

Asbestos Information Association
North America

Third Annual
Industry- Government Conference

September 8 - 9, 1976

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THIRD ANNUAL

AIA/NA INDUSTRY-GOVERNMENT CONFERENCE

September 8-9, 1976

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Nicolet, Inc.
OSHA
Research Triangle Institute

Remarks of Philip E. Enterline, Ph.D.
Professor of Biostatistics, Graduate School of Public Health
University of Pittsburgh

at

Asbestos Information Association
Third Annual Industry-Government Conference

September 8-9, 1976

Dr. Enterline is Professor of Biostatistics, Graduate School of Public Health, University of Pittsburgh. He received his undergraduate education at Westminster College, and his postgraduate degrees at the American University.

Dr. Enterline is a recognized expert in the fields of biostatistics and industrial epidemiology. He has published a number of distinguished papers. Prior to joining the University of Pittsburgh faculty, Dr. Enterline served in a variety of responsible positions in the U.S. Public Health Service. He has a broad background of experience on health advisory committees and has done extensive consulting work for government, academia and private industry.

Listening to Alex Cross reminded me of a grand tour I did of England back in 1962 when I first got in the "asbestos business." I'll never forget a young statistician who was assigned to orient a group of us about the problem in England and what was going on, and throughout his entire presentation he talked about the "asbestosis" factories in England. The man next to me said, "Oh, how I wish we could get him to stop saying that!"

I was asked today to talk about a project I've been doing for the Asbestos Information Association, and I'll spend a little bit of time talking about it, not much time, because I haven't gotten into it very deeply. This is something Guy Gabrielson asked me if I would undertake and is being done with the help of one of my graduate students. The question we're trying to answer is, "What did we know about the association between asbestos and cancer at various points in time as we go back through history? What did the experts think about the association in 1935, 1940, 1945, etc.? At any point in time what was the expert opinion? What did writers think about what they were seeing?"

This is an interesting kind of project because it requires doing something that to my knowledge has never been done. It means reading not only the summaries of the various articles, but the introductions and the discussions, and if it's a paper given at a meeting, the discussions of the paper from the floor and the questions and answers, if they're published. Also, all the editorials that have been written about asbestos and cancer, textbooks, letters to the editor, and questions and answers in the leading medical journals. Then try to form some kind of opinion about what was believed at these various points in time.

The game plan is that we'll have one or two graduate students do the actual screening of the literature (photographing the pages that are relevant) and then have a biostatistician and an epidemiologist independently review this material and make some decisions about what points in time were certain things known. I want to emphasize that we're not trying to find out when should we have known; we're trying to find out when did we know. When did the writers of the various periods realize what they were dealing with? That's something a little different than an ordinary literature review.

To give you a sampling of what we find when we do this, I'll show you a couple of things we've abstracted which illustrate a number of points about this particular project.

The first slide is a writing from the bulletin of the American Society for the Control of Cancer and was written in 1943. I'm going to talk only about asbestos and lung cancer in order to narrow this thing down somewhat.

Slide #1

1943

Bull. Am. Soc. Cont. of Cancer

"Asbestosis cancer of the lung is the most recent newcomer among the occupational cancers of this organ. First described in 1935, there are now 18 cases of this industrial cancer on record observed among asbestos workers in England, Germany, and the United States. The latter contributed five cases. Inasmuch as the asbestos industry is most extensively developed in this country asbestosis cancer of the lung has for us a special hygienic and sociologic significance.

Now this is interesting because it's based upon reports on an association of asbestosis and bronchogenic carcinoma at autopsy, and it is written by Bill Heuper whom some of you surely know. He wrote a great deal about occupational cancer. Now let me show you a writing in 1961. This slide is from the Journal of the American Medical Association. That's a very prestigious journal, and this writing is even more prestigious because this happens

to come from a section of that journal that answers questions that are asked by the medical profession. If you're a practicing physician and want the latest information on a particular topic, you write to the Journal. They refer your letter to someone they consider a leading expert and that person will then reply in the columns of the journal to your question.

