HARRISON

DAVID LIPMAN 0-I

3132432

IN THE CIRCUIT COURT OF MARION COUNTY, WEST VIRGINIA
DIVISION II

CHRISTOPHER CARLSON and
DOROTHY CARLSON, his wife,
Plaintiff,

Vs. Civil Action Number 91-C-647

OWENS-ILLINOIS,
Defendants.

Partial proceedings taken in the trial of the above-styled action before Honorable Rodney B. Merrifield, Judge, and a jury, on Friday, the 12th day of March, 1993.

APPEARANCES:

The Plaintiffs, represented by David M. Lipman, Esquire, and Daniel Brown, 5901 S.W. 74th Street, Suite 304, Miami, Florida 33143-5186; Mrs. Dorothy Carlson appearing in person.

The Defendant, Owens-Illinois, represented by David K. Hendrickson, and Paul E. Parker, III, Suite 1200, United Center, P.O. Box 273, Charleston, West Virginia 25321.

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MARY L. RADCLIFFE
Official Court Reporter
Marion County Courthouse, Division II
2nd Floor, Courthouse P.O. Box 943
Fairmont, West Virginia 26555-0943

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I N D E X

TESTIMONY OF DOCTOR RAYMOND HARBISON: FRIDAY, MARCH 12, 1993

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DOCTOR RAYMOND HARBISON

was thereupon called as a witness on behalf of the defendant, and after having been first duly sworn, testified as follows:

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DIRECT EXAMINATION

BY MR. HENDRICKSON:

Q. Good morning.

A. Good morning.

Q. Would you please state your name for the jury?

A. My name is Raymond Harbison.

Q. And where do you reside?

A. I reside in Gainesville, Florida.

Q. Okay. And how long have you lived in Florida?

A. I've lived in Florida approximately five (5) years.

Q. Okay. And could you please tell the jury if you're married?

A. I am.

Q. And do you have any children?

A. I do.

Q. How many?

A. Four (4).

Q. Could you please tell the jury a little bit about your qualifications and schooling?

A. I received a Bachelor of Science Degree in Pharmacy from Drake University in 1965. I subsequently received a Master of Science Degree in Pharmacology in 1967, and I received a Doctorate in Pharmacology and Toxicology from the University of Iowa College of Medicine in 1969.

Q. Have . . . So you are both a pharmacologist and a toxicologist, is that correct?

A. Yes, sir.

Q. Okay. Uh, can you tell me where you're licensed, please?

A. I am Board Certified in General Toxicology. It's not a licensure in individual States, it's a National Board Certification.

Q. Okay. Can you tell the jury a little bit about some of the books that you have authored, please?

A. I have published regarding the effects of chemicals on the living system, looking at chlorinated hydrocarbons, looking at metals, looking at a variety of materials that can produce both harmful effects as well as beneficial effects on the living system.

Q. Okay. Could you tell the jury about articles that you have written?

A. The articles that I have written have been with regard to the mechanism by which chemicals produce effects on

the living system, trying to understand how chemicals can produce harmful effects and how chemicals can alter the organs of the body to produce beneficial effects. So I have about more than a hundred (100) publications looking at the effects both beneficial as well as harmful.

Q. Can you tell the jury a little bit about some of the Societies and professional organizations that you belong to?

A. Yes, sir. I belong to the Society of Toxicology, the Teritology Society, the Society for Risk Analysis, the American Society for Pharmacology and Experimental Therapeutics, and the American Association for the Advancement of Science.

Q. Tell the jury a little bit about the Society for Risk Analysis if you could, please?

A. The Society for Risk Analysis is a professional organization that focuses on methodologies and ways to access risk. That is, if we are going to control or regulate chemicals in our environment, for example, those that would be in our food supply or in our water that we drink or in the air that we breathe, how do we go about deciding what levels are safe, that is, do not increase the risk of someone having some adverse effect or altering their health, and what kind of methodology, what kind of science, what kind of experimentation can we use to make those kinds of judgements. So the

Society for Risk Analysis is basically a group of professionals that are evolving methodology to establish public policy to regulate chemicals in our environment to make sure that none of those chemicals produce harm.

Q. Can you tell the jury a little bit about some of the advisory panels that you are currently serving on, sir?

A. Yes, sir. I serve as an advisor to the National Institute of Environmental Health Sciences. This is a group of the Government of one of the National Institutes of Health which studies chemicals that would be found in our environment to make recommendations about those levels that don't produce adverse effects. I serve on that committee.

I also serve as a advisor/consultant to the Science Advisory Board of the United States Environmental Protection Agency, and also to what are called the Field Investigation Teams and the Technical Assistance Teams. These are groups that respond to chemical spills. For example, if a truck were to turn over outside the Courthouse today the United States Environmental Protection Agency would send a Technical Assistance Team to provide advice as to what should be cleaned up, whether people should be evacuated, what are the potential adverse health effect. And what I do is to provide technical assistance to those teams throughout the nation. And also, if someone were hurt I would provide technical assistance to

emergency rooms to physicians who would either have to decontaminate those individuals or treat those individuals as a result of chemical exposure. The Field Investigation Teams are those that investigate hazardous waste sites and existing areas of pollution. They go out and take soil samples, air samples, and water samples. What I do is again provide toxicology technical assistance to those groups, and also provide medical surveillance to make sure those individuals, should they have to wear a respirator or some sort of protective clothing, it would not impair their health.

In addition, I serve as an advisor to the National Institute of Occupational Safety and Health, NIOSH, reviewing their studies that become the basis for their regulations to monitor or to control chemicals that would be found in the work place.

I also serve as a consultant to the Department of Justice and to the Department of Agriculture.

Q. Okay. Do you teach?

A. Yes, sir.

Q. Where do you currently teach?

A. I teach at the University of Florida College of Medicine. I teach second year medical students pathology, and also toxicology to pharmacology in the pharmacology program of the second year of medical school, and I also teach graduate

courses in the medical school.

Q. Okay. Give the jury a little bit of the flavor of some of your teaching background besides the University of Florida?

A. In addition to the University of Florida I have taught at the University of Arkansas for medical sciences; Vanderbilt Medical Center in Nashville, Tennessee; Tulane Medical School in New Orleans, Louisiana; also the Medical College of Wisconsin in Milwaukee. I also serve as an adjunct faculty to the University of Virginia in teaching about the adverse health effects of hazardous wastes and hazardous materials. Those would be some of the areas.

Q. You do research as well, is that correct, Doctor?

A. Yes, sir.

Q. Could you tell the jury some of your current research projects that you're currently looking at?

A. For about almost twenty-five (25) years now I have been provided funds from the National Institutes of Health, various Institutes within the National Institute of Health, such as the National Institute of Environmental Health Sciences, the National Institute of Occupational Safety and Health, and others. And what I have been doing over the last twenty-five (25) years is trying to find the cause by which chemicals produce adverse effects on the living systems. That

is, the cause of tissue damage, the cause of organ dysfunction, the cause of cellular death, and what factors modify or modulate those various effects. So what I've been doing is trying to, using animal studies, evaluate what chemicals do within the body, and then also using humans and human tissues trying to correlate that information with humans. That is, trying to find out whether or not observations that we make, for example, in white mice or white rats can be extrapolated to humans, such that we can use that information to make judgements about the potential adverse effects that chemicals have on humans.

That research is also used to develop new drugs. And as a pharmacologist, we also use those same experiments and the same experimental procedures to develop new anti-hypertensive or blood pressure medications or new treatments for diabetes and a variety of other diseases.

Q. Okay. You're currently employed at the University of Florida, is that correct?

A. Yes, sir.

Q. And are you employed elsewhere?

A. I also have a private practice in toxicology.

Q. Okay. Doctor, have . . .

MR. HENDRICKSON: Your Honor, at this time I would move to qualify Doctor Harbison as an expert in the areas of

toxicology and pharmacology.

MR. LIPMAN: Your Honor, as long as during my cross examination I can enter these areas, I have no problem with that.

THE COURT: Alright. You may proceed.

MR. HENDRICKSON: Thank you.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Doctor, one of the kind of interesting side note things you've got to do through your career was involving Elvis Presley, is that correct?

A. Yes, sir.

Q. Could you tell the jury a little bit about that?

A. Uh, I was one (1) of three (3) individuals when I was at Vanderbilt Medical Center that was involved in the autopsy of Elvis Presley, and ultimately trying to determine the death -- the cause of death of Elvis Presley, and ultimately providing testimony to the Medical Examiner's Board concerning the death of Elvis Presley.

Q. With that aside, leaving Elvis out of it now, let's talk a little bit about this case. Tell me, what is pharmacology? Tell the jury.

A. Pharmacology is the study of the beneficial effects of chemicals on the living system. As a pharmacologist I

develop drugs that will be used in the treatment of various diseases and ailments that occur in people and try to improve those drugs that are already being used for the treatment of a variety of diseases.

Q. Alright. How long has pharmacology been practiced?

A. Pharmacology has been practiced for centuries. For centuries people have been finding remedies and searching for remedies for a variety of diseases and ailments. Pharmacology has been around for -- for centuries. There is a quote by a Swiss pharmacologist going all the way back to the 1400's that says that essentially all substances are poisons, there is none which is not, the dose differentiates a poison from a remedy. And that goes all the way back to the 1500's where cyanide and mercury and a var -- and arsenic were used to treat a variety of diseases during that period of time.

Q. Okay. So pharmacology then, in a nutshell, is kind of the search and the quest to find a solution to the common cold?

A. Yes, sir.

Q. Okay. What is toxicology?

A. Toxicology is the study of the harmful effects of substances on the living system.

Q. Alright. How long has that been practiced?

A. Uh, toxicology has been practiced for a considerably

shorter period of time. Toxicology began as a recognized science in the early 1960's. That was the beginning of the Society of Toxicology. Most people weren't very much interested in the harmful effects of substances. It was actually very difficult to publish or to get published scientific articles concerning the harmful effects of chemicals on the living system. So as a result of that, pharmacologists usually did toxicological studies. And the reason they did them was to identify potential harmful effects of drugs. That is, if you were going to use a drug to treat high blood pressure what might be the consequences of the use of that drug, that is the side effects, or the other non-beneficial effects that would occur to you as a result of the use, for example, of that drug to treat high blood pressure. So as a result of that, toxicologists generally emerged from pharmacology departments mainly because of that focus on drugs. And then as the interest in the environment expanded, then that also expanded toxicology to look at the effects of chemicals on the living system as a result of their exposure in the environment and in the work place.

Q. When did that differentiation between pharmacology and toxicology take place?

A. I don't know that there is a bright line or an absolute time period, but that certainly began around the

1960's. The organization of the Society of Toxicology took place in 1960, and actually began in 1961. So at about that time people were trying to bring about the emergence of this new science of toxicology which would focus on the identification of the harmful effects of substances on the living system. So I would say 1960's or there abouts.

MR. HENDRICKSON: I would like to ask the witness to step down, please.

THE COURT: You may.

(Whereupon, the witness stepped down from the witness stand.)

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Doctor, try to . . . You can leaf through this up here. I ask you, please, you and I have discussed, and the jury has heard a little bit about this so far this morning, about a concept called risk assessment.

A. Yes, sir.

Q. Could you please explain that to the jury?

A. Risk assessment is the process by which the likelihood of some adverse effect occurring is determined. And there are really two (2) elements of assessing risk that must be considered. Risk . . . Risk, which is "R", is equal to the toxicity times the exposure. The two (2) questions that must

be answered is, first of all, what can this chemical or substance do? That is, what are its potential harmful effects? Does it effect the kidney? Does it effect the brain? Does it effect the lung? Does it produce cancer? Does it produce birth defects? What does it do? So the toxicity is one of the factors that you need to know before you can assess risk. So once you know what the toxicity is then you need to consider exposure. So risk is equal to the toxicity times exposure. And exposure is important because you need to know what level or what concentration produces the harmful effects. Once I know what the toxicity is I can't change the toxicity. It is what it is. That is, if that chemical causes cancer then I can't change that. That is an inherent property of that chemical. What I can change is the exposure. So if I know at what level, at what concentration, or what dose that effect is produced at, then I can regulate the risk by essentially regulating the exposure.

Now, if you think about the difference between pharmacology and toxicology, essentially what I am interested in in a dose response curve as a pharmacologist is the one hundred percent (100%) effective dose. That is, when you go to your doctor a pharmacologist has told that doctor that if you give this person who has high blood pressure one hundred (100) milligrams of this particular chemical it will lower that

individual's blood pressure. Or if the individual has a runny nose or watery eyes, you give them ten (10) milligrams of this antihistamine, it will cause the eyes to dry up and the nose to dry up. So as a pharmacologist I'm interested in that dose or exposure that results in one hundred percent (100%) effect in those individuals who would receive that chemical for a beneficial purpose.

As a toxicologist I'm interested in this end of the dose response curve, or in that dose or concentration or exposure that results in no effect. Because as a toxicologist in assessing risk what I'm concerned about is that when I provide a opinion or a recommendation regarding risk, I want to be sure that those individuals who are exposed to this chemical don't have any adverse effects occur as a result of that exposure.

