Asbestos and Health Presentation

December 3 and 4, 1973

Introductory Remarks by:

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CUSTOMER PRESENTATIONS

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Good morning, gentlemen. We're very glad to be with you.

We'll plunge right into our subject because we have a lot of ground to cover and we're mindful of the fact that your time is a very valuable commodity.

Our subject is asbestos and health. It's a subject we feel we know quite a bit about and we want very much in this meeting to transmit as much of that knowledge to you as we can.

Our J-M team of presenters are all competent people who have been involved in this field for a long time. I believe they'll be able to answer most of your questions - and we are willing to stay right here until the last question is answered.

We are going to attempt to give you <u>not the other side</u> of the asbestos-health question, rather <u>the perspective</u> ... in its proper context and based on hard facts.

We won't insult you by contending we're not biased on this subject. But ... let me assure you from the start that this is not going to be a propaganda session. We have nothing to gain by trying to hide the facts or cover them with meaningless rebuttals.

At Jonns-Manville, we firmly believe that while it is dangerous to pretend there is no problem and do nothing, it is just as dangerous to pretend the the problem is so great that total abstinence is the only cure. Our customers ... and indeed your customers, can ill afford to live with either extreme.

Between the time any health problem is identified and the time a cure or final solution is found, there is always a period of prevention and control. That is the period in which we find ourselves now. And, it may well be that prevention and control will be the cure in this instance. We already have indications to that effect.

Now, those are concepts, and what you want are facts. Let's start with three ...

Fact One: Johns-Manville is the leading producer of asbestos and asbestos-containing products in the U.S. ... although this still accounts for less than half of our multinational business.

We know, better than anyone else I would imagine, how indispensable asbestos has become in our modern society. You've probably heard that asbestos now is used in some 3,000 different products worldwide ... most of them in daily use.

Speaking of asbestos, let's make sure we review the facts on our main character. Asbestos is the name given a family of fibrous minerals -- not one form or one product. These minerals have occurred naturally in our environment for as long as our planet has been in existence. Characteristically asbestos minerals are resistant to extremes of heat and cold, are flexible, lightweight, and durable, as you know.

There are four commercially significant varieties of asbestos in use today -- and one variety, chrysotile asbestos, accounts for 97% of all the fiber used in the United States. The other commercials forms of asbestos are crocidolite, amosite and anthophyllite .. and it is important to remember that these three forms differ from chrysotile physically and chemically as well as in use.

Today, products containing asbestos are in our homes, schools, factories, offices, hospitals, theaters, spacecraft ... and I could go on and on. The point is ... there is no one material that can outperform asbestos economically or in quality in the majority of these applications ... and indeed, there are many products that, without asbestos, could not be made at all nor could they do the job they were intended to do.

Asbestos fiber is more in demand today than ever before, and we have expanded our mining and milling facilities again to meet that demand. Yet ... even the $75 million we just finished spending on a new mill at our Jeffrey Mine in Canada is not going to enable us to provide asbestos fast enough to meet all the demands of all our customers. We'll get there ... but we are finding the pace a little faster than we expected.

Now let's talk the health problem ... and let me be quite frank. No matter what has been said nor how much has been learned about the asbestos-health problem, we didn't have to do anything. We could have just sat back, continuing to sell as much fiber as we could deliver, and let the other guy, the government, or someone else worry about the health problem and what to do about it. Yes, we could have done that.

But, gentlemen we didn't ... and we never will. And that's Fact Two.

For the last half-century ... from the first indications that there was a health problem involving workers who inhaled too much asbestos dust ... we have taken the initiative. We didn't wait for someone to tell us what the health risks were ... we sought them out. And, J-M wasn't the only company to take action ... the asbestos industry as a whole has been active in asbestos health research both here and abroad for some time. Together, we have funded and encouraged a great many studies. We have worked with Federal, State and Local governments in eliminating problems and setting appropriate exposure standards. And, at our own J-M Research laboratories in Denver, we are not only conducting research into asbestos, but into many other materials. In addition, we frequently cooperate with other researchers and groups by supplying fiber samples for study.

In short, gentlemen, we have always put our money where our corporate conscience was.

We weren't always happy with what we learned. Frankly, no one likes to learn that because of a lack of knowledge not just on their part, but on the part of the medical-scientific community, labor and government, that the health of some employees was unknowingly endangered.

But ... neither did we hide from the fact once it was known ... and that brings me to Fact Three.

J-M also has been a leader in cleaning up ... in controlling those occupational hazards we helped identify. When the equipment did not exist to control a certain situation, we developed it. In fact, some of the equipment and systems we developed to control our problems are now being used by other industries with similar problems.

We have a coprorate policy at J-M ... a policy that has been quite widely publicized ... and one which we all live by. Since it puts what I have been telling you in perspective, bear with me while I quote it:

"It is our Company's policy to equip our plants for the highest degree of personal safety ... provided it is technically possible and economically feasible to do so.

"When technology is not available .. or when it is not feasible economically from a competitive standpoint to make these installations, I can assure you we will elect to discontinue a particular operation rather than knowingly endanger the health or life expectancy of a single employee."

We believe in this philosophy. We believe that you must agree with this philosophy or you wouldn't be here today ... to listen, to learn, to discuss.

You want to know what the asbestos-health question is all about and what it means to you. You want to know how to control occupational hazards, how to comply with new regulations. You want to know, I'm sure, what J-M has done to make your job easier ... as well as what we are doing and are willing to do for you in the future.

Those are the areas that our four speakers will address themselves to this morning. Afterwards we'll open up the meeting for your questions.

Ed Fenner, who is Director of Technical Relations in our Environmental Affairs Department, will discuss OSHA and EPA standards. He'll tell you what the standards are, and what they mean to you. He'll also tell you what you might expect in the future, and what we and the industry are doing to strike an acceptable balance between extremism on both ends of the spectrum.

Ed, a 33-year veteran with J-M, earned a B.S. degree in Mechanical Engineering from Worcester Polytechnic Institute in Massachusetts. Prior to this assignment, he was Director of Environmental Control for the company, and had all of our industrial hygiene laboratories under his direction.

After Ed, you'll hear from Noel Hendry, who is vice president of Johns-Manville Sales Corporation and general sales manager for Asbestos Fiber. A 24-year veteran with Johns-Manville, Noel earned an engineering degree from the University of British Columbia and a master's degree in geology from Cal Tech. He, of course, is responsible for all of us being here today.

Noel will focus on a topic I'm sure is of interest ... what J-M is doing to eliminate any dust problem for you -- our customers. You'll find that we have done a lot and are willing to do a lot more to help you with your particular situation.

Next, you'll hear from Don Hillier, our Director of Environmental Engineering. Don earned an engineering degree from the University of Michigan and began his career with the Armstrong Cork Company as an industrial engineer. At J-M, he has progressed through a number of production engineering positions to his present assignment as head of Environmental Engineering.

With this background, Don is well qualified to discuss the various fiber handling methods we have developed within J-M and how they can be applied to your individual situations. I'm sure Don is going to tell you that dust problems not only can be controlled, but that in most cases, the equipment, technology and expertise are available now.

Our first speaker is Bill Reitze, Corporate Manager of Accident Prevention and Industrial Health for Johns-Manville.

Bill Reitze's knowledge is well-recognized in the health field ... he holds a degree in bio-chemistry and has done graduate work in physiology. And he has had extensive experience in medical research, toxicology and industrial hygiene.

Let me now give the podium to Bill Reitze --.

CONCLUDING REMARKS:

Thank you, Don.

Now, gentlemen ... I'm sure that was a lot to digest in a short period of time. I hope we covered most of the questions you had on your mind, but before we get to those we missed, I hope you'll indulge me a few more minutes to summarize.

As Bill Reitze told you, we have learned a great deal about asbestos-health problems in a short period of time -- because we wanted to learn about them. We're still studying and still learning.

We learned a great deal at the last major meeting on asbestos and health, held a little over a year ago in Lyon, France.

It was there that a majority of scientists from all over the world who are actively studying the biological effects of asbestos, met under sponsorship of the International Agency for Research on Cancer ... which is a division of the World Health Organization. There were 130 participants from 20 countries at the meeting ... thus the report of that group's Advisory Committee on asbestos cancers bears a lot of weight.

Briefly, these researchers reported:

-- There is no evidence of lung damage by asbestos to the general public.

-- There is no evidence of an increased risk of cancer resulting from asbestos fibers present in water, beverages, food, or in the fluids used for the administration of drugs.

Regarding lung cancer, the committee reported that there is no detectable lung cancer risk above normal when occupational exposure to asbestos has been low ... and further noted that these low occupational exposures have almost certainly been much greater than the amount of asbestos to which the general public has been exposed.

-- And regarding mesothelioma -- a rare cancer of the lining of the lung or abdomen -- they said there is evidence from population studies that a considerable number of mesothelioma cases have no known association whatsoever with exposure to asbestos.

A lot more came out of that meeting, such as the incriminating evidence against cigarette smoking as a very probable co-carcinogen. And we learned that there are clear differences in risk with the type of fiber and nature of exposure.

