3132429

IN THE CIRCUIT COURT FOR BALTIMORE CITY

IN RE: BALTIMORE CITY	*	April 5, 1994
ASBESTOS LITIGATION	*	Trial Cluster
	*	Judge Edward
RALPH D. GARRETT, et al	*	Angeletti
Plaintiffs	*	
vs.	*	Case No. 94095701
ACandS, INC., et al	*	
Defendants	*	

EXCERPT OF THE OFFICIAL TRIAL TRANSCRIPT

TESTIMONY OF RAYMOND HARBISON, Ph. D.

The Presentation of the Defendants' Evidence in the above-entitled action was held on Tuesday, June 21, 1994, commencing at 9:30 a.m., in Courtroom 3, Courthouse East, Baltimore, Maryland 21202, before the Honorable Edward J. Angeletti, and reported by Sharon Mech, a Notary Public.

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APPEARANCES:

On Behalf of the Plaintiffs:
David Palmer, Esquire
Peter Nicholl, Esquire
Shepard Hoffman, Esquire
William Burgy, Esquire
Ann Ritter, Esquire

On Behalf of the Defendants:
F. Ford Loker, Esquire
Leigh Halstad, Esquire
Deborah Robinson, Esquire
Denise Moretz, Esquire
Laurence Hooper, Esquire
Christopher Emsley, Esquire
Nancy Leibowitz, Esquire
Warren Weaver, Esquire
Douglas Pfeiffer, Esquire

Also present: Carrie Blackburn, Law Clerk

BEGIN EXCERPT

Whereupon,

RAYMOND HARBISON, Ph.D.,

a witness produced on call of the defendants, having first been duly sworn, was examined and testified as follows:

THE CLERK: You may be seated.

Please state your name and address for the record.

THE WITNESS: My name is Raymond Harbison. My address is Progress Center, One Progress Boulevard, Alachua, Florida.

DIRECT EXAMINATION

BY MS. MORETZ:

Q Dr. Harbison, what is your profession?
A I am a pharmacologist and a toxicologist.
Q And where do you practice those two disciplines?
A I practice in the State of Florida, and also in Little Rock, Arkansas, as well as the rest of the country.
Q Are you married, sir?
A Yes, I am.
Q And do you have any children?
A I do.
Q How many children do you have?
A Four.
Q Could you tell the jury briefly about your educational background, Doctor.
A I received a bachelor of science degree in pharmacy from Drake University in 1965.
I then received a master of science degree in pharmacology from the University of Iowa in 1967.
And I subsequently received a doctorate in pharmacology and toxicology from the University of

Iowa College of Medicine in 1969.

Q Are you board certified in any discipline?

A I am.

Q What discipline is that that you're board certified in?

A I am board certified in toxicology.

Q Are you a medical doctor?

A I am not.

Q The jury has heard about board certification for medical doctors.

Could you explain board certification for a toxicologist.

A Board certification for a toxicologist is similar to the certification for a medical doctor, that is, it establishes a set of qualifications and knowledge, a criteria that you have to meet in order to be able to practice toxicology.

Q Doctor, have you written any books with regard to pharmacology and toxicology?

A I have published many articles with regard to pharmacology and toxicology, approximately 130.

Q Have any of those articles dealt specifically with asbestos?

A I don't believe any of them have dealt specifically with asbestos.

Q Can you tell the jury a little bit about the topics that you would have written about in the articles that were published.

A The articles that were published were articles concerning research that I have conducted with regard to the testing of a variety of substances, chemicals such as hydrocarbons, metals, such as lead, for example, or mercury, and then also drugs.

And the articles are reports of the testing of these substances for their harmful effects, as well as for their beneficial effects.

Q Were those articles published in peer review journals? The jury has also heard that term.

A These articles are published in peer review journals, meaning that a group of peers, other toxicologists or pharmacologists, would review the experiments, also the results and the conclusions that

would be reached from those results, to determine that they're consistent with what's known about in science and medicine at the current time.

Q Do you belong to any professional societies or organizations, Doctor?

A I do.

Q What are some of those societies or organizations?

A I belong to the Society of Toxicology, the Teratology Society.

Q Would you tell us what that involves, Doctor?

A That's the group that studies birth defects.

The Society for Risk Analysis, the American Society for Pharmacology and Experimental Therapeutics, and also the American Association for the Advancement of Science.