So risk is simply the consideration of the toxicity or the ability of the chemical to produce an effect, in this case a harmful effect, and the concentration or the dose or the amount that it takes to produce that effect. That is essentially the estimation of risk or the likelihood of some adverse effect occurring.

Q. You and I prepared a couple charts to a little more clearly demonstrate this.

MR. HENDRICKSON: For the record, this is Defense

Exhibit Number 77.

Can you use that to demonstrate?

THE WITNESS: Yes, sir.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

A. I talked about this graph here. This is the dose response relationship. It is the relationship between the response or the toxicity and the dose or the amount that you are given. So the dose response relationship is the road map by which a toxicologist or a pharmacologist determines whether this particular concentration, this particular chemical, is going to have a harmful effect, a beneficial effect, or no effect at all because of the concentration.

Again, when you go to the doctor he doesn't tell you to take that pill and cut it in half, he tells you to take the whole pill. Because if you cut it in half it wouldn't have any effect.

The dose response relationship is the relationship between the concentration and the effect.

And if I could use aspirin as an example, I'm sure many of you have seen the advertisements that if you have a heart attack and you take one (1) aspirin a day it can prevent a second heart attack. I'm sure all of you at one time or another have taken two (2) aspirin to relieve the pain of a

headache. You may know some people who have arthritis who have swollen joints, painful joints. They may have to take fifteen (15) to twenty (20) aspirin a day to reduce the swelling, to relieve the pain, to reduce the inflammation that occurs in the joints as a result of arthritis. You may know some people who have rheumatic fever, who likewise have a chronic inflammatory condition. They again may need twenty (20) or more tablets of aspirin a day to have a beneficial effect or to reduce the inflammatory process to cure or to relieve their condition. If you take ninety (90) tablets of aspirin you will die. So the dose response relationship is between these doses that can have some beneficial effect, and they vary between one (1) tablet to twenty (20) and more, all the way up to death that can be produced as a result of ninety (90) tablets. So all substances are potentially toxic. There is none which is not. And the dose or the amount differentiates a poison from a remedy.

Now, if you took that one (1) tablet of aspirin and you cut it into four (4) pieces and you took a quarter of the aspirin, and you took a quarter of the aspirin every day for the rest of your life, it would have no effect. It would have no effect because the dose or the concentration is not sufficient. So the dose response relationship is really the most important aspect of considering the risk or in evaluating the

risk because it is the information by which I can, or others can, make a judgement as to whether or not a particular concentration of a chemical is going to have a beneficial effect, a harmful effect, or no effect at all.

Q. Just let me interject one (1) question here. That's similar then to what they were trying to do with the TLV -- what they're trying to do today with TLV, is that correct?

A. That's correct. The TLV . . . If you look at this dose response curve, this is the dose, the exposure, the amount that you're exposed to or you get into your body; this is the response, or the effect that occurs. The threshold limit value is calculated or determined by taking that concentration that does not produce an effect and applying a margin of safety to that concentration to lower it even further. Because, for example, if this dose response relationship is determined let's say in white rats or in laboratory animals there may be differences between those laboratory animals and people such that the extrapolation is uncertain. That is, you don't know whether or not the information from this white rat is exactly extrapolatable to man, so a margin of safety is applied. So that if that concentration, for example, which produced no effect was ten (10) milligrams, in order to determine a threshold limit value, that is a value which you could recommend with confidence that the worker

could be exposed to eight (8) hours a day five (5) days a week for entire working lifetime, you would apply a margin of safety to that. The margin of safety might be ten (10). So that the conclusion would be that you would not allow any more than one (1) milligram of exposure to account for the differences between the laboratory animal and the uncertainties that exist in the experimentation. You would lower that number even further then and that would be the guideline for the work place. So the dose response relationship is critical in establishing the threshold limit value.

Q. I'm going to just ask you a question that I don't think has been covered before the jury. If the TLV, for example, is five million (5,000,000) particles per cubic foot of air of asbestos . . .

A. Okay.

Q. (Cont'g) . . . that doesn't mean that if we exceed that that the person is going to have a response, correct?

A. That is correct. Because a margin of safety has been applied. And let's go back to my analogy here of ten (10) milligrams at which no effect was produced. Apply a margin of safety to that to reduce it further to one (1), so that even if you went above the one (1) milligram it doesn't mean that you're going to have some adverse effect. Now, there are limits to that. And ultimately, if you go many

orders of magnitude above that, in fact you may reach a concentration that could produce an effect.

Q. Aren't they also too looking, Doctor, at an average exposure?

A. That's right.

Q. I mean, aren't they . . . When they assign a TLV aren't they taking into consideration that a worker is going to be exposed sometimes higher and sometimes lower or not at all, and so it's the average of all of those that have to either equal or come below whatever the level is, is that correct?

A. That's correct. The threshold limit value is a time weighted average, meaning that during the day . . . Let's go back to the one (1) milligram as an analogy. If a one (1) milligram were the threshold limit value, some time during the day you could be exposed to two (2), some times you could be exposed to five (5), as long as the time weighted averaged, that is the average during the day, did not exceed one (1) milligram.

Q. Okay. Let's talk about some known carcinogens for a second that these folks and I would possibly be exposed to every day but still exist in our products. Let's talk about, for example, vinyl chloride. Could you explain that to the jury?

A. Sure. Vinyl chloride is a material that is used to make PVC pipe, for example, polyvinyl chloride pipe. Vinyl chloride is also used to make plastic bottles that much of your -- many of your foods might come in. For example, the new bottles in which vinegar comes in, the plastic bottles are made out of polyvinyl chloride. Vinyl chloride is a designated known human carcinogen, yet it is used in a variety of products, and you all are exposed to vinyl chloride. If, for example, you use the vinegar that is in that plastic bottle it may have as much as one (1) part per million (1,000,000) vinyl chloride in it. Because vinyl chloride when it's polymerized to make the polyvinyl chloride pipe or the plastic bottle will still have some of the monomer in it, the vinyl chloride. So as the vinegar, which is an acid, sits in that bottle it will extract some of the vinyl chloride from the bottle and it will end up in the vinegar. The same is true of the plastic pipe in your house. If you have plastic water pipe that is polyvinyl chloride, there may very well be an extraction of the unused monomer from that vinyl chloride pipe into your water supply.

Now, there isn't much of a worry about that because the level is so low. And because the amount to which you would be exposed is so low, no one really worries as a matter of public health that, in fact, that this known human cancer causing

agent exists in these variety of places within your daily life. So carcinogens are part of our daily life. We are all exposed to carcinogens. Carcinogens are in a variety of products and foods and other materials that we use all the time.

Q. Would that hold true for like benzene and gasoline that we would pump?

A. Sure. Benzene would be another example. When you go to fill your car up with gasoline when you go to a self-service gasoline station you are exposed to benzene. When you smell that gasoline that you put into your car, benzene is a designated known human carcinogen. And when you are exposed to that, you're exposing yourself and others to a known carcinogen. Now, there isn't a whole lot of worry about that because, again, the level of exposure and the time of exposure really isn't very great.

Q. Okay. Let's bring it a little closer to home. How about nitrates on food, on meat?

A. Well, nitrates are also carcinogens. That is, when you eat the nitrates which are in the foods that you buy, the meats, for example. And when you go to the market the reason that your meats are red rather than brown is because they have nitrites in them -- nitrates in them. When you look at your hot dogs, for example, the back of the package will tell you

it has nitrates in them. Nitrates, when you eat them are converted to nitrosamines. Nitrosamines are carcinogenic. Now, again, there isn't a whole lot of worry about that because of the amount of those nitrates that are in your food supply. So you are exposed to carcinogens every single day of your life. You are exposed to all kinds of carcinogens every single day of your life, from the foods that you eat to the air that you breathe to the water that you drink from your tap to the daily activities that you participate in, you are exposed to a variety of carcinogens.

Q. And is that the concept of dose response?

A. Yes, sir.

Q. Okay. I take it you haven't seen any warning labels on the side of a package of Oscar Mayer wieners about the nitrates, have you?

A. I have not.

Q. Okay. Return to the stand, please.

(Whereupon, the witness returned to the witness stand.)

Q. One (1) other example, Doctor, that I talked to the jury about was -- was medicated shampoo.

MR. HENDRICKSON: For the record, I haven't marked these. What would it be? What's the next number? I'll describe them and come back and identify. Is that alright, Your Honor?

THE COURT: I'd rather have them marked first for the record, please.

MR. HENDRICKSON: I apologize.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. For the record, let me hand you what's been marked as Defendant's Exhibit Number 86, 87, and 88. Can you tell the jury what that is, please, sir?

A. This is Tegrin Dandruff Shampoo.

Q. Alright. This is something that is commonly sold in the grocery store?

A. Yes, sir.

Q. You don't have to have a prescription from a pharmacologist?

A. No, sir.

Q. Can you tell the jury what one of the active ingredients is in this -- in these shampoos?

A. It's coal tar.

Q. How do we get the coal tar? Is that mined, natural ingredient?

A. Coal tar is -- is derived from various processing, from digging, from mining, from extraction. Coal tar is a product of oil, tar. All of those are coal tar products.

Q. Alright.

MR. HENDRICKSON: For the record, let the record reflect I put up Defense Exhibit Number 76. I ask you to step down again, Doctor, if you would, please, and bring your shampoo with you.

(Whereupon, the witness stepped down from the witness stand.)

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Is coal tar a known carcinogen?

A. Coal tar is a known carcinogen. Coal tar has been known as a carcinogen since probably about the 1700's. And the reason that it is known is that chimney sweeps were exposed to coal tar, which is soot. And in cleaning the chimneys, because of poor personal hygiene, there was a finding of cancer in chimney sweeps in England in the 1700's. Car tar has been known for virtually centuries as a carcinogen.

Q. We've put deposition . . . Defendant's Exhibit Number 76 is a chart that you and I put together, and could you explain that to the jury, please?

A. What this is is a chart that lists the PAH's, which are polycyclic aromatic hydrocarbons, which are the constituents of coal tar, which are carcinogenic. And coal tar has been used for centuries as a medicine, as an ingredient in

salves and lotions, for example, that treat dry skin, that treat psoriasis. It's been used in shampoos to treat dandruff. This material has been used for a long time to produce -- to treat a variety of ailments that exist on the surface of the skin.

Q. Once again, listed on here is Tegrin Medicated Shampoo, correct?

A. That's correct.

Q. Uh, it's an example of dose response, is that not correct?

A. Yes, sir.

Q. We've got a substance, coal tar, that's a natural occurring mineral?

A. Natural occurring carcinogen.

Q. Carcinogen. Okay. That's included in that shampoo, is that correct?

A. That's correct.

Q. It's been known to cause cancer?

A. Yes, sir.

Q. But the dose that I would be exposed to when I took my shower in the morning and used that shampoo on my hair would not -- they wouldn't think it would cause me cancer?

A. That's right.

Q. Is there a warning anywhere on that bottle of

shampoo on -- that tells us that there's a known carcinogen in it?

A. No, sir.

Q. Okay. Thank you.

(Whereupon, the witness returned to the witness stand.)

Q. We've talked about how long pharmacology and toxicology have been practiced. Tell the jury, if you would, please, Doctor, which substances are capable of causing toxic effects?

A. Well, essentially all substances are capable of causing toxic effects. There is nothing in your life that is not able to cause some toxic effects. When I say "nothing" I'm talking about chemicals. And what are chemicals? Essentially chemicals are everything in your life other than light, radiation, and sound waves. Water is a chemical, air is a chemical, you're a chemical, food is a chemical. Essentially all the things that exist in your life are potentially able to cause a toxic effect if the dose is high enough.

MR. HENDRICKSON: Let the record reflect that I am now showing to the jury Defense Exhibit Number 75.

Again, Doctor, I would ask you to step down.

(Whereupon, the witness stepped down from the witness stand.)

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. What does Defendant's Exhibit 75 demonstrate to the jury?

A. Well, what this is is a display of a variety of chemicals which I'm sure you're all familiar with, and their potential toxicity. That is, they can produce death. This is the normal daily dose of those materials and these are the lethal doses. Even for water you can produce death if you drink enough water. Sugar, likewise, can be harmful if you take too much sugar. Salt. I'm sure many of you are aware of the potential dangers of taking too much salt, for example, hypertension, kidney disease, other ailments. Coffee, likewise, too much can produce harm -- I should say, produce death. And aspirin. So that essentially for all chemicals, all substances that are in your life, there are concentrations, there are doses, there are amounts that can produce harmful effects, and there are amounts which produce no effect. So that is a example of a variety of materials which I'm sure most people haven't thought about before as potentially being toxic. Essentially everything is.

Q. Okay. Thank you.

(Whereupon, the witness returned to the witness stand.)

Q. Doctor, going back to the shampoo, for example, if we know that there is a known carcinogen in here and we know

that everything can cause a toxic effect, why don't we label everything? Why don't we put warning labels on everything?