Now, gentlemen, add those facts to others we have known for some time -- that asbestos-related health risks today are almost exclusively confined to the occupational setting ... that the effects of excessive inhalation of asbestos are both time and dose related, and thus there are exposure levels that will not result in any increased risk of disease. And, most of all, remember, that, because of the long latent period for asbestos-related disease, the disease being found today among some long-time employees is not an indication of present day conditions -- rather it is a result of conditions existing decades ago, when neither industry, government, nor the medical profession knew very much about the health effects of asbestos ... and even less about the proper means for their control.

Today, as Ed Fenner told you, we have to live with a number of regulations and standards -- OSHA standards in our plants and EPA standards outside them. But these standards can be met, and we ... indeed the entire industry ... will be in there battling for proper controls, regulations, and standards not needless controls and regulations and standards.

Noel Hendry pointed out that we are not only concerned about our problems, but yours as well. We will continue to make every effort to assure that the fiber you receive from us in no way adds a problem for you. And if it does, or you need some special consideration because of your operation, we want you to call on us to help.

And, I think after hearing from Don Hillier, you know we are able to help ... that we have the expertise and the people to help solve your problems.

(START PROJECTOR AGAIN)

Still, there are other ways we may be able to help you. As some of you may know, we have established an Environmental Affairs Department at Johns-Manville, and our goals are geared not only toward our own people, but to you, our customers.

One of our projects has been the compiling and publishing of a number of position papers on Asbestos and Health.

SLIDE: Asbestos...A Family of Minerals paper.

Asbestos...A Family of Minerals is one. It describes the characteristics of the four commercially significant varieties of asbestos.

SLIDE: Lyon Report paper.

Another paper is titled the Report of the Advisory Committee on Asbestos Cancers to the Director of the International Agency for Research on Cancer, which we have nicknamed the Lyon Report. It outlines the major conclusions from a 1972 meeting in Lyon, France of respected researchers from all over the world who were studying the biological aspects of asbestos and health.

SLIDE: Asbestos and Health paper.

The third paper, Asbestos and Health, discusses the occupational health risks from asbestos dust and what J-M and the industry has done to eliminate or control them.

SLIDE: Q & A paper.

Paper number four, Questions and Answers on Asbestos and Health, provides answers to the most commonly asked questions about asbestos and health.

SLIDE: A/C Water Pipe paper.

And number five, Asbestos-Cement Water Pipe and Health, discusses the results of studies to determine if drinking water that has passed through asbestos-cement water pipe poses any health risks.

We are planning a few more, one which discusses studies on the asbestos health risk to the public, and the other on environmental health research supported by J-M and the asbestos industry as a whole.

You will find copies of the five position papers I mentioned in the folders we will hand out in a few minutes, along with an order form in case you want more.

In those folders you'll also find ...

SLIDE: Poster and Brochure.

... a copy of this poster on Safe Handling Practices for Asbestos Fiber, and a small pamphlet, which contains the same information. These were produced mainly for our customers and others who might find them useful, and, of course, they can be found throughout our plants. If you would like to order some of these for posting on bulletin boards or distribution to employees, just fill out the order form in the folder and send it to our Service Center.

SLIDE: Green Asbestos Employee Booklet.

Another project of ours which you might find of value to you is this employee booklet on, "What Every Employee Should Know About Asbestos." It has been distributed to all our people, and it is available to you and your employees. In fact, if you would rather not have J-M's name on it, it has been set up so that we can easily reprint your company name on copies -- even though that would have to be done at your cost ... which would be minimal.

I also know that Noel's group is planning a newsletter for Asbestos Fiber customers to keep you all up to date on what we are doing and what is new in the area of asbestos and health.

And, lastly, I call your attention to the fact that we have established in our deparment a fairly extensive medical library. We have copies of most of the important medical studies on asbestos, and have been and will be making copies available to anyone who needs them. You're welcome to give us a call...the man to get in touch with is Walt Cooper...and we'll try to provide any information you may need.

(TURN OFF PROJECTOR)

Sc, there is a lot we want to do and can do for you. The first step, however is yours. As Don said, we don't know what your problems are -- or even if you have any. But, if you do, we can help you identify them and work out a solution.

What it all boils down to is this. We will continue to work towards assuring that not only we, but our customers, control any health problems that may be involved with asbestos. We will never take the position that the benefits of asbestos -- or any other material for that matter -- outweigh all the health risks. What we will maintain is that the growing need for asbestos demands something that we believe J-M has, and something you have proven you have by your presence here today. That something is conscience.

All that remains now is for us to work together to turn that conscience into action.

PAUSE

And now gentlemen (and ladies), let's have any questions that remain on your minds. You can direct them to me, or to any of our speakers.

(After Questions)

Now, before you leave, I would like to have my colleagues hand out to you the facts folders we have prepared especially for you. Aside from the position papers, the Safe Handling poster and pamphlet, a copy of our employee asbestos booklet and the order forms I mentioned, you'll also find a set of the five booklets published by the Asbestos Information Association, this pocket size reference guide on OSHA, and this Facts About Asbestos Booklet published by the Quebec Asbestos Mining Association.

Also, in the back of the room, we have a number of copies of today's presentations. If you would like to have a transcript of the talks given by our team today, be sure to pick one up as you leave.

Now, let's adjourn for lunch.

# # #

Asbestos and Health Presentation

December 3 and 4, 1973

Asbestos and Health

Presented by: W. B. Reitze
Manager, Accident Prevention
and Industrial Health

I'm sure anyone who uses asbestos fiber in his plant and who reads the popular newspapers or magazines must have asked himself at one time -- what's the truth behind all this talk of asbestos and health hazards. Unfortunately, the popular press is out to sell papers and usually presents the sensational side of a question. But there is another side -- the medical scientific press -- which is mainly there to convey knowledge and usually presents the more factual side of health questions.

While there are two sides of this question -- the sensational and the factual -- there remains but one question that is important to all of you: Can asbestos cause a health problem?

In all honesty, we may say yes. Asbestos can cause health problems if it is improperly used or improperly handled. If an employee or person is subjected to high levels or air-borne asbestos dust in the air he breathes, serious health problems can result. But, if the person is protected -- if the normal, prudent dust control systems which we will discuss later are instituted -- a person's health can be safeguarded and he or she can still work with asbestos fiber.

Just about everything has a dose relationship when it comes to health, and asbestos is no exception. Every product we use in our plants, every product we use in our homes,

is potentially dangerous. It doesn't matter what it is -- whether it is asphalt or asbestos in our plants, or whether it is cooking flour or table salt in our homes. They are all potentially dangerous substances if improperly used. But properly used, they can be of great benefit in our everyday life and in our industrial processes.

Yes, there is a safe level for exposure to asbestos -- very definitely a safe level -- and this is what we have come to talk about. This level is one which a person can be exposed to and yet suffer no ill health affects.

There are other questions I'm sure you would like to have answered: How was this safe level established... what diseases are caused by asbestos over-exposure... are there different health risks from the different types of asbestos? We'll discuss those and the biological reaction of human tissue to asbestos fiber.

But, before doing that, I think it would be wise to briefly review some of the anatomy of the respiratory system.

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The air we breathe enters through these passageways, in the nose, down into the trachea, which is the round structure you see here with the small cartilage rings that keeps the trachea open.

The trachea separates into two main passageways, called the bronchi -- a left and a right -- and the bronchi in turn get smaller and smaller as they go down the bronchial tree. They just keep dividing into smaller passageways until they reach the bronchioles... and then later a portion of the respiratory system known as the alveoli.

SLIDE

We often refer to the respiratory system components as part of the bronchial tree, and you can see why it is called a tree. Here again, we see the same trachea-- the left and right bronchi -- and how it divides gradually. This is a very important area to remember when we talk about the formation of disease later.

SLIDE

I mentioned that the small passageways terminate eventually into alveoli. That's what we have here... these bulb-like structures are called alveoli, and here is where all the action takes place as far as our respiratory system is concerned. These small structures are encapsulated with minute capillaries -- blood vessels -- and it is here where the oxygen and carbon dioxide are exchanged. Incidentally, there are 750 million of these small alveoli in the human lungs.

This again is important to remember when we talk later about disease destroying these alveoli. Since we have 750 million of these small structures, several thousand, even several million can be destroyed without any adverse effect upon a person's normal respiration.

SLIDE

This part of the human respiratory system is what we refer to as a garbage collection system -- our own filtration system. It begins with the small hairs in the end of your nose. These are pre-filters -- they filter out the larger asbestos fibers, the larger particles of dust, or anything else you might inhale.

This area here, in the inner nasal passages, and down into the trachea into the smallest bronchioles, are lined with what are called cilial cells. These are small cells with a whiplike structure protruding from the top. There are literally millions of these cells lining this particular cavity, and their function in this waste filtration system is to sweep the dust you inhale out up from the lower depth of the bronchioles, all the way up the trachea, and out, so they can be removed by expectoration. These cilial cells are coated with a mucous-like layer which catches the dust particles. With the sweeping motion,

the material is brought up the bronchial tree so it can be removed -- in some cases swallowed, in others, spit out.

So, we have discussed two dust collection systems.

The first is the hairs in the nasal passages, the second is the cilia system. There is a third, called the macrophage system, which we'll discuss later.