Q Could you tell the jury about the Society for Risk Analysis, what's studied within that society or what that involves.

A The Society for Risk Analysis has an

objective of enhancing or improving our ability to assess the risks or hazards associated with exposure to various chemicals or substances.

That is, to develop methodology and testing procedures, evaluation procedures that will allow us to better evaluate potential risks and hazards to protect public health, and also to improve product safety or the safety of the materials that we use in our homes.

Q You mentioned risk assessment. Is that a part of the practice of toxicology?

A Yes, it is.

Q Could you describe for the jury just generally what it is that a toxicologist does.

A A toxicologist is a specialist in determining the harmful effects that substances produce in the living system.

Toxicologists test materials for their potential toxicity or harmful properties, evaluate what sort of adverse effects chemicals or substances may produce, and then also apply that knowledge to the

protection of individuals in the workplace, for example.

That is, by knowing what a substance can potentially do or the harm that it can produce, by knowing the concentration or the amount that it takes to produce that harm, a toxicologist can subsequently use that information to set guidelines or standards in the workplace.

For example, around your home or the soil that would be around your home, to set standards for exposure to chemicals that will not result in harmful effects.

So the toxicologist tests the material, identifies the harmful effects, subsequently takes that information and uses it to protect public health or to improve public health.

Q Would your work as a toxicologist include reviewing studies done by others and conclusions made by others as a result of the studies?

A Yes, it would.

Q What organizations would ask you to do that

kind of study? Who would you be working for as a toxicologist in doing that kind of work?

A I would be reviewing information for the National Institutes of Health. The National Institute of Occupational Safety and Health. The National Institute of Environmental Health Sciences. The National Institute on Drug Abuse.

Also, the United States Environmental Protection Agency. United States Department of Agriculture.

All of these entities would require the evaluation of toxicological information and data, both to determine what research ought to be done in the future, as well as what substances should be controlled in the environment, both in the environment in which we live as well as the workplace.

So those would be some organizations.

Q All of those organizations that you just listed for us, NIH and NIOSH, are those government organizations, United States Government?

A Yes, ma'am.

Q Would you tell the jury about some of the advisory panels that you serve on or sit on.

A I have served as an advisor to the National Institute for Environmental Health Sciences -- this is one of the institutes of the National Institutes of Health that focuses on environmental matters -- in environmental research.

That is, to better understand the potential harm or hazards associated with pollution, chemicals that would be found in your environment, to identify the potential harmful properties, as well as to ultimately help develop public policy for protecting against or controlling the exposure to those substances.

I have also served as an advisor to the National Institute of Occupational Safety and Health -- this is the group that serves as a research arm of the Occupational Safety and Health Administration -- to develop information about chemicals in the workplace, to set standards or guidelines for those chemicals in the workplace; that

is, chemicals and the levels of chemicals to which one could be exposed without producing any harmful effects.

I have also served for approximately 18 years as an advisor to the United States Environmental Protection Agency, providing advice to emergency rooms, to emergency response personnel, for chemical releases, chemical spills that would occur as a result of a truck accident or a barge or a ship accident or an airplane crash.

In addition, providing information with regard to the potential hazards associated with hazardous waste and the investigation of those materials in the environment.

Those would be the general areas of advice.

Q Have you ever served as a consultant to the Department of Justice?

A I have.

Q And what would they ask you to do as a consultant for the Department of Justice?

A For the Department of Justice, I have

provided consultation and testimony in enforcement actions to enforce the public laws with regard to environmental pollution, and have also assisted the Department of Justice in evaluation of their own environmental claims, for example, at the Department of Defense and other facilities.

Q Do you teach?

A I do.

Q Where do you teach?

A I teach at the University of Florida. I also teach at the Medical College of Wisconsin, and I also provide continuing education.

Q At the University of Florida, what is your position?

A University of Florida, I am a professor. I am a professor of pathology, pharmacology in the medical school, and also a professor of toxicology at the Health Science Center.

Q What is involved in being a professor of pathology? Who do you teach?

A As a professor of pathology, I teach

second-year medical students. I teach second-year medical students chemical carcinogenicity, or the causes of cancer. Also the mechanisms by which chemicals can cause cellular transformation.

And I teach them generally about cancer, its causes, and particularly chemical causes.

Q Do you teach students other than medical students at the University of Florida?

A I do.

Q What sort of classes do you teach, or in what area do you teach other than medical?

