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Johns-Manville

Greenwood Plaza
Denver, Colorado 80217
(303) 779-1000

May 23, 1974

Mr. Charles S. Laubly
Celanese Corporation
522 - 5th Avenue
New York, NY 10036

Dear Mr. Laubly:

Mr. Baitse asked me to forward the attached to you and express his apologies in the delay.

Very truly yours,

Linda Comyford

Linda Comyford
Secretary to W. B. Baitse
Manager, Accident Prevention
and Industrial Health

Attachment

GONZALEZ002

(TAPE 1 - SIDE A)

INTERNATIONAL SHIPYARD HEALTH CONFERENCE
LOS ANGELES - DECEMBER 13-15, 1974

Dr. Edge, you mentioned the fact in the 1930's our cases of lung cancer began to be seen among asbestos workers, and this continued until the matter was clearly settled by Dr. Doll in 1959 in his classic paper. Dr. Doll, however, was unable to settle one question, and we are still stuck with it. He found a good deal of lung cancer among these asbestos factory workers, but he didn't know what the cancer threshold was. He knew they had a great deal of exposure but he didn't know whether it was 10,000 times more than was necessary to cause cancer or 1,000 times more or 100 times more or 10 times more. He just didn't know. He just knew that they were getting much more asbestos than they needed to produce cancer. We came along and we thought we might be able to answer that question, and we made a mistake. We began to study a group of asbestos workers that we thought had light and intermittent exposure. May I have the first slide please. What we did was to make a list of every asbestos insulation worker in the New York area; there were 632 of them on January 1, 1943. That gave us at least a 20 year period of follow-up, and knowing their ages in 1943 we calculated age, year and sex specific rates of through December 31, 1962. We found that whereas there should have been 203 deaths, there actually were 255.

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and the excess was limited largely to asbestosis, expected; cancer of gastrointestinal tract, a modest increase, three times increase only, unexpected, and as Dr. Doll has pointed out, cancer of the lung, enthrothorasic cancer; whereas there should have been 6 or 7 cancers occurring, 45 actually did. Now we were wrong, as I say, because we too couldn't answer how much of this cancer resulted from an excess, a large excess of over-exposure. We didn't know whether the asbestos insulation workers in New York were having 1,000 times or 10,000 times or 100 times or 10 times more than they needed to be inflicted with this disease. So that in 1964, we were in the same position that Dr. Doll was in ten years previously. However, a good deal had been learned during the time of the first report in 1935 by Dr. Lynch and the 1960's when we began to find this, and the most important thing that became clear in those years was that as Ben Ferris said yesterday, everything that happened with asbestos tended to take more than 20 years to become evident. For example, these data of a study of ours in New York where we looked at a thousand asbestos insulation workers, of the 725 with less than 20 years from onset of expsoure, most had normal X-rays and when they were abnormal they tend to be minimally so. On the other hand, with more than 20 years from onset, the majority had abnormal X-rays and not infrequently the abnormality was considerable. The second important thing

we learned was that the mesothelial surfaces not infrequently became involved and nobody really knows why yet, as John Edge has just shown us, pleural plaques were commonly seen not infrequently. This was very extensive -- even fatal. In such cases the plaques sometimes became calcified, and these too obey the twenty year rule. Of the 725 with less than 20 years from onset, most of them had a normal pleura on X-ray. After that point, however, the pleura was frequently abnormal with either fibrosis or calcification. If the pleural plaques were largely on the parietal pleural and sometimes the pleura not only showed fibrosis and calcification but showed neoplasia -- in other words mesotheliomas. Then, in our experience in any rate so far, these have been invariably fatal. The mesothelium of the abdomen too, of during the early 1960's beginning in 1950 and in 1960's became apparently involved and in the excellent papers of Enticknap and Smither the frequency of such peritoneal involvement was emphasized. The diffuseness again can be well demonstrated in any laperotomy. In our own studies the importance of the mesotheliomas was so clearly seen in the 370 survivors of the original 632 group. On January 1, 1963 our prospect of observation through December 31, 1971 has shown that lung cancer, as expected, is markedly increased whereas totally there should have been 85 deaths there were 168 -- twice as many asbestos workers died as were expected to die during that period, age, year and sex specific rates, of course. Whereas there should have

been 5 deaths of lung cancer, there were actually 42, but interestingly as has been just emphasized, the mesotheliomas, pleural and peritoneal, began to be seen with increasing frequency. The same modest increase in gastrointestinal cancer and, of course, deaths of asbestosis. We have put on this slide our entire experience with this New York City group from '43 through '71, and it's evident that in this particular group one out of every 5 deaths among these asbestos insulation workers has been due to bronchogenic carcinoma. Somewhere around one out of 20 deaths has been due to mesothelioma , approximately one out of 10 to gastrointestinal cancer, and approximately one out of 15 to asbestosis. There was a possibility that the New York experience was unique; therefore, we have undertaken a second study in which on January 1, 1967, these are new data which have not yet been published. On January 1, 1967, we registered every single union insulation worker in the country. There were 17,800 men in the union on that day. That's about a one-third sample or a one out of four sample of all the insulation workers in the country. And we have followed them and these data reflect what happened to the 17,800 men through December 31, 1971. And although it's a much younger group containing, as I say, all members of the union, even those who were in the union only a year or two or less, we had very much the same results. There should have been age, year, and sex specific 44 deaths of bronchogenic carcinoma and