Now a word about the site of the diseases -- where they usually occur. First, we have asbestosis-- which is one of the pneumocniosis diseases. There are several diseases that fall into the category of pneumoconiosis. Siderosis is one which is caused by the inhalation of fumes or dust containing iron particles... silicosis is caused by inhalation of free silica (or quartz) dust... anthracosis, commonly known as black lung disease, is caused by inhalation of coal dust.. byssinosis is caused by excessive inhalation of cotton fiber dust... and of course, asbestosis which is caused by the inhalation of asbestos dust. These are all pneumoconiosis. They are non-malignant--non-cancerous-- pulmonary abnormalities.

Although these diseases can occur anywhere in the lungs, they usually occur in the lower lobe, and both lungs could be affected and usually are.

The next disease that can be caused by asbestos, smoking and a few other things is bronchogenic cancer. Now just the mere mention of the word cancer is enough to frighten many people, and it is the kind of sensational headline word the press often likes to latch onto.

Bronchogenic cancer, while it can occur any place in the lungs, usually develops at the major junctions of the bronchioles -- up in the central part of the bronchial tree. Bronchogenic cancer is caused by many agents including asbestos. One of the leading causes of bronchogenic cancer among both asbestos workers and non-asbestos workers is cigarette smoking.

The third disease is called mesothelioma -- which is another form of cancer. It affects the lining of the pleural cavity, or it may affect the lining of the peritoneum -- which is another name for the lining of the abdominal cavity.

Mesothelioma is by far the most serious of the three diseases I've described. It is 100% fatal, and there is no treatment for it. Death usually occurs in 18 months. It is, however, an extremely rare disease. It is not caused solely by asbestos. There are other agents which cause mesothelioma -- in fact, there are now more cases of mesothelioma listed in the world registries where asbestos has not been involved than there are cases where asbestos dust exposure has been involved.

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Getting back to the cilial system, since it is extremely important that we discuss our built-in defenses against dust. In this microscopic section showing the cilia, you will note the hair-like whips which sweep the dust particles that adhere to the mucous layers up and out of the body.

SLIDE

In this oversimplification of the bronchial tree, you can see small outpouchings. Usually, asbestosis starts here in these small outpouchings.

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Now about the biological reaction to asbestos fiber. When an asbestos fiber is inhaled into the body -- and this applies to many other types of fibers -- a few things can happen. Either the fiber is encapsulated in what we refer to as macrophages, or giant cells, and becomes coated. It becomes what some call an asbestos body, but is more scientifically referred to as an ferruginous body. The other alternative is that it remains in a naked state -- uncoated. If the fiber is encapsulated and becomes a ferruginous body, then the fiber, for all intents and purposes is harmless. If the fiber remains in a naked state, then a biological reaction may begin: you get cell proliferation -- an almost uncontrolled growth of cells. Collagen is formed,

which is another name for scar tissue, similar to what you get on a cut. When collagen forms in the lungs, it destroys the tissue -- you no longer have a functioning unit, there is no more exchange of oxygen and carbon dioxide.

Your vital capacity in this case is greatly reduced -- your lungs can't hold as much air as they did before because these alveoli have been destroyed. Because this vital capacity is reduced, you also alter your blood-gas exchange, and the overall effect is poor ventilation and belabored breathing.

How do we spot this in a patient -- what are the symptoms? It's done two ways. One is by x-ray, where several views of the chest are taken. The physician, looking at the x-ray, can spot various types of shadows, all of which will mean something to the trained radiologist.

The physical symptoms are unusual noises called rales, which the physician can hear with the aid of a stethoscope. Rales can be caused by bronchitis, colds, pneumonia and a number of other things besides asbestosis. Another physical symptom is clubbed fingers. Why this occurs is a mystery. It may be caused by the alternation in blood gas exchange.

Continuing on asbestosis, the first noticeable signs usually are that a person gets very tired on exertion and has difficulty breathing.

As far as bronchogenic cancer is concerned, the biological mechanisms in the development of this disease are not really that well understood. It is a cancer, like mesothelioma. When we unlock the mysteries of these diseases, as well as other forms of cancer, I'm sure we all will be very happy.

SLIDE

Now, about the different types of asbestos and their roles. Chrysotile, as I mentioned is the most used form of the fiber in this country, and comes mainly from Canada. It is usually referred to as the white fiber. We have crocidolite -- or blue fiber -- which is found largely in Africa. The third major type of fiber is amosite, or brown fiber, again found mostly in Africa.

SLIDE

There are chemical differences in the types of asbestos, and the most significant one is in the magnesium, content -- as you see here, chrysotile has 38% magnesium, while crocidolite and amosite have virtually no magnesium.

This is a major chemical difference in the fiber types. Anthophyllite, which is used in plastic reinforcement and is largely supplied by Finland, is similar to chrysotile in chemical composition and from a biological point of view as well. The important thing to remember is that the usage in the United States is primarily chrysotile asbestos.

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The physical difference in the fibers make a very big difference in the biological reaction of the fiber to the human tissue. In this 400 magnification of crocidolite -- the blue fiber -- we notice that the fiber is rod-shaped. The size differential is tremendous -- they go from particles less than one micron in length up to 50-60 microns -- all harsh, very rigid fibers. Amosite has basically the same physical characteristics.

SLIDE

Now, when we look at chrysotile, we notice there are some differences in the type of fiber. This is Canadian chrysotile from our Jeffrey mine. Notice how flowing these fibers are, how they resemble wool in their appearance. They are not rigid rods such as the other types, particularly the crocidolite.

SLIDE

Now, what does this mean in terms of biological effect on the lung tissue. Again, in this schematic of the bronchial system, we see a harsh fiber like crocidolite and here the softer fiber like chrysotile -- both approximately the same diameter and length. Yet, when we inhale the harsh fiber, it tends to zip right down the bronchial passageway. However, chrysotile, because of its wavy-like appearance, actually presents a larger fiber diameter, and these fibers tend to impinge on the sides of the smaller broncioles, where they are brought up by the cilia systems so the body can get rid of them. Therefore, the physical characteristics of a fiber are extremely important in relation to its biological reaction. In order to cause pulmonary disease, a fiber or particle must penetrate deeply into the lungs. In order for a particle to penetrate deeply into the lungs, it must be below 3-1/2 microns in diameter. In the case of a fiber, the diameter must be below 3-1/2 microns but the length can be considerably above that figure.

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It was with that thought in mind that investigators decided to find out if there is a difference between the clearance rate in lungs of the various types of fiber.

This study was undertaken with a group of rats, which were exposed to known concentrations of the fibers. One group of rats was exposed for 30 days to crocidolite, another to amosite, and another one to chrysotile. At the end of 30 days, some of the rats were sacrificed, and an estimation made of the amount of asbestos fiber in the lungs of these animals. These figures show the amount present at the end of 30 days' exposure. Thirty days later, another group of these same rats was sacrificed and the amount of fiber measured. An then, 30 days later, the third group of rats were sacrificed. From this graph you can see that the results of this study showed that chrysotile is more readily cleared from the lungs than either amosite or crocidolite.

SLIDE

I mentioned that another of the cleaning mechanisms in the body are the macrophages -- which are large cells that encapsulate the fiber as it enters the tissue. This is what they look like.

By process of encapsulation, the formation of asbestos bodies -- or ferruginous bodies -- takes place.

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Here we have a more advanced stage of the disease in a guinea pig. We can see the beginnings of the disease in these outpouchings -- which I described earlier.

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A natural progression again is shown in this slide. The darkly stained areas are where the disease is beginning to develop, destroying these small structures I pointed out before. As I said, we have so many million of them, you can destroy a few and not even know it.

SLIDE

Here, we have further destruction of this particular tissue. Collagen is beginning to form, and once this area is covered by scar tissue, the normal respiratory function ceases in that particular area.

SLIDE

Here we have further formation of collagen or scar tissue. Looking closely, we can see small black lines, which are the fibers -- in this case, about one micron in length. These are crocidolite fibers.

SLIDE

Now, asbestos bodies in themselves are not harmful. Once the fibers have been coated, they become harmless from a biological point of view. This is what an asbestos body looks like. In this case, we are talking about an asbestos fiber, but it can be any type of fiber around which an iron-rich protein substance is formed.

SLIDE

Here we see the inner fiber coated with iron-rich protein.

SLIDE

Now, about dosage standards. How do we know that the federal regulations of five fibers per cc now, are the safe levels?

This chart was taken from the study of Dr. Corbett McDonald, who is head of the Department of Epidemiology at McGill University in Canada. He did a survey of almost 10,000 Canadian miners and millers of asbestos in Quebec's eastern townships. Two separate groups were used, one at Thetford mines, and the other at our Jeffrey mine operations in Asbestos, Canada. The results are almost identical.

In analyzing these figures, we see McDonald used both the number of years of exposure and the exposure level itself. Some investigators use only one or the other, but most epidemiologists believe that unless you use both the exposure level and the number of years at that particular exposure level, your figures are not valid. Dr. McDonald uses both here.

Dr. McDonald's work clearly illustrates that the ill health effects of asbestos exposure are not seen until the exposure levels exceed 20 to 40 fibers per cc.