Slide #2

"There is no epidemiological evidence that silicosis, resulting from undue exposure to free silica, produces cancer of the lung. Of the several silicates, asbestos is held in suspicion, especially in Great Britain. In the American literature there is no evidence that there is a relationship between asbestosis and lung cancer. The reason for the difference between the English and American experience is not apparent. It may be due to a difference in the type of asbestos fiber or to the total dosage."

As you might expect, in 1961 there was considerable correspondence which followed this, however, the writer stuck to his opinion and defended it on the grounds that there was no epidemiologic evidence and points out in subsequent commentary in the Journal that without epidemiologic evidence no picture of a disease would really be complete. This is interesting because what is happening in 1961 is applying a different set of rules to decide if there is an association as compared to 1943. In other words, the rules were changing at the same time knowledge was developing.

This type of commentary is not indexed and calls for reading lots of journals, many of them weeklies. My student has read all issues of the Lancet (which is probably the leading medical journal in the world), the British Medical Journal, and the Journal of the American Medical Association back to 1935 and has picked out a lot of material that I can't present here today. So far we've gotten up through 1961. After that it really gets tough because the

volume of literature exploded after that date, particularly after the 1964 conference in New York. I'm simply giving you some idea of the type of project that Guy has launched us upon, what this project involves, and where we are at present. Incidentally, we've located some very humorous stuff. For example, in 1949 Ovaltine was being advertised to prevent pneumonociosis and asbestosis. So we've come a long way since 1949.

Let me now proceed to something quite different -- and this is stimulated by an article I saw in this morning's paper. It's the matter of how much disease will be produced from exposure to asbestos. We've been working on a model to predict how much disease is produced with continuous exposure at any given fiber level over any given period of time. For example, we could think of workers who start at age 20 and who work for 50 years at 2 fibers per cc. How much disease would we expect to occur? This is really the important question, I think. What will happen to people if we take certain actions on their behalf at this point in time?

First, to review rapidly some elements of carcinogenesis needed to develop a model, we know that if you're exposed to a carcinogen, you won't get cancer tomorrow, but that there will be a peak incidence at some future date and thereafter it tapers off. This distribution seems to follow a mathematical function called a log normal.

Another important notion for modeling the effects of asbestos exposure is that for low dose rates the time it takes for cancer to appear will be very long. On the other hand, if you have a very high dose rate, cancer will appear rather quickly. I'm thinking now about groups of people, say 100,000 people exposed at different levels. In other words, there is a relationship between

the intensity of exposure and the latent period. Thus, a population would have to live a long time to experience a full response to exposures at very low levels.

Now if we add to this the assumption that this dose-response relationship is linear, we can develop the family of response curves. The linear dose-response idea means simply that every increment of dose causes a like increment in response -- a straight-line relationship. That has some acceptance as far as cancer is concerned. It's one that you may not like, however, because it means that any little bit of asbestos will produce some kind of response given enough people and enough time. If you talk about a threshold limit, the idea is that a little bit won't produce anything -- that you have to have a certain amount - 2 fibers, 5 fibers, etc., before you produce any disease. I don't think it really works that way. I think that any little bit does produce something.

Here is the output of the model, and is kind of the end product.

Slide #3

Cumulative Relative Risks for Respiratory Cancer
at Seven Levels of Continuous Exposure

Exposure Level (f/cc)	20 Year	40 Year	60 Year
1/2	1.000	1.000	1.003
1	1.000	1.003	1.021
2	1.000	1.026	1.098
4	1.005	1.154	1.361
8	1.050	1.684	2.075
16	1.390	3.400	3.702
32	3.291	7.861	7.032

Unfortunately, in the interest of time, I've had to skip some intermediate steps and assumptions but could provide these to anyone interested. This says that where the cumulative relative risk is carried to three decimal places, no effect of asbestos on the death rate from lung cancer can be detected until 60 years of exposure at 1/2 fiber, 40 years at 2 fibers, and 20 years at 4 fibers. One reason for this is the assumed long latent period for low doses. After 60 years, for example, increased lung cancer would appear; but, of course, for persons entering the labor force in their 20's, other causes of death are pretty important at this point.

