Air Products and Chemicals, Inc.
Box 538
Allentown, PA 18105
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File
Vinyl Chloride
Monomer (Health
Effects

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DR. R. T. GOTTESMAN

AIR PRODUCTS

7 March 1985

Dr. H. C. Shah
Chemical Manufacturers Association
2501 M Street, N.W.
Washington, D.C. 20037

Dear Dr. Shah:

I am sending you a copy of a recent article on epidemiology studies among VC-exposed workers that you may not have seen. This could be of interest in connection with the EHA study.

Very truly yours,

John T. Barr, Manager
Regulatory Response

JTB:csb

cc: R. Gottesman
The Vinyl Institute

Attachments: Letter to the Editor, Cancer Facts and Figures, 6 Feb. 1985
Article entitled "Industrial Hazards of Plastics and Synthetic Elastomers".

Air Products and Chemicals, Inc.
Box 538
Allentown, PA 18105
Telephone (215) 481-4911

AIR PRODUCTS

6 February 1985

Editor, Cancer Facts and Figures
American Cancer Society
90 Park Avenue
New York, NY 10016

Dear Sir or Madam:

The past several editions of "Cancer Facts and Figures" have contained a statement that you are conducting follow-up work on vinyl chloride-exposed workers. As a user of vinyl chloride we attempt to keep aware of the results of such studies, but we have not seen results from your program.

Can you share with us your protocol, and any preliminary results you may have obtained? We wish to provide our employees with as much information on this subject as possible, and would appreciate your assistance.

Very truly yours,

John T. Barr, Manager
Regulatory Response

JTB:csb

SPI-00442

INDUSTRIAL HAZARDS OF PLASTICS AND SYNTHETIC ELASTOMERS

Proceedings of the International Symposium on Occupational Hazards Related to Plastics and Synthetic Elastomers, Espoo, Finland, November 22–27, 1982

Editors

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Contents

OCCUPATIONAL HAZARDS IN THE VC-PVC INDUSTRY

William J. Nicholson, Paul K. Henneberger and Herbert Seidman.

Environmental Sciences Laboratory, Mount Sinai School of Medicine of CUNY, New York, New York 10029 (WJN, PH) and American Cancer Society, 4 W. 35th Street, New York, New York 10001 (HS).

INTRODUCTION

On January 24, 1974, The Wall Street Journal published an article describing the occurrence of three deaths from hemangiosarcoma of the liver among polyvinyl chloride (PVC) production workers at the B.F. Goodrich Tire and Rubber Company plant in Louisville, Kentucky. This announcement shattered the relatively complacent view toward health effects associated with plastic production in general and PVC production in particular. At the time, U.S. and Western European production of vinyl chloride (VC) exceeded 6×10^6 metric tons. Numerous mortality and clinical studies were undertaken in the major producing countries in an attempt to establish the extent of the carcinogenic risk and to identify clinical parameters useful for surveillance of exposed groups. Because of the immediate concern in 1974, most of these studies were completed between 1974 and 1977. Several reviews and symposia on human health effects from VC exposure have been published recently. A superb one is by Lelbach and Marsteller (1981).

The exposures were high that led to the disease observed in these various studies. Typical concentrations in the industry were estimated to be about 1,000 ppm prior to 1955, from 300-500 during 1955-1970, and from 100-200 during 1970-1974 (Barnes, 1976). However, variations from such exposures would have occurred in specific plants (Rowe, 1975). While historical average exposures were generally less than 1,000 ppm, peak exposures often ex-

Table 1

Population and follow-up characteristics of twelve studies of vinyl chloride exposed workers

Study	Country	Analysis cohort size	Percent additional untraced	Number of deaths analyzed	Percent of total	Minimum exposure (years)	Minimum latency (years)	Earliest possible exposure	Maximum follow-up (years)	Last year of follow-up
Bertazzi et al. 1979	ITAL	4777	13.8	62	1.3	0.5	0.5	1952	22	1977
Buffler et al. 1979	USA	464	0.0	28	6.0	0.2	0.2*	1948	27	1975
Byren et al. 1976	SWED	750	low	58	7.7	>0	>0*	1945	28	1974
Duck et al. 1975	UK	2113	0.3	136	6.4	>0	>0*	1948	20	1975
Equitable Env. Health, 1978	USA	9677	4.9	707	7.3	1	1*	(1935)	25+	1972
Fox and Collier 1976, 1977	UK	7409	1.1	393	5.1	>0	>0*	1940	35	1974
Masuda 1979	JAP	304	0.3	26	8.6	1	1	1949	20	1975
Nicholson et al. 1975	USA	255	0.8	24	9.4	5	10*	1947	25	1974
Ott et al. 1975	USA	522	0.0	79	15.1	>0	>0	1942	31	1973
Reinl et al. 1979	GER	6544	7.3	414	6,3	>0	>0	NA	NA	1974
Theriault and Allard, 1981	CAN	451	2.8	59	13.1	5	5*	1943	30	1977
Waxweiler et al. 1976	USA	1287	0.5	136	10.6	5	10*	1940	22	1973

* Longer latencies considered for some causes of death.

diluted by the inclusion of many individuals with very short and recent periods of exposure.

Turning to chronic liver disease, one remarkable finding is the absence of significantly elevated mortality from this cause in most of the populations under observation. The only study with a significant elevation is that of Masuda (1979) in which five deaths from chronic liver disease occurred where only one was expected. However, this must be considered in the light of an equally high mortality from liver disease (6 observed vs. 1.4 expected) in a comparison population followed for control purposes. Five of 62 deaths from chronic liver disease seen in the study by Bertazzi et al (1979) are unusual, but the limitations of this study and lack of details make evaluation difficult. The generally benign results in other studies contrast sharply with the severe liver disease from VC exposure documented in clinical studies (Marsteller et al, 1975). Hepatomegaly, hepatic fibrosis, portal hypertension, and bleeding esophageal varices have commonly been found in individuals heavily exposed to VC, even without concomitant exposure to alcohol.

Table 3 lists the mortality data for primary cancer of the liver and biliary passages and for cancer of the lung, trachea and bronchus. In the case of liver cancer, the overall data are consistent and dramatic. Hemangiosarcomas of the liver were found in eight of the twelve studies. In each of the eight, a very large and highly significant SMR for liver cancer was seen. Methodological limitations can account for negative data in the other four studies. The large SMR's observed, however, are largely the result of low values for the expected number of cases rather than a high incidence of observed cases. Only 29 separate liver hemangiosarcomas were identified in all twelve studies. As the overall excess number of deaths from liver and biliary cancer in all studies was 47, some hemangiosarcomas may not have been identified. The low numbers must also be considered in light of the limited follow-up times in most studies.

The evidence for lung cancer is less clear. There is an elevation in some studies, but at a level that does not achieve statistical significance, except in the 15 year latency population of Waxweiler et al (1976). This, in part, may be the result of the low power of many of the

studies. Only two have an 80% power to detect an overall risk of 1.5 (Beaumont and Breslow, 1981). Of significance, however, are the very low SMR's in the groups studied by Theriault and Allard (1981), Reinl, et al (1979), and Nicholson et al (1975), cohorts that would be expected to manifest a high risk on the basis of the many hemangiosarcomas that were found. The four largest studies, although in some cases limited by inclusion of short-term and recently employed workers, also are noteworthy for the SMR's close to 100. Where available, data on subcohorts with longer latency (> 15 yr) suggest some increased risk.

Waxweiler et al (1981) undertook a detailed analysis of the exposure of those with lung cancer in their previously published study (Waxweiler et al, 1976) in an attempt to identify particular etiological agents. The analysis used a serially additive expected dose model (Smith et al, 1980) in which a dose measure during each year of exposure was accumulated for each study individual for a variety of potentially carcinogenic agents. The cumulative doses for those with lung cancer were compared with those of other individuals in the plant under study. The results showed that the greatest correlation of lung cancer was with exposure to PVC dust. Secondarily, exposure to vinylidene chloride appeared to be important, but only for large cell and adenocarcinoma. The serially additive dose for VC monomer differed little in those with lung cancer compared to others in the plant, except, possibly, for large cell cancers.

Thus, evidence to date does not establish that VC monomer is an important lung carcinogen in exposed worker populations, although it is recognized that limited long-term observation has so far been available. In all studies considered here, a slight deficit of cases was seen compared to the number expected. In the subcohorts with more than 15 years from onset of exposure, an overall excess of 10% was observed. If, in addition, one considers a "healthy worker effect," any excess lung cancer would still be considerably less than the excess of liver cancer. A qualification to this conclusion is that no study specifically considered cigarette usage. If cigarette smoking was much less common among VC workers than the general population, higher SMR's would have been seen if smoking specific data were available. However, this

Table 4

Observed and expected deaths from selected causes among vinyl chloride exposed workers

	Cancer of the brain & central nervous system			Cancer of the lymphatic and hematopoietic system		
	Obser.	Expect.	SMR	Obser.	Expect.	SMR
Bertazzi	1	(0.8)[a]	125	4	(3.0)[b]	(133)
Buffler	0	(0.1)	-	0	(0.5)	-
Byren	2	0.33	612[†]	0	-	-
Duck	-	-	-	-	-	-
Equitable	12	5.90	203[†]	20	17.01	124
Fox & Collier	2	3.66	55	9	9.01	100
Masuda	0	(0.15)	-	0	(0.5)	-
Nicholson	1	(0.1)	(1000)	2	(0.4)	(500)
Ott	1	0.4	(250)	1	(1.6)	(63)
Reinl	2	1.3	162	15	7.7	214[††]
Theriault	0	0.6	-	1	1.67	60
Waxweiler	3	0.9	329	4	2.5	159
15 yr. latency	3	0.6	498[†]			

† < 0.05

†† < 0.01

[a] ( ) = Expected estimated from the ratio of age standardized U.S. rates ICD 193/ICD 140-205.

[b] ( ) = Expected estimated from the ratio of 1950-1969 U.S. rates ICD 200-205/ICD 140-250.

confounding exposures precludes definitive statements. The overall excess of such malignancies (about 10) is also much less than those from primary hemangiosarcomas of the liver.

EFFECT OF REDUCTION OF EXPOSURE TO VC

As mentioned previously, most mortality studies followed populations only to the 1972-1975 period. No data exist on the risk to previously exposed populations after cessation of exposure in 1974, although hemangiosarcomas have been noted among retirees. We have recently completed a follow-up through 1981 of the population reported in 1975 (Nicholson et al, 1975) to determine whether a high risk of liver cancer continues, following significant reduction in exposure. The original group employed at a VC polymer-

pathological review of all available specimens has not been completed.) Among the 44 deaths that occurred in the Niagara Falls cohort, 6 were from primary cancer of the liver, including 5 hemangiosarcomas. Three of the hemangiosarcomas occurred in the period prior to 1974 and 2 subsequently. Similar findings occurred among the smaller group in West Virginia. Here, of 36 deaths, 4 were from hemangiosarcoma, all of which occurred subsequent to 1974. Thus, the risk of neoplastic VC disease continues undiminished, even though exposures to the monomer have been significantly reduced. The combined data from both groups are shown in Table 6 and demonstrate an excess risk of cancer, which is totally accounted for by the enormously increased risk of liver malignancy observed in each time from onset of exposure category. The excess lymphomas which achieved significance at the $p < 0.05$ level in the Niagara Falls group lose significance when combined with the data from South Charleston. A deficit of lung cancer was observed in both study groups and brain malignancies were about equal to the number expected.

It is not certain whether the results of these two plants will be reflected in the results of other plants in future years. The South Charleston plant was the first facility to commercially produce VC. The New York plant opened immediately following the cessation of World War II. Thus, we are observing effects in populations that include many individuals with long times from onset of exposure. There is no information on whether the exposures in these two plants were significantly different from those of the majority of other VC polymerization facilities. It is known that pre-1974 exposures in the New York plant were sufficiently high to cause loss of consciousness to some individuals (4.5% of those examined in the clinical survey of 1974) (Lilis et al, 1975).

MORBIDITY AND CLINICAL FINDINGS AMONG VC-EXPOSED WORKERS

Clinical abnormalities from VC exposure predated by 25 years the documentation of its carcinogenicity. Various VC-related abnormalities were reported in Eastern European literature, including hepatomegaly (Tribukh et al, 1949), angioneurosis (Filatova and Gronsberg, 1957), osteolytic lesions of distal phalanges (Smirnova, 1961), Raynaud's phenomenon and sclerodermalike skin lesions (Suciu et al, 1963). However, VC disease was not seri-

heavily exposed individuals, the portal hypertension and hepatic fibrosis often progressed after cessation of exposure (Martin et al, 1974). The histology of malignant and nonmalignant liver disease has been well described by Popper and Thomas (1975; Thomas et al, 1975), who suggested the possibility of an interrelationship between hemangiosarcoma and the proliferation of sinusoidal lining cells and hepatocytes seen in VC fibrosis. Lelbach and Marsteller (1981) have also noted that the vast majority of hemangiosarcoma cases have appeared on a background of some degree of hepatic fibrosis. The implications of these suggestions for a hemangiosarcoma dose-response relation are uncertain.

During 1974, extensive studies were undertaken by the Environmental Sciences Laboratory of the total workforces of three polymerization plants in the states of New York, Michigan and West Virginia. The results from the New York plant (Lilis et al, 1975) indicated the presence of acroosteolysis in heavily exposed individuals. Hepato- and splenomegaly or hepatic tenderness was commonly observed and associated with duration of exposure and elevated alkaline phosphatase levels. Sixty-four of 354 had an enlarged or tender liver or spleen and of these, 41% had elevated alkaline phosphatase. Liver function tests were not particularly revealing, except for a correlation of elevated alkaline phosphatase levels with duration of exposure. Additionally, carcinogenic embryonic antigen titers were slightly higher among vinyl chloride exposed groups than in a smoking matched control population (Anderson et al, 1978).

Tamburro and Greenberg (1981) have evaluated the effectiveness of federally mandated screening tests for vinyl chloride exposed workers. Figure 1 shows the results on specificity and sensitivity for 78 individuals with hepatic status determined by biopsy. ICG clearance had the highest combined sensitivity and specificity, with SGPT the second most useful test. Elevated alkaline phosphatase had the greatest specificity of all tests, particularly for chemically-induced liver injury, but was lacking in sensitivity. SGOT and GGPT were of limited use because of their low specificity for chronic liver disease. They recommended the use of ICG clearance for screening, to be followed with alkaline phosphatase determinations for those with altered clearance.

reported that approximately 20% of VC/PVC workers with high exposures to PVC dust had abnormal X-rays, which correlated with duration of exposure and, also, with cigarette smoking. In contrast, only 4.7% of individuals in a PVC plant with low dust levels had abnormal X-rays. In addition to "typical pneumoconiosis," a granulatomous reaction to PVC dust has been reported (Arnaud et al, 1978). Miller et al (1975) have observed pulmonary function abnormalities (a reduction in the ratios FEV_1/FVC and MMF/predicted MMF) in both smokers and non-smokers heavily exposed to PVC dust (and also to VC monomer). Maltoni and Lodi (1981), observed greater percentage of abnormal sputum cytological results among VC exposed workers compared to several other groups of manufacturing workers or miners. Only workers in the chromium industry demonstrated a greater proportion of abnormal cells.

Ducatman et al (1975) have observed an increased frequency of chromosome abnormalities in the lymphocyte cultures of VC workers. Most of the abnormalities were "unstable" changes, such as fragments, dicentrics, and rings. This was confirmed by Purchase et al (1978), among others. Some of the group studied by Purchase were resampled 18 and 42 months later (Anderson et al, 1980). In those studied during January 1976, the frequency of abnormalities was increased in those who continued VC/PVC employment, but decreased in those who left the industry. In January 1978, no increased frequency was found in any worker. The authors attributed the decrease to the reduction in VC exposure.

HEALTH HAZARDS IN THE PVC PROCESSING INDUSTRY

Prior to identification of hemangiosarcoma in VC polymerization workers, little effort was made to control either the concentration of residual monomer in PVC dust or exposures to dust and VC that occurred in the various forming operations of the PVC fabricating industry. VC concentrations in excess of 10 ppm occurred frequently. While these concentrations were significantly lower than those of the polymerization industry, the much greater employment in the processing industry (hundreds of thousands vs. tens of thousands in the polymerization work) raised concern for population health effects, particularly for malignant disease for which no threshold was known. However, only two hemangiosarcomas have been documented in

onset of exposure. Considering the numbers of observed and expected deaths in all studies, it would appear that the excess of malignancies at nonhepatic sites is less than the excess of liver tumors. Data presented elsewhere in this volume (Nicholson and Henneberger, 1983) suggest that exposure reductions in 1974 may have virtually eliminated the VC-associated risk of liver cancer if the current U.S. standard is met. To the extent that VC exposure is associated with other cancers, a similar risk reduction would be expected.

Raynaud's phenomenon, acroosteolysis, sclerodermalike skin lesions, hepato- and splenomegaly with noncirrhotic hepatic fibrosis, and severe portal hypertension have been associated with past heavy exposures to VC. Evidence exists that the liver disease and portal hypertension may progress following cessation of exposure. However, all of the above syndromes were found largely in heavily exposed individuals. Their occurrence would be much less likely in workers exposed only to concentrations currently allowed. Pulmonary deficits, X-ray abnormalities, and, perhaps, lung cancer have been associated with VC/PVC exposure. Because of the possible contribution of PVC dust to these findings, engineering controls during polymer drying, bagging and usage are warranted.

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John T. Barr
Manager, Regulatory Response
(215) 481-8343

AIR PRODUCTS

P. de la Cruz - Kraft
R Gottesman - VT

Just to be sure
you have seen this -
from EPA proposal
to ban - asbestos -

JB
5 Feb

[redacted] [redacted]

SPI-00456

...ile products are cost competitive and ...are suitable for most applications. There ...are also a number of products that can substitute for asbestos-cement sheet as ...laboratory desk top and fume hood ...bench. However, it appears that ...comparably priced products may not ...fully match the qualities of asbestos-...cement sheet in these applications.

h. *Asbestos-cement shingles.* There ...are substitutes for asbestos-cement ...shingles for both roofing and siding ...applications. The primary substitutes for ...asbestos-cement roofing shingles are ...asphalt-fiberglass composition shingles, ...cedar wood shingles, and various ...synthetic and natural tiles, such as ...Monray roofing tile and concrete tile. ...Asphalt-fiberglass composition shingles ...cost about half as much as asbestos-...cement shingles in terms of purchase ...and installation costs but have only ...about half the operating life. Cedar ...wood shingles have a slightly greater ...cost then asbestos-cement shingles but ...have a greater operating life.

Substitutes for asbestos-cement ...shingle siding include wood, wood ...shingles, aluminum siding, PVC siding, ...stucco or concrete block, vinyl, and ...brick. Aluminum and PVC siding are ...both virtually identical to asbestos-...cement shingles in terms of price and ...durability. Cedar shingle siding is also ...very competitive in terms of price, but it ...is somewhat less durable.