A. Well, because then you'd have to put a label on virtually everything and it wouldn't make much sense and it wouldn't be very effective. And it wouldn't be very effective because if there was a label on everything then you wouldn't pay any attention to the label, or you wouldn't be worried about those materials which have a greater propensity or a greater likelihood for producing harm than others. So the labeling is one based upon potency or based upon the likelihood of some adverse effect occurring.

Q. Alright. Probably everyone has observed from time to time the skull and crossbones on products. Why are those placed on there?

A. The skill and crossbones are placed on products, and probably what you would see most often is when you're driving down the highway and you're behind a semi-truck and you see a little placard on it, a little sign, and it says, "Poison A" or "Poison B", that is the modern day equivalent of the skull and crossbones. And what that means is that those materials can potentially produce harmful effects at very small concentrations, and could potentially be lethal to a human in amounts of a few drops, seven (7) drops or ten (10) drops. For example, when you're going down the highway and you're

behind a truck and the truck says "Poison A", it means that the material contained in there, if that truck were to have a wreck or turn over and release its materials, that if a policeman, for example, came upon that truck and put his hand in that material he could very well die or have some very serious harmful effects. So the skull and crossbones or that kind of labeling is based upon the potency of the chemical to produce some harm. The potency is the amount that it takes to produce some harmful effect. If it is a potent chemical, it means that it can produce an effect at a very low concentration. It takes only very small amounts to produce the harm. So the skull and crossbones would be put on something that a very small amount would produce harm. An example of a product that might have a skull and crossbones would be a pesticide. For example, a pesticide that would an organelle phosphate might have a warning on it because essentially small concentrations of that material -- if, for example, you are using it and you get it on your hand or you spill it on your clothing, could potentially have some serious adverse side effects.

Q. Are toxicologists concerned with whether or not a substance is capable of producing harm or are they concerned about the risk of harm or both?

A. Concerned about both.

Q. Okay. Tell the jury why.

A. Well, we're concerned about the ability to produce harm or the toxicity because that identifies the particular concern or worry that we should have about it, that is, does it effect the lung, does it effect the brain, does it effect the skin? And we're concerned about the risk because we want to know at what concentration does that effect occur. So that by knowing that concentration then we can develop rules and regulations or guidelines for the use of that material or how much, if any, could be in your water supply or in your soil or in your food. So the risk and the toxicity both need to be considered because that's how we ultimately get to a conclusion about the potential harm.

Q. Okay. Can you state with a reasonable degree of scientific certainty as to whether or not there are substances that are known -- have known toxic effects and are known carcinogens -- or just known toxic effects that when consumed by humans don't cause toxic effects on the body?

A. Yes, I can.

Q. What kind of a substance would that be?

A. Uh, essentially all substances are able to be used without producing harm if the exposure or the dose is -- is low enough.

Q. Okay. What about the use of salt?

A. Well, actually I forgot my little salt shaker. I wish I brought it. I . . . When I flew up here I got one of those meals on the airplane and I happened to notice the salt. On the top of the salt it says, "Contains yellow prussate of soda." Yellow prussate of soda is cyanide, and cyanide, I think all of you would agree, is certainly something that can be a poison and can produce harm. And yellow prussiate of sodium is used in salt as an anti-caking compound. It prevents the salt from solidifying or becoming hard so that when you take this little wrapper off the top you can essentially pour the salt. Now, I wouldn't worry about being poisoned by cyanide even though it is very potent material from using this salt. And I wouldn't because of a form in which the cyanide is in. It's in a salt, meaning a chemical salt, or its physical chemical properties, and the amount that is in the salt is very small. So essentially all substances can be used without harm if the dose is low enough or if the concentration is low enough, including cyanide. Cyanide, which can be contained in the salt that you use on your food, for example.

Q. This would be the same type of cyanide that we've all seen in the spy movies where they say, "If you're caught put one of these under your tongue and don't give yourself up," right?

A. It would be the same, yes.

Q. Okay. Alright. Let's talk a little bit about the TLV for a second. And I'm going to ask you again to please step down.

(Whereupon, the witness stepped down from the witness stand.)

Q. The jury has been told through several witnesses that the State of West Virginia in 1951 adopted threshold limit values for certain substances, including asbestos. Is this pretty much a TLV, Doctor?

A. That describes the TLV and how the TLV is -- is reached. Yes, sir.

Q. Is this a pretty accurate concept of how it was uniformly applied -- or is uniformly applied?

A. Yes, sir, I believe so.

Q. So when it says, "These values representing the consensus of various technical groups are those below which is believed no impairment to health to average healthy adults will result if they are exposed to any one such material or radiation eight (8) hours daily over a continuing period of time," that's the TLV?

A. Yes, sir. It is the concentration to which you can be exposed eight (8) hours a day five (5) days a week for an entire working lifetime, which is generally considered to be around forty (40) years.

Q. Alright.

MR. HENDRICKSON: Let the record reflect that this is Defense Exhibit Number 78.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Doctor, what is this?

A. This is the 1989 permissible exposure limit, which is equivalent to the threshold limit value, and it describes again what that number is and what that number is used for. And basically what it is, is a concentration to which workers can be exposed to eight (8) hours a day five (5) days a week for an entire working lifetime without any impairment of health or function of capacity. This includes protection against catastrophic effects such as cancer, cardiovascular, liver, kidney damage, lung diseases, as well as more subtle effects resulting in central nervous system damage, respiratory effects, and sensory irritation.

Q. Okay. So pretty much then what we've been trying to do, at least since 1951 or even before 1951 with TLV to today is pretty much the same?

A. Yes, sir.

Q. If you're not exposed to -- on an average basis to more of a dose than it goes above the TLV then it is thought to be a safe exposure?

A. Yes, sir.

Q. Okay. Doctor, let's turn to -- now to why you're here today. I asked you to come to help me explain to the jury what Owens-Illinois was doing with the Saranac studies, is that correct?

A. Yes, sir.

Q. Doctor, you have never appeared in Court on behalf of Owens-Illinois, have you?

A. No, sir.

Q. You have given one (1) deposition on behalf of -- well, actually two (2) depositions now on behalf of Owens-Illinois, is that correct?

A. Yes, sir.

Q. The other one was . . . The other deposition that you gave was in preparation for possible testimony in some cases in Baltimore last year, is that right?

A. Yes, sir, it is.

Q. Alright. And you didn't end up testifying there, is that correct?

A. That is correct.

Q. Alright. Uh, Doctor, you've testified for both plaintiffs and defendants in cases, have you not?

A. Yes, sir.

Q. Okay. Both for companies and individuals?

A. Yes, sir. I don't testify for companies or individuals, I provide my own opinions. But certainly it's been at the behest of one side or the other.

Q. Okay. Doctor, in preparing to come here to offer your opinion what did I provide you to review?

A. You provided me with the deposition of Mr. Hazard and also the Deposition Exhibits of Mr. Hazard.

Q. Okay. And the deposition that I gave you of Mr. Hazard was the same one that this jury has heard here from 1981?

A. It's from 1981. Yes, sir.

Q. Okay. Alright. And the documents that I gave you were the exhibits to Mr. Hazard, is that correct?

A. That's correct.

Q. And those documents purport to be all the documents involving the Saranac Lake studies, is that correct?

A. Yes, sir.

Q. Alright. You've reviewed all that material?

A. Yes, sir, I have.

Q. Okay. What was the TLV for asbestos between 1948 and 1958?

A. Five million (5,000,000) particles per cubic foot of air.

Q. Okay. When we talk about the five million

(5,000,000) particles are we talking about total dust or asbestos dust?

A. That's for asbestos.

Q. Okay. What was the TLV for asbestos where Kaylo was being manufactured, where they made the product?

A. It was five million (5,000,000).

Q. Okay. The same -- same standard?

A. Yes, sir.

Q. Okay. Explain to the jury from the -- from the deposition exhibits that I gave you what the animal experiments that Owens-Illinois had asked Saranac Lake to do, what were they asking them to do with those experiments?

A. What Owens-Illinois was asking of Saranac was to examine a new product to determine whether or not that product could result in a fibrosis or lung injury as a result of inhalation of that product. Being . . . Owens-Illinois being concerned with the silica in that material, and also being concerned with the ability of the inhalation of that material to enhance the progression of tuberculosis. Remember, tuberculosis at that time in history was an endemic disease. Many people had tuberculosis. One of the worries was that by inhalation of certain materials you could make the tuberculosis worse or you could enhance the spreading of the tuberculosis as a result of the inhalation of certain materials.

So . . . So what they asked Saranac to do was essentially to study this material, the Kaylo material, to find out what it would do.

Q. Alright. One of the things that you do in your daily life as a toxicologist in your professional life is to review the works of others, is that correct?

A. Yes, sir.

Q. Give the jury your opinion as to what you look at when you look at research such as this and what you are trying to find to see whether or not you would offer an opinion as to whether or not it was a valid study?

A. What I would do, which is essentially what I do every week, is I would look at the purpose of the study. That is, what is the study intended to do, or what do you want to accomplish? I would look at the experimental design. That is, based upon what you want to study, is the design or the way that you plan of going about that study appropriate? Whether the methodology that will be used is a methodology that can yield or produce a useful result . I would then look at the results of the study. That is, what is the data, what did the study show? And then, finally, the interpretation or conclusions that were drawn based upon the findings of that study. So those would be the various criteria or the various elements of the study that I would evaluate to determine

whether or not it is appropriate and whether or not it is usable for some intended purpose.

Q. Have you been asked to do this before?

A. Yes, sir.

Q. Apply that criteria? For whom?

A. The National Institutes of Health for about twenty-five (25) years, various scientific journals, looking at articles before they are published, in fact, is the scientific merit or the design in the conclusions and the data that is contained within a particular material that is going to be published appropriate and suitable based upon the purpose and experimental design.

Q. And what we asked you to do was to take the same criteria that you have applied for twenty-five (25) years to studies that you've reviewed for NIH and review that using the same criteria to the studies that O-I had conducted at Saranac Lake, is that correct?

A. Yes, sir.

Q. Alright. You're not being offered and you haven't reviewed the medical literature, have you?

A. No, sir.

Q. Surrounding that time period or any other time period, is that right?

A. That is correct.

Q. Alright. Let's start. Let me show you what's been marked as Defendant's Exhibit Number 16. It's the first letter of the Saranac Lake study. Do you have a copy of that?

A. Yes, sir. If you'll just tell me what Exhibit Number it is.

Q. It's a letter of February 12th . . .

A. Exhibit Number 1.

Q. Exhibit Number 1.

A. Yes, sir.

Q. It's Hazard's deposition. This is the February 12th, 1943 letter from Doctor Gardner to W. E. Bowes. Uh, . .

A. It's actually from Mr. Bowes to Doctor Gardner. It's the other way around.

Q. Right. Backwards. I said it backwards. Alright.

Uh, what was the concern of Owens-Illinois with this first letter to Saranac Lake?

A. The concern that Owens-Illinois had is that this product -- this Kaylo product contained some silicate materials. And their concern was whether or not those materials were capable of causing some changes in the lung or the respiratory system as a result of exposure. And the reason they had that concern is that when you mix chemicals together often each of the chemicals that had some effect before might

either lose those effects or not have those effects anymore, or the effects could be different. So because you knew about these materials individually you don't necessarily know about what they are likely to do when you mix them together. So, the concern that Owens-Illinois had was what is the potential adverse effects or harm that could occur, if any, as a result of use of this product.

Q. That would be the same concern you'd have today if you were going to test this product, is that right?

A. Absolutely.

Q. Okay. Doctor, let me sidetrack for a second. Is there a difference between calcium silicate and silicate?

A. The only difference is one is a calcium salt. They are both silicates. One is a calcium, one is not. So there is really no difference in them.

Q. Okay. But a silicate is a derivative of sand, is that correct?

A. Yes, sir.

Q. Okay. That was a commonly used substance back in the 40's and 50's and 60's, is that correct?

A. Yes, sir.

Q. Alright. Let's turn now to Hazard's Exhibit Number 3, the letter dated March 12th, 1943. I believe I have this correct this time. It's from Saranac Laboratories back to

Owens-Illinois.

A. Which exhibit?

Q. Exhibit Number 3. Do you have that?

A. I do.

Q. Okay. Again, the jury has heard this letter. This letter is the response that Owens-Illinois received back after their initial letter to Saranac Laboratories, is it not?

A. Yes, sir.

Q. Okay. Tell . . . The jury has heard this part read to them, "The fact that you are starting with a mixture of quartz and asbestos would certainly suggest that you have all the ingredients for a first class hazard. However, the particle size of the former will of course be determined. The asbestos may or may not be in such form as to be inhalable. We ourselves will be able to get rid of the matrix, I think, so that we can determine the particle size of the quartz." And then he talks about the estimate of the cost of the experiment and goes on.

Tell the jury what Saranac Laboratory . . . What first class hazard were they talking about?