Now that we know what the risk is at various exposure levels, we could calculate absolute number of cancers if we knew how many people were exposed. I went back to something the Asbestos Information Association did some time ago and made a slide of it. Here are quotes from Irving Selikoff about how many people are exposed and how many will die from asbestos-related diseases.

Slide #4

Dr. I. J. Selikoff Predictions

	<u>No. of Workers</u>	<u>Description of Cohort</u>	<u>Total Deaths from Asbestosis Lung Cancer & Mesothelioma</u>
Article in Wall Street Journal -- 6/8/72 "Studies by Dr. Irving Selikoff . . . Lead Him To Predict..."	250,000	All workers <u>currently</u> Employed in the Asbestos Industry	85,000*
Article in the New York Times...6/13/72 (Five Days Later) "If our experiences.... Are a Guide...."	500,000	All workers <u>currently</u> and <u>previously</u> employed in the Asbestos Industry	170,000
Testimony at Toxic Substances Hearing - "Our studies indicate..."	1,000,000	All workers <u>currently</u> , <u>previously</u> , and <u>who will</u> <u>be</u> employed in the Asbestos Industry in this country	340,000
*Actual Quoted Prediction was 95,000, But this included deaths from GI Cancer. (- 182-)			

This is essentially the material that was quoted in this morning's paper and apparently assumes that all persons exposed have been and will be exposed like men in his studies -- mostly asbestos insulators. We hope that isn't so. What we'd really like to know is how many men would be affected by asbestos if exposures were at 4 fibers, 2 fibers, etc., since that is what the government is deciding.

Let's just take one number. Let's take the first number, 250,000 -- that's all workers currently employed in the asbestos industry. One question we might ask is how many of these people would you expect to die of lung cancer if there was no asbestos around. Let's say they never had been and never would be exposed to asbestos. Of course, some people would still die of lung cancer because lung cancer has lots of causes -- cigarettes, air pollution, etc. Also, you have to remember that things can happen to you other than dying of lung cancer. You could get hit by a truck or have a heart attack (some people are going to have a heart attack when they read some of this stuff).

I estimate that if there was no asbestos exposure, in a group of 250,000 men there would be 12,500 dying of lung cancer. Now, what if these men were exposed continuously to half a fiber for 60 years? From Slide #3, we can estimate that 12,537 would die of lung cancer ($1.003 \times 12,500$). If these 250,000 men were all exposed continuously to two fibers, 12,762 would die; if exposed to four fibers, 17,012 would die, and if exposed to eight fibers, 25,937 would die of lung cancer. This is after 60 years. Looked at another way, 250,000 men exposed for 60 years to half a fiber will produce 37 lung cancer deaths, etc.

The problem then comes down to these excess deaths and how many there are at these different exposure levels. To simply deny that there are any excess deaths I don't think is ever going to get any place, but I think to recognize how many we're talking about may have some meaning. Given improvements in industrial hygiene, I'm sure we're not talking about excesses of the magnitude Dr. Selikoff predicts. Of the 500,000 he predicts will enter the industry or will be exposed during the remainder of the century, a 2 fiber standard at 40 years of continuous exposure would increase deaths from 25,000 to 25,650.

Let me show you my last slide which is a check on how well my model actually predicts.

Slide #5

Relative Risk Predicted by Continuous Exposure
Model at 15 f/cc Compared with Relative Risk
Reported in Study of U.S. Insulation Workers

<u>Years from Onset of Exposure</u>	<u>Predicted Relative Risk</u>	<u>Observed Relative Risk (Adjusted)</u>
10	1.0	0.0
10-14	1.6	2.2
15-19	2.8	3.4
20-24	4.3	3.1
25-29	5.4	4.5
30-34	5.7	6.4
35-39	5.4	5.4
40-44	4.8	4.9
45-49	4.1	3.6
50+	3.4	3.8

Does my model predict Selikoff's finding? These data are from Selikoff's study of 17,000 insulation workers. Selikoff has undoubtedly produced some of the most magnificent epidemiological data I've seen, and I think this 17,000 insulation workers study is truly a great study. You see there is a very good correspondence. The model predicts pretty much what Selikoff observed. Notice, for example, that Selikoff observed less and less cancer as time went on. That's what the model predicted too. Notice that his peak occurred for men who were exposed 30-34 years ago, and I get exactly the same peak.