A I would also teach graduate students. These are students that would be pursuing a graduate degree in pharmacology or physiology or one of the basic medical sciences. I teach those students toxicology.

Q Do the courses that you teach, either to the medical students or to the graduate students that you just described, do they deal with asbestos at all?

A Yes.

Q In what way would you deal with asbestos in teaching these particular courses?

A Asbestos would be taught to second-year, or information about asbestos would be provided to second-year medical students, both in pathology as well as in pharmacology. I teach the toxicology portion of pharmacology.

And it would be included in the general discussion of pneumoconioses, that is, substances that are nonabsorbable dust or particles which, if they are inhaled into the lung, can over some long period of time, if the level is sufficient, produce pulmonary fibrosis.

Q Have you held other teaching positions at other universities?

A I have.

Q What universities have you held positions at?

A Dulane Medical School, Vanderbilt Medical Center, and also the University of Arkansas, Medical Sciences.

Q The jury has heard the term or heard from an industrial hygienist.

Have you had experience in the area of industrial hygiene?

A I have.

Q Are you an industrial hygienist?

A I am not an industrial hygienist.

Q How would you have had experience in industrial hygiene?

A Part of the practice of toxicology involves industrial hygiene, that is, the measurement of various chemicals in various places in the workplace.

So that, as part of the practice of toxicology, I would frequently evaluate the levels of substances in the air, evaluate the exposure that would occur as a result of those various levels of chemicals in the air, and then also provide recommendations or advice with regard to the potential hazards or some sort of remediation or change that could be made to protect the individuals against those exposures.

Q All right. The jury has also heard the term threshold limit value.

Do you use the threshold limit values as a toxicologist?

A I do.

Q How would you do that? How would that come into play in your practice of toxicology?

A The threshold limit value is the concentration to which an individual can be exposed over a long period of time without producing any adverse effects.

So as a toxicologist I would use the threshold limit value, as well as other numbers or other concentrations, to determine whether or not a particular individual or group of individuals is being exposed to a potentially harmful level of a particular substance.

So the threshold limit value would be used in the practice of toxicology as a guideline to determine whether or not a particular workplace is hazardous or not hazardous.

Q Do you also do research?

A I do.

Q Could you tell the jury about some of your current research projects.

A Currently I am being funded by or supported by the National Institute of Environmental Health Sciences to study the harmful effects of a variety of chemicals on the living system, particularly trying to evaluate how chemicals produce their harmful effects and how there may be differences between laboratory animals, for example, and people and how we can best evaluate the usefulness of animal testing data and how we can improve the usefulness of animal testing data and improve its use in the risk assessment process.

Q You mentioned the term living systems. What do you mean by that?

A Living systems would be experimental animals, for example, mice, rats, rabbits, guinea pigs.

Those would be models that would be used for testing, in addition to humans would be used on some occasions, depending on what the testing is and the design of that test.

Q When would humans be used in testing -- different chemicals or drugs, I assume you may be referring to?

A Either chemicals or drugs. Humans would be used, for example, in testing the potential irritancy of a substance by using patch testing or by rubbing it on the skin, for example. These would be volunteers. These would be volunteers who would be advised of the potential dangers associated with that testing.

Humans would also be used for evaluating exposure by exposing humans to some chemicals and looking at the amount of that chemical that would be absorbed into the body.

Those would be some occasions in which humans would be used. But most occasions it would not be appropriate to use humans, so in those instances laboratory animals would be substituted for the humans in that testing.

Q Doctor, have you managed and/or conducted animal studies yourself?

A I have.

Q For what purpose would you have managed or conducted these animal studies?

A For a variety of purposes. One would be to identify the potential harmful effects of the chemicals; that is, to determine whether they can produce any harm or not.

Also, for evaluating the mechanisms by which a chemical produces the effects that it produces to determine whether or not that information could be extrapolated to humans.

And then also for evaluating the potential carcinogenicity or teratogenicity, that is, the ability to produce birth defects or cancer would have also used laboratory animals for those purposes.

Q Other than your employment at the University of Florida, do you have a private practice or do you have other employment?

A Yes, I have a private practice of toxicology.

Q And what does that normally involve?

A That would involve providing consultation to

various governmental agencies, as well as industry.

It also involves the development and management of medical surveillance programs, that is, the evaluation of individuals who would be exposed to chemicals, following those individuals over long periods of time, making sure that they are suitable for various activities, such as emergency response.