213 actually occurred --77 mesotheliomas,again, the same increase of gastrointestinal cancer and the deaths of asbestosis. These categories accounted for the total excess of some 300 or so deaths in the total group. The data when broken down again confirmed what Dr. Ferris said yesterday that 20 years at least 25 years, 30 years, 35 years must pass before the clinical effects are seen because when we analyzed our group less than 30 years, 20 years and more than 20 years, we found that of the 12,600 men who had less than 20 years from onset of exposure there was a very slight increase in lung cancer, seven expected and 22 occurred. The rate is there but the numbers are small. Only a small number of mesotheliomas, only five, were seen, etc. On the other hand, of the 5,000 men more than 20 years from onset, there were 37 bronchogenic carcinomas expected and 191 occurred. Almost all of the mesothe'iomas were in this group, more than 20 years from onset and the deaths of asbestosis similarly were so limited. Now, at this time we analyzed our data by duration from onset and as you can see here, we saw almost no increase in bronchogenic carcinomas less than 15 years from onset. Indeed most of the increase was seen 25, 30 and 35 years from onset. These are the ratios that you see and again mesothelioma, only two cases were seen in less than 20 years from onset and the others occurred following that point. Now at this time, we had now a good deal of information on what happens to asbestos insulation workers too. Well, I think this morning we heard the phrase "burst"-- --

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a bomb". Two bombs burst amidst our thinking. The first came from Dr. Wagner. Chris Wagner reported in 1960 that whereas all of us were seeing very few mesotheliomas, we at Mt. Sinai saw three in 30 years from 1930 to 1960. He reported 47 cases of mesothelioma all in the northwestern portion of the Cape Province, a place where there's much in the way of crocidolite mines and mills, and in 45 of the 47, there had been potential asbestos contact. Well, this was no surprise. We had had a number of reports of asbestos and mesothelioma but what was interesting was that in many of these people there had been no occupational exposure. These were people who lived in the household of an asbestos worker or along the road along which the donkey carts were taking the bags to the mill. Following these data Molley Newhouse reported in 1965 that she looked at the histories of interviewing the people of the 76 cases of mesothelioma in the files of a London hospital. And sure enough, 31 out of the 76 had worked with asbestos. From the 45 that had not, 9 had simply lived household of an asbestos worker, and of the 36 who neither worked with asbestos nor lived with someone who worked with asbestos, 11 had simply lived within one-half mile of an asbestos plant. This then raised for the first time the importance of "light exposure". I really don't know what "light" means and I don't know what "heavy" means. This is enought to cause mesothelioma. Dr. Lieben in Pennsylvania

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looked at the mesotheliomas in the files of the State Health Department, and of the 42 cases there, 20 had worked with asbestos. But of the 22 who had not, eight had simply lived in the house in the neighborhood within a [illegible] half mile of an asbestos plant and three had lived in the household of an asbestos worker. At this point the second bomb burst and it was a quiet comment made in that paper by Dr. Harries who is here with us today, and looking at the asbestos disease situation of the Davenport Dock yard, he reported that in addition to cases of mesothelioma there were five patients with asbestosis; there were five with mesothelioma at the Davenport Dock yard that he knew about. Well, this as I say would cause a great stir, especially when rapidly his observations were confirmed by others in Britain-- Whitwell, McEwen, Wappleston and others and elsewhere. Now this raised the question that we are discussing here at this meeting. The problem of indirect exposure as I've heard today a very cute phrase "Dr Zispin's bystander disease in shipyards". The importance of this to us can be demonstrated here. We in the United States had a small shipbuilding industry between the two world wars. As you know, the British shipbuilding industry was reactivated around 1931-1932. We did not begin to rebuild our shipbuilding industry until 1940. We employed around 75,000 men at any one time from 1922 to 1940. When the shipbuilding industry

began again in full blossom in 1940, we went up to a very much larger number, and this is a graph of those on the east coast, the west coast, and, of course, the gulf coast, and the Great Lakes area. We had also, starting around 42, 43, we began to employ a fair number of women and Dr. Rieke told us yesterday that at the yard that he was at there sometimes reached as many as almost 1/3 of the work force. Only 1 of 500 was a pipe coverer, was an insulation worker. All the other trades were here, but when you consider what happened in the hold of a ship, the insulation worker was obviously surrounded by all the other trades, electricians, steam fitters, etc. There was a huge turnover during the war, approximately 100% a year, and as a result, we had in this country 4½ million people, many women, who worked at some time or another in our shipyards in World War II from 1940-1945, reaching a maximum at the end of 1943. Well, is this a hazard? Well, I'll show you some of our studies that are trying to get some information on this. We first found out what kind of insulation these people used, and it was made by one company, by and large. A Navy spec in 1935, incidentally, with regard to the question of crocidolite, the experience that I've just shown you has nothing whatsoever to do with crocidolite which we didn't use in this country at all in insulation work. So the experience of insulation workers has nothing to do with crocidolite. Until around 1935, it was entirely chrysotile. We began to use some amosite in 1935

and this increased rapidly in the 1940's and subsequently. It was the Union Asbestos and Rubber Company that began to make all of the insulation for the Navy and the other shipyards. And they went into production in Patterson, New Jersey in 1941, and they were very good. Remember the Army-Navy E and these were the men. There were 933 men employed in this factory at sometime between 1941 and 1945. We have followed every single one of these men, and by the end of '71 as you can see we found that their experience was identical to the insulation workers. Lung cancer, 11 expected, 73 observed, mesothelioma, gastrointestinal cancer and asbestosis. So that the materials that were going into our shipyards were carcinogenic. We have now human proof in this regard. Indeed they were quite carcinogenic, because we have analysed our group of men working in this factory from '41 to '45 by duration of exposure. One-third worked for less than three months, one-third worked from 3 to 11 months. These were short term jobs. Some of them worked for the summer and even went into the service after a few months in the factory and one-third worked more than a year. The lung cancer rates were excessive even with less than three months of exposure to the materials that were then used in our shipyards in World War II. We got the wind up rather rapidly. The first case of mesothelioma we saw was in the man who invented this particular insulation material. He died