To summarize, it is possible based upon the epidemiological data now available to predict what will happen if various actions are taken at this time in regard to asbestos exposure and if various standards are set. This should be helpful in deciding where you want to set this thing. I think it would be sticking our heads in the sand to say that nobody will ever be affected at 2 fibers or at any other finite level.

Remarks of Guy G. Gabrielson, Jr.
Chairman of the Board, Nicolet Incorporated

at

Asbestos Information Association
Third Annual Industry-Government Conference

September 8-9, 1976

Mr. Gabrielson is Chairman of the Board, Nicolet Incorporated. A Vice President of AIA/NA, he also serves as Chairman of the Association's Asbestos Regulation Task Force. Mr. Gabrielson is a lawyer, businessman, and prominent civic leader.

I used to think that the last speaker was fortunate because he could have the benefit of all the wise things that were said by the informed speakers who preceded him. He could assimilate all this information, put it together, and make a profound impression on the audience. I'm not so sure as I stand here this afternoon that that is the advantage I thought it was. The disadvantage of being the final speaker is that all you who have been here through these proceedings have a much better appreciation of the complexities of the problems of which we are dealing, and I'm afraid you might be somewhat impatient with a simplistic kind of speech that I might make if I tried to put together in one piece all the things that we've heard during the last day and a half.

I'm glad I was here during these proceedings, but I have my regrets also. To perform the function I have undertaken on behalf of AIA/NA and the asbestos industry, I think it is essential that I endeavor to preserve my objectivity and that I try to understand the broad perspectives of the problem. Unfortunately when I come to a meeting of this kind and I listen to the speakers who are acknowledged experts in their fields, obviously understand their subjects far better than I ever will, I become intrigued with the details and it becomes difficult for me to step back so that I can see the forest and not the trees -- a

very, very confusing subject.

I thought the other day about a motion picture I saw a long time ago. It must have been at least 40 years ago when I was just a boy. I can't remember anything about the plot of the motion picture. I know that I enjoyed it. I remember only one incident in the motion picture. The setting was a steel mill. Two men who worked in the mill during their lunch break or coffee break or whatever it was were arm wrestling, and they put their elbows on an anvil. At either end of the anvil was a short piece of railroad rail that was red hot so that as the two men struggled you knew that the loser's hand was going to be forced down on the hot piece of railroad rail. Well that was a minor incident in the picture. It happens to be all that I can remember. But I do remember that the general tone of the picture was that steelworkers are tough guys. Steelworkers are guys who know the risks they are taking, and they are willing to do that job despite the risks. It proved their virility. There was no suggestion in the motion picture that the management of the steel company might have been at fault for not taking adequate safety precautions in the steel mill. These men were surrounded by hazards of all kinds. Most of them I recall would have been fatal hazards, but to my romantic mind at that age I thought that was perfectly all right. These were men who knew the risks of working in a steel mill. They assumed those risks. Presumably they received premium pay for doing it. And, most importantly to that young boy, it gave an opportunity to prove what

he-men they were.

Probably the atmosphere that was created in that motion picture reflected the history of our attitude toward safety in industry. Even at the time I saw it, it may have been somewhat of an anachronism. I suppose Jack Sheehan would say that the philosophy of management which was reflected in that motion picture could be described as the marketplace type of solution to the problem of industrial health and safety. In other words, at one time if not when I saw that motion picture, at least some time before that, I believe we generally accepted the thesis that, if we didn't deceive our employees, if we were candid in acknowledging what the hazards of the workplace were, and they chose to accept those hazards, perhaps demanding some premium pay for it, that was fair and equitable and a moral solution to the problem.

Well, today we don't look at things in the same way. Today we say and our statutes explicitly say that our employers have an obligation to provide each employee with a safe and healthful working environment. That might be disappointing to the romantic boy who saw that movie years ago, but I think most of us today accept that thesis. Times have changed and we don't rely on that old market mechanism that Jack Sheehan no longer will trust. We share with him the distrust of that market mechanism.