The total substitute market for both ...applications is approximately as ...follows:

Asphalt/fiberglass	50 percent
Wood products	30–35 percent
Aluminum siding	5–10 percent
PVC siding	5–10 percent
Brick, tile	5 percent

2. *Possible hazards of substitutes.* EPA has analyzed available data on the health effects of major substitutes for asbestos (Ref. 14). Some of the substitutes such as wood-based products (e.g., cellulose fiber products) and construction products made of brick and concrete appear to present little risk. While other substitutes present some risk, EPA has concluded that the available information suggests that none of the substitutes appear to present as great a potential for risk to human health as asbestos. EPA made extensive use of the work of the National Research Council and agrees with their conclusion that: "Current population risk from exposures to the various substances considered, including fibrous glass, attapulgite, and carbon fibers, appears to be much less than for risk from asbestos, especially chrysotile" (Ref. 6). The conclusions of EPA's analysis of specific substitutes follows.

a. Fibrous glass appears to be considerably less hazardous than asbestos based on (1) morbidity and mortality studies in workers, (2) *in vivo* and *in vitro* experimental data, (3) the order of magnitude lower exposure potential in the workplace, (4) the generally less respirable nature of the airborne fibers, and (5) the less durable nature of the fibers in the lungs.

b. Mineral wood does not appear to present the significant risks that asbestos does based on (1) limited animal data and morbidity and mortality studies for workers, and (2) the lower exposure potential in the workplace.

c. Ceramic fibers do not appear to present a comparable risk to that of asbestos based primarily on (1) the moderate workplace concentrations, and (2) the specialized applications which include its encapsulation or incorporation into products.

d. Carbon/graphite fibers are probably not a significant health risk based on the (1) use of coatings on the fibers which may reduce their respirability, and (2) low intrinsic respirability characteristics.

e. Aramid fibers appear to present relatively low risk because they are basically nonrespirable as currently produced and processed.

f. Polyethylene and polypropylene pulps and fibers appear to present relatively little risk since they appear to be relatively nontoxic and nonrespirable.

g. Attapulgite has large general exposure potential but available evidence suggests that attapulgite from U.S. mines may present little hazard. In addition, attapulgite is not a major substitute for asbestos.

h. Polyvinylcholoride does not appear to present a health hazard comparable to asbestos, although vinyl chloride, the monomer used to produce polyvinylchloride, is a carcinogen. The polyvinylchloride product itself presents little risk and workplace exposures are apparently adequately controlled.

i. Ductile iron pipe does not present a health hazard comparable to that of asbestos.

EPA recognizes that some asbestos substitutes may be new chemical substances for which a premanufacture notice (PMN) must be submitted under section 5 of TSCA. A goal of EPA's PMN review program is to encourage the development of new chemical substances that are less hazardous than the chemical substances they replace. EPA encourages the development of less hazardous new chemical substances as asbestos replacements. Potential developers of new chemical substances intended as asbestos substitutes may wish to discuss their plans with EPA during a prenotice consultation. Such a consultation can be arranged by contacting the Prenotice Communications Coordinator by telephone at (202-382-3745) or by writing to the Prenotice Communications Coordinator, Chemical Control Division (TS-794), Environmental Protection Agency, 401 M St., SW., Washington, DC 20460. Through a prenotice consultation, EPA can inform potential PMN submitters of legal requirements, possible EPA health concerns about the substance, and possible test data that EPA may believe necessary to evaluate the risk potential of the substance. During a prenotice consultation and any PMN review of a new chemical substance that is intended as a substitute for asbestos, EPA will consider the relative risks presented by asbestos and potentially presented by the asbestos substitute. EPA will make every reasonable effort to provide prompt and clear information concerning the likely result of PMN review in view of EPA's policy of encouraging less hazardous substitutes for asbestos.

D. Economic Effects of Proposed Rule

This portion of the preamble presents EPA's determination of the "reasonably ascertainable economic consequences of the rule" as required by section 6(c)(1)(D) of TSCA.

EPA has prepared a "Regulatory Impact Analysis of Controls on Asbestos Products" (Ref. 3) which analyzes the potential economic impact of this proposed rule. The economic impact is summarized and explained below.

Estimated costs are mainly from 1981 data obtained under EPA's section 8(a) asbestos reporting rule (40 CFR 763.60). Some of the data were adjusted to reflect more current information on production of asbestos products. Specifically, EPA gathered more current information on the use of asbestos clothing and asbestos flooring felt and then adjusted the estimated costs and benefits of the rule to reflect declining use of these products. The sources of the information are noted in the record for this rule. The costs are presented as the net present value of costs incurred due to changes in asbestos product production between 1985 and 2000. Costs are likely to be overstated since the baseline production levels used in the cost model probably overstate production in the future. In addition, the cost estimation model assumes that the relative prices of substitutes for

3745
3746
3747

memorandum

SPI

TO: Roy Gottesman, Pat Toner, Margaret Rogers, Cathy Randazzo, Ellen Robinson, Julie Cahn	REFERENCE
FROM: Margaret Rita MR	EPA: Asbestos; Proposed Mining and Import Restrictions and Proposed Manufacturing Importation and Processing Prohibitions (51 FR 3738)
DATE: February 6, 1986	

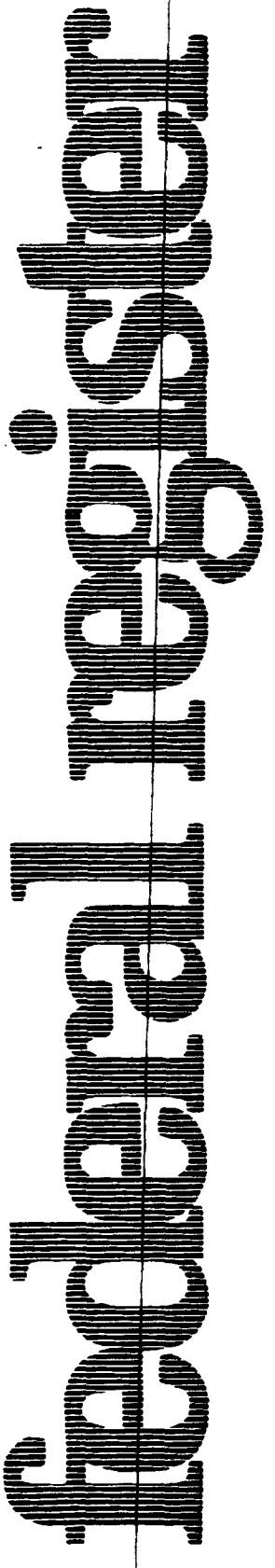
The Environmental Protection Agency proposed a rule January 29 to prohibit the manufacture, importation and processing of asbestos in certain products and to phase out the use of asbestos in all other products. Among its provisions, the proposal would ban the following products: asbestos-cement pipe and fittings, roofing felts, flooring felts, vinyl-asbestos floor tile and asbestos clothing.

EPA is also considering phasing out the manufacture, importation and processing of all asbestos products.

On page 51 FR 3743 there are three tables showing occupational exposure data for manufacturing, ambient exposure data for manufacturing, and exposure data for installation, use, repair, and disposal in relation to certain asbestos products. Some of the asbestos products listed include plastics, PVC siding, vinyl flooring, and surface coatings.

Comments are due by April 29, 1986. Public hearings will be held around May 14, 1986, but a definite date has not yet been decided. You may call EPA's TSCA Assistance Office to get the exact date and location at (202) 554-1404.

cc: John Dubeck



Wednesday
January 29, 1986

Part II

Environmental Protection Agency

40 CFR Part 763

Asbestos; Proposed Mining and Import Restrictions and Proposed Manufacturing Importation and Processing Prohibitions

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 763

[OPTS-62036; FRL 2947-3]

Asbestos; Proposed Mining and Import Restrictions and Proposed Manufacturing, Importation, and Processing Prohibitions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: EPA is proposing a rule under section 6 of the Toxic Substances Control Act (TSCA) to prohibit the manufacture, importation, and processing of asbestos in certain products and to phase out the use of asbestos in all other products. The products EPA proposes to ban are asbestos-cement pipe and fittings, roofing felts, flooring felts (and felt-backed sheet flooring), vinyl-asbestos floor tile, and asbestos clothing. Under this rule, EPA would also allow only those persons with permits issued by EPA to mine or import asbestos for use in products that are not banned. Eventually, all mining or importation of asbestos would be prohibited, except for that mining or importation allowed under an exemption process. EPA is proposing this rule to reduce the serious unreasonable risk to human health presented by exposure to asbestos. As an alternative, EPA is considering prohibiting the manufacture, importation and processing of categories of asbestos products at staged intervals. EPA is considering banning the manufacture, importation, and processing of asbestos construction products and asbestos clothing soon after the rule's promulgation with the category of asbestos friction products banned about 5 years later, and other asbestos products banned at a later time. EPA believes that this alternative approach would also be an effective way of reducing the serious unreasonble risk presented by exposure to asbestos and specifically requests comment on a staged ban of asbestos product categories. Finally, under both this alternative and the proposed approach, EPA is considering requiring labeling for all asbestos products that are not banned, including products manufactured pursuant to permits issued by EPA during the phase-down period, or pursuant to an exemption process. The Agency requests comments on the feasibility and effectiveness of such a requirement.

DATES: Public hearings will be held beginning approximately May 14, 1986. The exact times and locations of the hearings will be available by calling EPA's TSCA Assistance Office. Comments on this proposed rule and requests to participate in the informal hearings must be submitted by April 29, 1986. Reply comments made in response to issues raised at each hearing must be submitted no later than 1 week after the close of that hearing.

ADDRESS: Since some comments are expected to contain confidential business information, all comments should be sent in triplicate to: Document Control Officer (TS-793), Office of Toxic Substances, Environmental Protection Agency, Rm. E-209, 401 M St. SW., Washington, DC 20460.

Comments should include the docket control number OPTS-62036. Nonconfidential comments and nonconfidential versions of confidential comments received on this proposal will be available for reviewing and copying from 8 a.m. to 4 p.m., Monday through Friday, excluding legal holidays, in Rm. E-107 at the address given above.

FOR FURTHER INFORMATION CONTACT: Edward A. Klein, Director, Office of TSCA Assistance (TS-799), Office of Toxic Substances, Environmental Protection Agency, Rm. E-543, 401 M St. SW., Washington, DC 20460, Toll free: (800-424-9065), In Washington, DC: (554-1404), Outside the USA: (Operator—202-554-1404).

SUPPLEMENTARY INFORMATION:

I. Introduction

Asbestos, since the advent of its large scale use, has resulted in thousands of painful, premature deaths from lung cancer and other diseases. Because of the widespread use of asbestos and its particular nature, piecemeal control of the risks it presents is not satisfactory; only elimination of asbestos to the extent feasible will produce acceptable reduction of risks. Prevention of further deaths, therefore, requires forceful, integrated action against asbestos risks. To achieve this end, EPA has established a coordinated asbestos program, aimed at controlling exposure to asbestos from products already in use and eliminating risks from future uses. The rule EPA is proposing today, which would ban certain uses of asbestos and phase out all other uses, forms a central element of this program. Regulatory alternatives, which are discussed in this notice and which involve staged bans of various asbestos product categories, could also form a central element of the program.

The risks EPA is addressing in this proposal and its overall asbestos program are serious and well documented. Asbestos is a known human carcinogen that causes lung cancer, mesothelioma (a cancer of the chest and abdominal lining) and is also linked to other cancers. It has been estimated that 3,300 to 12,000 cancer cases a year occur in the United States as a result of past exposure to asbestos; almost all of these cancer cases are fatal. In addition, asbestos causes asbestosis (a serious lung disorder). About 65,000 persons in the United States are estimated to be suffering from asbestosis today. Assuming current exposure levels, EPA estimates that about 2,560 persons will develop lung cancer or mesothelioma as a result of exposure to asbestos from products made over the next 15 years, unless asbestos exposures are reduced through regulatory action. As discussed later, even with a relatively low workplace PEL of 0.2 f/cc, EPA estimates that almost 1,325 cancers will result from asbestos products made over the next 15 years. The underlying data upon which the risk assessments for asbestos are based come from a number of high quality epidemiologic studies. Unlike most potential carcinogens, asbestos has been studied often and thoroughly for its effects on humans.

Asbestos presents a particularly insidious threat because of the unique quality of its fibers. These fibers are small, colorless, odorless, often invisible except through a microscope, and indestructible in most uses. They can be transported on clothes and other materials, and they have aerodynamic features that allow them to be easily suspended and resuspended in the air and to travel long distances. Once released, asbestos fibers are difficult to detect and contain, and they readily enter the ambient air. Thus persons are exposed not only at the time and place of release, but long after the release has occurred and far from its source. There is constant renewal of risk as asbestos fibers reenter the atmosphere repeatedly over time.

Despite the known risks of asbestos, substantial amounts of the material are still mined, imported, and used in commercial products. About 240,000 metric tons, for example, were used domestically in 1984. Hundreds of products are still made with asbestos, including paper and textiles, cement pipe and sheets, tiles and felts, and automobile brakes. Asbestos fibers are released to the air at many stages of the commercial life of these products. Typical activities that lead to the

release of asbestos include the mining of asbestos, fiber processing into products, installation of products (e.g., the sawing, drilling, and sanding associated with asbestos-cement products), product use (e.g., release of fibers during use of asbestos cloth), product maintenance (e.g., buffing and scraping of vinyl-asbestos floor tile or repair of asbestos-containing brakes), dismantling and removal of products (e.g., removal of asbestos roofing felts), and disposal.

Release of fibers from these activities is substantial, resulting in exposure to both workers and non-workers. EPA estimates that about 700 metric tons are released to the air during mining and milling each year, about 100 metric tons during product manufacture, and about 18 metric tons from landfills. These estimates are probably low because they do not include releases from secondary fabrication of such products as millboard and asbestos-cement sheet, much of which is done in small shops with inadequate emission controls. Observations that levels of asbestos in the air near manufacturing plants and in cities are considerably greater than rural background levels seem to confirm that these releases occur and are significant.

Release of asbestos fibers occurs not only in the manufacture and processing of asbestos products, but also in their use and maintenance. This release can occur without the knowledge of the user or maintenance personnel. For example, construction workers tap into asbestos-cement pipes already in place. The workers often do not know that the pipe contains asbestos and thus do not take steps to limit fiber release. Similarly, significant releases occur as a result of the use and repair of asbestos brakes and other friction products, which constituted about 22 percent of the total asbestos market in 1984. Ambient levels of asbestos are elevated near freeways, presumable due to release from asbestos brakes.

Thus, the manufacture, processing, and use of asbestos products leave a legacy of asbestos in the ambient air. This ambient loading, while difficult to quantify, is a significant problem. The National Academy of Sciences, after analyzing studies of outdoor air, estimated typical concentrations of asbestos in outdoor ambient air in urban areas to be approximately 0.00007 f/cc (Ref. 6). Many millions of people are daily exposed to these levels of asbestos in the air. The National Academy of Sciences has also estimated that persons in urban areas face a lifetime risk of between about 1 in 100,000 to about 7 in 100,000 of developing cancer as a result of asbestos in the ambient air both indoors and outside of buildings (Ref. 6). Therefore, any comprehensive control strategy must take into account the potential for exposure during the entire lifecycle of asbestos products.

To date, EPA has focused its attention primarily on asbestos in buildings, a major source of asbestos release into the ambient environment. In the 1970s, EPA banned the use of sprayed-on asbestos and asbesto-containing pipe lagging under the Clean Air Act, and since then has taken steps to reduce risks from asbestos already in place in buildings. It has issued an air standard to reduce emissions from asbestos removal and renovation projects in buildings; issued a rule requiring inspection of schools for friable asbestos; and established an extensive technical assistance program, which provides guidance to public and private building owners on the identification and safe removal of asbestos. EPA has also proposed an immediately effective regulation to protect State and local public employees who take part in asbestos abatement activities.

These actions are primarily remedial, addressing risks from asbestos already in place; they do no address the substantial risks that will result from the continued manufacture and use of asbestos. Several other Federal agencies have already taken steps that partially reduce these risks. The Occupational Safety and Health Administration (OSHA) has an occupational standard for asbestos with a permissible exposure limit (PEL) of 2.0 f/cc. OSHA has proposed to lower this standard to either 0.2 or 0.5 f/cc. In addition, the Consumer Product Safety Commission (CPSC) has banned use of respirable asbestos in consumer patching compounds and artifical emberizing materials. However, substantial risk to workers and the general population remains. For this reason, EPA believes that only a major regulatory initiative under TSCA leading to the eventual elimination of most asbestos product manufacture and importation can satisfactorily reduce the overall risk to all segments of the population.

The limitations of exposure-based regulations in preventing asbestos-fiber release, and the need for more comprehensive action under TSCA, are illustrated by the use of PELs to control workplace exposure. In the first place, it appears infeasible to set a PEL for asbestos low enough to reduce risk to a satisfactory level. Even at 0.2 f/cc, the lowest PEL proposed by OSHA, OSHA, using the same lung cancer and mesothelioma models used by EPA, estimates that about 7 in 1,000 asbestos workers may die from an asbestos-related disease. Furthermore, it is unreasonable to assume complete compliance with a PEL of 0.2 f/cc, especially given the nature of the asbestos industry. Many of the workers exposed are in the service and construction industries, where worksites change frequently and the worker population is transient. Also, workers often do not know they are exposed to asbestos and therefore will not take the necessary precautions. As a result, PELs and other exposure controls are difficult to apply and enforce. Beyond these considerations, a workplace-based approach does not address risks to the general population. EPA estimates that, even if OSHA reduces the PEL to 0.2 f/cc, almost 1,325 cancers will still result from asbestos products made over the next 15 years.

Because of this residual risk, EPA is proposing under section 6 of TSCA a ban on the manufacture, importation, and processing of asbestos-cement pipe and fittings, roofing felts, flooring felts (and felt-backed sheet flooring), vinyl-asbestos floor tile, and asbestos clothing. These uses would be banned because safer, economically competitive substitutes are available, and because these asbestos uses are likely to contribute large amounts of asbestos to the ambient environment or present disproportionately high risk.

In addition, EPA is proposing to establish a permit system to phase out all other asbestos products. Under this system, EPA would allocate permission to mine or import a specific volume of asbestos to current miners and importers. The amount of asbestos a miner or importer would be allowed to mine or import would decline every year until after 10 years no mining or importation would be allowed, except under a specific exemption. This permit system would allow the market to allocate asbestos, based on the availability and cost of asbestos substitutes. After 10 years, EPA would put in place an exemption system for those asbestos applications for which no substitutes had been developed. EPA anticipates that there will be few such applications, because the permit system would create strong incentives for the development of substitutes. EPA is also considering a requirement that all asbestos products that are not banned be labeled as containing asbestos. This would apply to products made pursuant to permits issued by EPA to mine or import asbestos, and to products made pursuant to an exemption process.

In encouraging the development of substitutes, EPA will be promoting a

significant reduction in risk. Currently, all products that are replacing asbestos in its many uses appear to present lower risk. However, EPA will monitor the development of substitutes during the 10-year phase-down period, and will use section 4 of TSCA to require testing of substitutes if necessary to ensure their safety.