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Again, this is a chart adapted from Dr. McDonald's study, and again we see the death rate is insignificant until we get up to higher levels, where we really have some significant health changes. This is how we have established that the five fibers per cc level is safe.

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Here we have a comparison of three studies. The first, of 632 insulation workers -- a very small study was done by Dr. Irving Selikoff of Mount Sinai Hospital in New York. These workers were exposed to Canadian chrysotile, amosite, and crocidolite, plus they were exposed to solvents and other dusts. These are the men that cover the pipes and ducts with asbestos insulation materials.

The second study was done by Dr. Molly Newhouse in England, and involved factory workers only. Again, the factory workers here were exposed to three different types of asbestos but probably not the mixed dust and solvents to which the pipe workers were. The last study is Dr. McDonalds -- 9,981 people -- a population that was exposed only to Canadian chrysotile.

It is significant that when we look at the rate of lung cancer and mesothelioma in these different groups, you can see that the higher rates of these diseases were in groups exposed either to all three types of asbestos and other materials, or all three types of asbestos alone. When we look at the figures for those workers exposed only to Canadian chrysotile, we see quite a difference. The percentages are very low -- almost nil on mesothelial tumors.

SLIDE

This study revealed some significant facts. It is adopted from Dr. Phillip Enterlines study of a group of Johns-Manville retirees from our operations all around the country. The significance here is that it wasn't our production workers who had the heaviest exposure, rather our maintenance service workers -- the people who sweep the floors, maintain the dust collection systems, repair broken bags, and so on. They will have a heavier exposure, and therefore, should be carefully watched.

Let me stress here, that all these deaths I have been talking about -- from asbestosis, bronchogenic cancer and mesothelioma -- are the result of exposures that took place, 20, 30 or 40 years ago, before we knew there were any problems -- and before the medical - scientific community, labor and government realized the severity of the problems.

These diseases, particularly mesothelioma, have a long latent period. They take many, many years to develop even the first symptoms.

SLIDE

Here we get an idea of what good dust controls can do to solve the problem. This is a study done by Dr. John Knox, who was medical director for Turner Brothers in England. In this particular plant there was no dust control at all until 1933, when they decided to install dust control equipment.

He divided his plant population into three groups. Group one had over 10 years work experience in this one plant prior to any installation of dust control equipment. Group two were those who had some exposure prior to 1933 -- prior to dust control installations -- but less than 10 years.

Group 3 had no exposure prior to 1933 and the installation of dust control equipment. However, all of these people had at least 30 years exposure -- either with or without controls.

Now, in the group with the heaviest exposure before controls they expected to have about 10 deaths, but in reality they had 15. In group two, with some heavy exposure prior to controls, they expected 8.4 deaths and they got 6. And in the last group, which worked only in the plant after dust control equipment had been installed, we see that while they expected to have 5 deaths from lung cancer, they only had two.

So we can see that dust control equipment does pay off -- and from this study, we can see that the results are dramatic. You <u>can</u> protect the lives of your people by the use of dust control equipment.

<u>SLIDE</u>

Another important point is that smoking and asbestos just do not mix. In this adaptation of Dr. Selikoff's work, it is significant that the cases of bronchogenic cancer all were in asbestos workers who also smoked cigarettes. Those asbestos workers who did not smoke cigarettes had no greater rate of bronchogenic cancer than the normal non-smoking population. Based on these

hard facts about the co-carcinogen effect of smoking and asbestos dust inhalation, we at Johns-Manville have done all that we could to discourage smoking among our people who work with asbestos.

SLIDE

Now, as I conclude, let me say a few words about the difference in asbestos products. I'm sure you are getting questions from your own customers -- such as: Will this product be harmful to the end user?

Basically, asbestos products fall into two groups -- the bound products and the unbound products. In the unbound products, you do have to be concerned with the generation of dust. In those products that are bound by physical, chemical or thermal means, there is little cause for concern since the normal use of these products will not release significant amounts of asbestos fiber into the ambient air.

SLIDE

What all this means can be summed up in a very few words. First of all, we must realize that asbestos can cause some very severe health problems if the proper steps are not taken to reduce the exposure of the individual.

But these health risks can be controlled. There is a safe exposure level for asbestos... it can be handled safely... it can be used by the end user -- the consumer -- safely.

I think most of the responsible medical-scientific people in the country today feel that the levels that have been established by the Federal government under OSHA-- five fibers per cc time-weighted average, and 10 fibers per cc peak average -- are safe levels for any employee. And that includes all the diseases I mentioned. All these diseases are preventable if proper dust control measures are taken.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
ENVIRONMENTAL PROTECTION AGENCY

Presentation on these agencies' requirements
for the asbestos industry
to
Johns-Manville Asbestos Fiber Division Customers

Presented By

E. M. FENNER

Director, Technical Relations
Environmental Affairs Department
Johns-Manville Corporation

December 3 and 4, 1973

(Slide 1)

FIRST - OSHA asbestos standards - the standards for occupational exposures to asbestos.

SECOND - EPA emission standards for asbestos.

Both of these are of vital importance to Johns-Manville as a miner and miller of asbestos fiber and a manufacturer of asbestos-containing products, and to you, our customers, who also manufacture products with asbestos.

In discussing the OSHA standards, I will briefly review the five sections that I consider most important insofar as your operations are concerned, and recommend what changes I think industry should strive for when these standards are officially reopened by the Department of Labor. It presently appears that the Department of Labor will not form an Advisory Committee. Instead, within the next few months, they will publish in the Federal Register their proposed new asbestos standard, and request comment from all interested parties. This probably will be followed by a Public Hearing and the promulgation of the final revised standards.

(Slide 2)

The five sections I'll discuss are:

(1) Standards - The standards for airborne asbestos fiber in the workplace.

(2) Monitoring - The method of determining whether or not you meet the fiber standards.

(3) Methods of Compliance - The specified procedures.

(4) Medical.

(5) Labeling.

Let's look at the fiber standards first.

(Slide 3)

Here they are. Presently, they call for a maximum of 5 fibers greater than 5 micrometers in length per cubic centimeter - 8 hour time-weighted average concentration and 10 fibers greater than 5 micrometers in length per cubic centimeter - ceiling concentration. Effective July 1, 1976, the time-weighted average concentration standard becomes 2 fibers greater than 5 micrometers in length per cubic centimeter. In all cases the standard is referring to all fibers greater than 5 micrometers in length that can be seen in the collected sample by phase contrast light microscopy at approximately 430X magnification.

These and similar standards are frequently referred to as Threshold Limit Values or TLV's.

(Slide 4)

This is the definition of a TLV.

> Threshold Limit Values refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect.

What stand should industry take concerning the fiber standards during the review of the asbestos regulations? We should take the position that Bill Reitze just expressed that the level of 5 fibers per cubic centimeter is low enough to protect exposed employees against the biological effects of asbestos and that since 2 fibers per cubic centimeter will provide an added margin of safety, there is no need for a standard below 2.

Now, how do you determine whether or not your workplaces meet the required standard?

(Slide 5)

By monitoring. You perform what is generally referred to as an Industrial Hygiene Survey.

The asbestos standards require that

(Slide 6)

> Within 6 months of publication of the regulations, every employer shall cause every place of employment where asbestos fibers are released to be monitored in such a way as to determine where every employee's exposure to asbestos fibers is below the prescribed limits.

Monitoring is done by the membrane filter/personal air sampler technique. It requires that the employee wear an air sampler.

(Slide 7)

Here is one of our employees wearing the sampling device. A plastic holder containing a membrane filter is fastened to his collar in his breathing zone, open end down, so it samples the same air his nose breathes. Clipped to his belt is a battery powered vacuum pump connected to the filter holder with a rubber hose. The pump draws workplace air through the filter which collects the particulate and fibrous dust present in the air.

(Slide 8)

This is a close-up view of the equipment showing the pump, the filter holder and connecting hose.

Here in my hand is this sampling device. If you wish, it is available for a closer look later.

(Slide 9)

After the sample has been taken a portion of the filter paper is placed in a microscope on a microscope slide. Fibers present on the filter are counted. After the count is complete, fiber concentrations, expressed as fibers per cubic centimeter, are calculated by a formula.

Now, looking ahead to the reopening of the asbestos standards - what change will industry propose in the monitoring regulations -

(Slide 10)

Here again is the wording of the standard for monitoring.

The phrase "where asbestos fibers are released" should be clarified in the revised regulations. I believe that when a workman is using or installing a non-labeled asbestos containing product, a product where the fibers are locked in, monitoring is not needed because fibers will not be released in any significant quantity from a health standpoint.

I am thinking specifically of such operations as cutting asbestos roofing felt, shearing vinyl asbestos floor tile, and applying asbestos filled coatings. Why am I concerned

with this -- because I think the present standard could be interpreted as requiring the monitoring of such operations.

The standards should be modified to eliminate the requirement that the use of non-labeled fiber locked-in products be monitored.

Next,

(Slide 11)

Methods of compliance.

The asbestos standard very clearly defines these methods. I'll discuss only one -- engineering controls.