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of mesothelioma. We got the records out but when we inquired about him, his wife wrote us about another tragedy, and this was a tragedy that you see on the screen now. This was his daughter, a young child who had never, of course, worked in the factory or any factory and she was found to have a pleural plaque not too well seen of calcified plaque. Three years later she developed mesothelioma and died, and Mrs. X wrote us that her only contact with this particular insulation was that the chief engineer would bring home the products proudly to show his family what he had invented and the kid had played with them on the dining room table. This is a mesothelioma that we saw next. This was the Plant Manager. Mr. Shutt, in his previous X-ray had been normal. We then looked at to see how much of this material would be necessary to cause mesothelioma or other cancers or other disease, and I will now show you some new data on this study in progress, and, of course, has not been published. We have now examined 200 family members of the men and women -- men worked in this factory during '41, '42. These are the wives and children who lived with them from end of period 1941-1945, and this is our analysis of the first 115 cases we've seen. We have found that 40% have X-ray evidence of parenteral and/or pleural disease. These were simply family members of people who worked in that factory. We have found it that wives, sons, daughters, siblings, parents in about the same proportion. So that it did not take much of this particular dust of this particular material of amosite asbestos, and

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these are the typical things we have found as Dr. Edge has shown you this _____plaque. .These people are.___ , incidental even /this one. The minimal asbestosis we found occasionally and the pleural plaques that you see here. This study is still in progress as I say. We have looked at it another way, and again, these data have not been published. I thought you might be interested in them. In the New York City group when we examined these people, the history was obtained whether or not they worked in shipyards. Now these are all insulation workers. Approximately one-third never worked in a shipyard, one-third went up to two years, and one-third worked for 3 or 4 years in shipyards. Now these were all people of the same city and the same union -- all insulation workers, and their lung cancer rates, their mesothelioma rates were very much the same. We have also looked at it another way. In the National Survey we're doing from '67-'71 we have analyzed the Union's experience by whether or not the men were registered in locals in the midwest, in the central states, and presumably without any shipyard experience, and those registered in shipyard locals. There has been no difference in the rates of workmen in shipyards or not in shipyards. Now , we saw our first mesothelioma in a shipyard worker in 1966, Dr. Edge saw his first one in 1966. I think that Dr. Harries reported that he saw his first one in Davenport in 1964. Now the British experience is about five, six, seven years before ours. They began their shipyard work about that length of time before we did. We didn't see very much in the way of shipyard mesothelioma until the past year or two. Now we're seeing one roughly

around one every two weeks. I have no idea how many there are, but it's somewhere around in our experience at this time about one and two weeks and how many there are in the country we don't know. I'll show you some of our recent cases to close this presentation. This is a man who worked -- these are all mesotheliomas. A man who worked for two years in the Brooklyn Navy Yards as an electrician, 1943. This is a young woman who worked for six weeks in the Hingham Shipyard in Boston while she was going to school. She was a college student. In response to patriotic appeal, she worked for six weeks at the Hingham Shipyard as a pipe coverer. This is a man who worked as an engineer for two years in Mayor Island in San Francisco. This is a man who worked as a sheet metal worker — These are all mesotheliomas -- at the Bethlehem yard in the New York area. The next two cases I now have at Mt. Sinai. These are two patients that I left at the hospital when I came out here. This is a young woman, not a young woman. She's 66 I think -- Sally, Dr. Cooper knows this patient well. She is the wife of a good friend of Dr. Cooper's, here in the second row, if you want to know some details about her. She was perfectly well. She worked at I. Magnin in San Francisco. Several months ago, she underwent a routine store physical. An abnormal X-ray was found. She went to her private physician who did a _____ and he came

back into her room, and he said "Sally, I've got some bad news-- there is some problem," and she said "Well I know what I've got. I've got mesothelioma", she said. She told him that for 16 months, '43 to '45, she had worked at an Oakland, California shipyard and then went back to her clerical work. And this is her mesothelioma at the present time, and she is now at Mt. Sinai in our experimental chemotherapy program. Another patient we now have in the hospital is a woman who never had any work of any kind other than clerical work. She developed a disease in 1971. A biopsy was done and pleural mesothelioma was found. She had no asbestos exposure. Checking her history, however, she was found to have been married in '42 to a man who was a sheet metal worker at the Sun Shipyard in Chester, Pennsylvania. For those two years and she washed his clothes and she described coming home with this white dust over his clothes, which she then washed, and this is her mesothelioma, and she's now beginning to go down hill after a good portion of these last 18 months or so. Oh, this was a man that I saw three years ago. A 30 year old man with this mesothelioma. I couldn't find out where he got his asbestos exposure because at 30 years old where did he get it? We took a careful history, of course. He was born on Ball Street, lived there for a year and then moved for 16 years to Wilson Street and then he got married. His wife said "Well, we can't live around here. We've

got to move to Flatbush," one of the nicer sections in New York at that time and, in fact, she insisted that he get a job, which he did. Under duress, he became a bookkeeper and then for many years he was perfectly well until he developed this chest disease, and mesothelioma was found. One biopsy showed ample asbestos to be present. So there was no question about his exposure. Indeed one of the fibers was large enough for electron diffraction study and it proved to be amosite. So he knew darn well where he got his asbestos from. We got a 15 cent map of New York and that gave us the diagnosis. Here was Hall Street; here was Wilson Street. That was across the way from the Brooklyn Navy Yard, and he got his asbestos in his mother's arms in 1940, 41, 42. These are the last two slides, and they give you the reason for our current concern. The age distribution of the workers in shipyards on the atlantic coast and the west coast was known in '41 and '42. We haven't got good data of '43 and '44, so we're extrapolating a bit. Of these 4½ million men and women who worked in our shipyard from '40 to '45, they're given their age distribution in '41 to '45. There are now somewhere around three million Americans alive who worked in our shipyards in World War II and who are now reaching the 30 year from onset point, and we all feel that we are sitting on the edge of a volcano.

Thank you very much.

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The asbestos workers ....