A. The asbestos and the silica.

Q. Okay. How about the quartz?

A. And the quartz.

Q. Alright. So what they are saying is, is you've got

A. No, it did not.

Q. Okay. When you see a letter like this that's written do you as a toxicologist before you begin investigating this mixture, which is what Saranac was asking -- what Owens-Illinois was asking Saranac to do, do you make any assumptions?

A. No, I would make no assumptions.

Q. Why would that be?

A. Well, because this is a product now that contains a mixture of materials. And I would make no assumptions about the biological activity or reactivity of those ingredients, because they are now formulated or put into a mixture in which all these materials may have different physical and/or chemical properties. So when you mix these materials together there can be significant changes either to increase toxicity, to decrease toxicity, or to have no effect at all on the outcome. And you can't know that until you test it.

Q. Until you test it. Give the jury an example of that.

A. Uh, an example would be lead, lead in crystal. Lead is a chemical that is able to produce damage to the nervous system, produce neurotoxicity at sufficient levels of exposure. If you have crystal -- leaded crystal, leaded crystal contains thousands of parts per million of lead. You don't

need to worry about being poisoned by that lead because now in this new form, that is glass, the lead can't be released. And so even if you use every day that crystal goblet or crystal decanter or whatever it is you use that has that crystal material, you don't need to worry about being poisoned by lead because now the matrix in which that lead is won't allow it to be released. So the concern that was -- that Owens-Illinois had was what happens to this material now when it is in this new form? And what Saranac Lake is saying is that, "We can't tell you until we test it. Some of the ingredients certainly are first class hazards, but we can't tell you whether or not this is a first class hazard or a hazard at all until it's tested, because the ingredients now are in a different form." So essentially what Owens-Illinois asked was that a appropriate experimental design be developed to appropriately test this material to determine whether or not exposure to it could in fact cause changes.

Q. Doctor, the jury has heard me talk about phosphoric acid in coke. Would that be another example of what you just told us?

A. Sure. Phosphoric acid in coke, now because of the concentration and the form that it is in isn't going to produce any harm even though it's an acid.

Q. So then from the letter that we just read, the

exhibit we just went over, which is a joint exhibit of this trial, we can't assume anything, can we?

A. No, sir.

Q. Okay. What was Owens-Illinois' response to -- from the documents that you reviewed to this response from Saranac Lake?

A. Their response was to develop a testing procedure, a protocol, and to test the material to find out whether or not there was a inhalation hazard or a respiratory hazard that would be associated with this material and the use of this material.

Q. Can you tell the jury within a reasonable degree of scientific certainty what the purpose for the Kaylo study was?

A. The purpose was to determine whether or not there was a hazard that would be associated with the use of this product.

Q. Alright. I want you to step down again. I want to clean our board off here.

(Whereupon, the witness stepped down from the witness stand.)

Q. And I want to talk with you, Doctor, and have you explain to the jury how they went about setting up these tests. First of all, what did they -- what did they expose . . . Well, how many types of -- of species of -- did they use

in this experiment?

A. They used three (3) different species. They used guinea pigs, rats, and rabbits.

Q. Alright. Why didn't they use white mice?

A. They didn't use white mice because white mice are not very good for experimental purposes, and because they are so small it would be difficult to manage white mice in this kind of an experimental setting.

Q. Okay. From your experience with white mice, are they susceptible to developing carcinomas from just about any substance?

A. Well, they are highly vulnerable to developing carcinomas, depending on the strain, and they have a very high spontaneous occurrence of some forms of cancer, particularly lung cancer, and therefore are usually not a very good model because you can't distinguish between those cancers that occur naturally or normally and those that might be produced as a result of exposure.

Q. Why don't you list the three (3) species on the board for the jury?

(Whereupon, the witness complies.)

Q. Now, what were these animals exposed to?

A. They were exposed to the Kaylo dust.

Q. Alright. How . . . What did they have to do to the

Kaylo dust in order to make it respirable for these animals?

A. Well, the first question that was asked was what would it do in the lungs. And in order to attempt to answer that question rabbits, because of their size, they are several pounds, the experimental design was to inject the Kaylo dust into -- directly into the lungs of the rabbits. And the purpose of that was to determine whether or not if that dust material injected directly into the lungs of the rabbits would result in a fibrosis. In attempting to do that, because the particle size was so large, what Saranac had to do was to further crush this material in order to get it of a sufficient size so that it could pass through a syringe to be able to get it into the lungs of the animal. And when they did that, that is, they crushed it, they injected it, the animals did not survive. And they did not survive because of the -- of the alkalinity of this material. It caused damage to the lungs, and they essentially died of pneumonia. So this experimentation of the direct injection was -- was abandoned.

Subsequently, the rats and the guinea pigs were exposed by the air. And in that experimental setting the fibers were crushed, but many of the fibers couldn't be introduced into the air because of their large size.

Q. Okay. Now, how were these animals housed?

A. These animals were housed essentially in a box or in

a chamber, and they were exposed for eight (8) hours a day, six (6) days a week to determine what would happen as a result of that exposure.

Q. Okay. Did the . . . Did Saranac Lake when they were doing -- trying to expose the animals in the test chambers, were they stirring -- constantly stirring up the dust?

A. Oh, yes. The . . . The design was that the chamber would constantly have a dust in it by the dust being constantly generated so that there was continuous dust exposure for that eight (8) hours for six (6) days a week. And the experimental design was to do it for one (1) year first, and then to go longer than one (1) year, depending on the results at the end of the one (1) year study.

Q. Okay. It's my understanding also, too, Doctor, at the end of their eight (8) hour day of exposure they were not removed from those cages?

A. They were not.

Q. So essentially they walked through the dust and continued to be exposed to that dust twenty-four (24) hours a day, is that correct?

A. That's correct.

Q. Alright. Uh, Doctor, how high were the levels of exposure to asbestos in these -- in these animals?

A. The particle concentration was about a hundred and

fifteen million (115,000,000) particles per cubic foot of air. It varied, but it was above a hundred million (100,000,000). It was somewhere around a hundred and fifteen (115,000,000) or twenty (120,000,000) million particles per cubic foot of air.

Q. And the TLV again at this time was what?

A. It was five (5).

Q. Okay. Just write that down, please?

(Whereupon, the witness complied.)

Q. That's fine. You can return. Thank you.

(Whereupon, the witness returned to the witness stand.)

Q. Now, Doctor, let me just go over a couple other things about the about the experiment with you. Did . . . Who set up the experiment?

A. Saranac Lake.

Q. Okay. Owens-Illinois from the documents that you read didn't -- did not tell them how to conduct it, is that correct?

A. Owens-Illinois did not have any input into the design. Saranac Lake did it all.

Q. Okay. Saranac Lake was a pretty reputable laboratory at that time, is that correct?

A. It was probably the best laboratory of that kind at that time. It was one of the few places in the country where inhalation studies could be conducted. And it was certainly a

highly respected regarded institution.

Q. Okay. One of their main functions at Saranac Lake, as I understand it, was to look at tuberculosis?

A. Yes, sir.

Q. That was -- at that time was a pretty serious disease?

A. Yes.

Q. Okay. Doctor, let me ask you this, these animals, the guinea pigs and rats, did they get a coffee break?

A. No, sir.

Q. Did they get any lunch breaks?

A. No, they did not.

Q. At the end of the day did they go home to another clean cage?

A. No, sir.

Q. Alright. So essentially they lived in that environment twenty-four (24) hours a day for their entire life, is that correct?

A. Yes, sir. For the time of experimentation.

Q. Okay. Let me ask you this, Doctor, why such a high level of exposure?

A. Well, the design of experiments at that time was to attempt to answer the question whether or not a substance could produce a harmful effect at any level of exposure. And

because of the costs associated with experimentation the usual design was to expose animals to the highest concentration that could be achievable by, in this case the putting the material in the air, and to try to get the results as quickly as possible, because, again, of expense and the use of resources. So the experimental design usually always resulted in very high exposures to simply answer the question, at any level of exposure can an effect be produced?

Q. Alright. Tell the jury a little bit, if you would, Doctor, about the difference -- A. Well, first of all, why did they use different type of animals?

A. Well, an experimental design will use different types of animals because you are always faced with the question of, is a guinea pig more like a man, is a rat more like a man, is a rabbit more like a man, or what species can be substituted for people to attempt to gather information about this particular material? And you don't know the answer to that question because it may differ depending on the chemical, or one of the species may be appropriate but you really don't know that until you can gather some information in humans as well. So you try to use multiple species or several species to try to reduce the likelihood of missing some effect that would be important in ultimately assessing the risk, so you would use several animal species.

Q. Describe for the jury the differences in the respiratory system of the guinea pigs and the rats as compared to humans.

A. Well, there -- there are a number of differences. For example, rodents are obligatory nose breathers. They have to breathe through their nose. And as a result of that exposure to very high levels of particulate, for example, can result in suffocation because essentially it clogs up their noses. So there were a significant loss in the number of animals in this study because of the very high dust levels. Because they are obligatory nose breathers, they couldn't continue to breathe.

There are differences in the cells, some of the cells that make up the lung are rodents. There are differences in respiratory volumes and rates. That is, rodents breathe much more rapidly than do humans, for example. There is also a difference in the location. Remember that rodents are horizontal. Their lungs are located horizontally, as opposed to people, who are upright. And also the expulsion of particulates from rodents is not very effective because they don't have an effective mechanism called a mucosolary escalator for removing particulates from the lungs. So there are many differences both in the morphology or the anatomy, the cell makeup, the physical properties or the physical makeup of the

lungs, and the function.

Q. One of the big things then between the humans and these animals is the fact that there's really not a lot of defense mechanisms there, is that correct?

A. Well, there are -- there are fewer defense mechanisms in this particular experimental design for those rodents, that's right.

Q. Okay. Well, tell the jury, if you would, please, what did -- what is the significance between the differences between our lungs and the animal's lungs, if any?

A. Well, the significance is that the interpretation of the results, you have to use more caution in extrapolating from those animals to the human. There are some similarities, there are some dissimilarities. So one would have to take all of that into account in trying to extrapolate from that testing data to man, in this case of a respiratory exposure.

Q. Okay. How common is this type of experiment or this type of testing today?

A. This type of testing is -- is not common. It is very difficult to do this kind of testing. And even today it is not very common to have this kind of testing done or to be able to do this kind of testing. It is technically very difficult, it is extremely expensive, and most substances would not be tested because of those difficulties. I think

the work that was done by Saranac Lake was certainly pioneering work in that time, in the 40's. And even today it would be very difficult to do those kinds of studies.

Q. So it would be very rare to see something like this in 1944?

A. Yes, sir.

Q. Okay. What was the response that Owens-Illinois got back from their studies? And I'll direct you to Hazard Exhibit 5C and 5D.

MR. LIPMAN: Can you tell me the dates of the . . .

MR. HENDRICKSON: Yeah, I'd be glad to. 5C is May 13th, 1946, and it's accompanied with a report, 5D, May 13th, 1946.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Can you tell the jury what the response of Saranac Laboratory was at this time?

A. The response was that a letter was sent by Doctor Gardner, who was the Director of Saranac Laboratories in the study, and he also sent along a -- a summary of the studies to that date up to that time. And what he says is that, "I'm enclosing a summary of the experimental results," and he said that, "at the present moment no serious results have de-

veloped, and I doubt whether they will do so. The dust alone is not causing anything suggestive of either silicosis or asbestosis." That was contained within his letter.

Within the summary of the results that he sent he stated that, "These experiments were at fifteen (15) months," that is these animals had been exposed for a period over a year, for a total of fifteen (15) months. "They were exposed eight (8) hours a day, six (6) days a week, to a hundred (100,000,000) to one hundred and twenty-five (125,000,000) million particles per cubic foot of air." And based upon that he said in his report, "At the present time there is nothing to suggest that reaction comparable to asbestosis or silicosis will ultimately develop."

Q. So at fifteen (15) months the report from Saranac Lake to Owens-Illinois was essentially, "no problem"?

A. That's correct.

Q. What did Saranac ask Owens-Illinois to do?

A. What Saranac asked Owens-Illinois to do was to continue the study. That is, that they would like to continue the study for a longer period of time for a couple of reasons; they had some technical difficulties in the study with pneumonia, and also that it would be prudent to look for longer periods of time to see whether or not a longer period of exposure might result in any adverse effects. So they asked

to continue the study.

Q. Okay. So when they exposed guinea pigs and rats to a hundred and fifteen million (115,000,000) particles per cubic foot of air for eight (8) hours a day for six (6) days a week, didn't clean the cages, left the animals in there with the Kaylo dust, after fifteen (15) months they found no problem and they were asked to continue the experiment?

A. That's right.

Q. Alright. What did Owens-Illinois do?

A. Owens-Illinois authorized them to continue the study.

Q. Okay. What was the next report that they got back? Look at Hazard Exhibit Number 6, dated October 30th, 1947. It's Hazard Exhibit 6 and 6A. And it's a letter accompanying that from -- as well.