As explained more fully later, EPA is also actively considering other approaches to carry out a regulatory policy of phasing out the manufacture, importation, and processing of asbestos products. Approaches under consideration include banning categories of asbestos products at staged intervals. Two categories under consideration are asbestos construction products and asbestos friction products. Under this approach, EPA would ban the manufacture, importation, and processing of all asbestos products within the category at the same time.

EPA is considering this category approach because products within each of the categories have similar exposure patterns, raise similar exposure control issues, and have similar substitutes. EPA believes that it may be good public policy to ban such categories of products at the same time. This approach would address similar exposure patterns in the same way and treat all parts of an industry sector similarly. In addition, both the construction products category and the friction products category contain products that could substitute for other products in the category if all are not banned. Thus, a ban of the entire category may be necessary to reduce risk most effectively.

EPA also considered referring asbestos risks to OSHA and CPSC under section 9 of TSCA. EPA decided against this approach because OSHA and CPSC, in EPA's opinion, cannot adequately reduce the risk, given their authority and current control technologies. These agencies cannot comprehensively reduce the total volume of asbestos in commerce and cannot protect all of the many population groups at risk. Thus, action by these agencies under their separate authorities would still leave a large residual risk to workers and the general population. EPA concluded, therefore, that this approach would not adequately address the risks to society posed by the continued manufacture, processing, and use of asbestos-containing products. EPA is convinced that restrictions on the manufacture, importation, and processing of asbestos and asbestos products is the surest and most effective strategy for eliminating these risks.

II. Background

EPA announced that it was exploring possible use of TSCA to reduce the risk to human health from exposure to asbestos in an Advance Notice of Proposed Rulemaking (ANPR) published in the **Federal Register** of October 17, 1979 (44 FR 60061). Following publication of the ANPR, EPA investigated industrial and commercial uses of asbestos. Under section 8(a) of TSCA, EPA promulgated an asbestos reporting rule under 40 CFR 763.60 published in the **Federal Register** of July 30, 1982 (47 FR 33207). This rule required miners, millers, importers, and processors of asbestos to report information concerning (1) quantities of asbestos used in product manufacture, (2) employee exposure to asbestos, (3) waste disposal practices, and (4) emission control practices. The information reported under that rule has been used with other data to evaluate the risks and benefits of asbestos use.

Under section 21 of TSCA, a person may petition EPA to initiate a proceeding for the issuance, amendment, or repeal of a rule under various sections of TSCA. On June 21, 1979, EPA was petitioned to prohibit the future use of asbestos-cement pipe in water systems. EPA granted that petition by a notice published in the **Federal Register** of October 18, 1979 (44 FR 60155). On September 12, 1984, the Natural Resources Defense Council (NRDC) petitioned EPA to prohibit further use of asbestos in motor vehicle brakes. EPA granted that petition by a notice published in the **Federal Register** of December 18, 1984 (49 FR 49311). This proposal is in part a result of the proceedings conducted after granting those two petitions. EPA has identified effective substitutes for asbestos-cement pipe and is proposing to ban that product. EPA analyzed the availability of substitutes for asbestos in brakes but is not prepared to propose an immediate ban. Effective substitutes are still not available for many applications of asbestos in brakes. Instead, EPA is proposing to phase out use of asbestos in brakes and use market forces to encourage the more rapid development of substitutes. As an alternative, EPA is considering a ban of asbestos friction products about 5 years after this rule is promulgated. This alternative would also encourage the rapid development of substitutes.

III. Regulatory Assessment

Section 6 of the TSCA authorizes EPA to prohibit or limit by rule the amount of a chemical substance which may be manufactured, processed, or distributed in commerce if EPA finds that there is a reasonable basis to conclude that the manufacture, processing, distribution in commerce, use, or disposal of the chemical substance, or any combination of such activities, presents or will present an unreasonable risk of injury to health or the environment.

Under section 6(c)(1) of TSCA, EPA must consider the following factors when determining whether a chemical substance or mixture presents an unreasonable risk:

(1) The effects of such substance or mixture on health and the magnitude of the exposure of human beings to such substance or mixture.

(2) The effects of such substance or mixture on the environment and the magnitude of the exposure of the environment to such substance or mixture.

(3) The benefits of such substance or mixture for various uses and the availability of substitutes for such uses.

(4) The reasonably ascertainable economic consequences of the rule, after consideration of the effect on the national economy, small business, technological innovation, the environment, and public health.

After considering the above factors, EPA presents the following findings concerning the unrestricted mining and importation of asbestos, including asbestos imported in products.

A. Health Effects and Magnitude of Exposure to Asbestos

1. *Health effects.* This unit summarizes the health effects of asbestos. Detailed discussion and assessment of the health effects of asbestos may be found in the "Report to the United States Consumer Product Safety Commission (CPSC) by the Chronic Hazard Advisory Panel on Asbestos" (CHAP) (Ref. 1), "Health Effects and Magnitude of Exposure" in EPA's "Support Document for Final Rule on Friable Asbestos-Containing Materials in School Buildings," (Ref. 4) and the "Report of the (National Research Council) Committee on Nonoccupational Health Risks of Asbestiform Fibers" (Ref. 6).

EPA finds that the adverse human health effects from exposure to asbestos are extremely serious. Asbestos is a known human carcinogen that also causes other lung diseases. Asbestos has been thoroughly examined in numerous epidemiology studies. The life-threatening diseases that have been repeatedly identified are asbestosis, lung cancer, and mesothelioma. Also associated with asbestos exposure in some studies are cancers of the larynx,

pharynx, gastrointestinal tract, kidney, and ovary and respiratory dieseases such as pneumonia. Major health effects are discussed below.

Lung cancer is currently responsible for the largest number of deaths from exposure to asbestos. It has been associated with exposure to all the principal commercial asbestos fiber types. Excess lung cancer has been documented in groups involved with the mining and milling of asbestos and the manufacture and use of asbestos products. Studies in which the extent of exposure can be approximated provide evidence that lung cancer increase linearly with both level and duration of exposure. Cigarette smoking and asbestos have a strong synergistic interaction in development of lung cancer. Asbestos exposure appears to multiply the underlying risk of lung cancer. Consequently, when exposed to asbestos, the risk of lung cancer for smokers (for whom the risk of lung cancer is already high) is much higher than that for nonsmokers exposed to asbestos. Most persons who develop lung cancer die within 2 year.

Many human studies have also shown that exposures to asbestos produce mesotheliomas, which are cancers that occur as thick diffuse masses in the serous membranes (mesothelia) that line body cavities. Mesotheliomas occur in the pleura (the membrane that surrounds the lungs and lines the lung cavity) and the peritoneum (which surrounds the abdominal organs and lines the abdominal cavity). Most persons who develop mesothelioma die within the first 2 years after diagnosis, often after having been in constant pain. Epidemiology studies suggest that the incidence of mesothelioma is related to dose and time from first exposure. Association of mesothelioma with smoking is weak or nonexistent. Asbestos fibers appear, by far, to be the most common cause of mesotheliomas.

Asbestosis, which involves fibrosis of lung and pleural tissues, is another serious chronic disease associated with exposure to asbestos. There is no effective treatment for asbestosis and it is often disabling or fatal. Asbestosis is diagnosed from findings which may include radiographic changes, breathlessness, and abnormal lung function. Since some clinical symptoms of asbestosis are similar to those of other fibrosing lung diseases, a history of occupational exposure to asbestos is often a key feature of its diagnosis. Asbestosis can appear and progress decades after exposure to asbestos fibers. Under working conditions where average fiber concentrations in the air were high (more than 10 fibers per cubic centimeter (f/cc)) asbestosis has accounted for more than 7 percent of observed deaths (Ref. 11). It is apparently less common than lung cancer or mesothelioma at exposures lower than the current Occupational Safety and Health Administration (OSHA) workplace standard of 2.0 f/cc. Some recent data on the incidence of asbestosis appear compatible with a linear exposure-response relationship with no threshold (Ref. 12). However, it is still considered uncertain whether asbestosis occurs as a result of nonoccupational exposures.

In occupational studies where the primary route of exposure is through inhalation, lung cancer and mesotheliomas usually account for about 90 percent of the excess cancers seen among workers exposed to asbestos. However, as noted in the CHAP report (Ref. 1), a number of other cancers, principally of the gastrointestinal tract, have been associated with asbestos exposure. These are cancers of the larynx, pharynx, oral cavity, esophagus, stomach, colon, and rectum. Statistically significant excesses of cancers of the kidney and ovary have also been shown. In addition, the excess of cancers at all other sites combined is statistically significant in some studies.

The conclusions from epidemiology studies concerning the health effects of asbestos are also supported by results of laboratory studies. Animals treated with asbestos have shown increased incidence of fibrosis, lung cancer, and mesotheliomas. All commercial forms and several other types of asbestos are implicated from a variety of modes of exposure.

Most occupational studies have been conducted on populations exposed to high airborne concentrations of asbestos for relatively long periods of time. However, short-term occupational exposures have also been shown to increase the risk of lung cancer and mesothelioma. One group of asbestos factory workers with less than 2 months of occupational exposure had a twofold increase in lung cancer risk (Ref. 9). In addition, there are many documented cases of mesothelioma linked to extremely brief exposure to high concentrations of asbestos or long-term exposure to low concentrations (Ref. 4).

Direct evidence of adverse health effects from non-occupational asbestos exposure also exists. Persons who lived in the households of asbestos workers have developed pleural mesothelioma and asbestos-related radiographic changes. In an ongoing study, 4 cases of mesothelioma have been diagnosed among 626 family contacts of amosite workers (Ref. 10). These figures are much higher than that expected to be found among the general population. In addition, 35.9 percent of the contacts showed chest x-ray abnormalities as compared with 4.6 percent of control subjects drawn from the same community. A number of mesotheliomas have also been documented among populations whose only identified exposure was from living near asbestos mining areas, asbestos product factories, or shipyards where asbestos use had been very heavy (Ref. 4). An estimated 1,600 cases of mesothelioma occur yearly in the U.S. among various populations exposed to asbestos (Ref. 6).

In addition to exposure to asbestos fibers in the air, the general population is also exposed through various oral sources, including drinking water containing asbestos. Because of the potential for oral exposure as well as the excess of gastrointestinal tract cancers that has frequently been found in occupational groups exposed to asbestos in the air, there has been much study of the possible health effects of ingestion of asbestos fibers. Despite those efforts, evidence showing health effects from ingestion is still ambiguous.

2. *Cancer risk extrapolation.* As discussed above, numerous human studies have demonstrated that exposure to asbestos has increased the risk of cancer and asbestosis. Since a number of epidemiology studies indicate a positive relationship between asbestos exposure and the risk of lung cancer, several models may be used to extrapolate from risk at higher exposure to risk at lower exposure. The model that EPA believes is most consistent with the available human and animal data is the linear non-threshold dose/response model. This model assumes that (1) any exposure increases risk, and (2) the increase in risk is proportional to the background risk in the nonexposed population and to the level of exposure, defined as duration of exposure times concentration of asbestos fibers to which populations may be exposed.

The choice of the linear model is reasonable since there is no evidence for a threshold level of asbestos exposure below which there is no increased risk. It is further supported by evidence of cancers among populations whose asbestos exposure is believed to have been lower than levels reported in the epidemiology studies of asbestos workers mentioned above.

The model adopted by EPA to estimate excess mesothelioma incidence due to asbestos exposure relates disease

incidence to dose and the time from first exposure (minus 10 years) raised to the third power. This model reflects a delay (or minimum latency period) of 10 years between first exposure and the likely earliest possible appearance of the disease. Both the lung cancer and mesothelioma models have also been adopted by OSHA (Ref. 12). The National Research Council Committee on Nonoccupational Health Risks of Asbestiform Fibers also adopted a similar linear no-threshold model to estimate risk to nonoccupational populations from exposure to asbestos (Ref. 6). The derivation and validation of the models is discussed in detail in the CHAP report (Ref. 1) and in EPA's "Regulatory Impact Analysis of Controls on Asbestos and Asbestos Products" (RIA) (Ref. 3).

Although EPA believes that excess mortality from asbestosis and cancers other than lung cancer and mesothelioma will occur from exposure to asbestos released during the lifecycle of the products under study, EPA has not attempted to quantify that excess mortality. Thus, the model could understate the risk to humans from exposure to asbestos.

The risk of asbestos-induced disease may be modified by several factors. As mentioned in the earlier discussion on lung cancer, smoking drastically increases the risk of developing lung cancer from exposure to asbestos. Because of their lower underlying risk, the absolute increase of incidence of lung cancer in nonsmokers is about one-tenth of that in smokers. However, even complete control of the smoking factor (if possible) would leave a substantial health risk since the risk of mesothelioma (which is apparently unaffected by smoking) and the risk of lung cancer to nonsmokers would still remain.

Another factor that may affect the risk of asbestos-induced disease is the possible differences in biological potency among the different fiber types. The National Research Council (Ref. 6) studied this issue and concluded:

> Results of studies of various groups of workers indicate that it is extremely difficult to assess the role of fiber type (e.g., chrysotile or crocidolite) in determining the risk for developing either lung cancer or mesothelioma. Analysis of the epidemiological studies is complicated because of variations in type of industry, the diverse fiber characteristics within an industry, and the usual inadequacy of exposure data. Some scientists have interpreted the available epidemiological data to indicate that chrysotile asbestos, the asbestos type most commonly used in the United States, is less hazardous than the other types of asbestos, especially crocidolite. Such arguments have been used in the United Kingdom and other countries to rationalize different regulatory controls for crocidolite and chrysotile. However, in view of the laboratory evidence and great uncertainty about the nature of the fibers of asbestos to be found in nonoccupational exposure situations, the committee decided not to differentiate among them in the quantitative risk assessment. Furthermore, some of the apparent discrepancies may be explained by differences in physical properties of the fibers, their concentrations, and their characteristics in the different environments. These possibilities need further testing.

In view of this uncertainty about the relative potency of the various asbestos types and in view of the well-documented health hazard of the most common commercial form of asbestos, EPA has concluded that it is prudent to treat all asbestos fiber types as having equivalent biological activity.

Fiber morphology has also been suggested as a factor that may affect incidence of asbestos-induced disease. Animal studies in which asbestos fibers were applied by injection or implantation suggest that longer and finer fibers are more carcinogenic than shorter and coarser fibers. This has not, however, been confirmed by inhalation studies. EPA has not differentiated among fiber sizes in assessing the potential risk of asbestos. First, asbestos fibers released during the life cycle of asbestos products consist of a great range of dimensions, including those suggested as most dangerous. Second, it has not been clearly shown that short fibers pose a significantly smaller risk. No dimensional threshold for potency has been established.

3. *Magnitude of human exposure.* Asbestos fibers are released to the air during all stages of the lifecycle of asbestos products. Fiber release to the air occurs during normal operations of mining and milling, fiber processing into products, installation of products, product use, maintenance, renovation, dismantling, removal, and disposal. Asbestos fibers have special characteristics that affect exposure. They are colorless, odorless, and frequently invisible except by microscope, thus presenting risk to persons who are not aware that they may be exposed. Asbestos fibers are extremely durable and have aerodynamic properties that allow them to remain suspended in the air for a long time. They are basically nonbiodegradable and therefore persist for a very long time in the environment.

Asbestos fibers easily reenter the atmosphere after settling out and can travel long distances through the air. A report from Finland found that asbestos had traveled as far as 27 kilometers from a mine under study. Persons can be exposed to asbestos fibers long after those fibers have been released to the ambient air and a considerable distance from the source of the release. Asbestos fiber concentrations have been measured in areas far from obvious asbestos sources. Atmospheric sampling programs conducted in remote rural areas in the United States and Germany have found asbestos fiber levels between 0.01 and 0.12 nanogram/meter^3 (ng/m^3) (1 ng is one billionth of a gram). Conversion factors between asbestos fiber counts and mass counts are variable. However, EPA estimates that 1 ng of asbestos in air equals about 30 fibers visible by light microscopy. Using this conversion factor for asbestos in outdoor air, then the above measurements are the equivalent of about 3×10^{-7} to 3.6×10^{-6} f/cc. In areas of higher human population density, measured asbestos concentrations in the air are typically much greater. A survey of large cities showed mean readings of 2.6 to 5.0 ng/m^3 (7.8×10^{-5} to 1.5×10^{-4} f/cc). Measurements taken in New York City ranged from means of 8 to 30 ng/m^3 (2.4×10^{-4} to 9×10^{-4} f/cc). Typical fiber concentrations are much higher in densely populated areas because of fiber release from construction work (including renovation or demolition), from asbestos-containing brakes of motor vehicles, and from other activities during the lifecycle of asbestos products. In general, levels of asbestos in the air in cities and near manufacturing plants are considerably greater than rural background levels.

Thus, throughout their entire lifecycle, that is throughout their manufacture, processing, use, and disposal, asbestos products leave a legacy of asbestos in the ambient air. This ambient load, while difficult to quantify, is a significant problem. The National Academy of Sciences, after analyzing studies of outdoor air, estimated typical concentrations of asbestos in outdoor ambient air in urban areas to be approximately 0.00007 f/cc (Ref. 6). Many millions of people are exposed to those levels of asbestos in the air each day. Therefore, any comprehensive control strategy must take into account the potential for exposure during the entire lifecycle of asbestos products.

Some products do not present as much potential for releases to the ambient air during certain stages of their lifecycle. For example, there are likely to be releases to the ambient air during the manufacture, processing, installation, and repair of asbestos-cement pipe. However, there generally will be no release of asbestos to the ambient air during actual use of asbestos-cement

pipe since it is commonly buried in the ground.

A large proportion of the U.S. population is at risk from this asbestos in the air. Tables I through III show the numbers of persons exposed to asbestos during the more readily quantifiable stages of the lifecycle of asbestos products and the levels to which they are exposed. Exposure levels are "best estimates" based on monitoring studies. Additional information can be found in Refs. 2 and 3 which are included in the rulemaking record. To avoid disclosing confidential business information, the tables sometimes use a range rather than a single number. The notation NA means that data are not available.