I think I ought to introduce myself. You ought to know me by now. I think after the last two doctors, Dr. Selikoff and the doctor from England gave their presentations -- Their excellent presentations -- I would like to answer a little bit to Dr. Bell of his presentation yesterday. I would like to say the following in regard to his very interesting paper. Roman numeral. IX-4, he stated that the Division of Occupational Health and Pollution Control has built up a reputation for impartiality. I think in his case it's time to become partial. I'm not criticizing Dr. Bell, I'm criticizing the company. I think it's time they become partial. The many health problems they have arising from lack of communication, to be blamed on lack of communication and unsatisfactory employer and employee relationships, and lack of job satisfaction. This, in my opinion, is the fault of both lower and upper supervision. Somewhere along the line, if the men are that -- and their morale is that low, the supervision is wrong. This is all I can say about this if the morale is that low. I know we have many problems here today and we've gone over many problems. Also in his slide he indicated no hazards involved for clean-up work. Exposed dry insulation on ceilings, the use of sprayed wet asbestos in group workers, the cutting of asbestos sheets in open air and power operated hand saws in cabinets of no hazards.

I think after the two presentations this morning, I think that someone has an awful lot to learn and as was put so aptly by Dr. Selikoff this morning, if I was a business agent as I was in Toledo, Ohio for 16 years, if I was a business agent in Australia, there wouldn't be one man working in those yards. Those gates would be blocked tight every morning. I thank you for your time.

Could you repeat that please?

Q. Yes, what comment would you have to make, and I would like to ask Dr. Harries if he has seen any Navy people develop any of these symptoms who probably work around this stuff for years.

A. I think perhaps Dr. Harries will be able to answer that in great detail. We have studied the non-Navy personnel. I did mention yesterday that all of the mesotheliomas that I saw at the Armed Forces Institute of Pathology were in admirals. I didn't see one in a general, that's because the people who were not, I saw their specimens in 1960 or so, 30 years before they were lieutenant junior grade, in the engine room. The generals I expect were having a good time on some of the army posts.

Q. Dr. Harries, you care to field that?

Q. Thank you. We are seeing asbestos disease in the Naval personnel. But we have a problem, and I assume that you have the same problem in your country that our Naval personnel retire young so that as we see from Dr. Selikoff's wonderful presentation, these diseases occur after a period of 20 years. So that by the time the man comes to retire, he hasn't got any signs of the disease, and they're occurring after they take up other employment. So that they

are usually forced to follow-up and this is something we are looking into. I wonder as I now have the microphone whether I could take the opportunity to ask Dr. Selikoff if there are now any advances in the treatment of mesothelioma, because this seems to be the most crucial point.

A. I agree with you, Dr. Harries, this is probably the most important thing that we now should be looking to with mesothelioma. I think we have had enough diagnostic studies, enough epidemiological studies, enough statistical studies. We know what our problem is. We have to identify those at risk and I'm not quite sure I know how to do this for the 2½ or 1 million or 3 million people now alive who worked in our shipyards in World War II. This is a problem that we have not epidemiologically solved, but the question of therapy arises. None of us have had any success but there are some hints that are beginning to occur. Braced with some combined chemotheraputic approaches, we have without question been able to lengthen the duration of active life. One man I think you knew him well -- Ed Kilner. Local 12, the secretary of the Union. It was a bad Union to be secretary of. His predecessor, John Boglavitch died of pleural mesothelioma in 1964, and then he was replaced by Ed Kilner at a special election. I don't know whether the man did him a favor . . ., but Ed Kilner soon died of mesothelioma also, and nobody has wanted to take the job since.

And with chemotherapy he was able to go back to work for a year and a half. What we had done was to grow mesothelioma cells in cell culture and then test various batteries of chemotheraputic agents against the specific cell lines of the specific patients. We had also grown this in hamster cheek pouches and had used the same approach. We are now with Dr. Holland who has come to us from Roswell Park, have now begun a program of experimental chemotherapy with some very interesting new drugs. One, for example, that is specifically useful in tumors that produce mucous on people polysacarides. We don't know whether this is going to be effective here. There is a recent series from Memorial Hospital of peritoneal mesothelioma, given full abdominal radiation, and seemed quite heroic, but they have five patients now who have, one has gone 10 years and the four others have gone from 5 to 10 years, and they did not do their patients any harm. I saw one patient with abdominal mesothelioma sent me from Washington. He was one of the executives of Boys of America and he had some abdominal trouble. He went into Georgetown Hospital. The next thing he knew after the operation was the young intern came over to him and said "When have you worked with asbestos? " He said "I almost fell out of the bed." The intern had seen the slide. It was a peritoneal mesothelioma and, of course, he had worked when he was in Germany in 1928 with asbestos.

Well, he was treated at Georgetown Hospital with full abdominal radial therapy, and he also was able to live three years which was longer than our peritoneal mesotheliomas go. There is a possibility our immotherapy people, we have them looking at this also, are telling us that they might not be able to handle the huge amount of mesotheliomas that's present in a chest or an abdomen and they have recommended that we consider combined surgical and immunological and/or chemotheraputic approaches so that the cancer chemotherapy might have a chance in these patients. We are also engaged in a, sorry to give you so many of these theraputic approaches, but we don't know which is going to work, and so we are trying all at the same time. We have a very active program going based upon the observations of Schlipcolor in Germany with poly_____ and oxide and silica to see whether we might be able to inactiviate dust that is already in tissue in lung or in other tissues, and in the test tube we are well able now, we have a variety of chemicals that can inactivate the surface of asbestos, the various kinds of asbestos fibers utilizing hemolitic test systems and other test systems, and we are now going into the animal model. This is also a possible approach. So that we have, we're looking at a number of different ways of approaching this and I have my fingers crossed. I hope that one or more of them is going to be able to solve this problem which otherwise, there is no solution

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Q. Dr. Schmidt -- I have two questions. One, since having been diagnosed, has anyone up to now reached the five year level? Number one, number two -- Is there any explanation as to why, even on the meter exposure some people seemingly are predisposed to mesotheliomas?