A. Okay. At this time this is the interim report. The letter that transmitted this interim report, and this is from now Doctor Vorwald because Doctor Gardner had passed away. Doctor Vorwald was now the Director of the Saranac Lake facility and also the Director of this study. And what Doctor Vorwald told Mr. Hazard, he says, "Your attention is invited to the conclusion of the report wherein I have tried to express assurance that Kaylo alone is biologically inactive. Yet my conservatism dictates caution less the assurance might

be too optimistic because of inconclusive experimental evidence apropos influence of Kaylo upon tuberculosis." At that time Doctor Vorwald's concern was is that even though the studies didn't show any changes in the lung he was still concerned about the fact that it might take a longer period of time of exposure to worsen the condition of tuberculosis. So his concern was that the experiments should be -- should be continued to see whether or not in the presence of tuberculosis this inhalation would worsen or enhance the tuberculosis.

From the report he said, "It may be said here that there is no evidence to suggest that the dust alone when inhaled into the lungs produces pulmonary fibrosis in rats in an eighteen (18) month period," so it extended beyond those by about three (3) months, "and in the guinea pigs in a thirty (30) month period." So it was -- the time of exposure was doubled from the first experiment in that now the guinea pigs had been exposed for thirty (30) months, the rats for eighteen (18) months.

Q. Hold on for just one second. So this is the first report. The second one with the rats were how long?

A. Eighteen (18) months.

Q. Eighteen (18) months. I'm going to put "GP" for guinea pig. For how long?

A. Thirty (30) months.

Q. Okay. And, again, just so we're clear, a hundred and fifteen (115,000,000) to a hundred twenty (120,000,000) million particles per cubic foot of air, six (6) days a week, eight (8) hours a day, with them stirring up the dust, the animals were still living in the cages, given no break, in there all the time?

A. Yes, sir.

Q. Okay. Continue. What else did they find?

A. Doctor Vorwald puts in this particular report that fibrosis is not present. He goes on to say, "Again, fibrosis is conspicuous by its absence."

Q. Let me . . . Let me stop you for just a second there, Doctor. He's talking about fibrosis. He's talking about both silicosis and asbestosis at that time, is he not?

A. Yes.

Q. Because . . .

A. I'm sorry. Go ahead.

Q. Go ahead. I'm sorry.

A. Yes, generalized fiborsis. He hasn't looked at whether or not it's consistent with asbestosis or silicosis or some other pneumoconiosis. He's simply looking for fibrosis.

Q. Right.

A. And didn't find it.

Q. And didn't find any?

A. That's correct.

Q. Okay. Go ahead.

A. He goes on to say, "The absence of cellular reaction or fibrosis about the terminal bronchials would indicate that the inhaled quantity of such fibers was of extremely low intensity and insufficient to produce permanent damage. This view is supported by the graphic and X-ray defraction studies that disclose that a major amount of chrysotile component of that dust consisted of structures too large for dispersion into the breathing atmosphere and for easy access into the lungs." One of the problems they had was in suspending the dust, and that many of the particles were of such large sizes that they couldn't keep them in the air. And so they tried everything they could to try to keep those particles in the air, but many of them they couldn't because again of the particle size.

"In consequence . . . " He goes on, "In consequence of the experimental studies with guinea pigs to determine the biological activity of Kaylo, it may be tentatively concluded that Kaylo alone fails to produce significant pulmonary damage when inhaled into the lungs." In the study of the rats he concluded, "In no animals were there any tissue reactions of the sort seen in silicosis or asbestosis."

Q. Okay.

A. Finally, in the conclusion he says, "It seems clear from the results presented in Parts One (1) and Two (2) above, that Kaylo acts as an inert dust when inhaled by guinea pigs and rats. It does not injure them or produce fibrosis or anything suggestive of either silicosis or asbestosis."

Q. Okay. So once again, they did it for fifteen (15) months, they said, "Do you want it to continue?", Owens-Illinois said, "We will", they continued the experiment, eighteen (18) months, very high exposures, thirty (30) months in guinea pigs, the report back was, "no problem"?

A. Yes. sir.

Q. Owens-Illinois didn't quit with this though, did they?

A. No.

Q. Why would they ask to continue this experiment?

A. Again, the concern was with tuberculosis, because tuberculosis was endemic at this time in the history of our country. They were concerned about the continued exposure to materials and the worsening or the enhancement of the tuberculosis process. So the individuals that might be exposed to it would somehow develop or worsen in -- in the disease of tuberculosis. So what they wanted to do was to expose the animals for even longer periods of time, again to determine

whether or not there were any potential adverse effects. I might tell you that . . .

Q. Go ahead. Finish your answer.

A. In -- in guinea pigs and rats we are reaching the near lifetime of those animals. A lifetime in rats is about twenty-four (24) months, and in guinea pigs it's somewhere around thirty (30) months. So we're now approaching the lifetime. That is, rats don't live very long. They live about two (2) years, and guinea pigs about -- somewhere between three (3) and four (4) years. So this exposure now has continued for the near lifetime of these animals.

Q. Okay, Doctor, I think we're going to take a break now.

A. Alright. I'm sorry.

THE COURT: At this time . . . Ladies and gentlemen, at this time please go with the bailiff.

(Whereupon, the jury cleared the Courtroom, and the following proceedings were had out of the presence of the jury:)

THE COURT: Doctor, let me indicate to you that you shall not discuss your testimony with anyone until you resume the stand. You understand that?

THE WITNESS: Yes, sir.

THE COURT: Any questions?

THE WITNESS: No, sir.

THE COURT: The Court will be in recess fifteen (15) minutes.

* * * * *

(Whereupon, a recess was taken.)

AFTER RECESS

(The trial was resumed pursuant to the recess, there being present the same parties as heretofore noted, including the defendant and counsel.)

* * * * *

DOCTOR RAYMOND HARBISON

resumed the witness stand, and having been previously duly sworn, continued to testify as follows:

* * * * *

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Okay, we're back talking about, Doctor, the second interim report, okay . . .

A. Yes, sir.

Q. (Cont'g) . . . that they received. And, again, Owens-Illinois received the first report after fifteen (15) months when they were looking for -- for fibrosis. They didn't find any. And they received a second report looking for fibrosis and they didn't find any. Okay?

A. Yes, sir.

Q. After the first report they were asked to continue it because of some problems with the experiment?

A. Yes, sir.

Q. After the second report they were asked to continue it not because of fibrosis but because of tuberculosis?

A. Because of the concern, yes, sir.

Q. Okay. So if Owens-Illinois was simply concerned with whether or not their product caused a fibrosis, it would have been alright for them to have stopped after thirty (30) months, after the second test, is that right?

A. That's probably right. Yes.

Q. Okay. What did they do though when they were asked by Saranac Lake about continuing the exam?

A. What they did is they authorized Saranac Lake to continue the studies.

Q. Okay. Please turn . . .

MR. HENDRICKSON: For the record, these are Joint Exhibits Number 17, Joint Exhibit Number 11, and for your purposes, Doctor, Hazard Exhibits 8 and 9.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Now, Doctor, is this the . . . Is this the next report that Owens-Illinois received from Saranac Laboratories?

A. Yes, sir.

Q. And the date on the transmittal letter is November 16th, I believe, 1948? Is that right?

A. Yes, sir.

Q. And the date on the report is October 30th, 1948, is that correct?

A. Yes, sir.

Q. Alright. What did these reports tell Owens-Illinois about the . . . Well, let me back up. Let me do it this way. Once again, after they received the second interim report I think -- I believe you told the jury that not many animals were left because of their life expectancy -- their life span, is that correct?

A. And because some had died or had been sacrificed.

Q. Okay. Now, they asked O-I to continue the report to look for tuberculosis, correct?

A. Yes, sir.

Q. Alright. So they continued after the thirty (30) months with the guinea pigs with a hundred and fifteen million (115,000,000) particles per cubic foot of air again, average, in a cage, correct?

A. Yes, sir.

Q. Stirring up the dust once again, correct?

A. That's correct.

Q. Eight (8) hours a day?

A. Yes, sir.

Q. Stirring up the dust, that is?

A. Yes.

Q. Six (6) days a week?

A. It was five and a half (5 1/2) to six (6) days.

Q. Okay. And once again, they didn't clean the cages?

A. That's correct.

Q. And they didn't remove those animals from the cages?

A. That's correct.

Q. So basically, when they hit the thirty-one (31) month with the guinea pigs those guinea pigs had been exposed to Kaylo dust twenty-four (24) hours a day, seven (7) days a week, for thirty-one (31) months?

A. That's right.

Q. Okay. Tell the jury what the conclusion was after the thirty (30) months about the guinea pigs.

A. Okay. The conclusion subsequent to thirty (30) months is, "However, of nine (9) animals sacrificed subsequent to thirty (30) months in the present experiments, all have shown early lesions -- have shown not only early lesions, but also have developed true fibrosis of the type characteristic of the response of asbestos." This is at thirty-six (36) months.

Q. Okay. What conclusions then, Doctor, can you draw from this last report from Owens-Illinois?

A. Well, the conclusions that can be drawn are that after a period of exposure of thirty-six (36) months to the Kaylo material there is a fibrosis that develops, and that fibrosis is consistent with an asbestosis.

Q. Alright. Do you think that's surprising to anyone at Owens-Illinois?

A. No, I don't think that's surprising. I think that they were probably expecting a fibrosis to occur and to find an asbestosis. I suspect it wasn't surprising.

Q. Okay. Would it be fair to say that the reason that they probably weren't surprised was because they knew that if they had excessive exposure to asbestos, a known mineral at the time, that it would result in a disease called asbestosis?

MR. LIPMAN: Your Honor, objection. Just because it seems to me that it's speculative as to what they would be surprised about.

THE COURT: Sustained. Rephrase.

MR. HENDRICKSON: Okay.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Let me ask it another way. They knew that asbestos could cause asbestosis, correct?

A. Yes, sir.

Q. Alright. They knew that you had to have a prolonged exposure to asbestos to cause asbestosis, is that correct?

A. That is correct.

Q. So wouldn't it be reasonable for them to assume that -- and not be surprised that after an extensive hundred fifteen million (115,000,000) particle per cubic foot of air exposure that it would develop an asbestosis?

A. Yes, sir.

Q. Okay. Fine. Now, that would not only hold true for asbestos exposure, but wouldn't that also hold true for things like excessive exposure to coal dust?

A. Yes, sir.

Q. So as we know today, if you are exposed to a limited amount of coal dust you probably won't develop coal miner's pneumoconiosis?

A. That's right.

Q. Or Black Lung, correct?

A. That's correct.

Q. But it's not a surprise to anyone if someone is exposed to an excessive dose of coal dust that someone develops the disease Black Lung?

A. That is correct.

Q. Alright. What conclusions can be drawn to a rea-

sonable degree of scientific certainty from this data?

A. Well, the conclusions that can be drawn are that high levels of exposure to this material over a prolonged period of time can result in fibrosis, or asbestosis in this case, as a result of that exposure over that period of time.

Q. Alright. Doctor, you have that report in front of you. I've got the wrong tape. I'm sorry. So basically . . . Let's talk about what they told Owens-Illinois, okay?

A. Okay.

Q. They told Owens-Illinois that they exposed test animals for up to thirty-six (36) months to a hundred and fifteen million (115,000,000) particles per cubic foot of air?

A. Yes, sir.

Q. That resulted after thirty-six (36) months in disease in guinea pigs?

A. Correct.

Q. That was nothing new?

A. That's correct.

Q. Alright. They told O-I to maintain good dust controls in their plants, did they not?

A. Yes, they did.

Q. Alright. Did they tell them to do X-ray programs, as well?

A. Yes.

Q. Alright. And I'm not sure you know anything about whether or not they -- they did those things, so I'm not going to ask you to comment. Do you know that?

A. Do I know if they did it?

Q. Right.

A. Yes, they did.

Q. Okay. What level did they keep their -- their plants at where they produced Kaylo?

A. Five million (5,000,000).

Q. And what did their X-ray program show?

A. No changes.

Q. Okay. And that X-ray program was of workers that worked in the plants making the Kaylo product, is that correct?

A. Yes, sir.

Q. Alright. Now, Doctor, look at the document, the last report, and tell the jury some of the conclusions . . . First of all, they said it was a hazardous dust, is that correct?

A. Yes.

Q. Okay. We talked with the jury earlier about hazardous dust and their conclusion was, was that accurate?

A. That it was a hazardous dust?

Q. Right.

A. Yes, sir.

Q. What did they mean by that?

A. Well, it means that it -- exposure to it at some levels of exposure over some periods of time can result in a change of potential fibrosis or a fibrosis in the lung tissue as a result of exposure to that dust. There are many dusts that are hazardous that we're exposed to. This is another one.