TABLE I.—EXPOSURE DATA FOR MANUFACTURING—OCCUPATIONAL

Asbestos product	Primary manufacturing	
	Exposure level (10^6 f/yr)	Number of persons exposed
Commercial paper	5,691	0–150
Millboard	682	0–150
Pipeline wrap	307	0–150
Beater-add gasket paper	495	264
High-grade electrical paper	5,934	47
Unsaturated roofing felt	540	0–150
Saturated roofing felt	1,313	0–200
Flooring felt	NA	NA
Specialty paper	381	82
V/A floor tile	802	580
Felt-backed vinyl flooring	NA	NA
Asbestos/cement pipe	581	837
Flat A/C sheet	1,016	0–150
Corrugated A/C sheet	2,778	46
A/C sheet shingle	766	0–150
Drum brake lining	1,447	1,222
Disc brakes (LV)	1,568	1,038
Disc brakes (HV)	1,005	0–150
Brake blocks	1,608	456
Clutch facings	1,374	418
Friction products—automatic transmission	538	186
Friction products—commercial	1,361	479
Cloth	2,216	0–150
Thread	3,302	150–300
Sheet gasketing	780	105
Packing	1,084	247
Surface coatings	854	500
Sealants	638	708
Plastics	695	566
Insulation	438	0–150
Mixed fiber	1,348	150–300
Other	841	1,020

TABLE II.—EXPOSURE DATA FOR MANUFACTURING—AMBIENT

Asbestos product	Primary manufacturing	
	Exposure level (10^6 f/yr)	Number of persons exposed
Commercial paper	.00168	10,000
Millboard	.00168	30,000
Pipeline wrap	.00168	150,000
Beater-add gasket paper	.00168	350,200
Electrical paper	.00168	10,000
Unsaturated roofing felt	.00168	200,000
Saturated roofing felt	.00168	60,000
Flooring felt	NA	NA
Specialty paper	.00168	10,000
V/A floor tile	.0495	660,000
Felt-backed vinyl flooring	NA	NA
A/C pipe	3.07	1,700,000
Flat A/C sheet	3.07	790,000

TABLE II.—EXPOSURE DATA FOR MANUFACTURING—AMBIENT—Continued

Asbestos product	Primary manufacturing	
	Exposure level (10^6 f/yr)	Number of persons exposed
Corrugated A/C sheet	3.07	70,000
A/C sheet single	3.07	310,000
Drum brake lining	.0069	720,000
Disc brakes (LV)	.0069	320,000
Disc brakes (HV)	.0069	NA
Brake blocks	.0069	450,000
Clutch facings	.0069	70,000
Friction products—automatic transmission	.0069	NA
Friction products—commercial	.0069	90,000
Cloth	.0554	24,000
Thread	.0554	180,000
Sheet gasketing	.7326	690,000
Packing	.7326	90,000
Surface coatings	.00002	2,000,000
Sealants	.00002	4,350,000
Plastics	.00002	1,320,000
Insulation	NA	NA
Mixed fiber	NA	NA
Other	NA	NA

Table III.—Exposure Data For Installation, Use, Repair, and Disposal

Asbestos product	Installation		Repair/disposal	
	Exposure level (10^6 f/yr)	Number of persons exposed	Exposure level (10^6 f/yr)	Number of persons exposed
Commercial paper	NA	NA	NA	NA
Millboard	107	75	NA	NA
Pipeline wrap	NA	NA	NA	NA
Beater-add gasket paper	NA	NA	NA	NA
Electrical paper	120	18	NA	NA
Unsaturated roofing felt	160	7,577	NA	NA
Saturated roofing felt	160	2,423	NA	NA
Flooring felt	NA	NA	NA	NA
Specialty paper	130	75	NA	NA
V/A floor tile	90	5,100	NA	NA
Felt-backed vinyl flooring	NA	NA	NA	NA
A/C pipe	5,000	27,520	NA	NA
Flat A/C sheet	4,700	8,147	NA	NA
Corrugated A/C sheet	4,700	758	NA	NA
A/C sheet shingle	4,700	3,095	NA	NA
Drum brake lining	NA	NA	250	385,149
Disc brakes (LV)	NA	NA	105	164,322
Disc brakes (HV)	NA	NA	105	1,145
Brake blocks	NA	NA	NA	NA
Clutch facings	NA	NA	250	36,184
Friction products—automatic transmission	NA	NA	NA	NA
Friction products—commercial	NA	NA	NA	NA
Cloth	675	850	675	550
Thread	NA	NA	NA	NA
Sheet gasketing	1,380	4,586	NA	NA
Packing	12	2,914	NA	NA
Surface coatings	120	100,000	NA	NA
Sealants	NA	NA	NA	NA
Plastics	NA	NA	NA	NA
Insulation	NA	NA	400	3,000
Mixed fiber	NA	NA	NA	NA
Other	NA	NA	NA	NA

4. *Exposure from imported and exported asbestos and asbestos products.* EPA has determined that significant exposure is likely from imported asbestos products. Although some exposure to United States populations is avoided when asbestos products are manufactured abroad and imported rather than manufactured domestically, significant exposures will still occur after their import into this country. Exposures will occur during installation and use of the product; maintenance of the product; and during dismantling, removal, and disposal of the product. Much asbestos can be released to the ambient air as a result of these activities. Large numbers of people are exposed to asbestos during these activities and the level of exposure can be quite high.

Significant exposures will also occur during the domestic life cycle of bulk asbestos and asbestos products manufactured in this country for export abroad. These exposures will occur during the mining and milling of asbestos fiber and during the processing of fiber into products. There is much exposure to workers during the mining and milling of asbestos and manufacture of asbestos products. In addition, families of workers, and populations living near mining and manufacturing sites are also exposed to asbestos as a result of these activities.

5. *Exposure from various categories of asbestos products.* EPA has noted that various categories of asbestos products present very similar exposure patterns. For example, the products within the construction products category all present significant potential for fiber release to the air and subsequent human exposure during their installation, repair, removal, and disposal. These products are often cut, torn, sawed, and drilled during installation repair, and removal. All of these activities can release fibers to the air. In addition, sanding of these products during use often releases fibers to the air.

Similarly, products within the friction products category all present significant potential for fiber release and subsequent exposure during use and repair. Friction products wear down during use, often releasing fibers to the air either during actual use of the product or during maintenance or repair operations in which previously confined asbestos-containing dust is disturbed and becomes airborne.

Often, fiber releases from asbestos products in these categories occur in close proximity to other products within the same category, making it difficult to attribute observed fiber levels to a particular product. For example, EPA used monitoring data from automobile repair shops to estimate asbestos exposures resulting from repair of asbestos disc brakes, drum brakes, clutch facings, and automatic transmission friction components. Because there are no data available to estimate differences in fiber releases in the various repair activities, EPA

developed exposure estimates for each product using a weighting scheme based on the relative production volumes of each of the friction products which are the sources of the exposure. Similarly, it is common for many of the asbestos construction products to be used at one building site, making it difficult to attribute fiber release to one particular product. The estimation of ambient exposures due to releases from individual construction products, such as the various flooring products, was difficult since monitoring data were gathered in buildings where more than one type of asbestos flooring product was in place.

For these reasons, EPA believes that it may be appropriate to consider a categorial approach to analyze the risk presented by asbestos products and to control that risk. Table IV lists the products that are included in the construction products and friction products categories.

TABLE IV—EXAMPLES OF ASBESTOS PRODUCT CATEGORIES

Asbestos product category	Asbestos product
Construction product category.	Unsaturated roofing felt, Saturated roofing felt, Flooring felt, Vinyl asbestos floor tile, Felt-backed vinyl flooring, A/C pipe, Corrugated A/C sheet, Flat A/C sheet, A/C sheet shingle.
Friction products category.	Drum brake lining, Disc brakes (LV), Disc brakes (HV), Brake blocks, Clutch facings, Friction products—automatic transmission, Friction products—commercial.

6. *Quantitative cancer risk estimates.* As discussed above, there exist many asbestos exposure-producing activities to which many kinds of populations are exposed. Applying the cancer models described above to the available data on exposure and populations, EPA has estimated the number of cancers that may be avoided by implementing the EPA's proposed regulatory program. (A full discussion of the risk estimates is contained in the "Regulatory Impact Analysis of Controls on Asbestos and Asbestos Products (Ref. 3)". Using available dala and assuming current exposure levels, EPA calculates that about 2,560 lung cancers and mesotheliomas in the United States would result from production of asbestos products over 15 years without EPA action under TSCA. EPA calculates that this rule would avoid about 1,930 of those potential cancers. Assuming that OSHA achieves strict compliance with a PEL of 0.2 f/cc, EPA calculates that about 1,325 lung cancers and mesotheliomas would result unless EPA takes action under TSCA. EPA calculates that this rule would avoid about 1,000 of those potential cancers.

EPA also calculated the number of potential cancers avoided by the regulatory alternatives discussed later. Assuming current exposure levels, alternative 1, which would ban the asbestos construction products category and asbestos clothing soon after promulgation of the rule and ban the asbestos friction products category about 5 years later, would avoid about 2,100 cancers; alternative 2, which would ban the asbestos construction products category and asbestos clothing soon after promulgation of the rule, ban the asbestos friction products category about 5 years later, and ban the remaining asbestos products about 10 years later, would avoid about 2,120 cancers; and alternative 3, which would ban the asbestos construction products category and asbestos clothing soon after promulgation of the rule and cover all other asbestos products under the phase-down, would avoid about 2,020 cancers.

EPA believes these estimates of potential number of cancers, and therefore the potential number of cancers avoided, may be low for the following reasons:

a. The estimate is based only on exposures resulting from manufacture of asbestos products through the year 2000. Without regulatory action, manufacture of asbestos products may continue beyond that date.

b. The risk estimates often do not include cancers from consumer and other nonoccupational exposures to asbestos since data are either unavailable or uncertain. However, EPA believes that many people in these categories are at risk. An estimated lifetime risk of cancer of about 1 in 100,000 to about 7 in 100,000 exists for anyone who merely resides in a major city from exposure to asbestos in the ambient air both indoors and outside of buildings. (Ref. 6). Any additional exposure from asbestos products, such as consumer renovation of a house containing asbestos products, residing or working near plants that manufacture asbestos products, or residing or working in the vicinity of a construction project where asbestos-containing products are being installed or removed, will add to the risk of cancer. This additional exposure could increase the lifetime risk of cancer by more than an order of magnitude.

c. The risk estimates did not include all workers whose occupation causes them to come in contact with asbestos products. For example, the estimates do not include occupational exposure during repair, removal, and disposal of asbestos products other than friction products and cloth.

d. EPA did not make a worst case estimate of asbestos risk. Rather, the risk estimates were based on a relatively conservative interpretation of the dose-response relationship for mesothelioma and lung cancer. Risk estimates more than four times as high could be justified (Ref. 3).

e. EPA did not attempt to quantify reductions of cases of asbestosis and cancers other than mesothelioma and lung cancer. These diseases may add 10 to 20 percent more deaths to the total. OSHA estimates that at an exposure of 0.5 f/cc over a working career, 12 workers per 1,000 will develop asbestosis (Ref. 12). Thus, incidence of asbestosis could be significant among worker populations and possibly among other populations as well. In addition, in a major study of insulation workers exposed to asbestos, about 10 percent of all excess deaths were attributed to cancers other than lung cancer and mesothelioma (Ref. 11).

B. Environmental Effects

Section 6(c) of TSCA requires that EPA state the relevant environmental factors and key considerations which form the basis for regulatory action under section 6(a). The unreasonable risk finding of this proposal is based solely on risks to human health since these risks are by far the most serious consequence of commercial use of asbestos and are sufficient to support this proposed action.

C. Benefits of Asbestos Products and Availability of Substitutes

The benefits of the asbestos-containing products affected by the proposed rule are discussed below. Overall, EPA finds that the benefits to society of these asbestos-containing products are small since suitable substitutes are now available for most uses and applications of asbestos, and products are being developed that will replace almost all uses and applications of asbestos during the phase-down period of this proposal.

1. *Substitutes.* The detailed results of EPA's analysis of the availability of suitable substitutes for asbestos-containing products are reported in Appendix H, "Asbestos Products and Their Substitutes," of the RIA (Ref. 3) and are summarized in Table V.

TABLE V—SUMMARY TABLE OF ASBESTOS PRODUCTS, THEIR MAJOR USES, AND THE EXTENT TO WHICH THEY CAN BE SUBSTITUTED

Asbestos product	Major uses	Extent to which substitutes are available to replace asbestos products	
		Entirely	Partially
Asbestos cement pipe & fittings.	Water & sewer pipe.	X	
Flooring felt	Backing for vinyl sheet flooring products.	X	
Saturated roofing felt.	Construction of built-up roofing.	X	
Unsaturated roofing felt.	Production of saturated roofing felt.	X	
Vinyl/asbestos floor tile.	Floor tile for buildings.	X	
Asbestos-felt-backed vinyl sheet flooring.	A general floor surfacing medium.	X	
Adhesives & sealants.	Binding surfaces (adhesive) filling gaps in equipment & building construction (sealants).		X
Corrugated asbestos cement sheet.	Siding & roofing for buildings.	X	
Flat asbestos cement sheet.	Wall linings in buildings.	X	
Asbestos cement shingles.	Siding & roofing on buildings.	X	
Asbestos-reinforced plastics.	Components of appliance, electrical, automotive & printing equipment.		X
Friction components—transmission.	To dissipate heat when gears are changed.		X
Beater-add gaskets.	To provide nonleaking joints.		X
Brake blocks	To provide protection against heat & wear caused by braking in vehicles.		X
Asbestos textiles—cloth.	Material in safety curtains, fire blankets, & safety clothing.		X
Clutch facings	Friction materials in manual transmissions.		X
Commercial paper	General insulation paper & muffler paper.	X	
Corrugated paper	Pipe covering & block insulation.	X	
Disc brake pads (heavy vehicles).	Components of brakes in heavy vehicles.		X
Disc brake pads (light & medium vehicles).	Components of brakes in light & medium vehicles.		X
Drum brake linings (light & medium vehicles).	Components of brakes in light & medium vehicles.		X
Friction materials—industrial & commercial.	Materials that support braking & gear changing in vehicles & industrial		X
High grade electrical paper.	Electrical conductor fire insulation.		X
Millboard	To protect a supporting structure against heat, corrosion, moisture.		X
Asbestos packing	To seal fluids in applications where motion takes place.		X
Paints & surface coatings.	Protect surfaces from corrosion & water. Surfaces include chimneys, tanks, pipes, appliances.		X
Pipeline wrap	Wraps for gas, oil, hot water, & steam piping; primarily underground.		X
Rollboard	Protection against fire, heat, corrosion & moisture in industrial & office equipment & residential items.	X	
Sheet gasketing	Material used to seal fluids.		X
Specialty papers	Filters to purify or clarify liquids; cooling tower fill; & diaphragms for electrolytic cells.		X
Textiles—thread, yarn lap, roving, cord, & wick.	Insulation for wiring & electrical conductors; reinforcement for plastics; insulation for tools, packings, seals, & tape.		X
Total number		13	9

The following examples illustrate the types of substitutes available for those asbestos products EPA proposes to ban, either in this proposal or in one of the 3 regulatory alternatives described in this proposed rule, including the category of asbestos construction products and the category of asbestos friction products. A more complete analysis can be found in the Regulatory Impact Analysis (RIA) (Ref. 3).

a. *Friction products.* Substitutes exist or are being developed for almost all uses of asbestos in friction products. Replacement of asbestos in friction products has been more difficult than in the other asbestos product categories because of the unique combination of physical properties of asbestos which make it so well suited for friction products, e.g., heat resistance, corrosion resistance, high tensile strength, thermal stability, and processability. However, substitutes which are nearly as cost-effective as asbestos products have been developed for most uses of asbestos in friction products.

Asbestos automatic transmission friction components are currently being replaced with cellulose-based friction components. Only one of three domestic manufacturers of clutch facings makes them using asbestos. Clutch facings made of fiberglass and textile fibers have begun to replace asbestos facings to a significant extent. However, these substitutes are inferior to the asbestos clutch facings in durability, quietness, and tensile strength. Product development is continuing, however, to improve fiberglass facings to increase strength, wear, and ability to withstand heat through the use of special binders. Aramid-fiber-based clutch facings are also being developed. However, these have been relatively expensive compared to the asbestos and fiberglass clutch facings.

Semi-metallic disc brake pads have largely replaced asbestos disc brake pads in domestic cars with front wheel drive. Currently, about 85 percent of new domestic cars have front wheel drive and are equipped with semi-metallic front disc pads. Also, a number of brake manufacturers have begun to introduce an aramid fiber into production of disc brake pads.

The development of substitutes for asbestos drum brake linings has not been nearly as successful as it has been for disc brakes. Manufacturers have reported problems in processing nonasbestos fibers and problems in meeting standards of durability and heat resistance. There has been limited progress to date. One automobile manufacturer has reported that its new minivans are equipped with semi-metallic drum brake linings and one brake manufacturer has begun marketing aramid fiber-based linings for the replacement brake market. In addition, one automobile manufacturer has reported progress in developing a nonasbestos drum brake lining using an aramid fiber. However, domestic car manufacturers have not begun installing aramid-based or semi-metallic-based drum brakes linings on new vehicles except in very limited applications. A number of other substitute fibers are being tested by manufacturers and may have potential as a substitute for asbestos in brakes.

b. *Asbestos cloth products.* Asbestos cloth has been used as a final product in safety curtains, fire blankets, protective clothing, and high-temperature conveyor belts. Asbestos cloth is used as an input product in gaskets, packing, friction materials, and thermal and electrical insulation.

There currently are a number of substitute fibers for asbestos use in

cloth. These include glass fibers, ceramic fibers, carbon fibers, organic fibers, quartz fibers and cotton fibers. Replacement fibers for asbestos in cloth uses depend upon the specific application.

Substitutes appear to be available for almost all high-temperature applications of asbestos cloth. If asbestos cloth were not available, EPA expects that the following substitutes would replace asbestos cloth as follows:

Fiberglass cloth products: 50 to 60 percent.

Aramid cloth products: 20 to 25 percent.

Carbon/graphite cloth products: 5 to 10 percent.

Ceramics and silicon-based cloth products: 10 to 15 percent.

Because of their temperature and flame resistance, asbestos clothing products protect wearers from fire and heat. However, substitute products have been developed for asbestos clothing products. Aramid cloth products can substitute for asbestos in protective garments, but are more expensive. Some other textile products made without asbestos are less expensive than the counterpart product made with asbestos cloth. Substitute products for asbestos clothing include nomex, fiberglass, and zetex. Asbestos clothing has been replaced by substitutes in most or all firefighting and industrial applications.

c. *Asbestos-cement pipe and fittings.* Products in this category are manufactured for various uses. Most pipe is used to carry water or sewage. A small amount is used to carry chemicals or is used as air ducts. Pipe varies in construction depending on use and such factors as how deep it will be buried, the rate of fluid transmitted and whether it is under pressure.

EPA believes that at least one suitable substitute is available for each of the many pipe types and sizes. Based on information from manufacturers, EPA concluded that operation and maintenance costs and service life of all products are essentially similar. Asbestos-cement pipe does not dominate any segment of the pipe market, but is popular for certain applications such as carrying water at low pressure. If this rule is promulgated, EPA expects that the following substitutes will replace asbestos-cement pipe as follows:

Polyvinyl chloride (PVC) pipe	72 percent
Ductile iron pipe	23 percent
Prestressed concrete pipe	4.2 percent
Reinforced concrete pipe	0.15 percent

These estimates are only approximate and do not take into account other possible substitutes that EPA considered somewhat less suitable than those noted above. These include various plastic and vitrified clay pipes.

All of the substitutes considered are well established in the pipe market and can be joined to or replaced existing asbestos-cement pipe sections.

d. *Roofing felt.* Asbestos roofing felt is used for built-up roofing, primarily on flat roofs. "Built-up" refers to the practice of layering felt lengths on top of each other with hot roofing tar or asphalt mopped between layers of adhesion and additional weather protection.

Currently, less than 10 percent of roofing felt sold contains asbestos. Organic felt, fibrous glass felt, and single-ply membrane roofing all have greater shares of the flat roof market than asbestos felt.