A. There is a French paper which is unpublished, which was presented at their Nice Conference in June. It was a conference on diseases of the pleural in which one of their chemotherapy treated mesotheliomas has gone five years. It was a very, very long tumor. However, and I don't know whether you could credit the chemotherapy with this because sometimes we see patients going three months and a case of patients without any treatment last for three years and four years. So that I don't know how to explain this French report, and I've just given you the report with regard to radialtherapy. We have one other case in our hospital in which full chest radial therapy was given following surgery to a doctor's wife. A year and a half ago and so far her X-ray looks perfectly normal. So we have our fingers crossed knits. And why does relatively light exposure, limited exposure produce this tumor? Well, the cancer people, the carcinogenesis people, are fond of telling us that the occurrence of cancer is _____ event, that when you have the initial turn-around of normal cells into cancerous cells, from that

point on, they need no other energy source from the original carcinogenic agent. They are then off on their own, and just proceed. So that what is necessary is enough to have a small area become cancer and from then on in the initial cause has no relevance.

Q. I'm Dr. Cooper from Berkeley. I agree with Dr. Selikoff that we are facing a potentially very serious situation and regardless of what the incidence turn out to be, the population involved here is so large that the total problem in human, economic and social terms is bound to be a serious one, and I feel that the shipyard workers were casualties of the war, just as someone who lost an arm or leg or worse in combat. The people of the shipyards

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There are no provisions for taking care of this situation. Our Workman's Compensation and other provisions very often will not apply and I just wonder what kinds of steps are being taken. What the possibilities are of approaching this thing in a way that will be fair to these individuals no matter whether there are 1,000 or 10,000.

A. There is something being done and I think we have at least in large part to thank George Lewton for this. The Bureau of Federal Employees Compensation has agreed in the United States, I think this is within the year, to consider

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itself the last employer of record for any case of mesothelioma in which their last asbestos exposure was in World War II in the shipyards. There are certain criteria. Mesothelioma must be proven. There should have been no other asbestos exposure since that time, etc. But basically the Navy through the Federal Bureau of Employees Compensation and here too, what Dr. Lawton said yesterday, I have found it to be true and no lawyer is necessary. That these people have been given compensation by the Navy. I think that this has been a very humane act and a very difficult situation. This, of course, is rather cold comfort, I agree with you, but its the best that has been done and I think the Navy deserves a good round of applause on this very humane approach, and I think George Lawton, in particular, deserves credit for this.

Young lady over here.

Q. My question is this -- Does this ruling apply only to people who work in the U.S. Navy yards or does it also apply to all of the various people who work under contract for the Maritime Commission, because most of the work is done in private yards.

A. (Selikoff) - I am no expert on legal matters, perhaps Dr. Lawton can tell us.

A. (Lawton) - The Federal Employees Compensation applies only to federally employed workers. Contract employees would fall under a different compensation. Does that answer your question?

There are other measures that have been attempted. A year and a half ago we succeeded in having inserted in the OSHA-NIOSH budget a special line appropriation for a mesothelioma case finding registered. This item was vetoed when the president vetoed that part of the budget. A second attempt was made by us to begin this work. Legislation has been introduced. It's called skeletal legislation, that is to say, it is put into the hopper to be filled out later in hearings by Senator Hubert Humphrey, and this bill will call for a national register of all exposures as the beginning of the process of identifying these workers and trying to see that whatever community resources exist are made available to the worker. So, we're not sleeping on this problem.

(Selikoff) - There's another evidence of waitfulness that's now in the works, and this is again the idea of driving force of [redacted] He has been the principal individual who has been trying to develop a new approach to just such problems. His group has studied the population of the Union Asbestos and Rubber Company Plant in Tyler, Texas.

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Some 900 people worked there from 1954 through 1971. The plant is now closed. Yet, here we have 900 people who were exposed to exactly this material that we've been describing and what is to happen to them. Dr. Wagoner went to the National Cancer Institute some nine months ago and proposed that the National Cancer Institute fund a study of the chest hospital in Tyler, Texas to make a register of every one of these 900 workers and follow them for the rest of their lives. The Cancer Control Division of the National Cancer Institute has taken this proposal and it is my understanding that Dr. Wagoner's efforts will be successful. We hope to hear about this in the next several weeks and this might set a pattern for problems like this that we will have I'm sure from time to time.

I'm no authority in this particular field, in response to the young lady's question, but some place back in the gray matter here we're talking about some legislation identified as white lung as we relate to the black lung in the coal industry. How far downstream this is, I really don't know.

Thank you.

As Dr. Selikoff indicated and Shelley Samuels, Senator Humphrey has proposed a bill with Representative Frelinghuysen and Senator Taft. The most recent one in regard to your question about the so-called white lung bill and I think the one that

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AFL-CIO as well as the Asbestos Workers International is going to back is sponsored by Senator Harrison, William Javits, Jr., and Senator Williams. Now, I understand Humphrey is willing to withdraw his bill and they're going to make this bill a compensation law reform. It's going to bring the benefits up to at least the level of Longshoreman's Act of Washington, D.C., which changed October 1. I think for total disability it was $167.00 a week and now I believe it's gone up 25%. However, I want to say this much and I'll read a quote from one of the magazines -- "The alarm has sounded and guess who sounded it?" One industry and an association, The National Insulation Contractors Association is trying to sound an alarm. Its Executive Director, John Pollack, has written to some 30 industry association executives urging them to carefully analyze the bill and take steps to have it amended, if necessary, to make it more powerful. This bill if enacted, said Pollack, will in our opinion have a greater impact on employers of OSHA. Despite this, no organized effort appears to be made to alert employers to the very drastic provisions it contains. He's alerted the ADC, of course, and this bill also provides for the attorney fees to be over and above any settlement or any compensation payments. It's going to be quite a fight. I think it's one that our International will be backing. I know the AFL-CIO is going to back it. I'm sure the insurance companies will probably split on it. I'm fairly sure a lot of them will back the bill but it is going to be our so-called white lung bill that we decided to go for at our last convention in September.