(Slide 12)

Engineering standards such as, but not limited to, isolation, enclosure, exhaust ventilation and dust collection shall be used. This is a very sound and very logical requirement that should be followed with any dust generating process or material, regardless of whether or not it contains fiber. Why? Because any dust in sufficient quantities is potentially hazardous.

If you are looking for help in designing dust control systems there are two very good publications:

The one mentioned on the slide, which is prepared by the

American National Standards Institute - ANSI Z9.2-1971

and

this book

INDUSTRIAL VENTILATION by the American Conference of Governmental Industrial Hygienists

It's OSHA's intention to greatly expand the methods of compliance section in the revised standards. Why, because they have encountered difficulty with monitoring. Apparently they don't intend to eliminate monitoring, but instead place it in a subordinate role to be used as a check upon the effectiveness of the application of their written methods of compliance which they now refer to as "Standards of Performance".

I understand that OSHA presently plans to write these standards of performance for all facets of the asbestos using industry. That will be a tremendous job.

Next subject.

(Slide 13)

Medical.

The standard requires that

(Slide 14)

> "The employer shall provide initial and annual comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fiber."

There is no doubt that medical examinations are a necessity for employees exposed to significant quantities of asbestos fiber. However, during the standards review, our industry should recommend a modification.

The phrase "exposed to airborne concentrations of asbestos fibers" is the key to this medical requirement.

NIOSH - National Institute for Occupational Safety and Health -- recommended in their criteria for occupational exposure to asbestos that for the purpose of medical surveillance --

(Slide 15)

"The term exposed to asbestos will be interpreted as referring to time-weighted average exposures above 1 F/cc or peak exposures above 5 fibers per cc."

The intent of this NIOSH recommendation was to eliminate the requirement for medical examination when an employee's exposure was below 1/2 the TLV. Inclusion of this thinking into the revised standard would satisfactorily and logically limit the medical surveillance requirements.

Now,

(Slide 16)

Labeling.

The standards presently require that:

(Slide 17)

"Caution labels shall be affixed to all products containing asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder or other material so that during any reasonably foreseeable use, no airborne concentrations of asbestos fibers in excess of the prescribed exposure limits will be released."

The required wording of the label is:

(Slide 18)

"Caution
contains asbestos fibers
avoid creating dust
Breathing asbestos dust may cause
serious bodily harm"

Now, what is my point concerning labeling? In the forthcoming OSHA review proceedings industry should strongly take the stand that this labeling requirement need not be modified, since in its present form it provides all the protection necessary for the purchaser and user of asbestos containing products. This will prevent labels from being applied to such materials as cans of automobile underbody coating, rolls of asbestos roofing,

cartons of vinyl asbestos tile and the wrappings of flooring roll goods. This also will prevent the label wording from being changed to include such words as "cancer producing".

I believe we have an excellent chance of achieving this goal, since we have much data to support our claim that significant quantities of fiber - from a health standpoint - are not released during "any reasonably foreseeable use" from the non-labeled products in which the fibers are firmly "locked-in".

(Slide 19)

Now - EPA.

The Environmental Protection Agency published in the Federal Register of April 6, 1973, National Emission Standards for three hazardous air pollutants -- asbestos, beryllium and mercury. The standards for asbestos are unique because there are no emission standards or numbers -- instead the regulations are written around

(Slide 20)

"No visible emissions"

Such emissions are defined as any emissions which are visually detectable without the aid of instruments and which contain particulate asbestos material. An asbestos using manufacturing operation that has no visible emissions is automatically in

compliance. If an asbestos using plant has visible emissions but these emissions do not contain asbestos particulate as determined by microscopic examination of an emission sample, the operations is also in compliance.

If a manufacturing operation does have asbestos containing visible emissions, then control devices must be installed and the standard requires that

(Slide 21)

a fabric bag filter be used in all cases except where the character of the emissions would render such a filter unsuitable, in which case

(Slide 22)

a high energy wet scrubber must be used.

(Slide 23)

There are several notable deliberate exceptions from coverage under these standards. One of the most important is field fabrication. Field fabrication of any asbestos containing product is not subject to these standards. EPA's rationale for this is that if the field fabricating operation conforms to OSHA asbestos standards, potential airborne emissions will be satisfactorily controlled.

I'm sure you have questions on these two subjects. As Jack Solon requested -- please hold them until the end of our formal presentation.

Now, Noel Hendry -- fiber handling systems.

Asbestos and Health Presentation

December 3 and 4, 1973

Asbestos Handling Methods Within Johns-Manville

Presented By:

D. E. Hillier
Director, Environmental Engineering
Johns-Manville Corporation

DON HILLIER: ASBESTOS HANDLING METHODS WITHIN JOHNS-MANVILLE

GENTLEMEN, I'M SURE ONE OF THE OUESTIONS YOU HAD ON YOUR MIND WHEN YOU CAME HERE TODAY WAS: CAN ASBESTOS FIBER BE SAFELY HANDLED AND USED?

THE ANSWER IS YES.

JOHNS-MANVILLE HAS BEEN IN THE BUSINESS OF HANDLING ASBESTOS FIBER AND CONTROLLING ASBESTOS DUST -- AS WELL AS MANY OTHER TYPES OF DUST -- FOR MANY YEARS...AND WE ARE CONTINUALLY DEVELOPING AND IMPLEMENTING BETTER METHODS TO ACCOMPLISH OUR GOALS. SO, OUR YES ANSWER IS NOT JUST WISHFUL THINKING.

SO FAR THIS MORNING, YOU'VE HEARD ABOUT THE BIOLOGICAL ASPECTS OF THE ASBESTOS-HEALTH SITUATION...ABOUT THE DUST CONTROL STANDARDS OF OSHA AND EPA --
AND THE STEPS J-M HAS TAKEN TO INSURE DUST FREE SHIPMENTS TO OUR CUSTOMERS.

NOW, LET ME TACKLE THE MORE ABSTRACT AREA OF WHAT YOU CAN DO TO CONTROL DUST PROBLEMS IN YOUR OPERATIONS. I SAY ABSTRACT, BECAUSE IT IS IMPOSSIBLE FOR ME TO KNOW WHAT PROBLEMS YOU HAVE. IT'S QUITE POSSIBLE YOU HAVE NONE...OR YOU MAY HAVE ONES THAT ARE EASILY SOLVED BY

EXISTING EQUIPMENT AND TECHNOLOGY...OR MAYBE YOUR PROBLEM IS UNIQUE ENOUGH TO REQUIRE SOMETHING THAT DOESN'T YET EXIST. WHATEVER THE CASE, THE MOST IMPORTANT TASK FACING EACH OF YOU IS TO IDENTIFY THOSE PROBLEM AREAS, IF ANY, AND THEN DO SOMETHING ABOUT THEM.

TO HELP YOU ACHIEVE THAT GOAL, I AM GOING TO OUTLINE SOME OF THE METHODS WE ARE FOLLOWING IN J-M PLANTS TO HANDLE, STORE, AND USE ASBESTOS FIBER. THEN, I'LL TELL YOU HOW JOHNS-MANVILLE CAN HELP YOU IF YOU HAVE SIMILAR PROBLEMS.

NOW, AS I DESCRIBE SOME OF THE THINGS WE HAVE DONE WITHIN OUR PLANTS, I URGE YOU TO VIEW THEM NOT AS SYSTEMS YOU HAVE TO HAVE TO SOLVE A PROBLEM, BUT AS PRINCIPLES AND EXAMPLES OF HOW THINGS CAN BE DONE. ALTHOUGH THESE SYSTEMS AND METHODS MEET OUR NEEDS AND MAY NOT MEET YOURS, THE POINT TO REMEMBER IS THAT THE TECHNOLOGY IS THERE... IT CAN BE SCALED UP -- SCALED DOWN -- OR ALTERED TO MEET YOUR PARTICULAR NEEDS.

I'LL BEGIN AT THE BEGINNING...WITH THE UNLOADING OF ASBESTOS FIBER FROM BOX CARS. (SLIDE NO. 1). AS NOEL HENDRY NOTED, EVERY EFFORT IS BEING MADE TO OBTAIN MORE LEASED RAIL CARS WITH LARGE DOUBLE DOORS SO THAT FIBER CAN BE SHIPPED 100% ON PALLETS WITH INFLATED DUNNAGE...AND THEN UNLOADED AT THE DESTINATION POINT ENTIRELY BY FORK TRUCKS.

THERE ARE FOUR BASIC RULES THAT SHOULD BE APPLIED TO UNLOADING OPERATIONS, WHETHER IT BE FROM RAILROAD BOX CARS, OR FROM OTHER MODES OF TRANSPORT.

NUMBER 1. UPON ARRIVAL OF SHIPMENT, CHECK TO DETERMINE IF THERE IS ANY LOOSE FIBER ON THE BAGS OR ON THE FLOOR. IF THERE IS, THE AREA SHOULD BE VACUUM CLEANED.

NUMBER 2. IMMEDIATELY SEAL ANY BROKEN OR TORN BAGS BEFORE UNLOADING.

NUMBER 3. FOR MANUAL UNLOADING, CLEAN PALLETS SHOULD BE USED, AND, AFTER USE, THE PALLETS SHOULD BE CLEANED BY VACUUM OR WASHED DOWN WITH WATER.