Of these three well-established products, fibrous glass felt most closely approximates asbestos roofing felt in purchase and installation prices and service life. Organic felt has a lower purchase price, but has lower insulation value and moisture resistance and a somewhat shorter service life. Single-ply membrane roofing consists of a laminate of a modified bitumen or polymeric system such as polyvinyl chloride or ethylene propylene diene monomer. A typical product consists of a five-layer laminate composed of a thick plastic core protected on each surface by a layer of modified bitumen and an outer film of polyethylene. The purchase price of single-ply membrane roofing is several times that of asbestos felt, is about as expensive to install, but is expected to have a longer service life. Single-ply membrane also has the advantage of not requiring the use of hot asphalt during installation.

e. *Flooring felt and felt-backed vinyl sheet flooring.* Asbestos flooring felt was used as a backing for vinyl sheet flooring products. The felt confers dimensional stability and helps prolong floor life when moisture from below the surface is a problem. EPA does not believe that flooring felt is currently being produced in the U.S.

A large number of non-asbestos vinyl flooring products have entered the market in the last 5 years. These products include sheet backed with felt containing fibrous glass, cellulose, polyethylene or polypropylene fibers, ceramic fibers, and plastic foam. Also available are unbacked sheet and numerous traditional flooring products such as ceramic tiles, capeting, and wood flooring. Among these many products, consumers will find adequate substitutes for any particular use of asbestos containing felt or felt-backed flooring.

EPA has found that price differentials between asbestos and non-asbestos vinyl sheeting are negligible. Overall, the backing is a small part of the total cost for vinyl sheet products. Maintenance and service life are not materially affected by the backing. The wide range of prices found among various vinyl flooring products are mostly attributable to the colors and patterns of the vinyl as well as the wear-layer thickness.

f. *Vinyl-asbestos floor tile.* Vinyl-asbestos floor tile is used in numerous applications, but has been especially popular for use in heavy traffic areas such as in stores, kitchens, and entry ways. Addition of fiber contributes to abrasion and indentation resistance, dimensional stability, and resistance to moisture, heat, and oil.

Currently, the most suitable available substitutes for vinyl-asbestos floor tiles are various asbestos-free vinyl composition floor tiles. In place of asbestos fibers, manufacturers are using synthetic fibers including fibrous glass, polypropylene, polyethylene, and cellulose.

There are also several types of vinyl tiles that contain various fillers and resins in place of fiber. Many non-asbestos vinyl tile products have been on the market for only a few years. Consequently their service lives are not well established. Some industry contacts believe the non-asbestos tiles will last as long as the asbestos tiles, while others believe service lives will be shorter. EPA currently assumes that service lives of the non-asbestos tiles will be about one-third shorter than for the asbestos tiles.

g. *Asbestos-cement sheet.* There are a number of cost competitive substitutes for asbestos-cement sheet. These include both products using substitute fibers and other product substitutes. Glass-reinforced concrete is suitable for most corrosion and heat-resistant applications where asbestos-cement sheet is now used. Glass-reinforced concrete is widely available at a price that has been declining relative to that of asbestos-cement sheet. Cement-wood board is suitable for the general construction applications of asbestos-cement sheet. The use of resins and surface coatings with cement-wood board makes the product suitable in weather-resistant applications.

In the siding market, asbestos-cement products have no cost advantage over galvanized steel, aluminum, or concrete. However, asbestos-cement sheet may have greater corrosion resistance than the other products. In cooling towers, polyvinyl chloride products or ceramic

tile products are cost competitive and are suitable for most applications. There are also a number of products that can substitute for asbestos-cement sheet as a laboratory desk top and fume hood bench. However, it appears that comparably priced products may not fully match the qualities of asbestos-cement sheet in these applications.

h. *Asbestos-cement shingles.* There are substitutes for asbestos-cement shingles for both roofing and siding applications. The primary substitutes for asbestos-cement roofing shingles are asphalt-fiberglass composition shingles, cedar wood shingles, and various synthetic and natural tiles, such as Monray roofing tile and concrete tile. Asphalt-fiberglass composition shingles cost about half as much as asbestos-cement shingles in terms of purchase and installation costs but have only about half the operating life. Cedar wood shingles have a slightly greater cost then asbestos-cement shingles but have a greater operating life.

Substitutes for asbestos-cement shingle siding include wood, wood shingles, aluminum siding, PVC siding, stucco or concrete block, vinyl, and brick. Aluminum and PVC siding are both virtually identical to asbestos-cement shingles in terms of price and durability. Cedar shingle siding is also very competitive in terms of price, but it is somewhat less durable.

The total substitute market for both applications is approximately as follows:

Asphalt/fiberglass	50 percent
Wood products	30–35 percent
Aluminum siding	5–10 percent
PVC siding	5–10 percent
Brick, tile	5 percent

2. *Possible hazards of substitutes.* EPA has analyzed available data on the health effects of major substitutes for asbestos (Ref. 14). Some of the substitutes such as wood-based products (e.g., cellulose fiber products) and construction products made of brick and concrete appear to present little risk. While other substitutes present some risk, EPA has concluded that the available information suggests that none of the substitutes appear to present as great a potential for risk to human health as asbestos. EPA made extensive use of the work of the National Research Council and agrees with their conclusion that: "Current population risk from exposures to the various substances considered, including fibrous glass, attapulgite, and carbon fibers, appears to be much less than for risk from asbestos, especially chrysotile" (Ref. 6). The conclusions of EPA's analysis of specific substitutes follows.

a. Fibrous glass appears to be considerably less hazardous than asbestos based on (1) morbidity and mortality studies in workers, (2) *in vivo* and *in vitro* experimental data, (3) the order of magnitude lower exposure potential in the workplace, (4) the generally less respirable nature of the airborne fibers, and (5) the less durable nature of the fibers in the lungs.

b. Mineral wood does not appear to present the significant risks that asbestos does based on (1) limited animal data and morbidity and mortality studies for workers, and (2) the lower exposure potential in the workplace.

c. Ceramic fibers do not appear to present a comparable risk to that of asbestos based primarily on (1) the moderate workplace concentrations, and (2) the specialized applications which include its encapsulation or incorporation into products.

d. Carbon/graphite fibers are probably not a significant health risk based on the (1) use of coatings on the fibers which may reduce their respirability, and (2) low intrinsic respirability characteristics.

e. Aramid fibers appear to present relatively low risk because they are basically nonrespirable as currently produced and processed.

f. Polyethylene and polypropylene pulps and fibers appear to present relatively little risk since they appear to be relatively nontoxic and nonrespirable.

g. Attapulgite has large general exposure potential but available evidence suggests that attapulgite from U.S. mines may present little hazard. In addition, attapulgite is not a major substitute for asbestos.

h. Polyvinylchloride does not appear to present a health hazard comparable to asbestos, although vinyl chloride, the monomer used to produce polyvinylchloride, is a carcinogen. The polyvinylchloride product itself presents little risk and workplace exposures are apparently adequately controlled.

i. Ductile iron pipe does not present a health hazard comparable to that of asbestos.

EPA recognizes that some asbestos substitutes may be new chemical substances for which a premanufacture notice (PMN) must be submitted under section 5 of TSCA. A goal of EPA's PMN review program is to encourage the development of new chemical substances that are less hazardous than the chemical substances they replace. EPA encourages the development of less hazardous new chemical substances as asbestos replacements. Potential developers of new chemical substances intended as asbestos substitutes may wish to discuss their plans with EPA during a prenotice consultation. Such a consultation can be arranged by contacting the Prenotice Communications Coordinator by telephone at (202–382–3745) or by writing to the Prenotice Communications Coordinator, Chemical Control Division (TS–794), Environmental Protection Agency, 401 M St., SW., Washington, DC 20460. Through a prenotice consultation, EPA can inform potential PMN submitters of legal requirements, possible EPA health concerns about the substance, and possible test data that EPA may believe necessary to evaluate the risk potential of the substance. During a prenotice consultation and any PMN review of a new chemical substance that is intended as a substitute for asbestos, EPA will consider the relative risks presented by asbestos and potentially presented by the asbestos substitute. EPA will make every reasonable effort to provide prompt and clear information concerning the likely result of PMN review in view of EPA's policy of encouraging less hazardous substitutes for asbestos.

D. Economic Effects of Proposed Rule

This portion of the preamble presents EPA's determination of the "reasonably ascertainable economic consequences of the rule" as required by section 6(c)(1)(D) of TSCA.

EPA has prepared a "Regulatory Impact Analysis of Controls on Asbestos Products" (Ref. 3) which analyzes the potential economic impact of this proposed rule. The economic impact is summarized and explained below.

Estimated costs are mainly from 1981 data obtained under EPA's section 8(a) asbestos reporting rule (40 CFR 763.60). Some of the data were adjusted to reflect more current information on production of asbestos products. Specifically, EPA gathered more current information on the use of asbestos clothing and asbestos flooring felt and then adjusted the estimated costs and benefits of the rule to reflect declining use of these products. The sources of the information are noted in the record for this rule. The costs are presented as the net present value of costs incurred due to changes in asbestos product production between 1985 and 2000. Costs are likely to be overstated since the baseline production levels used in the cost model probably overstate production in the future. In addition, the cost estimation model assumes that the relative prices of substitutes for

asbestos products will remain constant over the time period used for measurement of costs. Actually, price differentials are likely to decrease over time.

Two types of costs are estimated in the RIA: (1) Costs to consumers and (2) costs to producers. These are discussed below. The costs represent the present value of losses incurred over the 15-year period from 1985 to 2000, using a discount rate of 10 percent.

1. Consumer losses due to the rule would result from increases in costs incurred for asbestos products or substitutes for asbestos products and from inferior performance of substitute products. Total consumer losses due to the rule are estimated to be $1.77 billion. However, this loss would be spread across the entire consumer population and would average less than $10 per consumer over 15 years. This rule would not cause dramatic cost increases in typical consumer products.

2. Losses would accrue to producers as a result of the rule when producers are forced to forgo some portion of the return on their capital stock used to produce asbestos products. Owners of equipment which can be readily converted to make other products are not expected to lose nearly as much as owners of equipment which cannot be easily converted. Total producer costs are estimated to be about $209 million for the rule.

3. In addition, the rule would result in transition costs to workers who are displaced by phasing down production of asbestos products. These losses are incurred in the form of lost wages and job search costs. EPA believes that transition costs of the phase-down will be relatively modest since the rule would allow industry to scale back production gradually and shift production to other products and that the transition costs from the proposed product bans will be small in comparison to the consumer and producer costs.

The sum of these costs, about $1.98 billion, represents the estimated total real resource costs of the rule. This cost would be spread over 15 years. The cost will also be spread over a large population and the impact on most persons would be negligible.

In addition, EPA estimated the real resource costs of the product bans proposed in this rule. These estimates are shown below:

Product	Real resource cost
A/C Pipe	$165.4 Million
Floor tile	$119.5 Million
Flooring felt	No Cost
Asbestos clothing	$.1 Million
Roofing felt	$4.2 Million

The above costs of the rule will be offset to some extent by the following avoided costs.

By reducing the amount of asbestos-related deaths and illnesses this rule would reduce the cost to society of the health resources used to treat asbestos-related illnesses (e.g., hospital and medical treatment) and the productivity (wages and lost work capacity of sick workers, etc.) lost as a result of illness caused by asbestos exposure. EPA estimates that the avoided morbidity cost is about $1.275 per case. This is measured in 1985 dollars using a 10-percent discount rate.

This figure is relatively low because people generally contract mesothelioma or lung cancer after a long latency period. Thus most medical costs occur far in the future and are therefore discounted heavily.

EPA did not attempt to value the loss of life itself. In addition, no value was assigned to "pain and suffering," "loss of leisure time," and other similar losses.

Substantial asbestos removal and disposal costs would be avoided as a result of this proposed rule. These include avoided expenses as well as avoided health risks for people exposed during removal and disposal activities. Use of nonasbestos products in construction reduces demolition and disposal costs in the future. Removal and disposal costs of products are likely to be considerably higher for asbestos products than nonasbestos substitutes because of the extra precautions required to meet OSHA and Clean Air Act (CAA) requirements. Avoided removal and disposal costs are a major benefit of this proposed regulation. These costs can be substantial. EPA has estimated that removing asbestos from school buildings costs between $2 and $13 per square foot of asbestos removed.

OSHA and EPA both have regulations to limit asbestos exposure at work sites. Certain costs related to compliance with these regulations would be avoided as a result of this rule. To comply with OSHA's current workplace standard for asbestos, employers incur expenses related to:

a. Monitoring for fibers.

b. Providing engineering methods to control exposures (this includes enclosing or isolating asbestos fiber generating activities, providing exhaust ventilation, dust collection, etc.)

c. Providing hand tools such as saws, scorers, drills, and abrasive wheels that have local exhaust ventilation systems.

d. Modifying work practices to reduce exposure.

e. Providing special clothing, change rooms, lockers, and special laundering.

f. Labeling asbestos material and posting caution signs.

g. Providing special procedures for collection and processing of asbestos waste.

h. Providing medical examinations for employees exposed to asbestos.

i. Responding to recordkeeping and reporting requirements.

EPA's CAA regulations require that activities during milling, manufacture, demolition and renovation, waste disposal, and some other asbestos-related activities release "no visible emissions." To comply with this requirement, persons must obtain and maintain air-cleaning devices such as filters and may be required to modify work and waste disposal practices to reduce emissions.

In addition, both OSHA and EPA may require stricter workplace controls for asbestos in the near future. The costs of complying with those requirements would be avoided at least in part by this rule.

United States courts and workman's compensation boards have been inundated with thousands of claims for compensation for deaths and illnesses caused by exposure to asbestos. Some past producers of asbestos products have declared bankruptcy because of these many claims. The continued use of asbestos can only exacerbate the problem. Each case of disease avoided relieves the various systems affected of a considerable burden. This rule, by reducting exposure to asbestos and reducing the number of asbestos-related illnesses and deaths, would reduce these costs.

As required by section 6(c)(1)(D) of TSCA, EPA has analyzed the economic impact of this proposed rule on small businesses. The effect of this rule on such businesses is expected to be small because (1) there are few small businesses producing asbestos products and (2) producer losses are expected to be small since capital equipment for production of most asbestos products can be converted fairly easily to other forms of production. A maximum of 27 out of the 212 primary processors of asbestos products are small businesses. EPA acknowledges that these 27 companies could incur losses under the rule. EPA was unable to determine how many of the secondary processors of asbestos products are small businesses.

However, EPA acknowledges that a higher percentage of secondary processors are likely to be small businesses than the percentage of primary processors that are small businesses. In addition, 5 of the 11 companies that manufacture the products that this rule proposes to ban are small businesses. This proposed rule could have significant impact on these few companies.

The estimated costs of the rule could be seen as significant. However, the overall benefits to society of asbestos-containing products are diminishing with the current availability and the continued development of various nonasbestos substitutes. The costs of the rule are speculative and probably are overestimated. In addition, many economic impacts of this rule are likely to be short-term and spread across large populations with only negligible impact on the typical consumer. This rule is not expected to cause dramatic price increases in typical consumer products. Consumer losses caused by this rule would be spread across the entire consumer population. Jobs displaced by this rule are likely to be offset by increased employment in companies producing substitutes for asbestos products. Potential consumer and producer costs are likely to be offset by the economic costs avoided by this rule, i.e., avoidance of the morbidity costs of asbestos-related diseases; the cost of removal and disposal of asbestos products; the costs of special control to reduce exposure to asbesto; and costs associated with legal actions seeking compensation for asbestos-related illnesses and deaths. Finally, the estimated costs of this rule appear reasonable in view of the unreasonably large number of asbestos-related deaths and serious illnesses that would occur without a phase-out of asbestos.

EPA expects that this proposed rule would have a positive impact on technological innovation and encourage the continued rapid development of nonasbestos substitute products. This development of new products is likely to involve significant technological innovation.

IV. Other Options Considered

Section 6 of TSCA requires that EPA apply the least burdensome requirements to reduce an unreasonable risk. EPA is considering a number of options for implementing the regulatory policy of phasing out the manufacture and importation of asbestos products. These options involve staged bans of categories of asbestos products. This approach would ban the manufacture, importation, and processing of all asbestos products within a certain category at the same time. EPA is considering a category approach for groups of asbestos products with similar exposure patterns, similar exposure control issues, and similar substitutes. Examples of categories under consideration are construction products and friction products. EPA believes it may be good public policy to ban categories of products at the same time. This approach would address similar exposure patterns in the same way and treat all parts of an industry sector similarly. In addition, both the construction products category and the friction products category contain products that could substitute for other products in the category if all are not banned. Thus, a ban of the entire category may be necessary to reduce risk most effectively.

One option under active consideration in addition to the ones embodied in the proposal is banning the manufacture, importation, and processing of the asbestos construction products category and asbestos clothing with the ban effective soon after promulgation of the rule; banning the manufacture, importation, and processing of the asbestos friction products category about 5 years after promulgation of the rule; and gathering up-to-date production, exposure, and use data on the remaining asbestos products under section 8(a) of TSCA to support possible bans of other asbestos products at that time. Another option is banning the manufacture, importation, and processing of the asbestos construction products category, asbestos clothing, and the asbestos friction products category as stated above and banning the remaining asbestos products at a later time (e.g., 10 years), thus allowing time for the development of effective substitutes while strongly encouraging substitute development. A third option is banning the manufacture, importation, and processing of the asbestos construction products category and asbestos clothing as stated above and covering all other asbestos products under the phase-down. Under each of the options, EPA is also considering a requirement that products not banned soon after promulgation be labeled as containing asbestos.

EPA is actively considering these options as alternatives to this proposed rule and specifically requests comment on these alternatives. EPA may adopt a final rule based closely on one or a combination of these alternatives. These alternatives are discussed more fully below.

1. *Ban the asbestos construction products category and asbestos clothing soon after promulgation of the rule, ban the asbestos friction products category about 5 years later, and gather additional information on other asbestos products.* Under this alternative, EPA would ban the manufacture, importation, and processing of the asbestos construction products category (i.e., asbestos-cement pipe and fittings, roofing felts, flooring felts and felt-backed sheet flooring, vinyl-asbestos floor tile, corrugated asbestos-cement sheet, flat asbestos-cement sheet, and asbestos-cement shingles) and asbestos clothing soon after promulgation of the rule. Effective substitutes exist for these products. The rule would also ban the manufacture, importation, and processing of the asbestos friction products category (i.e., drum brake linings, disc brake pads for light, medium, and heavy vehicles, brake blocks, clutch facings, automatic transmission friction components, and industrial and commercial friction materials) 5 years after promulgation of the rule. This alternative would reduce exposure to asbestos without the administrative burden of EPA establishing and operating a permit system as in the proposed approach. This alternative, by banning asbestos friction products 5 years after promulgation, would strongly encourage the rapid development of additional effective substitutes for asbestos friction products. The 5-year delayed ban would also allow time for expansion of production capacity for non-asbestos friction products.

EPA estimates that this alternative, assuming current exposure levels, would avoid about 2,100 cancer cases that EPA can quantify while costing about $2.11 billion. This is a cost of about 1.01 million per cancer case avoided.