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One more, I think from England.

Q. Could I make one comment and ask one question? The one comment is that we had a small gas mask factory -- I think someone asked about individual susceptibility -- We had a small gas mask factory in _____ at the beginning of the war which was using this blue asbestos from Western Australia and this employed only 9 women for a period about a year packing this stuff into part of gas masks. Six of these have died of mesothelioma. The three have been lost sight of.

This suggests to me that there is no individual susceptibility required to account for this. You can have the right fiber in the right place for long enough, you probably will get the disease. That is my comment. The two questions that are part of Selikoff's _____breakdown on the associated lesions or carcinomas related to industries that described either fibrosis. Could you give us a brief comment on the associated lesions with the men who develop cancer and finally in regard to therapy -- has he any comments about the use of BCG or _____.

A. (Selikoff) - All of our insulation workers have autopsy have asbestosis whatever else they have.

They may not have it on X-ray, but histologically there is always some pulmonary fibrosis among these people. The shipyard mesotheliomas we've seen on X-ray frequently have

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no evidence of asbestosis. They may or may not have plaques, but there is no association with asbestosis necessarily. With regard to BCG we ourselves have not used this. It certainly is a thought. However, we have discussed this with our immunology group and they are looking at the possibility of various immunological approaches. This is a very active field as we all know at the present time with regard to cancer management. We're keeping our fingers crossed that it won't go away as some of the other cancer which offered great promise at first and then have left us still worrying about our problems.

Might as well wind it up; one announcement to make; one observation and Dr. Goldsmith would like to make some comments.

Those of you who have not signed up for the workshop, please do. It is a great deal of interest.

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Tape 2 - Side A

Blue asbestos -- I got lost on the turn here. What - Blue asbestos any different than any other kind of asbestos or do you mean, just don't spray that blue stuff?

Q. The questions is -- Is blue any different than any other kind of asbestos?

A. Blue asbestos is crocidolite asbestos which comes mainly from South Africa, though there are some deposits in Australia, and it has different properties to amosite or chrysotile asbestos.

Q. I'm going to ask Dr. Selikoff to comment in a moment and the reason I was asking you the question in this form and he may want to ask you some questions, and I know others will. But the question, they built a huge First National Bank in Portland recently and they sprayed all that steel work for 40 stories and for about a week around there for four blocks around you walked around there and you were walking on white stuff, and I thought certainly the newspapers would get wind of this and raise the question, but nobody did. The Reader's Digest article was a little too far back there and you might want to comment on that. I don't know, I assume it's asbestos. I see them still putting white and gray stuff on these steel buildings there in Portland. I'm not absolutely sure what that stuff is, but you did talk about the spraying of this material and its problems. I can't help but feel that this stuff is still being used rather widely. Would you like

to comment on his remarks and perhaps dialate a little and ask him a question or two.

A. Dr. Wagner in Great Britain is of the opinion that crocidolite asbestos is even more dangerous than amosite asbestos or chrysotile asbestos. There have, however, been no population studies which would indicate that this is so. Experimental studies have shown that all types of asbestos have the property pretty much the same levels of producing the neoplasms. The United States' experience includes no crocidolite exposure. All of our data and other scientists in the United States have been based upon amosite and chrysotile exposure. I see no reason for treating crocidolite any differently than amosite or chrysotile, or shall I put it the other way. I see no reason for treating chrysotile or amosite any differently than crocidolite, and in this regard, I am not optimistic at all. I am not optimistic at all about our ability to protect workers who are now coming into these trades based upon our current standards. I'd like to translate some figures. The level of two fibers per cc indicates that there would be 2,000,000 fibers per cubic meter. These are fibers only longer than five microns in length. As was pointed out this morning , there may be anywhere from 90 to 99% more fibers shorter than those five microns in length, but if we would include only the long ones,

only those over five microns, two fibers per cc, a man working in an atmosphere containing two fibers each cc would be working in an atmosphere which has 2,000,000 fibers per cubic meter. Now, the working man inhales something around 8 cubic meters of air in an 8-hour day, a man actively at work. That means he would be inhaling, if the atmosphere contained two fibers per cc, he would be inhaling 16,000,000 fibers longer than five microns and perhaps 100 times that many shorter than five microns in each working day. Now, we do not know what percentage of those inhaled are retained. There are some studies by Bob Harris of North Carolina, University of North Carolina, which suggests that something around 50% are retained. I know of no studies that would indicate that his mathematical models and some engineering models are necessarily true. We may retain only 1% or 10% or 20%, we don't really know at this point. In the absence of knowledge, I think that precaution is doubly necessary. But whatever, we are asking workers at the present time to work in atmospheres in which they will inhale 16,000,000 fibers in each working day of long ones and perhaps several billion of the small ones, and retain an unstudied proportion. I have doubts whether this would protect anyone in the future. My doubts are based upon the fact that first of all those with very light exposure, as you pointed out, that only two of your mesotheliomas were in asbestos workers. The other 50 were in the other trades. So that we have reason to believe that this will not protect workers in the future. I have a second

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reason for having strong doubts. They are based upon the history of the setting of the asbestos standard. The asbestos standard of 2 fibers per cc or 5 fibers per cc or 4 fibers per cc is based upon the recommendation of the subcommittee on asbestos standards of the British Occupational Hygiene Society. The British Occupational Hygiene Society met in 1966, '67 and published its findings in 1968. They very wisely, in my opinion correctly, were very prudent in what they said. They said the data that we have and the data that they have is another problem, another question, another story, but the data that they had they said referred only to chrysotile. They said we know nothing about any other fiber because we only have data with regards to chrysotile. So your workers are working with amosite - our workers are working with amosite and no standard is known for amosite. That's the first thing. Secondly, they said our data referred only to the prevention of asbestosis. We know nothing;we have no data which would tell us what the level should be for the prevention of cancer. Now, most asbestos workers who die don't die of asbestosis. In our series less than 20% of the excess deaths were due to asbestosis. The excess deaths are due to lung cancer, mesothelioma, gastrointestinal cancer. The standard of two fibers per cc then was designed and specifically stated by the British Occupational Hygiene Society to refer only to the prevention of asbestosis.

