Statement by Dr. Irving J. Selikoff before the House Committee on Education and Labor, Select Subcommittee on Labor, on H.R. 14816, the Occupational Safety and Health Act of 1968, March 7, 1968.

Mr. Chairman and Members of the Committee:

My name is Irving J. Selikoff. I am Professor of Community Medicine at the Mount Sinai School of Medicine of the City University of New York, and Director of its Environmental Sciences Laboratory. I am Editor-in-Chief of "Environmental Research", a recipient of the Lasker Award in Medicine of the American Public Health Association, a Diplomate of the American Board of Preventive Medicine. I am President-Elect of The New York Academy of Sciences, a Member of its Scientific Council, and have served as Chairman of its Division of Environmental Sciences.

I detail these responsibilities both as identification and as an index of my professional and scientific interest in the problems with which this Bill is concerned, but I must confess at the outset that while my studies and research have been professional and scientific, the applications which may be derived from them are emphasized by my responsibilities as a citizen and a physician. The data I shall present are rigorously scientific; but I hope you will interpret them not only as cases in a tabulation but as persons whose health and lives are our responsibility.

I propose to describe to you my research experiences with one group of workmen in this country, so that you might use it as an example or as a yardstick against which to evaluate this proposed Bill, to test whether it is necessary or unnecessary, whether it goes too far or not far enough, whether it is sorely needed or will prove superfluous. Because if this Bill is not the answer, an answer must surely be found for the difficulties I will review.

For the past six years, I have been investigating occupational health hazards among insulation workers in our construction industry. These men apply the thermal insulation to pipes, ducts, boilers and other structures in buildings, factories, shipyards and other facilities. They are self-reliant, skilled craftsmen. The first union of insulation workers in the United States was formed in New York City in 1884 under a charter issued by the Knights of Labor (predecessor of the American Federation of Labor) as "The Salamander Association of Boiler and Pipe Felters." Partly from these beginnings, the present union of insulation workers in this country was chartered in 1910 by the AFL as The International Association of Heat and Frost Insulators and Asbestos Workers. They

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are an important part of the construction industry. The trade is an important one and it is not too much to say that modern construction and modern industry would halt without their work. The union has some 18,000 men on its rolls and there are probably almost an equal number of insulation workers who are not members of this union, often because of conditions of their work, as being employed in maintenance work, doing insulation work as part of other occupations, being members of other unions or by virtue of doing special insulation applications as, spraying.

During the course of their work, these men use many materials, some of them mineral or of other inorganic nature. While we have had little knowledge concerning possible adverse effects of most of the materials with which they work (in part, because of their rather recent introduction and inadequate opportunity to observe the presence or absence of such effects), one of the materials with which they work has been under suspicion for some time. I refer to asbestos. This mineral fiber, with unique characteristics and of great value in our industry, is found in a number of the products which these men use in their work and have used for more than seventy years.

In 1924, Cooke in England described a case of severe lung scarring - asbestosis - who had spent 20 years weaving asbestos textile products. In the next decade, numerous similar cases were observed, so that by the mid-1930s the hazard of asbestos as a pneumoconiotic dust was universally accepted. Textile factories in this country were also studied and our Public Health Service fully documented the significant risk involved in asbestos textile factories in the report by Dreessen and colleagues in 1938. Precautionary measures were urged in this report and elimination of hazardous exposure was strongly recommended.

Unfortunately implementation of the recommendations was haphazard and inadequate and the conditions and dangers, recognized and described 40 years ago, are still with us.

It is an unhappy reflection on all of us - government, public health authorities, the medical profession - that at this time in the United States in the 1960s, 7% of all deaths among insulation workers are due to a completely preventable cause, pulmonary asbestosis.

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It may be of interest to outline the studies which have demonstrated this continuing, disabling and fatal hazard. With my colleagues, Drs. E. Cuyler Hammond and J. Churg, I have been studying the health experiences of insulation workers in the New York-New Jersey metropolitan area, Locals 12 and 32 of the IAHFIAW. On December 31, 1942, these Locals had 632 members. We have followed each one of these men from that day to the present. During these years, 27 men have died of asbestosis, of a total of 367 deaths. Since there is no other cause for pulmonary asbestosis but the inhalation of asbestos fibers, these deaths have been unwarranted and unnecessary. Moreover, many of the men who have not been so badly affected as to die of the disease, have been and are disabled to a greater or lesser extent. Thus, more than half of the insulation workers examined by me with more than 20 years from the onset of their work, have the abnormal X-rays of asbestosis and almost one-third have shortness of breath of some degree.