NUMBER 4. ALL BROKEN BAGS -- AFTER RESEALING -- SHOULD BE TAKEN TO THE POINT OF USAGE -- AVOID PLACING THEM INTO INVENTORY.

(PAUSE)

THESE RULES MIGHT APPEAR TO REQUIRE AN EXCESSIVE AMOUNT OF TIME AND EFFORT AT FIRST. BUT, THAT'S NOT THE CASE. AFTER ALL, IT'S NOT REALLY ANYTHING MORE THAN PLAIN GOOD HOUSEKEEPING, WHICH, IN A WELL-OPERATED PLANT, WOULD BE A DAILY REQUIREMENT. ALL YOU HAVE TO DO IS MAKE SURE THAT IF DUST IS CREATED, CLEAN IT UP IMMEDIATELY.

SLIDE NO. 2

HERE YOU'LL SEE THE REDUCTION IN FIBER COUNT WE ATTAINED IN UNLOADING RAIL CARS AT J-M PLANTS.

(READ SIGNIFICANT ONES, USING POINTER)

IN ALL THESE EXAMPLES, THE IMPROVEMENT IN FIBER COUNT WAS ACCOMPLISHED BY ADHERENCE TO THE JUST MENTIONED RULES AND GOOD HOUSEKEEPING PRACTICES.

SLIDE NO. 3

HERE YOU SEE THE METHOD OF STORING ASBESTOS FIBER IN ONE OF OUR PLANTS. IF YOU SEE NOTHING UNIQUE IN THIS METHOD, IT'S BECAUSE THERE ISN'T ANY. IT'S THE SAME METHOD USED TO STORE MANY OTHER MATERIALS. IN FACT, BECAUSE OF THE PRESSURE PACKING OF ASBESTOS BEFORE IT IS SENT TO YOU, MORE POUNDS OF MATERIAL CAN BE STORED PER SQUARE FOOT OF SPACE THAN IS THE CASE WITH OTHER PRODUCTS. THE PLASTIC COVERS YOU SEE HERE ARE FOR LONG-TERM STORAGE -- ANOTHER METHOD THAT MAY BE SUITABLE FOR YOU.

SLIDE NO. 4

HERE WE HAVE ANOTHER METHOD OF FIBER STORAGE. NOTICE THE CORNER PROTECTORS AND THE SEALING OF BROKEN BAGS. FROM INVENTORY, THE BAGS OF FIBER ARE TRANSPORTED TO THE POINTS OF USAGE.

NOW AT POINT OF USAGE, OUR PLANTS ARE USING SPECIALLY CONSTRUCTED BAG OPENING DEVICES WHERE BAGS ARE OPENED AND THE FIBER CHARGED INTO THE BINS, BEATERS, HYDRAPULPER, MIXERS AND OTHER BLENDING DEVICES. HERE, THE IMPORTANT THING IS TO PROVIDE PROPER DUST REMOVAL FACILITIES SO THAT THE OPERATOR IS NOT EXPOSED TO ASBESTOS FIBER DUST. SUCH BAG OPENING DEVICES MAY BE AUTOMATIC -- WHICH IS RELATIVELY COSTLY BUT WORTH IT IF YOU HANDLE LARGE VOLUMES OF MATERIAL -- OR A SIMPLE BAG OPENING STATION WHERE THE BAG IS OPENED AND THE EMPTY BAG FED INTO ANOTHER PAPER OR PLASTIC BAG. THESE DISCARDED BAGS CAN THEN BE USED IN A PAPER OR FELT MILL AND/OR BURIED IN A LANDFILL AREA.

HERE ARE SEVERAL DIFFERENT TYPES OF BAG OPENING DEVICES DESIGNED FOR PARTICULAR NEEDS FROM SIMPLE TO SOPHISTICATED.

SLIDE NO. 5

THIS IS A SIMPLE OPENING DEVICE THAT PROTECTS THE OPERATOR AS THE BAG IS OPENED UNDER A HOOD WITH NEGATIVE PRESSURE. NOTE THE BAG IS ASIDED THROUGH A CHUTE INTO AN EMPTY BAG.

SLIDE NO. 6

HERE IS ANOTHER VIEW OF THE SAME TYPE OF BAG OPENING DEVICE AT ANOTHER J-M LOCATION.

SLIDE NO. 8

THIS VIEW IS OF A FIBER BAG OPENING REFEED STATION INTO A MOODY FIBER FLUFFER. WHEN THIS PICTURE WAS TAKEN THERE WAS NO PROVISION FOR SIDING THE EMPTY BAG. HOWEVER, THIS FEATURE CAN BE EASILY ADDED.

SLIDE NO. 9

HERE IS A MORE SOPHISTICATED BAG OPENING DEVICE AT THE MANVILLE TEXTILE OPERATION WHERE LONG FIBER ASBESTOS IS USED.

SLIDE NO. 10 AND 11

THIS IS ANOTHER VIEW OF THE SAME UNIT. THIS VIEW SHOWS AN OPERATOR BREAKING UP A CUBE OF FIBER.

SLIDE NO. 12

THIS SHOWS HOW THE EMPTY BAG IS ASIDED AND THIS VIEW SHOWS A CLOSEUP OF THE WASTE BAG CONTAINER.

IF IN YOUR OPERATION THERE IS A PROBLEM WITH DUST GENERATION, ADEQUATE DUST CONTROL FACILITIES SHOULD BE DESIGNED AND INSTALLED. IT IS IMPORTANT THAT YOU PROTECT YOUR EMPLOYEES FROM ASBESTOS FIBER DUST JUST AS YOU WOULD ENDEAVOUR TO PROTECT THEM FROM EXCESSIVE HEAT, FUMES, TOXIC CHEMICALS, OR DOZENS OF OTHER MATERIALS.

I WOULD LIKE TO SHOW YOU SEVERAL TYPICAL EXAMPLES OF SPECIALLY DESIGNED DUST COLLECTING SYSTEMS FOR PARTICULAR OPERATIONS.

SLIDE NO. 13

YOU WILL NOTE THE DUST COLLECTING HOOD HERE ON AN ASBESTOS SHINGLE PUNCH PRESS.

SLIDE NO. 14 (TRANSITE PIPE MACHINE)

HERE'S ANOTHER EXAMPLE OF HOW WE DESIGNED A DUST COLLECTOR FOR AN OPERATION. HERE WE MACHINE THE ENDS OF LARGE TRANSITE PIPE.

WHAT IS NECESSARY IN DUST CONTROL IS PROPER DUCT SIZES (A MINIMUM DIAMETER OF 4 TO 5 INCHES AND PROPER AIR DUCT VELOCITIES -- 4,000 TO 4,500 FEET PER MINUTE).

SLIDE NO. 15 (MACHINING SMALL TRANSITE PIPE)

HERE WE ARE MACHINING SMALL TRANSITE PIPE. NOTE THE DUST COLLECTION FACILITIES, THE HOODING AND DUCTS. PROPER HOODING IS ESSENTIAL, WITH FACE VELOCITIES ACROSS THE WORK STATION OF 200 TO 250 FEET PER MINUTE.

SLIDE NO. 16 (MACHINING BLOCK INSULATION)

HERE'S A DUST COLLECTION SYSTEM SPECIALLY DESIGNED FOR MACHINING BLOCK INSULATION. (POINT TO COLLECTOR & SHOW AIR FLOW).

SLIDE NO. 17 (DRILLING HEAVY DUTY BRAKE BLOCK)

DRILLING HEAVY DUTY BRAKE BLOCKS ALSO REQUIRED DUST CONTROL, AND A SPECIAL SYSTEM WAS DESIGNED TO DO THE JOB.

SLIDE NO. 18 (SURFACE DISC BRAKE SEGMENTS)

THE SAME WAS THE CASE HERE, WHERE WE WORKED WITH DISC BRAKE SEGMENTS. (POINT TO DUST EQUIPMENT). THE DUST COLLECTION SYSTEM HERE ENCOMPASSES THE WHOLE OUTER CIRCLE.

SLIDE NO. 19 (CLOTH COLLECTOR AT WAUKEGAN)

AND HERE WE HAVE A TYPICAL CLOTH COLLECTOR AS USED IN THE TRANSITE PIPE DEPARTMENT AT OUR WAUKEGAN, ILLINOIS PLANT. IT'S SUFFICIENT TO DO THE DUST COLLECTING JOB THAT'S NECESSARY. SUCH EQUIPMENT CAN BE SCALED UP OR DOWN, DEPENDING UPON MAGNITUDE OF JOB. IT IS IMPORTANT THAT THE PROPER CLOTH COLLECTOR BE USED WITH AIR TO CLOTH RATIO OF NO MORE THAN 3 TO 1 FOR A SHAKER TYPE OF COLLECTOR.