Because OSHA has proposed lowering the workplace PEL for asbestos to 0.2 f/cc, EPA also estimated the numbers of cancer cases avoided assuming strict compliance with this lower PEL. Assuming strict compliance with an OSHA PEL of 0.2 f/cc, EPA estimates that this alternative would avoid about 1,060 cancer cases that EPA can quantify, while costing about $2.11 billion. This is a cost of about $2.00 million per cancer case avoided.

To determine how sensitive the cost per cancer case avoided was to the banning of particular products, EPA conducted a sensitivity analysis, excluding asbestos-cement pipe from the ban.

Without a ban of asbestos-cement pipe and assuming strict compliance

with an OSHA PEL of 0.2 f/cc. EPA estimates that this alternative would avoid about 840 cancer cases that EPA can quantify, while costing about $1.87 billion. This is a cost of about $2.22 million per cancer case avoided.

EPA believes that effective substitutes are increasingly becoming available for asbestos friction products and will be readily available by the date the delayed ban would become effective. However, EPA is considering an exemption process for essential uses without substitutes. One area EPA is studying in particular is the aftermarket for asbestos brakes. Some persons have stated that asbestos brakes now in use cannot safely be replaced by asbestos-free brakes when they wear out, while others have disagreed with this assertion. EPA is aware of the potential risk to the public from poorly performing brakes. EPA specifically requests comment on this issue.

EPA considered various approaches for addressing the risk presented by asbestos products not banned either soon after promulgation or 5 years after promulgation under this alternative. One approach would be to propose and promulgate a rule under section 8(a) of TSCA to gather contemporaneous data concerning the production and use of and exposure to these products at the time the first products ban rule becomes effective or at a date a few years later. EPA would analyze that data and then decide whether to ban additional asbestos products. EPA would also determine the date of these bans, which may be at staged intervals. After deciding these issues, EPA would propose and promulgate the bans of these asbestos products. Another approach for addressing the risk presented by these remaining asbestos products is discussed as alternative 2 below.

2. *Ban the asbestos construction products category and asbestos clothing soon after promulgation of the rule, ban the asbestos friction products category about 5 years later, and ban remaining asbestos products about 10 years later.* Under this alternative, as in alternative 1, EPA would ban the manufacture, importation, and processing of the asbestos construction products category and asbestos clothing soon after promulgation of the rule, and ban the manufacture, importation, and processing of the asbestos friction products category 5 years after promulgation of the rule. This alternative would also ban the manufacture, importation, and processing of all other asbestos products 10 years after promulgation of the rule. This alternative would relatively quickly ban a number of asbestos products for which effective substitutes exist while strongly encouraging the rapid development of effective substitutes for other asbestos products.

This alternative, unlike alternative 1, avoids the necessity of future rulemakings to gather additional data and then ban additional products. It would also provide greater certainty about the status of all asbestos products and more strongly encourage the development of substitutes for all applications of all products.

As in alternative 1, EPA is considering the need for an exemption process for asbestos friction products in connection with the staged product bans.

EPA estimates that this alternative, assuming current exposure levels, would avoid about 2,120 cancer cases that EPA can quantify while costing about $2.29 billion. This is a cost of about $1.08 million per cancer case avoided.

Assuming strict compliance with an OSHA PEL of 0.2 f/cc, EPA estimates that this alternative would avoid about 1,070 cancer cases that EPA can quantify, while costing about $2.29 billion. This is a cost of about $2.13 million per cancer case avoided.

Without a ban of asbestos-cement pipe and assuming strict compliance with an OSHA PEL of 0.2 f/cc, EPA estimates that this alternative would avoid about 950 cancer cases that EPA can quantify, while costing about $2.02 billion. This is a cost of about $2.12 million per cancer case avoided.

3. *Ban the asbestos construction products category and asbestos clothing soon after promulgation of the rule and cover all other asbestos products under the phase-down.* Under this alternative EPA would ban the manufacture, importation, and processing of the asbestos construction products category and asbestos clothing soon after the promulgation of the rule and cover all other asbestos products under the phase-down.

This alternative, unlike the current proposal, would ban all asbestos-cement products at the same time, thus addressing similar exposure patterns in the same way and treating all parts of an industry sector similarly. The phase-down would operate to restrict use of asbestos in other industry sectors.

EPA estimates that this alternative, assuming current exposure levels, would avoid about 2,020 cancer cases that EPA can quantify while costing about $2.01 billion. This is a cost of about $1.00 million per cancer case avoided.

Assuming strict compliance with an OSHA PEL of 0.2 f/cc, EPA estimates that this alternative would avoid about 1,010 cancer cases that EPA can quantify while costing about $2.01 billion. This is a cost of about $1.98 million per cancer case avoided.

Without a ban of asbestos-cement pipe and assuming strict compliance with an OSHA PEL of 0.2 f/cc, EPA estimates that this alternative would avoid about 950 cancer cases that EPA can quantify while costing about $1.86 billion. This is a cost of about $1.95 million per cancer case avoided.

The following Table VI summarizes the estimated costs and estimated cancer cases avoided that EPA could quantify for the proposal and the three alternatives discussed earlier, first assuming current exposure levels and then assuming strict compliance with an OSHA PEL of 0.2 f/cc.

TABLE VI—ESTIMATED COSTS AND CANCER CASES AVOIDED

	Proposal	Alt. 1	Alt. 2	Alt. 3
Assuming Current Exposures				
Cost (billions)	$1.98	$2.11	$2.29	$2.01
Cancer cases avoided	1,930	2,100	2,120	2,020
Cost per cancer case avoided (millions)	$1.02	$1.01	$1.08	$1.00
Assuming Strict Compliance With an OSHA PEL of 0.2f/cc				
Cost (billions)	$1.90	$2.11	$2.29	$2.01
Cancer cases avoided	1,000	1,060	1,070	1,010
Cost per cancer case avoided (millions)	$1.99	$2.00	$2.13	$1.98

Alternative 1—Ban asbestos construction products and asbestos clothing soon after promulgation and ban asbestos friction products in five years.
Alternative 2—Ban asbestos construction products and asbestos clothing soon after promulgation, ban asbestos friction products in five years and ban remaining products in ten years.
Alternative 3—Ban asbestos construction products and asbestos clothing soon after promulgation and cover remaining products under the phase-down.

4. *Require labeling of asbestos products subject to a ban.* As part of this alternative, EPA also proposes and requests comment on a labeling requirement. In particular, it is proposed that products not immediately banned but subject to regulation 5 or 10 years from now be labeled in the interim. The labeling would advise purchasers that the product contains asbestos. EPA requests comments on this proposal, in particular on (1) the appropriateness of this proposal for all or some subset of the products in this category; (2) the appropriateness of a simple content warning as opposed to a more extensive labeling provision; and (3) the extent to which labeling would serve to reduce exposure to asbestos.

EPA also considered a number of alternatives for implementing the phase-down. These include options concerning the following: who would be assigned permits; how persons would be granted

permits; whether permits would be transferable; whether permits would be bankable; and how imported products containing asbestos would be treated. EPA also considered a number of options before adopting its current regulatory strategy for controlling the risk from asbestos. These options are discussed in documents which are included in the rulemaking record.

V. Finding of Unreasonable Risk

EPA has weighed the health risks from continued use of asbestos and asbestos-containing products against the costs attributable to the proposed regulation. EPA has concluded, that the avoidance of about 1,930 cancer cases that can be quantified assuming current exposure levels, or the 1,000 cancer cases that can be quantified assuming strict compliance with an OSHA PEL of 0.2 f/cc, many other cancer cases that cannot be quantified, and many cases of asbestos-related disease substantially outweigh the costs to consumers, producers, and users of asbestos products from the proposed regulation. Therefore, EPA finds that the continued mining and importation of asbestos and asbestos products in the United States for domestic use and for export present an unreasonable risk to human health. The finding is based on the following points:

1. The health effects from asbestos exposure are very serious. Asbestos is a demonstrated human carcinogen. The cancers caused by asbestos are usually fatal and cause much pain and suffering. In addition, asbestos causes other lung diseases such as asbestosis.

2. Available evidence supports the conclusion that there is no safe level of exposure to asbestos. This conclusion is consistent with present theory of cancer etiology and is further supported by the many documented cases where low or short-term exposure has been shown to cause asbestos-related disease.

3. Models developed to estimate the relative risk of developing cancer from exposure to asbestos show a linear dose-response relationship. Based on data from epidemiology studies, these models predict that humans exposed to very low levels of asbestos incur some risk. Individuals frequently exposed to levels typically found at asbestos worksites are estimated to have very high risks of contracting cancer, perhaps greater than 1 in 100.

4. Asbestos fibers are colorless, odorless, and frequently invisible, thus presenting risk to persons not aware that they may be exposed. Asbestos fibers are extremely durable and have aerodynamic properties that allow them to remain suspended in the air for a long time. Asbestos fibers easily reenter the atmosphere after settling out and can travel long distances through the air.

5. Health risks from exposure to asbestos fibers during the lifecycle of the asbestos products covered by this proposed rule occur to many population groups during many activities. Persons can be exposed to asbestos fibers long after those fibers have been released to the air and at a considerable distance from the source of release. The vast majority of the general population of the U.S. is exposed to asbestos in the air. More than 40,000 workers are exposed during manufacture and processing of asbestos products covered by this proposal. Many additional thousands of workers and consumers are exposed during product installation, use, maintenance, renovation, removal, and disposal of asbestos products. Finally, many millions of people who reside near asbestos worksites are also exposed to significant concentrations of asbestos in the air.

6. Using typical, rather than worst-case, data and assumptions, EPA has estimated that this proposed rule banning certain asbestos products and phasing out all others, if promulgated, would avoid approximately 1,930 cases of cancer which would otherwise result from exposure to asbestos between the years 1985 to 2000. EPA underestimated the number of cancer cases avoided because of the lack of comprehensive data on releases of asbestos to the ambient air from many activities. EPA estimates that the following numbers of cancer cases would be avoided as a result of the proposed product bans, assuming both current exposure levels and strict compliance with an OSHA PEL of 0.2 f/cc.

Product	Cancer cases avoided	
	Current exposure	At 0.2 f/cc
Asbestos clothing	1	1
A/C pipe	533	52
Floor tile	459	948
Flooring felt	0	0
Roofing felt	4	4

These estimates of cancer cases avoided by the product bans should not be viewed in isolation, since asbestos use in other product sectors would theoretically decrease at less than the current rate unless all asbestos use is phased out.

7. Even if OSHA promulgates and achieves strict compliance with a PEL of 0.2 f/cc, almost 1,325 cancers would still result from asbestos products made over the next 15 years. This rule would avoid about 1,000 of those cancer cases.

8. The estimated costs of this proposed rule are reasonable in view of the number of cancers and other adverse health effects that would be avoided. Substitutes for asbestos are readily available for many products and can be expected to become available during the phase-down period for most, if not all, other uses. Even though the costs are probably overestimated, the cost per cancer case avoided, assuming current exposure levels, that EPA can quantify, is about $1.02 million. Even if OSHA promulgates and achieves strict compliance with a PEL of 0.2 f/cc, the cost per cancer case avoided that EPA can quantify is about $1.99 million. If all cancer cases and the incidence of other diseases could be quantified, the cost per case of disease prevented would be substantially lower. In addition, the overall costs of the rule are spread over a large population so that the cost to any individual would be negligible. Further, EPA expects substantial savings to result from this rule from such factors as avoided costs in treating asbestos related diseases, avoidance of lost productivity caused by these diseases, avoided costs in asbestos removal and disposal, and avoidance of litigation costs resulting from asbestos disease claims.

EPA also finds that the costs of alternatives 1, 2, and 3 are reasonable in view of the numbers of cancers and other adverse health effects that they would avoid. The costs per cancer case avoided that EPA can quantify of these alternatives are approximately the same as for the proposed rule.

As discussed earlier, EPA conducted a sensitivity analysis to see how sensitive the cost per cancer case avoided by this rule and the cost per cancer avoided by the regulatory alternatives discussed earlier were to the banning of particular products. Specifically, EPA analyzed the cost per cancer case avoided for the proposal and the other options excluding asbestos-cement pipe or vinly-asbestos floor tile from the bans. Even with these relatively high exposure products excluded from the bans, the cost per cancer case avoided by the proposal and the alternatives are similar.

For example, without a ban of asbestos-cement pipe and assuming strict compliance with an OSHA PEL of 0.2 f/cc, this proposed rule would cost about $1.96 million per cancer case avoided that EPA can quantify. Without a ban of vinyl-asbestos floor tile and assuming strict compliance with an OSHA PEL of 0.2 f/cc, this proposed rule

would cost about $2.28 million per cancer case avoided that EPA can quantify.

VI. Other EPA Statutes

Section 6(c) of TSCA requires that if EPA determines that a risk of injury to health or the environment could be eliminated or reduced to a sufficient extent by actions taken under another statute administered by EPA, EPA may not promulgate a rule under section 6(a) of TSCA unless EPA finds it is in the public interest to protect against the risk by action under TSCA. EPA finds that no other law administered by EPA will eliminate or reduce the risks from asbestos to a sufficient extent.

Several EPA statutes have been used to limit asbestos exposure. In 1973, EPA used the authority of the CAA to list asbestos as a hazardous air pollutant, establish a "no visible" emission standard for manufacturers, and ban the use of spray-applied asbestos-containing material as insulation in buildings, published in the **Federal Register** of April 6, 1973 (38 FR 8826). EPA amended this regulation in 1975 to ban asbestos-containing pipe lagging, by a rule published in the **Federal Register** of October 12, 1975 (40 FR 48292); and in 1978, extended the ban to all uses of sprayed-on asbestos by a rule published in the **Federal Register** of June 19, 1978 (43 FR 26372). The CAA rule, which was last amended on April 5, 1984 (49 FR 13658), also regulates the removal of asbestos from buildings and the disposal of wastes generated by removal.

However, the CAA has limitations. The CAA does not apply directly to indoor air in the workplace or home. Consequently, any possible additional use of that statute may leave many workplace or home exposure situations inadequately controlled.

Another EPA statute that could be used to limit asbestos exposure is the Safe Drinking Water Act (SDWA). EPA announced its intention to consider asbestos for inclusion in its proposed National Revised Primary Drinking Water Regulations by a Notice published in the **Federal Register** of October 5, 1983 (48 FR 45502). However, even if the SDWA is used to set a drinking water standard for asbestos, it would necessarily ignore the inhalation risk associated with asbestos.

An additional EPA statute that could be used to limit asbestos exposure is the Resource Conservation and Recovery Act (RCRA). Under RCRA, EPA could list asbestos as a hazardous waste and subject asbestos waste to general RCRA requirements designed to reduce exposure. However, such action under RCRA would only reduce exposure during the disposal of asbestos and asbestos products.

VII. Analysis Under Section 9(a) of TSCA

Under section 9(a)(1) of TSCA, the Administrator is required to submit a report to another Federal agency when two determinations are made. The first determination is that the Administrator has reasonable basis to conclude that a chemical substance or mixture presents or will present an unreasonable risk of injury to health or the environment. The second determination is that the unreasonable risk may be prevented or reduced to a sufficient extent by action taken by another Federal agency under a Federal law not administered by EPA. Section 9(a)(1) provides that where the Administrator makes these two determinations, EPA must provide an opportunity to the other Federal agency to assess the risk described in the report, to interpret its own statutory authorities, and to initiate an action under the Federal laws that it administers. Section 9(a) of TSCA thus requires EPA to review other Federal authorities not administered by EPA to determine whether action under those authorities may prevent or sufficiently reduce unreasonable risk. The following unit summarizes past and contemplated action by other agencies and then discusses why those agencies are not able to prevent or sufficiently reduce the unreasonable risk presented by asbestos.

A. Other Authorities Affecting Asbestos

Under the authority of the Consumer Product Safety Act (CPSA, 15 U.S.C. 2051) the CPSC has issued rules banning consumer patching compounds containing respirable asbestos (16 CFR Part 1304) and artificial emberizing materials containing respirable asbestos (16 CFR Part 1305). The CPSC took those actions based on findings that the use of those products in the household would result in increased risk of cancer. Earlier, the Food and Drug Administration under the Federal Hazardous Substances Act (FHSA, 15 U.S.C. 1261) banned "general-use garments containing asbestos other than garments having a bona fide application for personal protection against thermal injury and so constructed that the asbestos fibers will not become airborne under reasonably foreseeable conditions of use" (16 CFR 1500.17). The FHSA is now administered by the CPSC.

In 1980, CPSC issued a general order requiring persons to furnish information on the use of asbestos in certain consumer product categories. CPSC has also measured potential consumer exposure to asbestos from such products as asbestos millboard, asbestos paper products, and stove door gaskets.

OSHA began to regulate asbestos in the workplace in 1971 under the Occupational Safety and Health Act (29 U.S.C. 51, OSHAct). Since the first workplace standard setting a limit of 12 f/cc was promulgated in May 1971, the workplace standard has been twice revised and is now 2 f/cc (TWA). An Emergency Temporary Standard (ETS) establishing a permissible level of 0.5 f/cc was published in the **Federal Register** of November 4, 1983 (48 FR 51086), but the ETS was found invalid by a court. OSHA proposed a revised standard in the **Federal Register** of April 10, 1984 (49 FR 14116).

The Mine Safety and Health Administration (MSHA) acting under the Mine Safety and Health Act has adopted workplace standards designed to protect workers engaged in pit and underground mining and milling. The MSHA standards are similar to those administered by OSHA for other workplaces. The MSHA standard was last amended in 1976 and calls for a PEL of 2 f/cc.

Possible jurisdiction over other aspects of asbestos risk may lie with still other Federal agencies. For example, the Asbestos Information Association (AIA), commenting before a Senate subcommittee on early versions of TSCA, noted that the Federal Trade Commission may have authority to require labeling, distribution, and marketing of asbestos products and that the Department of Transportation has authority to control transportation of hazardous substances, such as asbestos. 1971 Senate Hearings at 224–227.

State and local public employees are generally excluded from coverage under the OSHAct. However, under section 19 of the OSHAct, OSHA has approved State plans for 23 States and two territories, thus effectively extending OSHA protections to State and local public employees in the jurisdictions. EPA has proposed a rule to establish requirements similar to those of the OSHA Asbestos Standard for State and local public employees not under a State plan who conduct asbestos abatement work. However, other public employees, such as firefighters, are not covered by this rule.

B. EPA's Determination Under Section 9(a) of TSCA

EPA is not required to submit a report to other agencies under section 9(a) on the asbestos risks described in this notice since EPA has determined that such risks cannot be prevented or

reduced to a sufficient extent by actions taken under a Federal law not administered by EPA. Certain activities involving asbestos present risks that fall under the jurisdiction of a number of different Federal laws such as the OSHAct, the Consumer Product Safety Act, and the Clean Air Act, but no one statute, other than TSCA, can adequately address all its risks. Referral would result in fragmented assessment of risks and potentially duplicative regulatory efforts, inefficient control of risk, and an adverse effect on public health. Furthermore, even if EPA were to refer asbestos risks to other agencies, action taken by those other agencies would still leave a substantial residual risk. EPA's reasons for reaching this conclusion are set forth below.