The British Occupational Hygiene Society made no claim that this standard would prevent cancer. Yet when we imported this standard across the Atlantic, we forgot the caution that the British Occupational Hygiene Society and we said this is the standard for asbestos. Not that this is the standard for the prevention of asbestosis but this is the standard for asbestos in general. There is no published body of data that would say that a standard of two fibers per cc or 16,000,000 fibers in a working day will prevent cancer. There are no such data and with so dangerous a situation with such an important disease, with irreversible disease, with death of neoplasm, I submit that not to take every possible precaution not to wait everything on the side of the worker is not necessarily going to prevent the disease of death of cancer in the future.

I agree that Dr. Selikoff made a very important point that these standards do refer to the prevention of asbestosis, and our regulations were drawn up at the time when crocidolite asbestos was more closely associated with mesothelioma than the other two varieties of asbestos. I still think they're not absolutely certain all the degree of risk involved with the different types of asbestos, and we need to know more about it. As far as our environmental conditions are concerned in our ships our dust sampling team are [illegible] dispirited because they do not find asbestos fibers in the air and I don't think I mentioned this in my talk that we now take thousands of environmental measurements and fiber

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concentrations. I know these are by the light microscope but it is the best we can do with a practical point of view. We have brought about very drastic reductions in asbestos concentrations, but I agree that these standards were designed to prevent asbestosis, and it is uncertain about a standard for mesothelioma.

Are there questions?

Q. I have two questions. One, because of the precautionary measures that asbestos workers have to take, the plastic suits, they appear to be plastic, and the respirators and this type of thing, is there any compensation, shorter work hours or monetary compensation for this? Second question you raised about the throw away respirator, I would like to have that question answered as to its effectiveness for asbestos filtering. I believe that was your question.

A. Well yes, thank you. The first point is that we do pay the men an extra rate for wearing the uncomfortable clothing. It is most uncomfortable to do an 8-hour day wearing an impervious suit. So we pay them purely for wearing an uncomfortable overall respirator. The second question was, was a question that I posed. I am not sure - I do not know whether anybody has done any evaluation on this kind of thing on the effectiveness of these respirators. As far as I know, they are not approved by our Ministry, our Department of Employment, for protection against asbestos dust.

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Q. I'm sure that they are not approved. These guys are wearing surgical masks.-- It's deferred for the moment with your permission. One question, I gathered somewhere that subliminally you tend to have this type of work done somewhat in isolation on the ship. Is this correct? You don't mix a whole bunch of other cats in there with these chaps?

No, this was always the problem that the men would be in working conditions that you've seen now with all the other trades and the Navy in with them. Nowadays, we do not let the other trades go in until the asbestos work has been done and as we are not putting any asbestos back into our ships, this would be a self-limiting problem. We isolate the workers as far as possible. In fact, it's gone so far that our men are very particular when they see a dusty condition, and they insist that we evaluate the dust and let them know what the dust is and what the concentrations are. I think this is good that people are aware of the hazards.

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June and July of last year, I spent five weeks going through the nuclear coal stations in Great Britain and I came back to London to talk to them about what I'd learned, and Dr. Linell spent all of my time not talking about nuclear problems but telling me about what they were doing with asbestos in the coal stations in _____. 180 major coal burning electrical stations in England and Wales and they have a very special program that is all tuned up and in operation. I haven't seen too much excitement about that within the States as yet, but I simply mention that they felt that the nuclear problem was handled years ago, but the asbestos problem is very much with them. That's the reason I asked about the spraying on the buildings and the question of its use in the community, but it appeared to me it is very widely used still.

Q. Dr. Morton, I would like to know if you have in your studies of your mesotheliomas -- if the experience of smoking was brought out in your study?

A. Not very clearly, with the same problem that Dr. Edge mentioned this morning, that lots of these people die before we could get to them. We have, I think, six non-smokers in amongst our 55, but there's no clear relationship as far as I can see from the incidence or the prevalence of pleural _____ in smoking habits as far as I can see.

Q. Dr. Selikoff said once that the incidence or the occurance of the cancer in the non-smokers is extremely low -- is that correct --almost non-existent. Lung cancers, other cancers not turning out to be dormant - apparently with smokers and non-smokers.

Q. I would like to ask this of Dr. Selikoff, as Dr. Harries also did, as to whether there are any indications of hypersusceptibility or susceptibility to mesotheliomas. Are the people at special risk? This was in your last slide.

A. I think that Dr. Harries is on to something. I think he's got a sense of something. We had one asbestos worker in Local 32 in Newark, a man who developed a left pleural mesothelioma and died. He came into the trade in 1928. His brother, three years younger came into the trade in 1931. This is a father-son-brother-brother union. You can't get into this union. (laughter). He came into the trade three years in 1931 rather than 1928. He died three years later of a left pleural mesothelioma. He worked in the same conditions and Dr. Churg tells me that he cannot tell the logical sections apart, they look identical. So that there is now some suspicion on the basis of these clinical impressions that there may be some susceptibility factor. Nature is trying to tell us something. We are too dense so far to find out.

Q. I was going to ask you a question on the spraying of asbestos. Most of the formulations that contain asbestos are 9 to 15% asbestos that are sprayed by and large many cities and states have banned the spraying of asbestos. On the other hand, they substitute synthetic fibers that essentially have the same formulation and that gives us some concern.

A. Let me enlarge on the father-daughter, father-son syndrome in unions. Perhaps the unions will now wish to either have their daughters take on these jobs or else give it to somebody else's kids. The first breakthrough I've seen here where the union fathers may not bring their kids into the union. Doctors do this also. Stay with me and don't get excited. In discussion of equal rights here I recently pointed out that a union man rarely ever brings their daughters into the union, but one sees a great many sons. So equal opportunity hasn't really broken through, but perhaps with asbestos and these things in the picture, they may choose to mix. Are there questions of the speaker?