It is evident that, somehow, we have failed these men. They had every right to look to their government and public health authorities, and to the physicians and scientists who guide them, for protection at their work. They were not given this protection.

If the problem were to be limited to this difficulty, it would be bad enough and sufficient spur to remedial action. However, these workmen face an even greater and more worrisome hazard. There is hardly an asbestos insulation worker in this country who is not concerned with the possibility that cancer, induced by the asbestos to which he is exposed, will overwhelm him as he reaches the prime of life. This hazard, too, comes as no surprise to us. In 1935, Dr. Kenneth M. Lynch, then Professor of Pathology and now Chancellor of the University of South Carolina, described the case of lung cancer in a man who also had asbestosis. Because both of these diseases were then rare, Dr. Lynch suggested an etiological relationship. In the next 20 years, numerous similar cases of this association were recorded. Indeed, the Chief Inspector of factories in Great Britain, reviewing all the cases of asbestosis known to their Department, found in the mid-1950s that approximately 20% had associated lung cancer. Sticklers for statistical niceties insisted they were unconvinced, however, and wanted even better data.

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Our experiences have supplied these requested morbid figures. I refer you again to the 632 men who were members of the Union in New York-New Jersey in 1942. You may wonder why we went so far back (especially since we have also been following 890 members of these Locals who joined in 1943 or after). The reason lies in an important characteristic of disease associated with industrial asbestos exposure. Asbestos disease rarely occurs in less than 20 years from onset of exposure. Thus, men who work with asbestos do not get asbestosis in five, ten or fifteen years after starting work - asbestosis will become significant and death may follow 25, 30 or more years following the start of their first job. A similar period of clinical latency is true of asbestos cancer, as well. When this occurs, it strikes 25, 30 or more years after the initial exposure. Incidentally, this is true of many other cancers, as well, both those related to industrial exposure and those not so related. For example, the youngster of sixteen or eighteen who starts smoking has no immediate fear of lung cancer, and correctly so. Unfortunately, he does not look ahead to his late forties or fifties, when the risk appears. Similarly, the bladder cancer following beta-napthalene exposure, the lung cancer of certain chromate workers, and even the skin cancers following arsenic ingestion; all have a long period of latency. For this reason, any evaluation of the carcinogenic potential of a substance, such as asbestos, must include a long period of observation in humans. I will talk more of this later.

To return. There were 632 members of these Locals on December 31, 1942. We have followed these men, as I have said, to the present. Since we knew the ages of each one of these men in 1942, it was possible for Dr. Hammond, who is Director of Statistical Research and Epidemiology for the American Cancer Society, to determine how many cancers we might expect among these 632 men in subsequent years. We then compared the actual number of deaths and causes of death among these men, with what should have occurred among them, had their experiences been the same as the general population in the United States, age, year and sex being taken into account.

The following Table outlines the data we obtained from January 1, 1943 to December 1, 1962.

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Observed and Expected Number of Deaths Due to Cancer
Among 632 Asbestos Workers Exposed to
Asbestos Dust 20 Years or Longer

	Years				Total
	1943-1947	1948-1952	1953-1957	1958-1962	1943-1962
Total, all causes.....					
Observed (asbestos workers)	28	54	85	88	255
Expected (US white males)	39.7	50.8	56.6	54.4	203.5
Total cancer, all sites.....					
Observed (asbestos workers)	13	17	26	39	95
Expected (US white males)	5.7	8.1	13.0	9.7	36.5
Cancer of lung and pleura....					
Observed (asbestos workers)	6	8	13	18	45
Expected (US white males)	0.8	1.4	2.0	2.4	6.6
Cancer of stomach, colon, and rectum.....					
Observed (asbestos workers)	4	4	7	14	29
Expected (US white males)	2.0	2.5	2.6	2.3	9.4

The Table demonstrates that of the 632 men, 203 deaths could have been expected, had their experience been the same as the general population. Instead, 255 men died. As we look for the reason for the extra 50 deaths, it becomes evident that cancers of several types are responsible for the excess deaths.