And then also evaluating pathological specimens, evaluating blood levels of various chemicals.

That would all be part of the practice of toxicology.

Q You mentioned medical surveillance.

What sort of medical surveillance activities are you involved with?

A The medical surveillance activities that I am involved with would be for emergency response personnel, primarily contractors of the United States Environmental Protection Agency. These would be individuals who respond to chemical accidents or chemical spills.

These would also be individuals who investigate hazardous waste sites, all of whom have potential exposure to hazardous substances or hazardous materials.

To evaluate them prior to that employment. To evaluate them annually during that employment to make sure that there is no excess exposure that is resulting in disease or harmful effects.

And then also evaluating them prior to leaving that employment to make sure that they're okay or healthy when they leave that particular employment.

Q Have you testified in the past at the request of Owens-Illinois?

A I have.

Q Do you recall how many times you have testified on behalf of Owens-Illinois?

A I believe it was three times.

Q Have you testified as an expert with regard to areas other than asbestos?

A I have.

Q Okay. In the courtroom setting like we are

here today?

A That's correct.

Q Have you also testified in the past on behalf of plaintiffs in the lawsuits?

A I have.

Q What is the charge for your time?

A $175 per hour.

Q Doctor, I had you define toxicology. You also mentioned that you were a pharmacologist; is that correct?

A That is correct.

Q Could you define that term or tell us what that involves.

A Pharmacology is the study of the beneficial effects of substances or chemicals on the living system, and toxicology is the study of the harmful effects of chemicals on the living system.

Q How are the two fields related, toxicology and pharmacology?

A Well, they are related in that the -- both disciplines rely upon the dose response relationship,

that is, how much of a chemical it takes to produce a particular effect.

As a pharmacologist, I'm interested in that dose or that amount which will produce 100 percent effect or produce an effect in 100 percent of the people that are exposed to that particular material.

For example, if I develop a medication to control blood pressure, I want to be sure that whenever the physician administers a certain amount of that material, that in 100 percent of the people that receive that material, the blood pressure will be lowered.

So in the instance of pharmacology, I'm interested in the 100 percent response.

As a toxicologist, I'm interested in that concentration or dose that doesn't result in any adverse effect.

So I'm interested in the other end of the dose response curve. I'm interested in that concentration or dose of exposure to a chemical that does not result in an adverse effect or harm in those

individuals who might be exposed to that, so the relationship is the dose response relationship.

Q Have the disciplines of pharmacology and toxicology always been separate, or at one point were they combined as a profession?

A They have always been separate, and certainly pharmacology is a much older discipline than is toxicology.

Q When did toxicology become an accepted science or discipline?

A Toxicology emerged as an identifiable discipline around the 1960s.

Prior to this time, the interest in toxicology was primarily as a result of the development of drugs, that is, what were the side effects or the toxicities or the harm that would occur as a result of taking certain beneficial substances. These are called side effects.

So prior to that time, the interest was really in development of drugs, and it wasn't until the '60s that there was an interest in environmental

exposure, occupational exposure, and that's when toxicology became a separate and identifiable discipline.

Q You mentioned earlier, I think, that, as a toxicologist and a pharmacologist, that it was usual and a customary part of your job to review studies done by others; is that correct?

A That is correct.

Q What factors, when you're reviewing those studies, do you look at to determine whether or not the study is a valid study or the conclusions are valid? What do you look at or look for?

A In reviewing a study, you would look at, first of all, the objective, that is, what was the study intended to show or to find out. So the objective is important.

And based upon identifying what the objective is, that is, if it is to determine the potential harmful effects of a substance, then one looks at the experimental design.

That is, is the design, the animals to be

used, the exposure of the animals, is that all suitable to develop or to produce information that would ultimately be useful in evaluating the objective, in this case determining whether or not it would produce harm.

Then subsequently evaluating the data that is produced, that is, once one conducts the test with the experimental design that has been adopted, are the results results that are reliable, and then ultimately the conclusion that is drawn from that study, is it consistent with the data that has been generated as a result of that particular experimental design or study.

So one would, first of all, look at the objective, then whether or not an appropriate experimental design was developed to meet that objective, and then whether or not appropriate results were obtained, and then whether or not the conclusion would be a conclusion that is consistent with those results that were obtained during that experimental design.

MS. MORETZ: Your Honor, at this time we would offer Dr. Harbison as an expert in pharmacology, toxicology, and as an expert in the testing of products regarding their toxicity.