Q. Dr. Harries, I had the privilege of meeting with you the other day, and would you elaborate on that change procedure. If I followed you correctly, and correct me if I'm wrong, the worker come into the locker room area. He removed all these garments including his undergarments and placed them in a locker. He was issued other garments to put on, including the coveralls and the safety paraphernalia.

He went to the job site. He accomplished his job and at the end of the shift he removed all these garments and left them in the change room in a clean room atmosphere, showered, picked up his garments and went on home, and when he came back all the garments that he wore the day before were laundered and put into the receptical for use the following day. O.K. I want to be sure of that, because I think that it personally as far as I'm concerned a step ahead. You had one question, Doctor, I would like to comment on that you weren't quite sure about the source of asbestos that that banker had. One of my colleagues suggested that he might have been moonlighting and that may be your source of answer and I would also like to comment on the father-son ban and to lay aside a learned colleague about the daughter. I had two daughters. They didn't get in the business but they married two young man that did get into the business. So it's all in the family.

Of course, it is, and of course, this is the breakthrough the chain. _____when you make them launder the stuff at work. The little lady whose X-rays on my desk at the office is the wife of the guy that ran a business for 40 years. He died of a very peculiar cancer which the pathologists couldn't quite classify three years ago. She's got all this classic stuff which you've been showing me the last 24 hours. And she never went near the damn plant, but she'd been laundering her stuff, as a good housewife

always does. And what we talked about is breaking that chain and that's what you're talking about, of course, isn't it? Are there questions back there?

Q. I would like to know, Dr. Harries, if the pictures that you show _____ must have been for a grip out of the material and bagging, transporting and disposing of it and so on. And you also indicated that the -- while you were waiting for me I lost my train of thought. Anyway, I'll get to my point here. Do you require any type of respiratory or protective clothing protection for installation of non-asbestos material?

A. Yes, the answer is yes. We are not absolutely certain that the mainly calcium silicate type of material we are now using is going to be safe in the long term. Therefore, we provide a dust respirator and usually a brine nylon overall for work using these materials and the respirator is optional, if the dust concentration is less than 5 milligrams per cubic meter.

But you try to make it obligatory when it is about five milligrams per cubic meter and this means that it is obligatory during all rip-out procedures.

Thank you.

We are now imposing on the next sets of speakers. Would you give us a good hand of applause.

Union Carbide 5/7-1

ASBESTOS TOXICOLOGY REPORT

It has been known for years that some persons working in asbestos production were prone to develop a disabling lung disease. In time, this condition became known as asbestosis and was related to exposure to high concentrations of asbestos dust. With further experience, it was found that men could work with asbestos without development of lung disease if dust concentrations were kept below a certain level.

It has been generally accepted that a worker will not develop asbestosis if he is exposed to no more than 5 million particles per cubic foot of air, even if this exposure continues for his entire working lifetime. Although no cases of asbestosis are known to have occurred when exposures have been maintained at or below this level, the ACGIH (which sets the [redacted] in the U. S. A.) has indicated they intend to lower the TLV for asbestos to 2 million particles per cubic foot in an effort to increase the safety factor incorporated in the limit. The U. S. Department of Labor has already issued a regulation under the Walsh-Healy Act placing the TLV for asbestos at 2 million particles per cubic foot for public contracts in which they have jurisdiction. This concentration of dust is generally not visible in the average work area unless a

beam of light causing a Tyndall effect is present. Usually the dust concentration must be from 8-10 million particles per cubic foot (MPPCF) before its presence it visible in average lighting conditions.

Several years ago, it was reported that there was an increase in the incidence of cancerous tumors, especially of the lung, associated with asbestosis. Recently there have been reports of some cancers occurring in individuals exposed to asbestos dust, but who have not developed clinical asbestosis. It is believed by most authorities that these cases have been associated with exposures significantly exceeding the Threshold Limit Value.

A type of cancer named mesothelioma has been noted to be associated with asbestos exposure in recent years. These tumors, while rather few in number to date, may occur in individuals with histories of only slight exposures, and that as much as twenty to forty years earlier. There is considerable evidence that crocidolite is most frequently associated with mesotheliomas. From the data available it appears that the TLV of 5 MPPCF is not low enough to protect against mesotheliomas, and it is quite possible that 2 MPPCF is not, either. Research on the problem continues.

Control of asbestos dust exposure is therefore necessary. The control methods are [redacted]

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[redacted] in the system are necessary. [redacted] sometimes used to improve the handling characteristics of [redacted] materials. [redacted] to stay within the Threshold Limit Value is impractical or impossible, [redacted] available for the protection of the employee. A program of [redacted] is highly desirable to determine that Threshold Limit Values are not being exceeded. In paper manufacturing, it would be desirable to know the dust concentrations where the asbestos is dumped from bags into the pulp slurry. Concentrations should also be determined where dusting occurs in finishing products. While initial dust determinations should be made at frequent intervals, once the level has been established as satisfactory, the frequency may be extended to occasional tests to assure continuation of a satisfactory condition.

Pre-employment and periodic physical examination of workers are desirable. These should include chest X-rays to insure that the worker has no chest condition prior to work with asbestos and to determine that no lung changes are resulting from work with asbestos.

It is believed that the addition of asbestos at the proposed levels during the manufacture of paper products would be harmless to the consumer. Total dusting would

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have to be well in excess of any levels acceptable to the consumer for the asbestos concentrations to approach the Threshold Limit Value.

In conclusion, while asbestos dust in excess of the Threshold Limit Value is potentially harmful, as are many other dusts encountered in industry, it is as readily controlled as other such dusts and it can be used safely with appropriate precautions.

[redacted]
Toxicology Department
[redacted]

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