Q. Okay. In consideration of the exposure levels, a hundred and fifteen million (115,000,000) particles per cubic foot of air, average; the length of exposure, thirty-six (36) months in the guinea pigs; and the species exposed, the guinea pigs itself, can you tell us to a reasonable degree of scientific certainty whether or not the data transmitted to Owens-Illinois in 1948 showed that the amount of any asbestos exposure which might result from the ordinary use of Kaylo poses a substantial health hazard to end users?

A. Yes, I can have an opinion about that -- or I have one about that.

Q. Would you please tell the jury what that is?

A. That the data that was transmitted to Owens-Illinois did not indicate that at the current use levels of five million (5,000,000) particles per cubic foot of air, that there was a hazard or a risk associated with the use of a

product. The data showed that there could be a risk if the levels were extremely high, a hundred million (100,000,000) particles per cubic foot of air, and if the exposure was over a prolonged period of time, a near lifetime, that there could be a potential risk. But at the use levels, and based upon the experience of Owens-Illinois, the information that was provided to them indicated that their current operations and the current use of that material did not increase the risk of an adverse effect.

Q. Alright. Would that be similar, Doctor, going back to, although this is a medication, similar to what we do with aspirin?

A. Sure. There are levels that don't produce harm and there are levels that can produce harm, and we know what those levels are.

Q. Now, Doctor, I've got a couple other areas and then I think we will be finished. In reviewing the documents attached to Mr. Hazard's deposition and Mr. Hazard's deposition, you can -- did you find whether or not Owens-Illinois wanted to have the results of these tests published?

A. Yes, they did want to have the results published.

Q. Okay. Wanted to tell folks what they had found out with the hydrouscalcium silicate that contained fifteen percent (15%) asbestos, is that correct?

A. That is correct.

Q. Alright. What . . . Did Owens-Illinois draft a report and submit it to Saranac to send out, or how did that occur?

A. What happened is that Owens-Illinois repeatedly requested that Saranac provide or -- or develop a report or a manuscript that could be submitted for publication. And Owens-Illinois did not have anything to do with the preparation of that manuscript. As a matter of fact, they didn't know that it was prepared and ultimately submitted for publication prior to its being submitted. They had no input into the preparation of that report.

Q. It took some time for them though to get Saranac to publish it for some reason?

A. It took a long time for them to get Saranac to publish that -- that paper.

Q. Owens-Illinois kept urging them to do so, is that correct?

A. That is correct.

Q. From the correspondence that you've reviewed?

A. Yes, sir.

Q. Okay. Doctor, look at Hazard Exhibit 18A, which is Defense Exhibit Number 61. Tell me when you get there.

A. Yes, sir.

Q. This is a transmittal letter dated June 12th, 1955. And attached to that letter is a report entitled, "The Effect of Inhaled Commercial Hydrouscalcium Silicate Dust on Animal Tissue", is that correct?

A. That's correct.

Q. And that was printed -- that was authored by a Doctor Schepers, is that correct?

A. That's correct.

Q. And Doctor Schepers was the Director of Saranac Lake for a while?

A. Yes, sir.

Q. And that was reprinted in the American . . . What . . . What journal did that appear in?

A. The American Medical Association Archives of Industrial Health.

Q. Okay. Is that a peer review journal?

A. Yes, sir.

Q. Alright. And this was . . . And this is the study that Saranac -- the report that Saranac Lake authored concerning the studies on the Kaylo product, is that correct?

A. That's correct.

Q. Now, you've reviewed this document, have you not, Doctor, in preparation for your testimony here today?

A. Yes, I have.

Q. Tell the jury what data or any mention in that document, that report, did it have concerning the instance of cancer in the test animals.

A. There is no information or no reporting of the incidence of cancer in this document.

Q. Doctor Schepers makes a comment in the paper, "No neoplastic changes can be postulated." Explain that to the jury.

A. It means that upon necropsy or examination of the tissues of this animal he could not find any cancerous changes in the gross and microscopic examination of those tissues.

Q. So when the report came back to Owens-Illinois and they read the tests of their product that indicated to them that at least from this test result Kaylo did not produce cancer?

A. That's correct.

Q. Okay. Tell the jury, Doctor, if you would, in that report if they talked about mesothelioma?

A. They did not.

Q. They didn't even mention mesothelioma in the report, is that correct?

A. That is correct.

Q. So if Owens-Illinois read that report in 1955 they could conclude because of the absence of the mention of

mesothelioma that their product did not cause that disease?

A. That is correct.

Q. That would be a reasonable assumption, is that correct?

A. Yes, sir.

Q. Alright. And can you tell us, and can you tell this jury, within a reasonable degree of scientific certainty if those would have been good conclusions for Owens-Illinois to make when they received those documents?

MR. LIPMAN: Your Honor, objection to what a good conclusion Owens-Illinois . . .

THE COURT: Sustained.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Can you tell this jury within a reasonable degree of scientific certainty if that was the conclusion that Owens-Illinois made?

MR. LIPMAN: Objection to what conclusion Owens-Illinois made.

THE COURT: Sustained.

DIRECT EXAMINATION (CONT'D)

BY MR. HENDRICKSON:

Q. Can you tell the jury within a reasonable degree of certainty that that is the conclusion you made?

A. That, based upon this information this was not a cancer causing agent?

Q. Right.

A. Yes, sir. That would be a conclusion that I would come to based upon the data that I reviewed.

Q. And would you consider, sir, that to be a valid test of this product?

A. It is a valid test of this product based upon that time and those conditions. Yes, sir.

Q. One final area. You reviewed all the literature concerning Saranac Lake attached to the Hazard deposition, is that correct?

A. Yes, sir.

Q. Saranac Lake did not advise Owens-Illinois to stop the manufacture and sale of Kaylo, did they?

A. They did not.

Q. They did not tell them to remove the asbestos, did they?

A. They did not.

Q. They did not say that the TLV was unreliable, did they?

A. They did not.

Q. As a matter of fact, they used the TLV when they went to take dust samples in the Owens-Illinois plants, is

that correct?

A. That is correct.

Q. They did not say end users were at risk?

A. They did not.

Q. And they did not say to warn the end users, did they?

A. They did not.

MR. HENDRICKSON: That's all I have. Thank you, Doctor.

MR. LIPMAN: May I have a moment just to set up?

THE COURT: You may.

* * * * *

CROSS EXAMINATION

BY MR. LIPMAN:

Q. Good morning, Doctor.

A. Good morning.

Q. I'm going to kind of start at real basics. Uh, H-a-r-i-v . . . None of us can spell on the board right.

Doctor Harbison, and I know . . .

A. I'm sorry, that's not correct.

Q. Correct me then.

A. It's b-i-s-o-n.

Q. Oh, b-i-s-o-n?

A. Yes, sir.

Q. Right now?

A. Now it's right.

Q. You're a toxicologist?

A. Yes, sir.

Q. I, uh . . . From a lay person's point of view . . . You've studied toxicology and pharmacology through the years and you're trained, but I picked up the dictionary when I was at His Honor's secretary's office this morning, American Heritage Dictionary, and I put a little tag under "toxicology". Could you read the definition at least in that dictionary of the term "toxicology" or "toxic"?

A. The definition of toxicology?

Q. Of toxic.

A. The word "toxic"?

Q. As in the . . . As in your profession, toxicologist.

A. "Poisonous, of or caused by a poison or toxin."

Q. Poisonous, p-o-i . . .

A. I'm sorry. I'll have to look it up. P-o-i-s-o-n . . .

Q. You, too. You, too. You, too, huh?

A. Yes, sir.

Q. P-o-i . . .

A. s-o-n.

Q. That's just kind of starting at real base level, that does justice, does it not, in terms of how lay people would understand the term "toxicology" or the word "toxic"?

A. Would they assume that something that's toxic is poisonous?

Q. No, not quite that. If a person saw the word "toxic" and went to the dictionary and saw the definition of "toxic" as poisonous or poison, would that -- is that consistent with what you would believe a lay person's view or understanding of that term would mean, the term "toxic"?

A. Well, it could certainly be one (1) meaning or one (1) interpretation.

Q. And if somebody picked up that dictionary and knew nothing else and read the word "toxic" because they were concerned about what the word meant, they would find out that it is defined as poison?

A. That it can be defined as poison.

Q. Can be.

A. Sure.

Q. Now, you . . . We're all familiar with this term by now, "Kaylo". That's the material -- the name of the material. And I think the next witness will explain the origin of that term . That's the name of the material that Saranac studied. That was Owens-Illinois' asbestos containing pipe

covering and block that they were manufacturing and selling during the era that we've been speaking of?

A. Yes, sir.

Q. Now, you've studied the . . . As I understand it, you have studied the various articles and letters and reports flowing between the Owens-Illinois Company and Saranac, back and forth, which I think we've been kind of loosely calling the Saranac documents. And you obtained them because they were attached to Mr. Willis Hazard -- the jury's heard all about him -- his deposition from maybe a decade ago?

A. Yes, sir.

Q. In . . . In the various reports from Saranac, you've referred to some?

A. Yes, sir.

Q. In any of the reports and in any of the correspondence did you come across the fact that Saranac had characterized the properties of Kaylo as being toxic? Did you ever see that characterization or reference?

A. I don't recall that specifically in all the documents.

Q. Okay. Let me . . . Let me ask you to do this, pull . . . Do you have them?

A. Yes, sir.

Q. Alright. I think you could sit wherever you want,

but pull them because I want to refer you to . . . Just what the jury is seeing. I want you to take a look at, and I'll tell you so you don't -- we can kind of do this in an orderly manner -- the July 30, 1952 report.

MR. LIPMAN: For the record, I know it's been introduced as an Exhibit.

CROSS EXAMINATION (CONT'D)

BY MR. LIPMAN:

Q. "Investigation Concerning The Capacity Of Inhaled Dust Study -- Inhaled Kaylo Dust to Injury The Lung" It's confidential. It's a final report authored by Saranac.

MR. LIPMAN: For the record, I think I have the Exhibit Numbers, so we have a complete record. Yeah, it's Exhibit 45.

THE WITNESS; Which Hazard Exhibit?

MR. LIPMAN: I can't do it that way. I can do our internal, I can do the dates, but I can't do all the cross references. Are you with me on it?

THE WITNESS: It's dated . . . It's January . . .

MR. LIPMAN: 30, 1952, sir.

THE WITNESS: I can't find it in my . . . I need the Hazard number.

MR. LIPMAN: Let me get it for you then.

MR. HENDRICKSON: Your Honor, with permission I'm advising that it's Hazard Exhibit Number 15.

MR. LIPMAN: It's 15 then. I . . . We're having trouble finding it.

THE WITNESS: I've got it.

MR. LIPMAN: Got it?

THE WITNESS: Yes, sir.

MR. LIPMAN: Remind me and we'll get you. I know that's a Joint Exhibit. We have to have a full copy. We'll take care of that at lunch. It's been admitted in the proceedings. It's . . . For Madam Court Reporter, it's Exhibit 15. For Mr. Hazard's deposition it's Exhibit 15. It's 45 for the Court and for the jury.

CROSS EXAMINATION (CONT'D)

BY MR. LIPMAN:

Q. Now, do you recall the question? We're trying to get the material. I asked you whether in all of your tour and study of the Saranac documents was there any reference that characterized the Kaylo properties as toxic, and you said you didn't recall. And what I'd like you to do . . . I'm reading here, and tell me if I'm reading correctly. Or could you read this?

A. I can't see it.

Q. How about now? Beginning with the word "In"? Do

you want to read that out loud for the jury?

A. "In the final shipment of Kaylo received in January, 1949, the first use in this experiment in September, 1949, the asbestos component contained the mineral amosite as well as chrysotile. The fibers of amosite in comparison with those of chrysotile are less flexible and have a higher iron content. However, since experiments with animals have shown that the amosite and chrysotile are capable of causing asbestosis, it is unlikely that the substitution of the one mineral for the other in Kaylo would cause a significant change in the toxic properties of the final product."

Q. So you would agree that in the Saranac documents, as a matter of fact, in the January, 1952 report, Joint Exhibit 45, that Saranac did refer to the properties of Kaylo as being toxic?

A. Sure.

Q. Okay. That's 30-52. You spoke on -- at some length in the earlier portion of your direct testimony about shampoo and things that -- that have warnings and things that don't and about toxic substances. Sometimes we warn. Sometimes materials that are toxic have a warning on them and sometimes they don't.

A. Right. And I think I said that all materials are toxic. The dose determines whether they are or not.

Q. We now know that in the Saranac documents that the Kaylo properties were termed as toxic? We just read that, right?

A. Well, it was referred to in that sentence. That's correct. Yes, sir.

Q. Plaintiff's Exhibit 13, I'm going to hand you. It's been admitted into evidence. Thank you. I'm going to just have you refer to it. The jury's already seen this particular exhibit. And the cover sheet, just so we have a little context of what we're doing. It's an article by -- in the Petroleum Engineering by a man -- and kind of the yellow part covered it up -- a man named E. C. Shuman, and it's dated, as you can see, April, 1952, correct?