Thus, while we might have expected six or seven deaths due to lung cancer among these men, there were 45. While we would have expected nine or ten cancers of the stomach or colon, there were 29.

Incidentally, since 1963 the figures have been, if anything, even worse. While we would have expected approximately 50 of the remainder of the men to have died in the past five years, there have been 113 deaths. And, while we would have expected 3 to have died of cancer of the lung or pleura, 28 have died of this disease. It is surely a tragedy to reflect that 1 in 5 of all insulation workers who now die in the New York-New Jersey metropolitan area die of lung cancer. More than half of the 368 deaths among these men in the past 25 years have been due to cancer of one or another type. If these figures are projected to the country as a whole, and if no improvement in the health hazards these men face is achieved, we may look forward to perhaps 6,000 deaths of lung cancer and to perhaps 15,000 deaths of cancer in general among men in this single asbestos trade alone, in the U.S

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I do not relish the role of Cassandra, and for the purpose of demonstrating the necessity for the development of an occupational health program for the insulation trade, the data already presented might suffice. Nevertheless, another dimension exists which may be useful in your considerations and which should be, at least briefly, mentioned. I refer to a hazard not even suspected until several years ago. While lung cancer, as I mentioned, was observed in association with asbestos more than 35 years ago, in the past several years, we have found that another tumor, mesothelioma of the pleura or mesothelioma of the peritoneum, has also begun to attack asbestos workers. This has attracted a great deal of attention, since until the recent past, this highly malignant tumor was considered to be extraordinarily rare - so rare as not to be separately coded in the International Classification of Causes of Death. Accurate data are hard to come by but in the past in general, mesothelioma was found in approximately 1 in 10,000 deaths. It was a very rare tumor.

Now, it is not at all rare among individuals exposed to asbestos. Thus, in the last several years over 250 cases have been collected in one laboratory in South Africa, primarily in the area about one group of asbestos mines. Over 350 cases have been collected by another group of investigators in Great Britain and, again, asbestos exposure has been traced for the majority of these.

We, too, have been struck by the early reports, especially by those of Dr. Christopher Wagner of South Africa, and noted that in our first 255 deaths, 4 had been due to mesothelioma. This number was, of course, too few to warrant extensive comment. However, since January 1, 1963, 13 of the next 113 deaths have been due to diffuse mesothelioma of the pleura or peritoneum! It would appear that this invariably fatal tumor has been added to the already heavy risks of the insulation worker and that one in ten deaths among them will be caused by it!

Mesothelioma is curious in another way - one that has caused us much concern. While the cases seen in my Laboratory have been among industrial workmen more or less heavily exposed to asbestos dust, in many other instances the degree of exposure to asbestos has been very light indeed and there has been no clear correlation between degree of exposure and the liklihood of occurrence of the tumor. Newhouse and Thompson in London have presented very disturbing data in this regard. They investigated

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seventy-six consecutive mesotheliomas at the London Hospital, most seen within recent years, to study the relationship of asbestos exposure. As expected, in 31 of the 76 cases, the individual had worked with asbestos. Of the 45 cases who did not work with asbestos, in 9 instances the only asbestos exposure occurred by virtue of their having lived in the household of an asbestos worker (who often came home with the dust on his clothes). That left 36. Eleven cases occurred in people who merely lived within 1/2 mile of an asbestos factory in one district in London!

Similar cases were reported by Wagner in South Africa, while in this country Lieben & Pistawka, reviewing 44 cases of mesothelioma in Pennsylvania, found that 20 had potential occupational exposure and 24 did not. Of the latter, 8 occurred as the result of neighborhood exposure by virtue of living near a factory using asbestos and in 3 cases there was potential household exposure. Thus, one death occurred in a minister living across the road from an asbestos plant, one was a child whose father was an asbestos worker and another death occurred in a woman whose sons worked with the material. Borow and his colleagues have recently reported 17 cases of mesothelioma in New Jersey. Again, 15 were in asbestos workers, but two were in individuals who merely lived in a town which had a large asbestos factory.