SLIDE NO. 20 (JEFFREY SYSTEM)

THIS IS ONE OF THE LARGEST CLOTH COLLECTORS IN THE WORLD. IT'S LOCATED AT OUR ASBESTOS MINE AND MILL AT JEFFREY, CANADA. THIS SYSTEM ENCOMPASSES THE ENTIRE TOP FLOOR OF A 12-STORY BUILDING WHICH IS UNDER NEGATIVE PRESSURE. THERE ARE 80,000 BAGS IN THIS COLLECTOR AND 32-350 H.P. MOTORS DRIVING FANS THAT GENERATE 5 MILLION CUBIC FEET PER MINUTE.

THE FIBER COUNTS AT ALL OF THESE STATIONS AND OTHER SIMILAR ONES ARE WELL BELOW THE FIVE FIBER PER CC THRESHOLD LIMIT VALUE, AND MOST ARE DOWN TO TWO FIBERS PER CC.

SLIDE NO. 21

LET ME SAY A FEW WORDS ABOUT THE PERFORMANCE OF J-M PLANTS IN LINE WITH THE OSHA STANDARDS OF 5 FIBER PER CC AND THE PROPOSED 2 FIBER PER CC STANDARD WHICH WILL BECOME EFFECTIVE JULY 1, 1976.

AT THE PRESENT TIME, J-M HAS 943 ASBESTOS FIBER WORK STATIONS IN U. S. PLANTS WHERE WE MONITOR ASBESTOS FIBER DUST COUNTS ON A REGULAR BASIS.

OF THESE STATIONS, 860, OR 91% OF THEM ARE AT OR BELOW FIVE FIBERS PER CC. WE ARE CURRENTLY WORKING ON ALL OF THE BALANCE OF THESE STATIONS TO BRING THEM BELOW THE FIVE FIBERS PER CC TLV.

OF THE 943 FIBER STATIONS MONITORED, THERE ARE 545, OR ABOUT 58%, WHERE WE ARE BELOW TWO FIBERS PER CC. HERE WE HAVE MORE OF A JOB TO DO AND OUR PLANS CALL FOR MEETING THE OSHA PERFORMANCE STANDARDS WELL BEFORE 1976. THIS IS TO BE ACCOMPLISHED BY:

1. IMPROVED HOUSEKEEPING
2. IMPROVED METHODS
3. CHANGES IN OUR PROCESSES
4. INSTALLATION OF IMPROVED DUST CONTROL FACILITIES

SLIDE 22 (J-M LOGO)

NOW, YOU MAY BE WONDERING WHAT ALL I HAVE SAID AND SHOWN YOU HAS TO DO WITH YOU AS USERS OF ASBESTOS FIBER. FRANKLY, J-M HAS SPENT

MILLIONS OF DOLLARS TO CONTROL ASBESTOS FIBER DUST...AS WELL AS OTHER DUSTS...ALL TO PROTECT THE HEALTH OF OUR EMPLOYEES. BUT, AFTER ALL, WE ARE A LARGE COMPANY...WE USE ABOUT 160,000 TONS OF ASBESTOS FIBER EACH YEAR.

AS I SAID INITIALLY, WHAT WE HAVE DONE IN J-M TO CONTROL DUST SHOULD BE VIEWED AS PRINCIPLES TO WORK FROM--NOT EQUIPMENT YOU MUST HAVE IN ORDER TO SOLVE YOUR DUST PROBLEMS.

OVER THE PAST 30 YEARS, J-M HAS DEVELOPED EXPERTISE IN THE HANDLING OF ASBESTOS FIBER NOT ONLY FOR PROCESS REASONS, BUT FOR DUST CONTROL. WE HAVE LEARNED THROUGH EXPERIENCE THE EQUIPMENT BEST SUITED TO HANDLE A PARTICULAR TASK OR SOLVE A PARTICULAR DUST PROBLEM.

WE HAVE JUST AS MANY, IF NOT MORE, LITTLE OPERATIONS AS YOU HAVE.

GENTLEMEN, JOHNS-MANVILLE CAN HELP YOU. OUR RECOMMENDATIONS ARE THESE.

1. IF YOUR INDIVIDUAL PLANTS OR WORKSHOPS REQUIRE A GOOD JOB OF HOUSEKEEPING, THEN THIS IS THE FIRST STEP. A GOOD INDUSTRIAL VACUUM CLEANER SHOULD BE USED.
   IF YOUR PLANT ALREADY HAS DUST CONTROL FACILITIES, WE STRONGLY RECOMMEND THE USE OF A VACUUM CLEANING SYSTEM AS A TAKE-OFF FROM THE PRESENT DUST SYSTEM BY INSTALLATION OF A BOOSTER FAN AND A SMALL CYCLONE. J-M WILL BE GLAD TO PROVIDE YOU WITH A TYPICAL LAYOUT AND SCHEMATIC OF SUCH A SYSTEM.

2. IF IN YOUR OPERATIONS YOU HANDLE AND USE ASBESTOS FIBER AND YOU HAVE NO DUST CONTROL FACILITIES, THEN I CAN ASSURE YOU THAT YOU HAVE A PROBLEM AND PROBABLY A TWO-FOLD ONE...ONE BEING THE EXPOSURE OF EMPLOYEES TO ASBESTOS DUST (OSHA)... THE OTHER BEING EXHAUSTING ASBESTOS DUST LADEN AIR OUT OF YOUR BUILDING (EPA).

   I DO NOT ADVISE YOUR SPENDING ANY MONEY TO HIRE J-M OR ANY OTHER COMPANY TO COME INTO YOUR PLANT AND MAKE AN INDUSTRIAL HYGIENE SURVEY. ALL THIS WILL ACCOMPLISH IS TO GIVE YOU NUMBERS FOR PROBLEMS YOU ALREADY HAVE.

RATHER THAN EMPLOY THE SERVICES OF AN INDUSTRIAL HYGIENIST, WE RECOMMEND YOU ARRANGE FOR AN ENGINEERING SURVEY WHICH IS GENERALLY QUITE REASONABLE IN COST. SUCH A SURVEY WILL RESULT IN A REPORT TO YOU WITH SCHEMATICS (DETAILED DRAWINGS, IF SPECIFIED) AND RECOMMENDATIONS ON HOW TO CORRECT YOUR DUST PROBLEMS BOTH INSIDE AND OUTSIDE YOUR PLANT.

THE SURVEY WILL BE ADEQUATE ENOUGH TO PERMIT YOU TO OBTAIN FIRM QUOTES ON THE COST OF THE PROJECT.

JOHNS-MANVILLE CONDUCTS ENGINEERING SURVEYS AND WILL PERFORM SUCH SERVICE ON A FEE BASIS, THE SAME AS A NUMBER OF OTHER RELIABLE ENGINEERING FIRMS.

3. FURTHER, JOHNS-MANVILLE IS EQUIPPED TO HANDLE THE PURCHASING AND INSTALLATION OF DUST CONTROL FACILITIES ON TURN KEY BASIS, IF SUCH WORK IS DESIRED. IN FACT, WE ARE IN THE BUSINESS OF SELLING ENGINEERING SERVICES, THE SAME AS OTHER ENGINEERING FIRMS. THERE ARE MANY GOOD ONES IN THE FIELD.

4. THE REAL TIMES FOR INDUSTRIAL HYGIENE SURVEYS ARE:

   A. IF YOU ALREADY HAVE DUST CONTROL FACILITIES, YOU SHOULD ARRANGE FOR A HYGIENE SURVEY SO YOU WILL KNOW HOW WELL YOUR FACILITIES ARE PERFORMING AND WHETHER OR NOT YOU MEET OSHA STANDARDS.

   B. IF AFTER AN ENGINEERING SURVEY, YOU INSTALL FACILITIES, THEN AN INDUSTRIAL HYGIENE SURVEY SHOULD BE A PART OF THE INSTALLATION AGREEMENT TO ESTABLISH THE RELIABILITY OF THE EQUIPMENT INSTALLED AND WHETHER OR NOT THE STANDARDS HAVE BEEN MET.

IN CLOSING, GENTLEMEN, LET ME AGAIN EMPHASIZE THAT ASBESTOS DUST PROBLEMS-- IF YOU HAVE THEM-- CAN BE CONTROLLED. THE MEANS TO CONTROL DUST IS ONLY AS FAR AWAY AS DECIDING TO DO SOMETHING ABOUT IT...AND I DON'T THINK YOU WOULD BE HERE TODAY IF YOU DIDN'T FEEL IT WAS IMPORTANT TO FIND THOSE SOLUTIONS.

AND, I HOPE YOU'LL AGREE THAT WE WOULDN'T BE HERE TODAY IF WE WEREN'T SINCERE IN OUR DESIRE TO HELP YOU IN YOUR EFFORTS.

(PAUSE)

NOW, I'LL TURN THE ROSTRUM BACK TO JACK SOLON, WHO HAS A FEW CLOSING COMMENTS BEFORE YOUR QUESTIONS.

Asbestos and Health Presentation

December 3 and 4, 1973

Fibre Handling Systems

Presented By: N. W. Hendry
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ASBESTOS & HEALTH PRESENTATION

BY

N. W. Hendry

My subject is Asbestos Fiber Handling. In addition, I will show you some of the things we have done and are doing at Jeffrey Mine in this regard.

By way of introduction and since I will be speaking of the Jeffrey Mine, here are some of the major features:

Slide 1: The Jeffrey Mine is the largest producer of asbestos in the world, with annual production in excess of 650,000 tons annually. It is located approximately 100 miles east of Montreal in Asbestos, Quebec, Canada.