A. Yes, sir.

Q. You . . . Do you know that publication? Are you . . . In your work and research are you familiar with it at all?

A. I am not.

Q. Alright. Now, Mr. Shuman, if you stay with me, sir, it's an article about this new product. And as we see, Mr. Shuman, the first page, was the Director at the time of research in the Kaylo Division of Owens Glass Company, at least presumably at the date that it was authored.

A. Yes, sir.

Q. And in the article you'll see . . . You can read it

right off the overlay with me. "Applicators appreciate the fact that hydrouscalcium silicate," and we know that to be the materials in the product he speaks of, "is non-toxic and easy on the hands."

A. Yes, sir.

Q. Do I read that correctly?

A. Yes, sir.

Q. Alright. So we now know that at least in this article . . . Is that April, 1952?

A. Yes, sir.

Q. Mr. Shuman describes the product as non-toxic. Now, attached to that . . . Well, later in the same edition is an advertisement that appeared in the same edition. And we know that because you see the same article, the same periodical, and the same day. It's a page reference a couple pages later. This is an advertisement. I think it's self-explanatory. This is the -- gives you the nature and the shape of the configuration of the molded pipe covering, and this would be the block. You're aware that it came . . . You're aware of that from the Saranac studies that it came in two (2) formats: it came in this premolded, just what it would look like, pipe covering that could be collapsed over a pipe or in half sections, I believe; and it also came in this like block cube format. Did . . .

A. I'm not aware of that.

Q. Did you pick that up?

A. I'm not aware of the forms. I knew it was in different form, but I didn't know what it was.

Q. Okay. Now, in this ad they're kind of beating their chests. They are kind of promoting the material. As you see, "Kaylo heat insulation is a hydriumcalcium silicate." We know all about that by now. "It's a revolutionary heat saving material, outstanding both in performance and ease of application." Then, as advertisements often do, it kind of recites the sum of the characteristics of the material. And read with me down here. Could you read that out loud?

A. "The material is non-irritating to the skin and non-toxic."

Q. Okay. So we know in that ad, the same journal, that the product, at least as Owens-Illinois is informing the public, is characterized as non-toxic? True?

A. Based on that, yes, sir. Yes, sir.

Q. Okay. I think we can . . . I just wanted to go over that with you.

There is no specific statement in any of the Saranac documents that you reviewed that indicated that Kaylo is not dangerous if the dust levels are held below five million (5,000,000) particles per cubic feet, correct? And I don't

mean inference, and I don't mean what you read into it, I want to be fair on this. If a lay person or anyone read, there is no specific statement that states that?

A. What is stated is the reference to the threshold limit value, which is a concentration that is considered to be safe in the work place.

Q. There is no statement that says that -- in the Saranac documents that the Kaylo dust is not dangerous, or words to that effect? I don't want to quibble about words. The point is, at levels of dust below five million (5,000,000) particles per cubic feet.

A. That it is not dangerous. That exact wording is not in there.

Q. Alright.

A. It would be contained within the threshold limit value, which is cited as the guideline. And that guideline is the safe guideline for the work place.

Q. We're going to get to that in a minute about the safe guideline in the work place. You're not testifying that Saranac was telling Owens-Illinois -- an important question -- that from the gospel of Saranac if you hold -- if you conform and hold dust levels below the TLV workers will always be safe? You're not telling us that, are you?

A. I don't think that Saranac specifically said that.

What Saranac recommended was the guideline, which at that time was the consensus of all who were involved in setting these guidelines, and that's what they recommended.

Q. Okay. Let's . . . Let's pursue that a bit. And I'd like you to refer . . . And I only know it by the -- the date and our Court Exhibit. It's Exhibit 20. I can furnish it to you. You'll have it in your material, but this may be easier. Parties' Exhibit 20.

MR. LIPMAN: And, counsel, it's -- we're getting all cross referenced up here. It's May 25th, 1951. It may be easier . . . Tell me what's easier, to give you the date or the Court Exhibit? Counsel?

MR. HENDRICKSON: Either one's fine.

MR. LIPMAN: Okay.

CROSS EXAMINATION (CONT'D)

BY MR. LIPMAN:

Q. So we can follow with the jury. I think you can just sit there. I mean I don't think it's necessary to disturb where you are. We're here. This is the Plaintiff's Exhibit -- or Parties' Exhibit 20. It's entitled "Report. Kaylo Division Plant. Owens-Illinois. May 25th, 1951. Industrial Hygiene Survey by Saranac." Correct?

A. Yes, sir.

Q. We have some tough copies to read, but I want you to

go over to the conclusion towards the end. Can you follow me?

A. Can I . . . I can't see from here.

Q. Alright.

A. You can tell me the page. One or the other.

Q. I'm going to get you there. It's not page . . . The light works. But it's the page following page 8. The only page that isn't page numbered. I'm going to read the overlay and you tell me if I'm reading it correctly, sir. On page unnumbered following page 8, paragraph 9. "The maintenance of the working environment in a condition which conforms to regulations promulgated by local health agencies or which is in accord with accepted standards of good practice should not be considered as a complete protection for a worker from acquiring a disease as the result of his occupation." Did I read that accurately?

A. Yes, sir.

Q. Alright. Had you seen that before in the Saranac analysis?

A. Sure. I did. And what that means, and what Owens-Illinois did, is to provide physical examinations for the workers. What Saranac was saying to just comply with the threshold limit value and not look at the workers would really not be very prudent and not be sufficient. And what it goes on, if you read further, it says it is strongly recommended

that the Kaylo plant . . . "That at the Kaylo plant a medical program be maintained that would require pre-employment examination, renograms," and so forth, which is what Owens-Illinois did. I think what they're saying is that basically don't rely just only upon measurement of some concentration but look at the employees. That's what they did.

Q. Don't . . . In your words, "Don't rely solely upon," and I think they used the term "government regulations" or "local regulations"? Can you help me with that?

A. Uh, "Regulations pulmulgated by local health agencies."

Q. "On local health regulation or agency regs." And what was the second?

A. "Or with accepted standards of good practice."

Q. "Or accepted standards of good practice." Because what may happen? What did they say?

A. Well, as . . .

Q. Stay with me at least on this. And you'll get a chance on redirect.

MR. HENDRICKSON: Your Honor, I would object. If he wants to agree and then explain his answer I think he's allowed to do that.

MR. LIPMAN: No, I think I can ask the question and get an answer.

THE COURT: Counsel. Do you have an objection?

MR. HENDRICKSON: Yes, sir.

THE COURT: Sustained. Rephrase.

MR. LIPMAN: Yes, sir.

CROSS EXAMINATION (CONT'D)

BY MR. LIPMAN:

Q. What . . . What, based on that paragraph 9 that we're reading, that the jury has in front of them, would be the consequence -- the potential consequence of -- of relying solely upon local health agency regs or accepted standards of good practice?

A. There may not be any consequence . . .

Q. Right.

A. (Cont'g) . . . associated with relying upon it. It may be a very reliable standard.

Q. Right.

A. But what Saranac is saying is it's strongly recommended to verify that that standard is appropriate to continue to follow the employees by physical examinations.

Q. But the literal language of Saranac is telling Owens-Illinois is, and just tell me if I'm reading this correctly, is "this does not afford complete protection from acquir -- from a worker acquiring a disease." True?

A. Well, if you only read that sentence, sure. But it goes on to say what you ought to do. And what it's saying is to verify those numbers, make sure that they are right, you should continue to follow the health of the employees, which is prudent practice.

Q. Alright. Okay. So we're clear that the point of that paragraph 9 was to protect the worker from acquiring a disease? That's all. That's all I'm getting at. That's what they're telling you?

A. Well, it should not be considered complete protection . . .

Q. Right.

A. (Cont'g) . . . and that following the employees, that is looking at their health, is a way to make sure that that number or that standard is appropriate.

Q. Do you know during this era whether Owens-Illinois ever, ever put warnings on their pipe covering and block that indicated that if you were beyond five million (5,000,000) particles per cubic feet bad things can happen; yes or no?

A. I do not know of any such warning.

Q. I've got ink all over my jacket. "Does not know of O-I warning of consequences if Kaylo dust is greater than five million (5,000,000) particles per cubic feet." Fair?

A. That's correct.

Q. Any reference in the Saranac documents that indicated that applicators, guys out in the field like Mr. Carlson, working with the Kaylo product who were using the product between '48 and '58 had exposure levels lower than five million (5,000,000) particles per cubic feet?

A. Is there anywhere in the documents where it indicates that . . .

Q. Applicators . . .

A. (Cont'g) . . . applicators would be exposed to lower than five million (5,000,000)? Not that I'm aware of.

Q. "No indication in Saranac that applicators . . ." We've used the term "applicators" and "end users" kind of simul -- you know, interchangeably. Would you rather . . . Do you know what end user means, like an applicator?

A. Yes, sir.

Q. I wrote, "No indication in Saranac documents that applicators, end users, are -- would be exposed to dust below five million (5,000,000) particles per cubic feet." Right?

A. That's correct. Yes.

Q. We've heard one (1) witness, Doctor Pohl, earlier in the week talk about the general knowledge of the medical community at various points in time over the decades in terms of what they knew based on published reports, et cetera -- what they knew, medical doctors, scientists, about asbestos

and the kinds of disease that asbestos caused. And expect to hear Owens-Illinois, a witness, an expert, later in the proceedings be testifying as to much of the same subject. You're not . . . You're not presenting any testimony here where you're sharing with the jury, aside from the Saranac data, what the general medical community knew over the years about asbestos and asbestos related diseases?

A. I am not.

Q. You're . . .

A. I am not. That's correct.

Q. And you had indicated that you personally knew that when the studies commenced in 1943 that it was known that asbestos could cause the disease asbestosis?

A. Yes, sir.

Q. Do you know at the time that the Saranac documents were offered and communicated back and forth between Owens-Illinois and Saranac whether there were indications or knowledge in the general medical community in that period of time that asbestos caused cancer?

A. From the Saranac documents?

Q. No, sir. Do you know personally whether, aside from the Saranac documents, because you indicated the Saranac documents don't tell us about cancer . . .

A. Right. But that's all I looked at.

Q. Okay. But I'm now asking you, aside from the Saranac documents and what you looked at, do you know from your own personal knowledge whether prior to 1958 there were reports in the medical community indicating that inhalation of asbestos caused cancer?

A. I have not looked at that chronology.

Q. You don't know that?

A. I haven't looked at it, and I'm just not aware of it at this time.

Q. Okay. You have read, as I understand it, in terms of preparing and fashioning your -- your examination for today, not only the Saranac papers that were attached to Mr. Hazard's testimony in his deposition, but you also read his testimony, as I understand it, correct?

A. That's correct.

Q. And are you aware that . . . Is it Doctor Hazard or Mr. Hazard? I can't remember if he's a Ph.D.

A. I think it's Mister. I think it's Mr. Hazard.

Q. Is it Mr. Hazard? Are you aware of the fact that he testified under oath at page 143 and 144 of his deposition which was read to the jury, "And is it correct, sir, that the threshold limit value that you talked about did not apply and did not contemplate cancer?" The answer is yes. Were you aware of that?

A. Am I aware that that's his testimony?

Q. Yes, sir.

A. Yes, sir.

Q. "Not applicable. Cancer." Same question. Do you know that his testimony is, "And you mentioned certainly that it did not apply with mesothelioma?" The question is no. Same idea.

A. Yes, sir.

Q. Did you know that?

A. Yes, sir.

Q. Aside from the Saranac documents, you're not here and you're not testifying about other summaries or medical knowledge or medical literature that was placed in the corporate offices of Owens-Illinois, are you?

A. I am not.

Q. So you don't come in here and you're not offering any opinion about any knowledge that Owens-Illinois may have obtained from a series of periodicals called The Industrial Health Digest?

A. I am not.

Q. Do you know about The Industrial Health Digest materials that Owens-Illinois had been receiving over the years?

A. I don't know those. No, sir.

Q. Do you know what the Industrial Health Institute was, just from your general work over the years in pharmacology and toxicology?

A. Yes, sir.

Q. And you know that it was an organization up where we're probably going to fly out of later today, hopefully, up in Pittsburgh, the Mellon Institute on Fifth Avenue?

A. Yes, sir.

Q. And did you know that Owens-Illinois was a -- a member of that organization?

A. I believe that's correct.

Q. And did you know that Owens-Illinois over the same period of time that you're speaking of was receiving digests and materials of various medical extracts and communication regarding what is out there in the medical literature from time to time and literally monthly?

A. I have no knowledge of that.

Q. Okay. I won't be much longer. Let me return to you . . . And again, I don't -- I don't have your numbers, but it's the March 12th, 1943 . . .

MR. HENDRICKSON: For the record, Your Honor, if I may, Joint Exhibit Number 10, Hazard Exhibit Number 3.

MR. LIPMAN: Thank you, counsel. I couldn't tell you which tab it would be in your material. I can get it

for you. Thank you, sir.