Today we handle the occupational safety and health problem in two ways. We impose upon employers a statutory obligation

to provide a safe and healthful workplace, and we issue rules and regulations to make sure that he does in fact provide that kind of workplace. Recognizing that we will not always be successful in protecting our employees from accident or damage to their health, we have a workman's compensation program which provides monetary compensation to the employee if our safety precautions fail. This is the approach which we have adopted. I think it is overwhelmingly supported in this country. I think most of us, if we were required to say what we would favor, would probably say, "Well, we favor that too." But we're not happy with it.

Much of what has been said during the last day and a half clearly evidences the fact that we are unhappy about this kind of treatment of the problem. For instance, in the development of rules -- occupational safety and health standards to protect our employees -- we heard Grover Wrenn say that we must allow, as I understood him, approximately one year to develop a standard. The most that OSHA seems to be able to undertake at one time, at least in my observation, is the development of about five standards. Well, assuming that they can develop five standards per year, taking a year to develop each one, and accepting a number which I have seen published somewhere that there are perhaps one thousand suspected carcinogens used in industry, we can expect that we will have standards covering our presently known suspected carcinogens in about 200 years.

This kind of procedure is cumbersome, and it is of concern

to me, and I know it is of concern to you. It is of concern to industrialists as well as to labor leaders. But I ask myself what is the alternative? Shall we rely upon the good will of employers to provide a safe working place? Well, Jack Sheehan wouldn't do that. And when he said as much I winced because in part I have to agree with him. Yes, good will on the part of employers will take us a certain distance, but I have to say candidly that if the provision of health and safety for my employees is going to be a very expensive undertaking, if a particular step is going to be very costly, and if I have some doubts about its efficacy in any event, I'm going to be very reluctant to spend that money because I'm afraid that my competitor won't do it and he'll have a competitive advantage against me. Good will will take us a fair distance, I think, despite Jack Sheehan's sentiments in this regard. But I don't think it will take us all the way. I think, candidly, we need some kind of prod in order to make us provide a truly safe workplace.

From where can such a prod come? Our customers aren't going to boycott us if we don't provide a safe workplace in the production of our products. If they would it would be a very effective motivating factor. But consumers generally aren't that sophisticated, and their buying choices are much more self-centered and not nearly that visionary or idealistic. That leaves us with the procedure which we're following now which I find very cumbersome and inefficient. The only alternative I've been able to think of would be perhaps to remove the limitations

which are contained in our workman's compensation statutes, remove the limitations upon the employee's right to sue his employer for damages. That if it were done I suspect would provide a very considerable motivation to employers. But if our statutory regulatory system is inefficient and cumbersome, imagine how inefficient and cumbersome the other alternative would be -- all these individual questions involving individual employees to be resolved in our courts of law. The 200 years would be a modest period of time it seems to me compared to the time period that would be necessary to clear our courts of all these thousands of cases, particularly when Congress shows no particular disposition to appropriate the money to expand our court system.

For better or for worse, gentlemen, unless you can suggest a better answer for our country, I think we are stuck with the approach which we are trying to use now and we have no choice but to try to make that approach work as best we can. It is to that task that the Asbestos Information Association is dedicated. It is to this effort that I currently am devoting a considerable amount of my time.

In the course of my activities with the AIA/NA I, of course, have frequent contact with scientists who are working in this field. I talk to and work with Hans Weill, Phil Enterline, Paul Kotin, George Wright, men whose skills and experience I respect to the highest degree, men who know far more about all these asbestos-health related subjects than I could ever hope

to learn. But I can't avoid the temptation to attempt to be an expert myself. One can't think about these things extensively without trying to organize it in one's own mind and to one's own satisfaction. I listened yesterday to Hans Weill talk, and I tried to summarize quickly in my own mind what he was saying about asbestos and disease. I want you to listen to what I say, remembering that this is a Gabrielson version of Weill, and he is not responsible for what I am saying in attempting to summarize his opinion.