The very real question has thus been raised - is asbestos-induced cancer limited to those men who regularly are exposed to significant amounts of the dust, or is it a much wider hazard than this? A moment's reflection may highlight the potential problem. We have little accurate data concerning the number of men employed in the United States who are regularly and directly exposed to asbestos, as in asbestos textile plants, asbestos product factories, insulation work, etc. Perhaps 100,000 or more men are regularly so employed. The hazards I have outlined would be serious enough if this were the only group involved. But are those indirectly occupationally exposed at similar risk? If so, the problem is much wider. For example, insulation workers work side by side with more than 3,500,000 other construction workers, often in the same room, inhaling the same dusts -

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steamfitters, electricians, carpenters, plumbers, masons, tile setters and others. Incidentally, to their indirect exposure must be added occasional direct exposure of their own in some instances, as a carpenter sawing an asbestos-cement board, a plumber using asbestos rovings, or the electrician stripping asbestos-covered wire. Much of the asbestos now used is used in the construction industry and much of the increase in world production (500,000 tons per year in 1930 to over 4,000,000 tons per year at present) has been utilized here.

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I believe enough has been said to indicate that an important occupational health problem exists in this trade, one that requires urgent and energetic corrective measures. I would urge you to consider the Bill before you in relation to the data I have presented. My own reading of the Bill suggests that it will go a long way in improving the unfortunate conditions that now exist. Again, from my own experience, a number of observations may be pertinent in evaluating specific approaches contained in the Bill.

1. I am convinced that the problems I have detailed can be solved and health hazards eliminated. Suggestive evidence is available in Great Britain, Germany and in this country indicating that both asbestosis and bronchogenic carcinoma can be significantly reduced in incidence as levels of asbestos exposure are drastically reduced. The asbestos industry in general and the insulation industry in particular are much too important and much too valuable to be limited or injured by default. Appropriate safety measures are thus in the interests of both the industry and its employees.

2. Workmen in the trade expect and await the measures necessary to eliminate or diminish the hazards to which they are exposed. I recently inquired of them what problems they had noted in their practical experience. Over 13,000 took the trouble to write me with suggestions about cleaning up their trade, ranging from the availability of improved masks through less dusty materials, improved working practices, appropriate exhausts, appropriate health examinations and the vacuuming clothes before going home.

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3. It is idle and largely inaccurate to "blame the industry" for the present situation. It is sometimes not appreciated that "industry" is not an all-powerful monolithic single entity - certainly it is not in the insulation trade. In this trade, most employers are small business men, with limited resources, employing few men. When I looked into this matter at the end of 1965, there were over 900 employers in the industry, employing an average of 17.6 men per shop.

   Such employers have neither the expertise, nor funds, nor knowledge to have detected these health hazards. They are just as much upset by them as are their men. Nor can they mount the necessary engineering and industrial hygiene programs to develop adequate safeguards to remove these hazards. They will be anxious, I am sure, to undertake appropriate occupational health and industrial hygiene programs once these are suggested to them. This, I assume, is in line with the purposes of the Bill.

4. In the insulation trade, it is my impression that, while all would welcome the necessary measures, unless the public health authorities and those responsible for the occupational health measures take action, nothing will be done. In large part, this is because no one knows where the responsibility actually lies. Does it belong with the materials manufacturers? The individual employer? The regional employers' associations? The national employers' association? The national materials manufacturers' association? The local unions? The international union?

5. The problems we have discussed are excellent illustrations of the urgent need for extensive strengthening of the Occupational Health Program of the Public Health Service. Their task has been tremendously extended and complicated in the last 20 years by the widespread introduction of numerous new materials, the biological actions of which are usually untested. Are there other asbestoses lying in wait for us? Only the Public Health Service includes the possibility of long-term surveillance necessary for detection of those effects with a long latent period, as occupational cancer. Their continuing responsibility includes the coordination of observations made by scientists in various fields at various times. Moreover, they often have the opportunity of studying large groups of men, often occupational lists. Few employers, except the very largest, have this opportunity.

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Moreover, workmen often go from job to job within the same industry, especially in the construction trades. No one employer can expect to follow his employees long enough for long-term effects to be defined. Indeed, since such effects may vary with the same material from industry to industry, only a body which can observe all industries may be able to detect such effects.

What I am saying is that industry is simply unable to police itself in the detection and definition of such hazards as have occurred. The industry needs help.