The Jeffrey open pit is over 1 mile in diameter and 950 ft. deep. For six days a week some 35,000 tons of ore are hauled to the crusher and more than 100,000 tons of waste rock and overburden are hauled to the waste dump.

Slide 2: This is mill 5 with the fiber storage warehouse in the foreground. Mill 5 is 12 stories high and has 20 primary rock processing lines.

Slide 3: This is an overhead view of the 72" Gyratory crusher which is handling at present 35,000 tons of ore daily. This crusher replaced 4 jaw crushers.

Slide 4: This is a view of the upper portion of the concentrator dryer complex. The entire complex is under rigid dust control; note there is no visible emission from the dryer stacks.

As you realize, asbestos fibre is very important to our division. We produce and sell upwards of 775,000 tons annually from our 4 mines. Our objectives are to deliver asbestos fibre to our customers in a form and in a manner in which there is no dust problem and such that the employees of our customers have no actual contact with asbestos. Many of the methods and systems which I plan to describe to you today will accomplish these objectives. We are prepared to work closely with your personnel to assist you in the achievement of these same objectives.

By way of indicating our confidence in the future of asbestos fibre, we have completed an expenditure of 75 million dollars in re-locating and in expanding our mining equipment at the Jeffrey Mine.

Now let me describe briefly some of the things we have done and are doing relative to fibre handling.

THE BULK TANK CAR

We have, in conjunction with the Ford Motor Co., and Procor in Oakville, Ontario, developed a bulk tank car and we have been shipping short asbestos fibre grades in it on a successful basis over the past 3 years. C.J.M. alone spent approximately $150,000 in the development of the car.

Slide 5: This car will hold 55 to 57 tons of the fibre grade being supplied to Ford; we have 6 bulk tank cars supplying the Ford plant requirements.

Slide 6: This is a schematic of the bulk tank car with a listing of the specifications and working data.

We load the car at the mine by pumping the fiber into the 7 compartments. At the receiving location plant, air is attached to the car to fluidize the fiber and cause it to flow into the storage silos. The contained fibre can be pumped out in 4 hours.

Slide 7: This is a storage silo at Jeffrey Mine with a capacity of 25 tons. A Vibra screw hopper on the bottom is essential to keep the fiber from packing.

Slide 8: This is a fiber pump in use at Jeffrey Mine to load the car.

There are definite limitations to this system, including:

1. The length and openness of the fibre.
2. The capital investment required - the investment is in the order of $100,000 and on a rule of thumb basis it does not appear practical unless annual usage is in the order of 2000 tons.

Advantages of the bulk system, include:

1. No handling of bags.
2. No contact with fiber by personnel.
3. Lower handling costs.
4. East of monitoring dust levels.

The entire bulk fibre system at Jeffrey is monitered for dust control and fibre counts are maintained under the 5 fibre/C.C. level.

2. IN-PLANT FIBRE HANDLING SYSTEMS

Slide 9: This is a schematic of an in-plant fiber handling system based on equipment developed and tested at Jeffrey Mine. The system includes a bag breaking station and a fiber pump. The fiber is pumped to the mixers or to weight hoppers. The entire system requiring approximately 3,500 cu. ft. of air. The cost of this system would be in the order of $14,500 plus the cost of piping.

Slide 10: We have developed cost estimates for the installation of a bulk fiber system. The figure of $96,000 is a reasonable estimate.

Slide 11: We have talked about a fiber pump, which is a C.J.M. development, but there are other items of equipment on the market which can be used to transport fiber. One such item is the Vanco Blower. This model can move 100 lbs. per minute of GP 7 fiber. We have several such systems at Jeffrey and we are moving fiber 35 ft. vertically and 2000 ft. horizontally with these units, with the entire operation under dust control. There are two models of this Vanco Blower, ranging in price from $2,000 to $3,000.

3. THE AUTOMATIC BAG OPENER

Slide 12: This is an automatic bag opener as developed by the Jeffrey engineers.

Slide 13: The operator places pressure packed bags on the feed conveyor and the bags can be paper, or polyethylene and the machine cuts the bag, automatically dumps the fiber into a chute and deposits the bag at the far end.

Slide 14: This part is the bag disposal section. A bag baler is under development to automatically bale the empty bags.

Slide 15: Here you can see the detail of the dumping mechanism. The contents of the bag are dumped into a bin and the empty bag is carried to a disposal station.

Dust control requires 800 C.F.M. of aspirating air and dust counts taken through the complete cycle were less than 2 fibers/ C.C.

The cost of the machine ranges from $9,900 to $12,500 depending on the various controls specified.

Fairmount Engineering, Inc. of Hackettstown, New Jersey has developed a bag opener which appears to have merit, the quoted price is $8,500.

4. IN-PLANT HANDLING SYSTEM

Slide 16: This is a fiber handling system employing the bag opener. The fiber feeds to a Vanco blower. The capacity of this system would be approximately 10 tons per hour.

Our estimated cost of this system installed in a plant is $29,000 and that would include a bag baler.

KMX 01799

5. FIBER PACKAGING

Slide 17: Here are our 3 standard types of pressure packed bags being used to package fiber in the domestic market.

1. Standard Kraft multiwall paper.
2. 6 mil polyethylene film.
3. Pulpable Kraft paper multiwall bag.

This slide illustrates a very important concept in fiber handling. For example, the pulpable bag was developed for use in the asbestos paper industry so that bag and contents could be dumped into the Hydropulper or vat, thereby eliminating the need to have a man open the bag. In the same way, the polyethylene bag is used in the asphalt paving industry and in limited cases, in the floor tile industry. Again the bag and contents are dumped into the pug mill or mixer.

Unfortunately, this concept is limited to suitable materials from which a bag can be constructed, as well as the compatability of the bag composition with the product formulation.

6. UNITIZATION

Slide 18: Here we have a 1-ton unit consisting of 45 pressure packed bags. The unit can be shipped on a cardboard deck sheet or a wooden pallet and the bags can be glued locked. Similar units of one or two tons can be shipped if required.

KMX 01800

Slide 19: Shows the same unit covered by shrink polyethylene; we have the equipment at Jeffrey to shrink poly film if our customers request it.

Unitized shipments of asbestos fiber in bags glue locked on wooden pallets, with or without shrink poly, suffer less damage and undergo less shifting in a car than any other method.

7. THE ASSIGNED CAR

In seeking added measures to insure improved condition of arrival of asbestos in bags, we have developed the "assigned car" plan. Over the past 18 months approximately 450 cars, each 40 ft. long with double doors have been in assigned service to J.M. plants in the United States.

Under this concept, we unitize and glue lock the pressure packed bags on wooden pallets and employ inflatable dunnage to stabilize the load.

Slide 20: This is an assigned car loaded with bagged units, on wooden pallets with inflatable dunnage.

Slide 21: Here you can see the inflatable dunnage in more detail; there are two bags in each car.

Slide 22: Here are the wooden pallets in more detail. They are heavy duty, double faced, four way entry style, hardwood pallets.

Our experience over the period of 18 months has been excellent, whereby the condition of arrival of the asbestos shipments has been greatly improved over previous standards.

A limited number of these assigned cars fully equipped with inflatable dunnage bags and pallets are available for test shipments. If after receiving a trial shipment you decide to accept this new concept, we estimate it will take approximately 6 months to acquire the necessary cars and dunnage.

Our experimental work on improved asbestos fibre handling systems is continuing in two directions.

8. HIGH DENSITY BLOCKS

Slide 23: Shows a compressed block of fiber measuring 9" x 12" x 16" with a density of 100 lbs./cu. ft. For comparison, is a standard pressure packed bag of fiber having a density of 50 lbs./cu. ft.

The blocks are dust free and our evaluation work to-date with a large paper manufacturer is most encouraging.

Slide 24: This is a 1-ton of compressed asbestos blocks on a wooden pallet and covered by shrink poly.

Slide 25: Here for comparison, are an equal weight of pressure packed bags and compressed blocks. Note the difference in cubic content.

In addition, we have developed a compressed paper pallet which is under evaluation for asbestos in paper use.

We have engineered and built a packer to produce compressed blocks but more time will be required before blocks can be termed a production item.

9. PELLETIZED FIBRE

Slide 26: Here you see 100 lbs. of pellets loose, the same weight of pellets in a paper bag and for comparison a standard bag containing 100 lb. of pressure packed fiber.

We have a Sprout Waldron Pelletizing Machine under evaluation at Jeffrey Mine and have successfully produced pellets with GP 7 fiber grades using water as a binder. Pellets have a loose density of 65 lbs./cu.ft. and they lend themselves admirably to shipment in closed hopper cars or in bags or in other types of containers.

They are largely dust free.

In conclusion, I have outlined the work we have done and are doing in the asbestos fibre division to meet our objective of delivering asbestos fibre to our customers in a form and in a manner in which there is no dust problem and such that you will have no problem in meeting the OSHA regulations as these relate to asbestos.

We will be pleased to work closely with any of your personnel in the development of a fiber handling system that fits yours particular requirements.

END