He seemed to me yesterday to say -- you can check this against your own recollection -- he seemed to express the notion that all asbestos diseases are dose response related, in his opinion. He appeared to me to say that he was satisfied that there is a threshold for fibrosis, that is asbestosis, and for bronchogenic cancer, lung cancer. He seemed to me to imply, and I believe from my previous conversations with him that this would be a fair statement, that our present standard of two fibers is appropriate for that threshold level. He expressed some doubt, I thought, as to whether or not there is a threshold level for mesothelioma. I'll stop right there talking about Hans's opinion and turn to Grover Wrenn's opinion.

Grover Wrenn appeared to me to say that there is a dose response relationship, but there is no threshold level. I listened to Phil Enterline this afternoon, and I rather liked what he said -- and perhaps it will help me to reconcile what the other gentlemen have said. I thought from listening to

Phil that he said yes, there is a dose response relationship, but there is no threshold. However, a dose response relationship involves not only the seriousness of the disease but its latency period. So you may get to zero risk within a lifetime or you may get to zero risk beyond a lifetime. I wonder if that enables me to reconcile the view of Hans Weill and Phil Enterline. Perhaps they see the thing in the same way though they don't express it in the same way. Perhaps Hans Weill would be willing to say yes, there is no threshold, but for fibrosis and bronchogenic cancer the effects at low fiber concentration go beyond the normal human lifespan so that you finally get to the zero risk way out in the term of human experience.

Grover Wrenn seems to say that there is no threshold; you get to zero risk at zero exposure, and in the case of all diseases that will occur during a working lifetime. What do you do then in trying to set a regulation if you follow Grover Wrenn's hypothesis? What he seemed to say this morning was that the only way we can be sure that there is no risk of disease is to ban asbestos, but we can't do that. We can't go to zero risk. Therefore, we will make our decision based upon grounds of feasibility.

Well, that may be an easy thing to say, but it's a very difficult thing to implement. What, after all, is feasible and what is not feasible? The position that AIA/NA has taken in responding to the OSHA proposal I think can be summarized in this way. We do believe that there is a dose response relation-

ship between asbestos and all the diseases which it causes. We do believe that the present two-fiber level is sufficient to protect our work force during a working lifetime. We admit that we cannot prove that, particularly in the case of mesothelioma. We take the position that Hans Weill has taken, that until it can be established that this is not a safe level we should not pay the cost of severely damaging or destroying a valuable industry. That is the position we took in the case of the manufacturing regulation. Let's stay with the two-fiber level until it can be demonstrated that that is not adequate to protect the safety of the work force.

Can we do this in good conscience? Well, I wouldn't be arguing this case if I didn't believe that we could. And I must confess that in addition to the information which I tried to gather from the medical and scientific community I rely to a great extent upon my personal experience in the asbestos industry. I would concur, strongly I think, with the kind of statements that were made by Alex Cross and that is that the present incidence of disease which we are observing is the product of very high exposure to airborne asbestos. I am not persuaded by the assumptions made in some scientific papers that certain types of domestic exposures, neighborhood exposures, necessarily were either low or discontinuous, intermittent. I believe from what I have seen during my lifetime's work in the asbestos industry, and I believe from my own conversations with veterans in this industry, that exposures were extremely high

in the past, extremely high even in the neighborhood case, and I believe often in the domestic case.

To place this thing in perspective for myself, I believe that today's two-fiber standard, if achieved, will be many, many times lower than the exposures which have created the disease which we are observing today. In good conscience, I can and I do support the two-fiber standard, and I will argue for that standard. I have recommended to the Executive Committee of the AIA/NA that we use every tool in our command to make our point with the regulatory authorities, that we exhaust our administrative remedies, and if at that point we still do not have the kind of standard we think we require to run our businesses that we go ahead and go to court to challenge an unsatisfactory regulation. I believe the system permits us to do this and we can do that with a clear conscience.

It's interesting to think, however, despite Jack Sheehan's rejection of the marketplace as the final arbiter of occupational safety and health, that in the final analysis it will be in the marketplace which decides. The market can make its decisions known either through purchases by buyers in the marketplace or sometimes through the political process.