THE COURT: Mr. Hoffman, any cross-examination on that issue?

MR. HOFFMAN: Yes. Thank you, Your Honor.

VOIR DIRE EXAMINATION

BY MR. HOFFMAN:

Q Dr. Harbison, good morning.

A Good morning.

Q Doctor, now, am I correct that none of the articles which you have published in any of the scientific journals deal with asbestos-related disease?

A I believe that is correct, yes, sir.

Q Have you submitted any chapters to any textbooks which have been published of any kind, any chapters on any subjects in any textbooks?

A Yes, sir.

Q Do any of the chapters you have submitted to

textbooks deal with asbestos-related disease?

A No, sir, I don't believe so.

Q Have you edited or authored any textbooks in their entirety?

A I have not.

Q Now, have you ever participated in doing any air monitoring or dust counting for the presence of asbestos in the air?

A I don't believe so.

Q Have you ever conducted or participated in conducting any animal inhalation experiments, and by that I mean experiments where animals were given a substance to breathe and where the results of the animal experiments were then looked at?

Have you ever conducted animal inhalation experiments?

A Yes, sir.

Q And when was the first time you conducted any animal inhalation experiments?

A It would have been about 1970. Around 1969, 1970.

MR. HOFFMAN: Your Honor, if I may approach the witness.

Q Doctor, do you recall testifying in a case where -- in Baltimore City called Abate vs. ACandS?

A I don't recall that, no, sir.

Q Let me show you page 35 of that deposition, sir, and ask you to take a look at the first question and answer there.

Do you see that?

A I do.

Q Am I correct, sir, that at the time of this deposition, which I think was, what, 1991, you were asked at the time, have you ever conducted any animal inhalation experiments personally, and your answer was that no, you had not?

A That is correct.

Q And if you will look back on the previous page, sir, you were asked questions about whether you had ever conducted any animal inhalation studies when you were doing your post-graduate training; is that correct?

A That is correct.

Q The answer, again, was that no, you had not conducted any animal inhalation studies; is that correct?

A That's correct, I have not personally.

Q In fact, you have not conducted any animal studies at all with asbestos; is that correct?

A That is correct.

Q Thank you. You do not consider yourself an expert in the field of what's referred to as mineralogy; is that correct?

A That is correct.

Q Early on in this case we had a scientist named Arnold Brodie here testifying.

Are you familiar with Dr. Brodie?

A I am not.

Q We also had a scientist -- physician testify named Victor Roggli.

Are you familiar with him, sir?

A I am.

Q Let me ask you this: Are you a member of

the American Conference of Governmental Industrial Hygienists, the ACGIH?

A I am not.

Q The past chairman of the ACGIH, Dr. John Dement, was here testifying, actually has yet to finish.

Are you acquainted with Dr. Dement?

A No, sir, I am not.

Q You were asked some questions about consulting work that you have done for government agencies.

I would like to ask you some questions about consulting work done for chemical companies, if I can.

You have consulted for and been an expert witness on behalf of a chemical company called Merrill Dowell; is that correct?

MS. MORETZ: Objection, Your Honor. That's outside the scope of the purpose of this examination.

THE COURT: Overruled. It goes to the voir dire as to whether or not Dr. Harbison is an expert.

Go ahead, please.

Q I'll back up.

Counsel for Owens-Illinois, I believe, asked you, sir, if you have testified in other areas beside asbestos, and you answered yes, didn't you?

A Yes, sir.

Q You testified for a chemical company named Merrill Dowell; is that correct?

A Yes, sir.

Q And in the case of Village of Wilsonville, you testified as an expert on behalf of an operator of a chemical waste dump; is that correct?

A Yes, sir.

Q And you have testified on behalf of numerous other chemical companies, perhaps as many as 30 times, in various trials around the country?

A Yes, sir. I don't consider it testifying on behalf of, but I have certainly testified in all those matters.

Q Well, you were retained by the lawyers for the chemical companies and called by them as a witness in the trial.

A That is correct.

Q Finally, Doctor, as I understand it, in this case you have been given documents by the lawyers for Owens-Illinois and asked to review them; is that correct?

A Yes, sir, that's correct.

Q You have absolutely no personal knowledge whatsoever of anything that happened at Owens-Illinois during the time these documents were created; is that correct?

A That is correct.

Q So all of your testimony here today is based simply on going back through the documents from years gone by and looking at them and telling us about the documents to the extent that counsel asked you questions about them.