1. *Interpretation of section 9(a) of TSCA.* The comprehensive nature of TSCA has long been recognized. TSCA allows regulation of a chemical substance based on all its risks and, thereby, allows the Government to remedy the deficiencies in other statutes that can deal only with parts of the risk. (Statement of the President on signing S. 3149 Into Law, October 12, 1976, Weekly Compilation of Presidential Documents, vol. 12, No. 42, Oct. 18, 1976, at 1489; S. Rep. No. 94-698, 94th Cong., 2d Sess. at 2.) The need for a total exposure approach to chemical regulation and the dangers of a fragmented regulatory approach were recognized even during the early congressional hearings on TSCA. See, e.g. 1973 Senate Hearings at 212-214; 1972 House Hearings at 65-67. No other single law provides authority to deal comprehensively with multi-media hazards.

In particular, Congress designed TSCA to deal with chemical substances for which the most appropriate remedy would be a total ban on their production and distribution in commerce. In this regard, Congress focused on the risk of asbestos and the dangers of fragmented regulation of asbestos during the legislative hearings. See 1971 Senate Hearings and 1973 Hearings. Asbestos risks were described in the workplace and in over 3,000 uses that could present risks to the general population. (H.R. Rep. No. 94-1341, 94th Cong., 2d Sess., at 5 (1976).) Members of Congress believed it intolerable that no agency could deal comprehensively with chemical risks, including the risk from asbestos. See 1973 Senate Hearings at 319-320 (Letter from Senator Tunney to Dow Chemical Company); 1975 *Senate Hearings* at 131-133 (Remarks of Senator Tunney).

EPA's decision not to refer the risks associated with asbestos is divided into two parts. First, EPA determines that there is no other Federal authority capable of addressing the combination of activities involving asbestos. Section 9(a) requires EPA to consider the issues necessary to make this determination because the Agency believes that the combination of asbestos activities, under the jurisdiction of a number of Federal laws, presents an unreasonable risk. Second, EPA examines the residual risks that would remain if other agencies were to regulate asbestos and determines that such residual risks would still be unreasonable.

2. *Capability of other Federal authorities to deal with the combination of asbestos activities.* EPA has concluded that asbestos is a clear example for TSCA action rather than referral to other agencies. It is a substance for which there is broad exposure to populations in numerous situations—in the workplace, through ambient concentrations, and from consumer products. With the exception of TSCA, there is no one unified authority to deal with these multiple exposures. No one of the other potential Federal regulatory authorities, in looking at its specific part of the overall exposures, can either evaluate or deal with the totality of the risk presented. Thus, OSHA may set exposure limits for workers, but there may be venting of asbestos into the atmosphere; EPA, under the Clean Air Act, may regulate ambient emissions, but not workplace or consumer exposures; and in each step of the process, only a fraction of the risk is evaluated. Only EPA under TSCA may look across the range of asbestos use to evaluate whether it presents an unreasonable risk. There is no other Act that affords such authority and, accordingly, referral is inappropriate.

EPA's analysis of the jurisdiction over the risks presented by asbestos among a number of agencies and statutory authorities is set out below. OSHA has authority under the OSHAct for risk presented to private sector manufacturing, construction, and service employees from workplace exposures, and may approve State plans covering State and local public employees. CPSC has authority under the CPSA and FHSA concerning risk presented to consumers from consumer products. The Mine Safety and Health Administration has authority under the Mine Safety and Health Act concerning risk presented during the mining and milling of asbestos. State and local public employees, such as firefighters who may wear asbestos clothing, in about half the States are not covered even indirectly by OSHA regulations and are subject to State authority.

3. *Residual risks.* Even if other Federal agencies took additional action to reduce the risk associated with asbestos during the various stages of the lifecycle of asbestos products clearly within their jurisdiction, a substantial and unreasonable residual risk would still remain.

Many groups outside of OSHA jurisdiction are at risk from exposure to asbestos. State and local public employees, such as firefighters, are not protected by OSHA regulations in about half the States. The general population is exposed to asbestos in the ambient air as a result of release during the manufacture, processing, use, repair, and disposal of asbestos products. EPA estimates that about 540 persons will develop cancer as a result of exposure to asbestos in the ambient air as a result of releases associated with products imported or manufactured over the next 15 years.

Even if OSHA promulgates and achieves strict compliance with a PEL of 0.2 f/cc, a substantial and unreasonable residual risk would remain. About 1,325 persons would still develop cancer as a result of exposure to asbestos in products imported or manufactured over the next 15 years. These include cancers in populations totally outside of OSHA's jurisdiction. Even with a lower workplace PEL, EPA estimates that about 540 persons will develop cancer from exposure to asbestos in the ambient air. In addition, at a PEL of 0.2 f/cc, EPA estimates that about 785 workers under OSHA jurisdiction would develop cancer as a result of workplace exposure to asbestos in products imported or manufactured in the next 15 years.

EPA calculated these figures using well-accepted models. EPA used the Nicholson relative risk model to estimate the number of lung cancer cases and the Nicholson absolute risk model to estimate the number of mesothelioma cases. The dose-response constants used in the risk assessment were those estimated by Selikoff in a study of asbestos insulation workers (Ref. 11). A number of epidemiological studies have estimated dose-response constants for asbestos-related diseases and estimates vary by as much as an order of magnitude. The Selikoff estimates fall approximately in the middle of the ranges of dose-response estimates for both lung cancer and mesothelioma. In addition, the Selikoff estimates have the lowest variance among all of the estimates. These models and dose response constants were recommended by the CPSC's Chronic Hazard Advisory Panel on

asbestos (Ref. 1) and were also used by OSHA to estimate the risk posed by asbestos in support of the proposed revision of OSHA's asbestos standard.

OSHA's choice of 0.2 f/cc as a proposed PEL was based on the feasibility of measuring asbestos levels in the workplace. At a level of 0.2 f/cc, OSHA, using the same lung cancer and mesothelioma models as EPA, estimates that there would be 670 excess cancer deaths per 100,000 workers exposed over a working career (Ref. 12). In 1980, a joint NIOSH/OSHA Asbestos Work Group stated that there was no level of exposure to asbestos below which clinical effects did not occur and recommended a PEL of 0.1 f/cc based on the limitation of current technologies for measuring air concentrations of asbestos (Ref. 7). Even a level of 0.1 f/cc, OSHA estimates that there could be 336 excess cancer deaths per 100,000 workers exposed over a working career (Ref. 12).

It is likely that a PEL of 0.2 f/cc will be exceeded in many cases since it is particularly difficult to apply the PEL in the construction and service sectors. Many of the workplace exposures to asbestos occur downstream in the construction and service sectors rather than the manufacturing sector. Over 80 percent of workers exposed to asbestos are in the construction and service sectors. Employees in those sectors often do not know when they are exposed to asbestos because they do not know that they are working with asbestos products. Compliance inspections are also difficult in the construction and service sectors since employees frequently do not have a fixed worksite. In fact, the current PEL of 2.0 f/cc has been exceeded in many cases in these sectors. Thus, it is likely that many workers in the construction and service sectors will develop cancer unless EPA takes action. Finally, many asbestos control measures, in particular, the use of respirators, only put the asbestos exposure problem elsewhere because they do not control the release of large quantities of asbestos to the ambient environment, where it continues to present a risk both to other workers and the general population.

Similarly, CPSC cannot evaluate or deal with the totality of the risk presented by asbestos. CPSC may ban or require safety standards for asbestos-containing consumer products based exclusively on risk to consumers. CPSC is unable to consider risk to other groups from releases of asbestos during the lifecycle of those products.

After carefully analyzing other Federal authorities, EPA concludes that action under TSCA is appropriate to reduce the unreasonable risk to human health posed by asbestos. Use of other Federal authorities cannot reduce risk to a reasonable level because (1) they cannot reduce the total volume of asbestos in commerce, (2) they cannot protect the many population groups at risk, and (3) they all have jurisdictional gaps.

VIII. Provisions of the Proposed Rule

A. Product Prohibitions

EPA proposes to prohibit the manufacture, importation, and processing of several asbestos products. The prohibitions will take effect at the same time that the restrictions on the mining and importation of all asbestos and asbestos products become effective. Thus, when this rule becomes operational, no person could mine or import asbestos without a permit issued by EPA. In addition, no person could manufacture, import, or process the following asbestos containing products: Asbestos cement pipe and fittings, roofing felts, flooring felts (and felt-backed sheet flooring), vinyl-asbestos floor tile, and asbestos clothing. EPA is proposing to ban asbestos clothing because it presents a particularly serious risk because of high exposure potential. EPA is proposing to ban the other products because effective substitutes are currently available for all applications. As an alternative, EPA is considering banning these several asbestos products by a date soon after the promulgation of this rule.

B. Mining and Import Restrictions

EPA proposes to prohibit the mining or importation of bulk asbestos, and the importation of the asbestos products listed in § 763.145 of the proposal, unless the miner or importer holds a permit issued by EPA allowing mining or importation of that quantity of asbestos. EPA is considering the requirement that products made under the permitting system be labeled as containing asbestos. Labeling would ensure that persons working with or otherwise handling the products would know that the products contained asbestos, and it would enable them to take steps to reduce the likelihood of exposure.

EPA proposes to reduce the amount of asbestos that may be imported or mined in set decrements each year for 10 years. EPA proposes to define "mine" as "to produce asbestos other than as an unintended contaminant or impurity by extracting asbestos-containing ore so that the ore may be (1) distributed in commerce or (2) milled for distribution in commerce." Thus, the unintentional mining of asbestos in connection with mining of another substance such as vermiculite would not be covered by this proposal unless the asbestos were later milled or sold for use. EPA is concerned about possible unintended asbestos contamination of vermiculite and other minerals. However, any attempt to cover the unintentional mining of asbestos under this rule would complicate the operation of the rule considerably and perhaps make it unworkable.

The proposal defines "import" as "to bring into the customs territory of the United States except for (1) shipment through the customs territory of the United States for export without any domestic use or processing; or (2) entering the customs territory of the United States as part of a product during normal personal or business activities involving use of the product." Thus, asbestos that is shipped through the United States for export without any domestic processing or use would not be covered by this proposed rule. The proposed rule also excludes from coverage situations where an item, such as an automobile containing asbestos, travels across the United States border in the course of normal personal or business activities. In addition, asbestos contained in products that are imported in small quantities solely for personal use by consumers would not be covered by the proposal. Thus, under this provision an individual could bring an item such as a consumer appliance containing asbestos into the United States for his or her own use without obtaining a permit. EPA believes that any attempt to cover these situations would make this rule very complex and difficult to administer. However, EPA specifically requests comment on whether, in view of the serious health hazard posed by asbestos, all asbestos products should be covered by this rule.

This proposal covers mining and importation of asbestos and the importation of specific asbestos products. EPA proposes to define "asbestos" as "the asbestiform varieties of: chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonite-grunerite); tremolite; anthophyllite, and actinolite that are mined or milled." EPA requests comment on this definition, including whether asbestos which has been chemically treated or altered should be included within the definition. EPA also proposes to cover under this phase-down the asbestos contained in a number of products listed in § 763.145 of this proposal. Persons would be allowed to import these products only if they held permits allowing the importation of the amount of asbestos contained in the

products. EPA is covering these particular products in this proposal because they represent the largest quantities of asbestos imported as part of products. EPA is proposing to cover asbestos in products because of the risk posed by possible asbestos exposure during use and disposal of the products and to treat domestic producers and importers of these products similarly.

To implement this program, EPA is proposing that importers of listed products estimate the typical asbestos content of the products. To aid those estimates, EPA has ascertained the typical asbestos content of the asbestos products covered by this proposal. If persons do not know the exact asbestos content of products they import, they can rely on the EPA figures to estimate the amount of asbestos they import. EPA would allow persons to use an amount other than the EPA figure if they can show that their imported product contains a different amount of asbestos. Such persons would be required to maintain records supporting their determinations of typical asbestos content and would be subject to appropriate enforcement action if EPA discovered that their imported products actually had a higher asbestos content than they estimated. EPA believes that this is a practical way to implement the phase-down of asbestos use.

C. Permits to Mine or Import Asbestos

EPA proposes to issue current miners and importers of asbestos permits that would allow those persons to mine or import set amounts of asbestos. The permit would be letters from EPA stating the amount of asbestos that a person may import or mine during each year of the 10-year phase-down period. The "permitted" amount of mining or importation would be a uniform percentage of the average amount of asbestos each person mined or imported yearly during the base period of 1981, 1982, and 1983. The "permitted" amount of asbestos would be 30 percent of the person's average base year volumes during the first year of the phase-down period and would decline to 27 percent of average base year volumes during the second year, 24 percent during the third year and so on until it reached 3 percent in year 10. EPA chose these "permitted" amounts based on projections of future asbestos use after analysis of current use trends, publicly available information on asbestos use, and information reported under the section 8(a) asbestos reporting rule. In addition, the "permitted" amounts chosen reflect the EPA has proposed to ban certain high volume uses of asbestos where suitable substitute products are avilable.

Persons would apply to EPA for permits, listing in their applications their mining or import volumes during those years. Persons who do not apply for permits would not be granted any. EPA would compare volume information included in applications with information reported under the section 8(a) asbestos reporting rule, which covered 1981, United States Customs Service data, and Bureau of Mines data. Persons who include false information in their application would be subject to enforcement action, including criminal prosecution in appropriate cases.

EPA would similarly cover importers of asbestos contained in the products listed in this rule. Those persons would apply for permits, including in their application the total amount of asbestos in their imported products during the base years 1981, 1982, and 1983. Those persons could use EPA's estimates of typical asbestos content of products if they do not know the typical asbestos content of their product.

The proposal contains an appeals procedure for persons who disagree with EPA's allocation of permits to them. However, since the proposed rule would allocate each miner and importer a uniform percentage of their base volume levels, EPA would expect few appeals. The only issue in an appeal would be whether EPA allocated permits based on the correct base years' volume information.

Persons would be allowed to transfer their permission to mine or import asbestos to other persons, including persons who were not issued permits by EPA. Permits issued to miners, importers of bulk asbestos, and importers of asbestos in products would be interchangeable. Persons could transfer all or only part of their yearly permitted amount to one person or a number of persons. Persons transferring all of part of their permitted amount would be required to report each transfer to EPA.

Persons would also be allowed to reserve or "bank" permisison to import asbestos during any year of the phase-down period for use during any later year of the phase-down period. Persons would be required to report each "banking" of asbestos permits to EPA. A person who banks permission to mine or import a certain amount of asbestos would be allowed to use only part of that amount during later years of the phase-down period. The amount of asbestos mining or importation permitted by banked permits would decline yearly at a rate of 10 percent. Permits not used by the conclusion of the 10-year phase-down period would no longer permit the holder to import or mine asbestos in any quantity and would have no value of any kind for any purpose.

EPA is considering an alternative of having banked permits not decline in value. This alternative would provide greater incentive for the banking of permits and thus incentive for greater reductions in asbestos mining and importation in early years of the phase-down period.

Under the proposed approach, at the end of the 10-year phase-down period, all mining or importation of asbestos would be banned except that allowed under an exemption procedure. EPA would consider applications for exemptions and grant them for essential uses of asbestos for which substitutes are not available. In addition, EPA is considering a requirement that products not banned be labeled as containing asbestos. This requirement could be imposed as part of this rulemaking or by a separate rulemaking.

As an alternative, EPA is considering allowing a residual amount of asbestos mining and importation after the 10-year phase-down period. This general approach would avoid the potentially heavy administrative burden and expense of an exemption process. As part of this alternative, EPA is considering allowing permits banked during the 10-year phase-down period to continue to be used during the later period when a much smaller percentage of base years volume is permitted. Such an approach would provide additional incentive for the banking of permits and thus additional incentive for greater reductions in asbestos mining and importation during early years of the phase-down period.

EPA specifically requests comment on this series of alternatives to a ban with an exemption process after the 10-year phase-down period.

D. Reporting

EPA proposes to require persons to report the amount of asbestos imported during each import transaction. EPA specifically requests comment on whether this report should be sent directly to EPA or whether persons should turn the report over to the United States Customs Service, which would forward the report to EPA. Requiring the report to be turned over to the Customs Service as part of each import transaction may facilitate enforcement of the rule.

The proposal also would require persons to report to EPA each transfer of permission to mine or import asbestos. This reporting would be under authority of section 8(a) of TSCA and

would apply to all importers, including small businesses. Section 8(a) exempts small businesses from reporting in certain cases. However, EPA may require miners and importers of a substance subject to a rule under section 6 of TSCA to report. Since asbestos is already subject to rules under section 6 and would be subject to this one, the small business exemption of section 8(a) would not apply. EPA believes that these reporting requirements represent very little burden and are necessary for effective enforcement of the phase-down rule. EPA would use the information in these reports to maintain a computerized record of the quantities of asbestos each person is permitted to mine or import as compared to the actual level of mining or importation. EPA would investigate cases where the quantity of asbestos mined or imported appears to exceed the quantity of asbestos that a person is permitted to mine or import and take appropriate enforcement action for any violation of the phase-down rule.

To facilitate the transfer of permits, EPA is considering making readily available to interested parties information concerning the persons holding permits and the quantities they hold. EPA may allow persons computer access to an EPA data bank if this would not reveal confidential business information. EPA specifically requests comment on whether EPA should facilitate the transfer of permits and on ways for EPA to accomplish this without revealing confidential business information.

E. Recordkeeping

EPA proposes to require persons to retain documentation of information concerning all transfers of permission to mine or import asbestos and the amount of asbestos mined or imported each year. The proposal would require these records to be kept for 5 years after the end of the last year of the phase-down period covered by the rule. Importers of asbestos contained in products covered by this proposal would also have to keep records concerning their levels of importation. EPA believes that these recordkeeping provisions would be essential to enforcement of this proposed rule.

IX. Enforcement

Section 15 of TSCA makes it unlawful to fail or refuse to comply with any provision of a rule promulgated under section 6 of TSCA. Therefore, any failure to comply with this proposed rule when it becomes effective would be a violation of section 15 of TSCA. In addition, section 15 of TSCA makes it unlawful for any person to: (1) Fail or refuse to establish and maintain records as required by this rule; (2) fail or refuse to permit access to or copying of records, as required by TSCA; or (3) fail or refuse to permit entry or inspection as required by section 11 of TSCA.

Violators may be subject to both civil and criminal liability. Under the penalty provision of section 16 of TSCA, any person who violates section 15 could be subject to a civil penalty of up to $25,000 for each violation. Each day of operation in violation of this rule when it becomes effective could constitute a separate violation. Knowing or willful violations of this rule when it becomes effective could lead to the imposition of criminal penalties of up to $25,000 for each day of violation and imprisonment for up to 1 year. In addition, other remedies are available to EPA under sections 7 and 17 of TSCA, such as seeking an injuction to restrain violations of this rule when it becomes effective and seizing any chemical substance or mixture manufactured or imported in violation of this rule when it becomes effective.