If we look at occupational safety and health in gross and think again of those one thousand suspected carcinogens plus all the other potentially toxic materials that are used in industry and if we recognize that there are people who are

arguing for zero exposure or a practical ban on many of these substances, we begin to get an idea of the enormous economic cost that might flow from the successful pursuit of an objective of that kind. Those who look upon the consumption side of our economy as the measure of our standard of living would say that to go the distance that some of the zealots seem to be advocating would lower our standard of living. Well, stated in those terms I would say that's true.

An alternative, however, would be, and perhaps more fairly would be, to say that occupational safety and health is part of the standard of living. So we would be trading cheap goods for more occupational safety. We would be trading plentiful goods for more occupational safety depending upon how far we go in this direction.

I think it is safe to say that there will be a limit to which the American people will be pushed. There will be a limit to the quantity if you wish to call it that, to the quantum of occupational safety and health which they are willing to buy. When their automobile begins to cost 4, 5, 6, 10 times as much as it did, when they find that they can't buy a house because it's beyond their means, when they find that they have to work longer hours or have shorter vacations because we are devoting more of the resources of this economy to the pursuit of diminishing returns in the occupational safety area, they will finally blow the whistle. And, they will do it not so much through the marketplace as through the political process. Believe you me,

ladies and gentlemen, their congressmen will respond. We have the simple example of the seatbelt interlock. It didn't last very long when the motorists became impatient with it. So too will be the case with all occupational safety and health regulations. In the final analysis it will be the public, the consuming, voting public who will decide how much occupational safety and health we are to have. Let us hope when that time comes we don't get a pendulum effect and they throw the whole thing out in disgust. That conceivably could happen.

I'm afraid Jack Sheehan is disappointed really or will be disappointed. The final determination will be a marketplace determination. It will be expressed, I believe, through our elective process rather than through buying and selling in our stores. But finally it will be the people who decide how much occupational safety and health we should have. And that is going to be the kind of cost benefit analysis which is anathema to so many labor leaders and others who are zealously advocating more safety and health.

We are, after all, all of us, businessmen, labor leaders, legislators, administrators, we are all trying to guess at what the decision of the average man will be -- how much occupational safety and health does he want to buy? So that forces us back to a cost benefit analysis. Increasing expenditures of money and increasing efforts directed toward occupational safety and health cost more and more and more money and give us diminishing returns. If, in fact, we do have a straight line relationship

between exposure and onset of disease and/or its severity, then we must look at this relationship as best we can even in the absence of hard data. This is the kind of subject that a law school student would very much enjoy.

Let me postulate a case. Let me say that the membrane filter test method is very accurate and very reproducible down to several decimal points, and let me say that in our asbestos industry we can reduce average exposures in our workplaces by 1/100 of a fiber by the expenditure of a hundred million dollars, which we then are going to charge to our customers. And that this reduction of 1/100 of a fiber per cc in all our workplaces will benefit one very sensitive man who happens to be working in one of our factories, and as a result of this reduction this man lives to be 76 years and one week instead of dying on his 76th birthday. After all, this is what we're talking about when we're talking about mortality. We haven't yet discovered how to live forever, so all we're talking about is how soon are we going to die. Well, this fellow is going to live one week longer because we paid a hundred million dollars to make an improvement.

Obviously my example is absurd, but it makes the point that we cannot conscientiously duck the question of cost benefit analysis. Despite the fact that we may be branded as crass privateers for our interest in the economic aspects of this subject, we, gentlemen, have no choice but to look at it in these terms and to call these matters to the attention of the

regulatory authorities so that they give it attention too. They must respect these considerations if they are concerned about the reaction of the general public and ultimately they must be so concerned. We, I think, have the obligation to do this job and to do it as responsibly as we can.

Although there are many respects in which our effort in the manufacturing case were deficient in my opinion, I think on the whole we did a good job with the time that was allowed to us, and I think we did a responsible job. And I think that that is recognized at OSHA and elsewhere. We now face the prospects of a regulation of asbestos exposures in construction, and we propose to address ourselves to that problem in the same responsible way. We will make an effort in this case even to improve the quality of our response, but we can't afford to ignore it because the construction market represents such a substantial portion of our total market. This is of vital importance to the asbestos manufacturing industry and must be so treated.