A That is correct.

MR. HOFFMAN: Your Honor, I have no objection to this witness in the field of pharmacology and toxicology generally, but I object to anything beyond that.

MR. PALMER: I just have one question.

THE COURT: Go ahead, Mr. Palmer.

VOIR DIRE EXAMINATION

BY MR. PALMER:

Q Doctor, you mentioned something about the TLV and what TLV was; is that correct?

A Yes, sir.

Q TLVs were promulgated by the ACGIH, American Conference of Governmental Industrial Hygienists?

A Yes, sir, that is correct.

Q Are you aware that the ACGIH has from time to time put out textbooks and articles and publications about TLVs and what the TLVs are?

A Yes, sir.

Q And you indicated that if there is a TLV concentration of some toxic substance below the TLV, that that would be a safe working condition?

A I have a little problem with your question.

Q That's fair enough. It's inartful.

I think you indicated that below a certain concentration, below a TLV, that that concentration

would be safe to humans; is that correct?

A Yes, sir.

Q Are you aware that the ACGIH has indicated that, with regard to the TLV, that there is no fine line between safe and dangerous concentrations?

MS. MORETZ: Objection, Your Honor. Beyond the scope of the purpose of this cross-examination.

THE COURT: Overruled.

A Yes, sir. I would agree that the threshold limit value is not a bright line between toxicity and safety because there is a margin of safety built into that number, so it would require concentrations well above a threshold limit value to produce --

THE COURT: Excuse me, Doctor. Perhaps I misunderstood, but I think you're answering a question that hasn't been asked.

The question was were you aware that the ACGIH said this. The answer would be yes or no, not an explanation.

MS. MORETZ: Your Honor, I think he was just explaining his answer. He did answer --

THE COURT: I don't think he -- maybe I missed it, but perhaps -- that's why I prefaced my remark with maybe I misunderstood.

Perhaps, Mr. Palmer, would you restate the question, please.

MR. PALMER: Yes.

Q You are aware, are you not, that the ACGIH has indicated that the TLV does not represent a fine line between dangerous and safe concentrations?

A And I said yes, and then I explained or tried to explain.

Q Doctor --

MS. MORETZ: May he be allowed to explain his answer, Your Honor?

THE COURT: I think he has,but if he wishes to say something further, he may do so. Sure.

A Then again, it's not a fine line, that is, if you go above the TLV, it doesn't result in toxicity. It would be orders of magnitude above that before some toxicity would be produced. I would agree.

Q And if it's below the TLV, depending upon the magnitude, an individual can also contract a disease from the substance even though it's below the TLV; isn't that correct?

A I would not agree with that.

Q You would not agree with that?

A No, sir.

Q Okay. Doctor, have you read any of the articles dating from the 1930s to the 1940s concerning asbestos-related disease?

A I have read some, yes, sir.

Q And are you aware of any articles, such as the one done in Pennsylvania by Fulton, where individuals have developed asbestosis being exposed to concentrations of asbestos below five million particles per cubic foot of asbestos dust?

MS. MORETZ: Objection, Your Honor. This witness has not been offered as a state-of-the-art witness and now we're getting into the area of state of the art.

THE COURT: Mr. Palmer, I think the

objection is well founded. I sustain the objection.

MR. PALMER: Thank you. I was just asking because he said no one gets sick below the TLV.

MS. MORETZ: Move to strike the comments of counsel, Your Honor.

THE COURT: The jury is aware that nothing that counsel says is evidence, so it's not necessary.

Q Doctor, have you ever tested any asbestos-containing insulation products to determine whether or not they were toxic or not?

A I have not.

MR. PALMER: Your Honor, I have no further questions.

THE COURT: The doctor will be permitted to testify as an expert in pharmacology and toxicology, period.

MS. MORETZ: Are you denying his ability to testify with regard to testing of products?

THE COURT: I said he will be permitted to testify as an expert in pharmacology and toxicology, period. Whatever those two subjects cover and those

two disciplines cover, he will be permitted to render opinions on.

MS. MORETZ: Very well, Your Honor. Thank you.

DIRECT EXAMINATION (Resumed)

BY MS. MORETZ:

Q Doctor, to start out with some general topics, you mentioned earlier the term risk assessment, and as a toxicologist, what do you mean by risk assessment?