6. I would suggest that it is very much in the interest of industry in general, and the insulation industry in particular, to have, as the proposed Bill suggests, adequate authority given to the Department of Labor to set those standards necessary to reduce or eliminate occupational health hazards. I do not refer to those callous statistics which indicate that it is cheaper in the long run to have adequate safety and health precautions than to pay workmens compensation costs. While this may be true, there is a much more important aspect to the question.

In many instances, where there is intra-industry and inter-industry competition, it is often the most conscientious employer who is at a competitive disadvantage. This is certainly true in those industries in which there is a risk of pneumoconioses or dust diseases of the lungs, as silicosis, coal workers' pneumoconiosis, talcosis and asbestosis. Since there is, as we have seen, a long latent period - usually over 20 years - between dust exposure and disease resulting from such exposure, precautions taken today will bear fruit, in the form of the employees' good health, two decades or more hence. But at that time, it is highly likely that the employee will be working elsewhere! The employer in investing in current occupational health precautions, sees no immediate benefit, not even in reduction of workmen's compensation costs. If he must pay the latter to current employees who are ill, he is paying for the neglect of another employer twenty or thirty years before.

This analysis is relevant to the insulation trade today. I have spoken to many insulation contractors. They have been very concerned with the difficulties that have become evident and earnestly wish to remedy matters. Yet they have told me that if substantial investments or

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significant changes in working practices and conditions were required as part of the program to make this trade safe for the men working in it, such investments should be industry-wide and should not penalize those who undertake them in favor of those who do not.

Standards based upon information collected and evaluated by experts in the Public Health Service, set on practical and realistic levels by the Secretary of Labor with adequate enforcement powers, and required by all employers in the industry seem essential to correct the serious situation I have outlined. The industry itself has neither the academic and scientific nor the administrative resources to prepare the appropriate corrective program and, the economic facts of life are such as to mitigate against the broad application of such a program by voluntary persuasion alone.

Moreover, these influences are even more relevant when considering the social and community responsibilities which may exist. If the use of asbestos insulation materials should be shown to include some health hazard to other construction workmen as the result of concomitant indirect occupational exposure, we would need some mechanism as that outlined in this Bill to insure appropriate corrective measures, since many employers might hesitate to undertake expensive precautionary measures to prevent uncertain disease that might occur many years later among men they did not know, did not employ and for whom they had no responsibility - especially if in making such an investment they assumed an intolerable competitive disadvantage.

In concluding, may I add a few words of personal comment and opinion. As I read this Bill, it seemed to divide responsibility fairly and effectively. What we now know would be used to set enforceable standards immediately. The institution of beryllium safety standards has resulted in a significant reduction in beryllium disease and similar advantages will be obtained with other noxious agents, of which we already know a good deal; enough to prepare practical, realistic safety programs.

I noticed that Secretary Wirtz on February 15 testified that over 1,000 workers are expected to die from radiation-induced lung cancer in uranium mines. I am sure we all regret these deaths from a hazard which has been recognized since 1879. And we have enough knowledge to point the urgency of a protective program for our insulation workers in this country, who should no longer die of asbestosis, lung cancer, pleural and peritoneal

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mesotheliomu. We should help industry help itself in the development, installation and administration of an industry-wide program which will penalize no employer but will help the many thousands of workmen who look to us to accept our responsibility to protect them against serious occupational hazards.

On the other hand, the Bill looks forward to an important expansion of the research responsibilities and capabilities of the Occupational Health Program of the Public Health Service. This is urgently needed. At this time the Program is composed of highly skilled, energetic and dedicated scientists. But their responsibilities, already heavy and numerous, are increasing almost geometrically. The Surgeon General, Dr. Stewart, stated in his testimony on February 20 that "... workers are coming in contact with literally hundreds of new chemicals and formulations in industrial uses every day." He noted that these "... chemicals have increased so fast in number that we have recommendations for only 400 out of 6,000 in commercial use." Industry has increased in complexity and potential hazard. The tasks of the Occupational Health Program must somehow be accomplished and I would strongly urge that the strengthening of the Occupational Health Program as envisaged by this Bill be supported.

In conclusion, may I thank you, Mr. Chairman, and the Members of the Committee for your invitation and for the opportunity of reviewing those of our experiences relevant to the Bill you are considering.

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