CROSS EXAMINATION (CONT'D)

BY MR. LIPMAN:

Q. We've heard about this before. This is the March 12th, 1943 letter from Doctor Gardner, then the Director of Saranac, to Mr. Bowes. Among other things he states, "That the fact that you were starting with a mixture of quartz and asbestos would certainly suggest that you have all the ingredients for a first class hazard." In retrospect -- in retrospect, as we all sit here in this Courtroom on March 12th, 1993, Doctor Gardner's writings proved correct, that this material did turn out to be a first class hazard. Would you agree with that?

A. I wouldn't agree with that, no.

Q. You would not?

A. No. What it did is it turned out a hazard at some levels of exposure.

Q. Right.

A. It doesn't make it a first class hazard. Again, all substances at some level of exposure can produce harm.

Q. You think it turned out to be a first class hazard for Mr. Carlson?

A. The asbestos?

Q. Yes.

A. I don't know. I didn't evaluate what the cause of his injury or illness was, so I don't know the answer to that.

Q. That's not your role to talk about his disease and that cause of his disease?

A. Well, I wasn't asked to do that, so I have no knowledge of that.

Q. Fair. Throughout the Saranac documents -- Let me make sure we're -- we're on the same page -- they were prepared and there were correspondence and communication that, "Look, Saranac, we want you to test it not only because we've got workers in our plant but we know applicators out in the field are using it or will be using it." Fair?

A. Yes, sir.

Q. Absolutely true? In other words, the Saranac documents and all this exercise wasn't just geared to test this product to determine disease of Owens-Illinois workers in the plant?

A. No. The very first letter for the experimental design is asking Saranac to look at not only the workers, but in fact the users.

Q. Okay. So kind of a goal, is that fair?

A. Yes, sir.

Q. "That Saranac study tests for Owens-Illinois workers, but also the applicators, the end users in the field."

A. That's not quite fair. The goal of the study was to test the product with an experimental design in which the highest levels of exposure would be applicable to all those groups.

Q. Alright.

A. So what Saranac did was to use the highest level that was tolerated.

Q. But . . . But with a consciousness . . . "goal" was probably an unartful term. And you write the way you tell it. With a consciousness, with an idea, that "Gee, "Gee, us Owens-Illinois guys, we'd like to know about this not only for our guys here, our employees, but also because we're going to be sending this stuff out and hopefully selling it, and others out there will be working with it."

A. So the question is, was the purpose of the study to get information to be useful for both of those groups?

Q. That's the point, not the . . . The word "goal" was a very unartful term. But the purpose of the study was for the two (2) different catogories of employees, the workers in the plant and the workers out there somewhere?

A. The purpose was to evaluate the potential inhalation hazard, to apply that information to Owens-Illinois employees and others who would use it.

Q. Both subsets?

A. Yes, sir.

Q. Both the users in the plant -- the workers in the plant and the workers out in the field?

A. Yes, sir.

Q. Instead of the word "goal", give me a better word for that then. You corrected me when I used the term "goal".

A. What is the RST, is that what that is?

Q. "Test for . . .

A. I'm sorry, test.

Q. (Cont'g) . . . Owens-Illinois workers and applicators and users." I just want to make this . . . Don't need to spend a lot of time on this, but I think we both agree on this concept.

A. Okay. The purpose of the study . . .

Q. Yeah.

A. (Cont'g) . . . was to test the material to determine the potential hazard. It wasn't specifically to look at each of these groups, but it was to be applied to both of those groups.

Q. Okay. So let's use the word "application".

A. Okay.

THE COURT: Ladies and gentlemen, at this time I want to again caution you, please do not discuss this case among yourselves or with anyone else, and please have no

contact with the parties and/or their attorneys.

At this time I ask you to be back upstairs at 1:15. 1:15. The jury is excused. Everyone else remain seated.

(Whereupon, the jury cleared the Courtroom, after which the following proceedings were had out of the presence of the jury:)

THE COURT: Again, Doctor, let me indicate to you, do not discuss your testimony with anyone until you resume the stand, do you understand that?

THE WITNESS: Yes, sir.

THE COURT: Nothing further, the Court's in recess until 1:15.

* * * * *

(Whereupon, a recess was had.)

AFTERNOON SESSION

(The trial was resumed pursuant to the recess, there being present the same parties as heretofore noted, including the defendant and counsel.)

* * * * *

DOCTOR RAYMOND HARBISON

resumed the witness stand, and having been previously duly sworn, continued to testify as follows:

* * * * *

CROSS EXAMINATION (CONT'D)

BY MR. LIPMAN:

Q. A couple final areas, Doctor Harbison. We had . . . We had talked before the lunch break that the Saranac studies and documents and the flow of correspondence was kind of directed to the two (2) categories of employees. They realized the studies were done, but the employees at the Owens-Illinois plant and also with an eye of addressing the end users, the applicators, the guys like Chris Carlson, outside of the plant?

A. Well, I don't think the correspondence was directed that way. It was the request of -- of Owens-Illinois to have studies which could address those areas.

Q. More artfully stated. We're on the same page though. So what -- what steps in terms of safety measures did Owens-Illinois take for the workers at the plant? Or what safety measures were at least discussed or at least contemplated, if we don't know if they actually took them?

A. Well, based upon the studies, and based upon the air measurements . . .

Q. Yes, sir.

A. (Cont'g) . . . what they did is had health and safety meetings and discussions about the employees and continued the medical surveillance program for those employees.

Q. And I read about some suggestions, and you probably did as well, exhaust fans in the box loading area?

A. Yes, sir.

Q. I think they used the term "wetting down" after the application of the dust?

A. Yes, sir.

Q. There were some suggestions thrown out?

A. That's correct.

Q. Uh, do you know of any safety measures that Owens-Illinois formulated, based on what you read, for the Chris Carlsons out there, for the applicators or for the end users?

A. I . . . I don't have any information about other users.

Q. We use the word "applicators". I think we're using an "end user" there. In . . . In that period of time, back between '48 and '58, the U.S. Bureau of Mines had respirators that were approved by that organization, is that correct, based on your general knowledge of the time period?

A. I do not know the answer to that.

Q. Uh, so we can expedite this, I furnished you -- Madam Clerk provided me with Joint Exhibit -- Parties Exhibit 11.

MR. LIPMAN: Counsel, that's 10-30-48. Now that I'm over, I'm getting used to the cross reference. That's

Mr. Hazard's Exhibit 8 in the deposition. Do you have that in front of you? Both, your counsel?

MR. HENDRICKSON: Yes. Yes, sir.

MR. LIPMAN: Got it?

MR. HENDRICKSON: I do.

MR. LIPMAN: Okay. That's interim report, Parties Exhibit 11, for the Court Reporter.

CROSS EXAMINATION (CONT'D)

BY MR. LIPMAN:

Q. Interim report regarding the biological activity of Kaylo dust to the Owens-Illinois Glass Company, Saranac, October 30, 1948. And what I'd like you to do is turn to page 4 -- 5. Now, do you recall seeing the reference to the fact that -- that it appeared that even a very small number of fibers -- I think that is found in dust that, "It appears that very" -- then into page 6 -- "very small number of fibers are capable of producing asbestosis, although the experiment of the lesions is delayed." Do you recall that reference in the Saranac study, Doctor Harbison?

A. The . . . I'm sorry, the exhibit I have is not -- is not the same as that one, right? This one's retyped?

Q. Yeah, probably on a different page. You got it?

A. I can just do it to mine if you tell me what the Hazard number is.

Q. Hazard 8. Yeah.

A. Yes, sir.

Q. We can figure this out with the Clerk tomorrow -- later. We're missing a page I think.

Uh, you recalled that reference, did you not? The fact that even very small numbers of asbestos fiber were capable of producing asbestosis?

A. Well, it says "certain investigations have indicated that a seemingly negligible proportion of fibers, asbestos, is sufficient to produce the characteristic reaction."

Q. And that comports with your understanding of the -- the particular document that we speak of?

A. Yes, sir.

Q. You had indicated . . . Last question. You had indicated that -- that the overriding goal and purpose of this study when it was initiated was to determine whether or not the product was a hazardous industrial material, is that correct?

A. Yes, sir.

Q. Or something of that effect?

A. Yes, sir.

Q. And the conclusion of the 1948 report, and I read at page 6, and we're still at Joint Exhibit 11, reads, "Conclusions. Kaylo, because of its content of an appreciable amount

of fibrous chrysotile." Now, that would be, Doctor, the -- the asbestos element in the product?

A. Yes, sir.

Q. (Cont'g) . . . "is capable of producing asbestosis and should be handled as a hazardous industrial dust." Do I read that correctly?

A. Yes, sir.

Q. And does that comport with your reading and study of this particular exhibit?

A. Yes, sir.

Q. "Capable of producing" . . . Give me the -- I don't have it in front of me -- the language. "Capable or producing asbestosis and to be considered," or . . .

A. "And should be handled" . . .

Q. "And should be handled" . . .

A. (Cont'g) . . . "As a hazardous industrial dust."

MR. LIPMAN: I have no further questions. Thank you, sir.

MR. HENDRICKSON: Brief redirect, Your Honor.

THE COURT: You may.

* * * * *

REDIRECT EXAMINATION

BY MR. HENDRICKSON:

Q. Now, Doctor Harbison, Owens-Illinois knew that in

guinea pigs after thirty-six (36) months of exposure to a hundred fifteen million (115,000,000) particles per cubic foot of air of asbestos dust from Kaylo that those guinea pigs could develop asbestosis, right?

A. That's correct.

Q. Okay. Owens-Illinois also knew that the threshold limit value for asbestos dust was five million (5,000,000) particles, is that correct?

A. Yes, sir.

Q. Okay. So what Owens-Illinois did then was to take the studies and apply it to the TLV, is that correct?

A. Yes, sir.

Q. Tell the jury what conclusions can be drawn from that test result when you consider the TLV of the day.

A. That the test demonstrated that at high concentrations, a hundred million (100,000,000) particles per cubic foot of air, that you could produce asbestosis. But the TLV, the threshold limit value, that level at which or below which no adverse effects would occur was five million (5,000,000) particles per cubic foot of air. It was a very large safety margin between those two (2), and that the standard practices of the five million (5,000,000) particles was appropriate. And Owens-Illinois went farther and used the advise of Saranac to continue to look at those employees by medical examination

of those individuals continuously.

Q. Okay. So what Owens-Illinois knew was, was then when guinea pigs were exposed to a hundred fifteen million (115,000,000) particles per cubic foot of air for thirty-six (36) months, eight (8) hours a day, six (6) days a week when they are stirring up the dust, or twenty-four (24) hours a day for thirty-six (36) months, that that Kaylo would be considered toxic at that level?

A. That is correct.

Q. And that's what they were referring to in their report? Is that correct?

A. That's correct.

Q. Alright. And the only disease that they are talking about as far as toxicity in the reports was asbestosis, correct?

A. That is right.

Q. And, Doctor, the reports didn't make any mention . . . In fact, when you are looking at the toxic effects one would conclude, would they not, Doctor, that Kaylo was not -- would not be considered toxic in substance for causing the diseases of lung cancer or mesothelioma?

A. That's correct.

MR. HENDRICKSON: That's all I have.

THE COURT: Counsel?

* * * * *

RECROSS EXAMINATION

BY MR. LIPMAN:

Q. And, Doctor, to the extent of your knowledge, Owens-Illinois placed no warning label on its Kaylo product to indicate to applicators and end users that if you are around dust above five million (5,000,000) particles per cubic feet you've got a potential problem?

A. That's correct.

MR. LIPMAN: Thank you, sir.

MR. HENDRICKSON: He may be excused.

THE COURT: Nothing further, you're excused.

THE WITNESS: Thank you.

MR. HENDRICKSON: Thank you, sir.

(Whereupon, the witness was excused.)

* * * * *

* * * * *

(Whereupon, on the 12th day of March, 1993, the above-styled matter was adjourned.)

* * * * *

STATE OF WEST VIRGINIA,

COUNTY OF MARION, TO-WIT:

I, MARY L. RADCLIFFE, OFFICIAL COURT REPORTER FOR THE CIRCUIT COURT OF MARION COUNTY, WEST VIRGINIA, DIVISION II, DO HEREBY CERTIFY THAT THE FOREGOING PARTIAL PROCEEDINGS IN THE CASE OF DOROTHY CARLSON, AS A PERSONAL REPRESENTATIVE OF CHRISTOPHER CARLSON, DECEASED, PLAINTIFF, VERSUS OWENS-ILLINOIS, DEFENDANTS, CIVIL ACTION NUMBER 91-C-647, WAS CORRECTLY TAKEN BY ME IN SHORTHAND NOTES OR CHARACTERS ON THE 12TH DAY OF MARCH, 1993, AND TRANSCRIBED TO THE BEST OF MY SKILL AND ABILITY FROM SAID SHORTHAND NOTES OR CHARACTERS ON THE 14th DAY OF MARCH, 1993.

GIVEN UNDER MY HAND THIS 14 DAY OF MARCH, 1993.

OFFICIAL COURT REPORTER