And if it would be helpful to you, Doctor, to explain to the jury, the board behind you, there is a special marker and you can write on the board any of the terms that you need to use that should be defined or explained by using a chart.

A May I just do that?

THE COURT: If you would be kind enough, Doctor, to make the writing somewhat large so that everybody can see it.

A Risk assessment is the process by which risk is evaluated, risk being the hazard or the likelihood

that some adverse effect will occur.

In order to evaluate the risk, there are essentially two things that you need to know. You, first of all, need to know the toxicity of the substance, that is, what are the harmful effects that it can produce.

And you also need to know the exposure or the level of this material or the concentration of this material that it takes to produce those harmful effects.

So risk is equal to the toxicity times the exposure, so to evaluate risk, that is, whether or not some harm can occur as a result of a particular substance, you need to know what that substance does, the harmful effects it can produce, and the concentrations at which those harmful effects are produced in order to evaluate the potential hazard.

Q Does the concept of dose response play into risk assessment?

A It does.

Q And would you explain to the jury how the

concept of dose response plays into risk assessment?

A The dose response is the relationship between the concentration of material to which you would be exposed or someone could potentially be exposed and the response or the toxicity that is produced.

So if you look at the dose response relationship, this is the response and this is the concentration, at some levels of exposure or at some concentrations, the response would be produced, a bad response, a harmful response, and ultimately there will be a concentration at which no adverse effect is produced.

So to evaluate the risk, you use the dose response curve to identify that concentration that doesn't produce any response.

Remember, I talked about pharmacology and toxicology. As a pharmacologist, I'm interested in this end of the dose response curve, in which 100 percent of the individuals exposed would respond, have a beneficial effect.

With regard to toxicology, we're interested in the lower end of the dose response curve, or that concentration at which no effect is produced.

So essentially the dose response curve is the methodology by which a toxicologist can ultimately determine the risk by knowing what the response is, the potential adverse effect, and the concentrations at which they occur and the concentrations below which none of these effects or adverse effects will occur.

So the dose response relationship is critical in evaluating the risk.

Q Could you, Doctor, using a common example, such as aspirin, explain how the dose response relationship relates to aspirin, for example.

A Sure, with regard to aspirin, I'm sure that you all have seen advertisements, for example, in which, if you've had a heart attack and you take one aspirin a day, it can prevent a second heart attack.

So there is a dose that can be used for preventing this second heart attack.

I'm sure all of you have taken two aspirin

one time or another to relieve the pain of a headache, so that's another dose that produces an effect.

And I'm sure you know some people who have arthritis or a rheumatoid condition which may require 20 tablets of aspirin a day to relieve the joint swelling and the pain of the rheumatoid arthritis.

If you take 90 aspirin, you will die. So the relationship between the dose and the response for aspirin varies between a beneficial effect, either preventing a second heart attack, relieving the pain of a headache or relieving the joint swelling and pain, or if you take too much, it can produce harm or it can produce death.

Now, that concentration which doesn't result in any effect is, if you take the aspirin and you divide it into four pieces, and you took only a quarter of that aspirin, it would have no effect.

So that concentration below which no effect would occur would be a quarter of an aspirin. It would have no effect.

You need to take at least one to have the effect on the heart, you need to take two to relieve the headache, and then on up, and ultimately, if you take 90, it would produce a harmful effect.

So that is the dose response relationship. That is, some levels of aspirin have no effect at all, others can have beneficial effects, and still higher can have harmful effects.

Q Doctor, like the aspirin, are there other substances that are potentially toxic at certain doses and not at others?

A Well, essentially all substances can be toxic at some level of exposure, so the answer would be that all substances at some level of exposure can produce harm, and there are no exceptions.

Q Doctor, you mentioned or were asked about the threshold limit value a little bit earlier.

Does dose response play a role in threshold limit value or in determining threshold limit value?

A It does.

Q And can you explain to the jury how the two

are connected or related?

A To establish a threshold limit value, you take that concentration that doesn't produce any harmful effect and you lower it by some order of magnitude.

An example might be is if the concentration, for example, that didn't produce any effect was 10 milligrams, the threshold limit value would be developed by taking that 10 milligrams which produces no effect and lowering it further, for example, to 1 milligram, so the margin of safety in that case would be 10.

That is, you would take the level that doesn't produce any harm, lower it by a factor, in this case of 10, to develop a threshold limit value of 1, which then has a margin of safety built into it.