Although we have much work to do on this problem between now and perhaps next spring, it is the present feeling of those who are most actively engaged in it that we will, for a variety of reasons, undoubtedly advocate the retention of a two-fiber per cc exposure level in the construction industry. We have in my opinion, however, a more difficult problem to address in the case of the construction regulation, and that involves all the other parts of the regulation. I believe, speaking selfishly as a manufacturer of asbestos products, that the potential

harm to our manufacturing industry is greater as a consequence of the promulgation of a construction regulation than it is as a consequence of the promulgation of a manufacturing regulation. For this simple reason, if the burdens of medical surveillance and monitoring and record keeping are too great and those burdens are imposed upon our contractors, the contractor can say, "I'm not going to be bothered with this hassle. I'm just not going to put up with this kind of problem and this expense and this inconvenience even though some may argue that it isn't terribly expensive." He's going to look for substitute materials, and to him it really doesn't make a great deal of difference because buildings will be built; factories will be constructed; highways will be laid; bridges will be built whether asbestos is used or not, and his business won't be destroyed. He doesn't have the same vital interest that we do in this construction regulation. The most difficult part of our task in this case will be to try to mitigate the impact of these other elements of the regulation, the medical surveillance, the monitoring, the record keeping, so that our contractor customers will not be discouraged and will not accelerate their search for other materials so that our market will be preserved.

Now we can point out to the authorities the damage that may be caused to our industry by a regulation that is too strict in these areas, but we must go beyond that, in my opinion. We must find a rationale that will support on occupational safety and health grounds the different treatment of these factors from

the treatment which will probably be given to them in the manufacturing sector.

Can that be done? Well, I think perhaps it can, but it's going to require a great deal of data gathering, a great deal of research, and a great deal of careful thought not only on the part of the members of the industry who are working on the problem but on the part of the contractor who will be assisting us in the technological feasibility and economic impact study.

I believe we can take the reasonable position, in the absence of good solid scientific data, that two fibers per cc will adequately protect the workmen in the workplace. We have to be honest and acknowledge that we can't prove that. It seems to me that our obligation then, if we are successful, is to be very sure that we act responsibly as businessmen and that we should not be satisfied with a two-fiber level in any case where that level can be lowered. In other words, even, gentlemen, if we succeed in persuading the government that two fibers is the standard which should be required of us, it is not the standard which we should require of ourselves. We have an obligation to our employees and to our employees and to our own consciences to make every effort that we can to keep fiber levels at the lowest possible point. We have the obligation also to be candid with our employees and acknowledge to them that we don't really know where a safe level is and therefore they should join with us in the effort to keep the factories in which they work and the job sites where they work as clean and as free of dust

as possible. And I can't help but think that this may be one of the most important things which we can do because my own pragmatic observation is that more dust is created by carelessness and poor work practices than is ever created by defective engineering controls. We, gentlemen, can go a long way to reduce these exposures simply by doing our jobs right.

And here we do encounter some difficulties which takes me back to my movie. We have in the work force today people like that young boy who saw the movie, people who worship machismo, people who say, "I ain't scared of that fiber," and won't wear their respirator or won't take other precautions. "I want to show you what a he-man I am." We have a big job ahead of us to explain to our employees that this is in their best interests, and if they want to prove how virile they are, perhaps they should go out on the week-ends and do some sport parachuting!

I think perhaps I've talked much too long this afternoon. I would like to close by referring to a conversation I had last evening, and someone said to me, "This is our third industry-government conference." He said I wondered after the first one if we'd be back again. And he said that here we are back for the third time. Well, I admit, gentlemen, that I sometimes become discouraged by the enormity of the problems which face us, but on the whole I try to keep my optimistic attitude. And on the whole I have the feeling that there are enough people in enough important places who will respond to reason and logic so that this whole issue can successfully be resolved. In the spirit of that optimism I'd like to thank you for listening to me, and I'll see you next year!