction materials, textile operations, or building demolition, [illegible] only for the determination of the fibrous content of treatment sludges, however, [illegible] fact, it does not provide timely numbers of asbestos fibers present in the samples. At least three ambient air sampling and analysis techniques, with [illegible] electron microscopy to render visible even the smallest asbestos fibers, are currently undergoing development. To date, these methods are capable of providing estimates of asbestos mass concentrations, but not number concentrations of asbestos fibers in processed samples, and reproducibility of results obtained by the three methods has not been established. Until these new techniques are perfected, emission control must be based upon the best feasible control technology. Accordingly, the proposed standards would require the operation of specified control equipment.

Fabric filtering devices have been specified as the mainstay of these standards because they possess (1) demonstrated high-efficiency collection across a wide range of solid particulate sizes and (2) reasonable investment and operating costs. It is prudent to require control techniques that provide high collection efficiency for submicron-size particulates because research studies have shown that the largest number of asbestos fibers in emissions generated by some industrial

and some operations routinely recycle filter-cleaned air for ventilation of work areas. In additional operations amenable to emission control by gas cleaning, but where technical difficulties preclude the application of fabric filters, these standards would permit the use of other control equipment of demonstrated lesser effectiveness.

[illegible] regulations that would prohibit visible emissions apply to sources not readily controlled by dust-cleaning devices. Flexibility is required in design and use [illegible] of alternative control techniques should be provided in case the [illegible] would not specify control equipment. The retention of uncontrolled water from the ventilation would be made to meet limitations in which water would be used as a control medium. Processes that are presently operated could be controlled by feasible techniques to ensure compliance.

The surfacing and resurfacing of roadways with asbestos tailings would be banned because of the probable ineffectiveness of control measures during both application and the normal period of usage. The proposed ban on the spray application of products that contain asbestos is based upon experience with spray-fire-proofing operations wherein efforts to control emissions by the use of containment and good housekeeping practices have repeatedly failed. Several local municipalities in the United States have already put into effect procedures that exclude the use of sprayed asbestos materials. Asbestos-free substitute materials are available for both sprayed asbestos fireproofing and high-temperature asbestos insulation.

ECONOMIC IMPACT OF PROPOSED STANDARDS

The basic processing of domestic asbestos ores is carried out in nine mills with production capacities ranging from 200 to 55,000 tons per year. These mills produce approximately one-sixth of the total consumption of asbestos in the United States. The estimated additional annualized costs required of these existing sources for compliance with the proposed standards range from zero to $9.03 per ton of asbestos fiber produced per year; this year rents a range of zero to 0.7 percent of the average selling price per ton of domestically produced asbestos in 1969. The average investment, for the entire industry, is estimated to be $3.73 (0.3 percent) per ton of asbestos fiber produced per year. Actual investments range from $2,700 for an essentially uncontrolled mill of 200-ton/year capacity to $'33,000 for a partially controlled mill of 40,000-ton/year capacity.

[illegible] additional investment of $6,201, [illegible] and to be passed [illegible] partially absorbed [illegible] arises from compliance with the proposed [illegible] annual output, or an annualized cost of 0.3 percent of the output product value. [illegible] of alterations in product price, there would result an estimated increase [illegible] of consumers; the most significant increase would be 2.6 [illegible] for brake [illegible] linings.

[illegible] of asbestos in spray-applied fireproofing and insulation represents [illegible] only 0.1 percent of the annual domestic consumption of asbestos. [illegible] application on the price of a finished or semi-finished product is minimal [illegible] production or any substitution of some other fireproofing and insulation [illegible]. Increased costs for substitute materials, maintenance and labor [illegible] to the use of asbestos, would add [illegible] to a [illegible] of $6 million. [illegible] substitute materials does not pose any problems or any additional [illegible] of personnel.

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