Individuals, as well as corporations, could be subject to enforcement actions. Sections 15 and 16 of TSCA apply to "any person" who violates various provisions of TSCA. EPA may, at its discretion, proceed against individuals as well as companies. In particular, EPA may proceed against individuals who report false information or cause it to be reported.

X. Confidentiality

A person may assert a claim of confidentiality for any information, including public comments, submitted to EPA in connection with this proposed rule or in connection with this rule after it is promulgated. Any person who submits a confidential public comment must also submit a nonconfidential version. Any claim of confidentiality must accompany the information when it is submitted to EPA. Persons would claim information confidential by circling, bracketing, or underlining it and marking it with "CONFIDENTIAL" or some other appropriate designation. EPA will disclose information subject to a claim of confidentiality only to the extent permitted by section 14 of TSCA and 40 CFR Part 2, Subpart B. If a person does not assert a claim of confidentiality for information at the time it is submitted to EPA, EPA may make the information public without further notice to that person.

XI. Rulemaking Record

EPA has established a record for this rulemaking (docket control number OPTS—62040). A public version of the record, without any confidential business information, is available in the Office of Toxic Substances Public Information Office, from 8 a.m. to 4 p.m., Monday through Friday, except legal holidays. The Public Information Office is located in Rm. E-107, 401 M St., SW., Washington, D.C.

The record includes information considered by EPA in developing this proposed rule. EPA will supplement the record with additional information as it is received. The record now includes the following categories of information: (1) **Federal Register** notices, (2) support documents, (3) reports, and (4) memoranda and letters.

EPA will identify the complete rulemaking record by date of promulgation. EPA will accept additional material for inclusion in the record at any time between this notice and designation of the complete record. The final rule will also permit persons to point out any errors or omissions in the record.

XII. References

(1) USCPSC. Report to the U.S. Consumer Product Safety Commission by the Chronic Hazard Advisory Panel on Asbestos. July 1983.

(2) USEPA, OPTS, OTS. Exposure Assessment for Asbestos. Draft January 9, 1984.

(3) USEPA, OPTS, OTS. Regulatory Impact Analysis of Controls on Asbestos and Asbestos Products. January 1986.

(4) USEPA, OPTS, OTS. Support Document for Final Rule on Friable Asbestos-Containing Materials in School Buildings—Health Effects and Magnitude of Exposure. January, 1982.

(5) National Research Council. "Asbestos" *In:* "Drinking Water and Health," Vol. 3. National Academy Press, Washington, D.C. (1982): 223–263.

(6) National Research Council. "Nonoccupational Health Risks of Asbestiform Fibers." National Academy Press, Washington, D.C. (1984).

(7) NIOSH–OSHA Asbestos Work Group. Workplace Exposure to Asbestos: "Review and Recommendations" DHHS (NIOSH) Publication No. 81–103, U.S. Government Printing Office, Washington, D.C. 20402. (1980).

(8) OSHA. "Quantitative Risk Analysis for Asbestos-Related Cancers: A Preliminary Report." (1983).

(9) Seidman, H. Selikoff, I.J., Hammond, E.C., "Short-Term Asbestos Work Exposure and Long-Term Observation." *Annals of the New York Academy of Science*, 330 (1979): 61–89.

(10) Selikoff, I.J., Anderson, H.A., Seidman, H. "Asbestos Disease Among Household Contacts of Asbestos Workers" *In:* "Disability Compensation for Asbestos-Associated Disease in the U.S.," edited by I.J. Selikoff, Environmental Sciences Laboratory, Mount Sinai School of Medicine of the City University of New York. (1982): 73–76.

(11) Selikoff, I.J., Hammond, E.C., Seidman H., "Mortality Experience of Insulation Workers in the U.S. and Canada, 1943–1976." *Annals of the New York Academy of Science.* 330 (1979): 91–116.

(12) USDOL, OSHA, "Occupational Exposure to Asbestos: Emergency Temporary Standard." (November 4, 1983: 48 FR 51086).

(13) USDOL, OSHA, "Occupational Exposure to Asbestos: Proposed Rule and Notice of Hearing" (April 10, 1984: 49 FR 14116).

(14) USEPA, OPTS, OTS, Asbestos Substitutes and Related Materials, April 24, 1985.

XIII. Regulatory Assessment Requirements

A. Executive Order 12291

Under Executive Order 12291, EPA has determined that this proposed rule is a "Major Rule" and has developed an RIA. The RIA estimates that this proposed rule would cost about $1.98 billion over 15 years. However, the RIA also estimated that this proposed rule, if promulgated, would avoid approximately 1,930 cases of cancer. As shown in Unit V above, EPA believes that these costs are reasonable and that this proposed action is a cost-effective way of reducing the unreasonable risks related to asbestos.

This proposed rule was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291.

B. Regulatory Flexibility Act

EPA has analyzed the economic impact of this proposed rule on small businesses. A summary of EPA's analysis appears in Unit III.

C. Paperwork Reduction Act

The reporting and recordkeeping provisions in this proposed rule will be submitted to the Office of Management and Budget (OMB) for approval under the Paperwork Reduction Act. Comments on these requirements should be submitted to the Office of Information and Regulatory Affairs at OMB and marked Attention: Desk Officer for EPA. Any final rule will explain EPA's response to OMB and public comments on the proposed reporting and recordkeeping requirements.

List of Subjects in 40 CFR Part 763

Environmental protection, Hazardous substances, Recordkeeping and reporting requirements, Asbestos.

Dated: January 22, 1986.

Lee M. Thomas,

Administrator.

PART 763—[Amended]

Therefore, it is proposed that 40 CFR Part 763 be amended as follows:

1. The authority citation for Part 763 is revised to read as follows:

Authority: 15 U.S.C. 2605 and 2607(c).

2. By adding new Subpart H to read as follows:

Subpart H—Asbestos Mining and Import Restrictions

Sec.

Subpart H—Asbestos Mining and Import Restrictions

§ 763.140 Scope.

This Subpart prohibits the mining or importation of asbestos, including asbestos in certain asbestos products, unless authorized by a permit issued by EPA.

§ 763.143 Definitions.

The definitions in section 3 of TSCA, 15 U.S.C. 2602, apply to this Subpart. In addition, the following definitions apply:

(a) The terms "act," "article," "byproduct," "customs territory of the United States," "EPA," "importer," "manufacturer," "persons," and "United States" have the same meanings as in § 720.3 of this chapter.

(b) "Asbestos" means the asbestiform varieties of: chrysotile (serpentine); crocidolite (riebeckite); amosite, (cummingtonite-grunerite); tremolite; anthophyllite, and actinolite that are mined or milled.

(c) "Asbestos product" means any mixture or article containing asbestos.

(d) "Consumer" means a natural person who uses a product for personal rather than business purposes.

(e) "Import" means to bring into customs territory of the United States for any purpose except (1) for shipment through the customs territory of the United States for export without any domestic use or processing; or

(2) entering the customs territory of the United States as part of a product during normal personal or business activities involving use of the product.

(f) "Milled" means the separation of asbestos fibers from asbestos ore, the grading and sorting of asbestos fibers, or the fiberizing of asbestos ore.

(g) "Mine" means to produce asbestos other than as an unintended contaminant or impurity by extracting asbestos-containing ore so that the ore may be (1) distributed in commerce or (2) milled for distribution in commerce.

(h) "Miner" means a person who mines asbestos.

§ 763.145 Mining and import restrictions.

(a) Beginning the first day of the calendar year after this rule becomes effective, or if this rule becomes effective during the last 4 months of a calendar year, beginning the first day of the second calendar year after this rule becomes effective, no person other than a person authorized by a permit issued by EPA as provided in this part may:

(1) Mine asbestos in the United States or

(2) Import asbestos, including asbestos in an asbestos product listed in this section, except in small quantities solely for personal consumer use, into the customs territory of the United States.

(b) The following asbestos products may not be imported into the customs territory of the United States except in small quantities by a consumer solely for his or her personal use unless authorized by a permit issued by EPA as provided in this Subpart:

(1) Appliances.
(2) Pipeline wrap.
(3) Thread, yarn, lap, roving, cord, rope, or wick.
(4) Sheet gasketing, rubber encapsulated compressed.
(5) Disc brake pads (light-medium vehicles).
(6) Cloth, other than asbestos clothing.
(7) Brake blocks.
(8) Millboard.
(9) Packing.
(10) Mixed or repackaged asbestos fiber.
(11) Thermoplugs.
(12) Tape.
(13) Roof coatings.
(14) Clutch facings.
(15) Automotive gasket kit.
(16) Drum brake linings.
(17) Yarn.
(18) Automobiles and other motor vehicles.

§ 763.147 Permits to mine or import asbestos.

(a) Persons may mine in the United States or import into the customs

territory of the United States only the quantity of asbestos for which they hold permits issued under this Subpart.

(b) The amount of asbestos contained in imported product listed in § 763.145 will count toward the total amount of asbestos a person may mine or import during a year.

(c) Persons must estimate typical asbestos content of imported asbestos products covered by this rule. Persons may use EPA's estimate of typical asbestos content if they are not certain of the typical asbestos content of a product.

§ 763.148 Issuance of permits.

(a)(1) EPA will issue permits for the mining or import of asbestos, including asbestos contained in the asbestos products listed in § 763.145.

(2) Applications for permits must be sent to the Office of Toxic Substances (TS–792), EPA, 401 M St., SW., Washington, D.C. 20460.

(b)(1) Persons must apply to EPA for permits by 30 days after the effective date of this rule.

(2) Persons must list in their application for permits the amount of asbestos, including asbestos contained in the asbestos products listed in § 763.145, that they imported or mined during 1981, 1982, and 1983.

(c) If an application is mailed to EPA, the application must be postmarked by 30 days after the effective date of this rule.

(d) EPA will allocate to persons who apply for permits a uniform percentage of the amount of asbestos those persons reported mining or importing during 1981, 1982, and 1983.

(e) Each permit will allow a person to mine or import the following percentages of the average amount of asbestos he or she mined or imported yearly during 1981, 1982, and 1983.

Year 1—30 percent.
Year 2—27 percent.
Year 3—24 percent.
Year 4—21 percent.
Year 5—18 percent.
Year 6—15 percent.
Year 7—12 percent.
Year 8—9 percent.
Year 9—6 percent.
Year 10—3 percent.

§ 763.149 Appeals concerning permits.

(a) A person may appeal EPA's initial disposition of his or her application for a permit.

(b) The person must appeal in writing to the Director of the Office of Toxic Substances (TS–792), EPA, 401 M St., SW., Washington, DC 20460, within 20 days after receipt of EPA's announcement of the disposition of his or her application. If the appeal is mailed, the letter must be postmarked within 20 days after receipt of EPA's announcement of disposition.

(c) A person must indicate in an appeal why he or she should receive a permit or be allowed to mine or import additional asbestos under the permit.

(d) The Director of the EPA Office of Toxic Substances will either grant or deny the appeal within 60 days after its receipt. The disposition of the appeal will be announced by letter to the person making the appeal.

§ 763.150 Transfer of permits.

(a) A person issued a permit by EPA to mine or import a quantity of asbestos may transfer that permit in whole or in part to another person.

(b) A person who transfers a permit to mine or import a quantity of asbestos and a person who receives such a transferred permit must report that transfer to the Office of Toxic Substances (TS–792), EPA, 401 M St., SW., Washington, DC 20460, within 10 days of the transfer.

(c) The parties involved in a transfer may report either jointly or separately.

(d) If a report is mailed to EPA, the report must be postmarked within 10 days of the transfer.

§ 763.151 Banking of permits.

(a) Persons issued permits by EPA to mine or import a quantity of asbestos during one particular year may reserve or "bank" all or part of the permitted amount and use it to mine or import asbestos during a later year during the 10-year phase-down period.

(b) The amount of asbestos that a person is permitted to mine or import will decline from year to year when it is reserved or "banked" at a rate of 10 percent per year.

(c) A person who "banks" a permit in whole or in part must report that "banking" to the Office of Toxic Substances (TS–792), EPA, 401 M St. SW., Washington, DC 20460, within 60 days of the end of the year for which the permit was issued.

(d) If a report is mailed to EPA, the report must be postmarked within 60 days of the end of the year for which the "banked" permit was issued.

§ 763.153 Recordkeeping.

(a) Any person who mines or imports asbestos or any asbestos product listed in § 763.145 must retain in one location documentation of information showing:

(1) The name of any person to whom he or she transferred permission to mine or import asbestos.

(2) The name of any person from whom he or she received permission to mine or import asbestos.

(3) The amount of asbestos mined or imported each year, including asbestos imported in any asbestos product listed in § 763.145.

(4) The typical asbestos content of any asbestos product listed in § 763.145.

(5) The number of individual asbestos products listed in § 763.145 imported each year.

(b) This information must be retained for 5 years from the end of the last year of the 10-year phase-down period covered by this rule.

§ 763.154 Reporting.

(a) Any person who imports asbestos, including asbestos in an asbestos product listed in § 763.145, must report to the Office of Toxic Substances (TS–792), EPA, 401 M. St. SW., Washington, DC 20460, within 2 days of the day of import indicating:

(1) The person's name.

(2) The amount of asbestos imported.

(3) The number of individual asbestos products listed in § 763.145 imported.

(4) A certification that the person was either issued a permit by EPA to import at least that amount of asbestos that year or obtained that permission from another person as provided in § 763.148.

(b) Within 60 days of the end of each year covered by this Subpart, each person who mines or imports asbestos including asbestos in an asbestos product listed in §763.145 must report to the Office of Toxic Substances (TS–792), EPA, 401 M. St., SW., Washington, DC 20460:

(1) The total amount of bulk asbestos that person mined or imported that year.

(2) The total amount of asbestos that person imported in asbestos products listed in §763.145 that year.

(3) The number of individual asbestos products listed in §763.145 that person imported that year.

(4) The amount of asbestos that person had permission to mine or import that year.

(c) If a report is mailed to EPA, the report must be postmarked within 60 days of the end of each year covered by this Subpart.

§ 763.156 Enforcement.

(a) Failure to comply with any provision of this Subpart is a violation of section 15 of the Act (15 U.S.C. 2614).

(b) Failure or refusal to establish and maintain records or to permit access to or copying of records, as required by the Act, is a violation of section 15 of the Act (15 U.S.C. 2614).

(c) Failure or refusal to permit entry or inspection as required by section 11 of the Act (15 U.S.C. 2610) is a violation of section 15 of the Act (15 U.S.C. 2614).

(d) Violators may be subject to the civil and criminal penalties in section 16 of the Act (15 U.S.C. 2615) for each violation.

(e) EPA may seek to enjoin the mining or import of asbestos or asbestos products in violation of this Subpart, or act to seize any asbestos or asbestos products in violation of this Subpart, or take other actions under the authority of section 7 or 17 of the Act (15 U.S.C. 2606 or 2616).

§ 763.157 Inspections.

EPA will conduct inspections under section 11 of the Act (15 U.S.C. 2610) to ensure compliance with this Subpart and to verify that information submitted to EPA under this Subpart is correct.

§ 763.159 Confidentiality and public access to information.

(a) A person may assert a claim of confidentiality for any information he or she submits to EPA under this Subpart.

(b) Any claim of confidentiality must accompany the information when it is submitted to EPA.

(c) EPA will disclose information subject to a claim of confidentiality asserted under this section only to the extent permitted by TSCA and Part 2 of this title.

(d) If a person does not assert a claim of confidentiality for information at the time it is submitted to EPA, EPA may make the information public without further notice to that person.

3. By adding new Subpart I to read as follows:

Subpart I—Prohibition of the Manufacture, Processing, and Distribution in Commerce of Certain Asbestos-Containing Products

Sec.
763.160 Scope.
763.163 Definitions.
763.165 Manufacture—prohibitions.
763.167 Processing—prohibitions.
763.169 Enforcement.

Subpart I—Prohibition of the Manufacture, Processing, and Distribution in Commerce of Certain Asbestos-Containing Products

§ 763.160 Scope.

This Subpart prohibits the manufacture, importation and processing, of the following categories of asbestos-containing products: asbestos-containing roofing felt, asbestos-containing flooring felt (including vinyl sheet flooring backed with flooring felt), vinyl-asbestos floor tile and asbestos-cement pipe and fittings and asbestos clothing.

§ 763.163 Definitions.

The definitions in section 3 of the Toxic Substances Control Act and the following definitions apply to this subpart.

(a) "Asbestos" means the asbestiform varieties of: chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonite-grunerite); tremolite; anthophyllite, and actinolite.

(b) "Asbestos-cement pipe and fittings" means an asbestos-containing product that contains cement and is intended to transmit water or sewage; for use as conduit pipe for the protection of electrical or telephone cable; or for use as air ducts.

(c) "Asbestos clothing" means an asbestos-containing product made of cloth and designed to be worn by individuals.

(d) "Asbestos-containing product" means any material which contains more than 1.0 percent asbestos by weight.

(e) "Flooring felt" means an asbestos-containing product made of paper felt and intended as an underlayment for floor coverings, or to be bonded to the underside of vinyl sheet flooring.

(f) "Roofing felt" means an asbestos-containing product made of paper felt and intended for use on building roofs as a covering or underlayment for other roof coverings.

(g) "Vinyl-asbestos floor tile" means an asbestos-containing product composed of vinyl resins, containing fillers, stabilizers and pigments and used as floor tile.

§ 763.165 Manufacture—prohibitions.

Beginning the first day of the calendar year after this rule becomes effective, or if this rule becomes effective during the last 4 months of a calendar year, beginning the first day of the second calendar year after this rule becomes effective, no person shall manufacture or import the following asbestos-containing products either for use in the United States or for export: asbestos-containing roofing felt, asbestos-containing flooring felt (including vinyl sheet flooring backed with flooring felt), vinyl-asbestos floor tile, asbestos-cement pipe and fittings, and asbestos clothing.

§ 763.167 Processing—prohibitions.

Beginning the first day of the calendar year after this rule becomes effective, or if this rule becomes effective during the last 4 months of a calendar year, beginning the first day of the second calendar year after this rule becomes effective, no person shall process the following products, either for use in the United States or for export: asbestos-containing roofing felt, asbestos-containing flooring felt (including vinyl sheet flooring backed with flooring felt), vinyl-asbestos floor tile, asbestos-cement pipe and fittings, and asbestos clothing.

§ 763.169 Enforcement.

(a) Failure to comply with any provision of this Subpart is a violation of section 15 of the Act (15 U.S.C. 2614).

(b) Failure or refusal to establish and maintain records or to permit access to or copying of records, as required by the Act, is a violation of section 15 of the Act (15 U.S.C. 2614).

(c) Failure or refusal to permit entry or inspection as required by section 11 of the Act (15 U.S.C. 2610) is a violation of section 15 of the Act (15 U.S.C. 2614).

(d) Violators may be subject to the civil and criminal penalties in section 16 of the Act (15 U.S.C. 2615) for each violation.

(e) EPA may seek to enjoin the manufacture or import of asbestos products in violation of this Subpart, or act to seize any asbestos products in violation of this Subpart, or take other actions under the authority of section 7 or 17 of the Act (15 U.S.C. 2606 or 2616).

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