So that even if you went above that threshold limit value, it's not a fine line between having no effect and having some effect. You can go well above that threshold limit value and still not result in any adverse effect.

So the threshold limit value is based upon the dose response relationship in identifying concentration or dose that doesn't produce any harmful effect.

Q Is the term threshold limit value still used today, or is another term more commonly used?

A It would still be used today, but the permissible exposure limit would be that guideline that would be used, for example, in industry, predominantly because it would be part of the Occupational Safety and Health Act.

Q How are threshold limit values measured? Is it minutes, hours, days, months? How is that measured?

A It would be -- the threshold limit value would be measured over the day, and it's a time-weighted average.

It would be the average concentration over the day that would occur, and there would be excursions above the threshold limit value, and there would be excursions below the threshold limit value,

so it would be the time-weighted average throughout the day, or the average concentration throughout the day.

Q Is the day important, or is it the working lifetime of the employee or of the person exposed?

A It would be the working lifetime, but it would also be important to consider the date of the exposure.

Q Are you aware of what the TLV or the threshold limit value was for asbestos in the 1940s and 1950s?

A I am.

Q What was that?

A It was five million particles per cubic foot of air.

Q If the threshold limit value for asbestos is five million particles per cubic foot of air, does that mean that, if the TLV is exceeded, that that person will have adverse effect?

MR. HOFFMAN: Objection. It's beyond the scope of his expertise.

THE COURT: Sustained.

MS. MORETZ: Your Honor, as a toxicologist -- may I respond, please, Your Honor.

THE COURT: Go ahead.

MS. MORETZ: As a toxicologist, he uses the threshold limit value, he applies it in his practice, and I think that it's clearly within his expertise to testify with regard to the threshold limit value.

THE COURT: Hasn't he already stated what occurs above and below it?

Let's move on. Next question, please.

MS. MORETZ: Very well, Your Honor.

THE COURT: He's already stated that without having been asked that specific question.

Did I understand that correctly, Doctor? Didn't you explain that without being asked that particular question?

THE WITNESS: About the threshold limit value, above and below.

THE COURT: You explained that.

THE WITNESS: Yes, sir.

THE COURT: Next question.

MS. MORETZ: Very well, Your Honor.

Q What injuries or harms were the threshold limit values developed to protect?

MR. HOFFMAN: Objection. That's speculation.

THE COURT: Overruled.

Q Go ahead and answer.

A The threshold limit values were designed to protect against all injuries.

Q In evaluating or looking at the threshold limit values specifically for asbestos, or I think it applies or does apply across the board, are we looking at asbestos only, or are we looking at total dust counts?

MR. HOFFMAN: Same objection. It's beyond his expertise.

THE COURT: Overruled.

A For asbestos it would be for asbestos particles, so the five million particles per cubic foot of air would be for asbestos particles.

Q You mentioned that part of your work as a toxicologist has been involved in looking at chemicals or substances that are suspected to cause cancer; is that correct?

A That's correct.

Q Are there common things that we are exposed to that at low doses are no risk but at higher doses may be a cause of cancer?

A Yes, there are substances to which we are exposed to that are carcinogenic, and at those levels of exposure, there is a minimal risk or a nonmeasurable risk associated with those exposures.

Q What are some examples of substances like that?

A Some examples would be vinyl chloride. Vinyl chloride would occur as a result of the use of various plastics. For example, PVC pipe, water pipe, would contain the vinyl chloride monomer.

Things like vinegar in plastic bottles, those plastic bottles are made of vinyl chloride, and the monomer could be extracted and end up in vinegar.

Filling your car with gasoline, being exposed to benzene. Benzene is also a potential carcinogen.

Those would be some examples of exposure to carcinogens that would occur as a result of daily life activities.

Q What about coal tar?

A Well, coal tar contains polycyclic aromatic hydrocarbons, and coal tar is produced, for example, whenever you charbroil meats. It's also found in shampoos and other medicinal products.

For example, salves and lotions contain coal tar for medicinal purposes. Coal tar is also a suspect carcinogen.

Q You mentioned shampoo.

MS. MORETZ: I have with me a couple of bottles of shampoo, if you want to see them, counsel.

MR. HOFFMAN: I use the green one.

Q I hand those to you, Dr. Harbison. Do those particular products contain a cancer-causing, a potential cancer-causing ingredient?

A They do.

Q And what ingredient is that?

A That would be polycyclic aromatic hydrocarbons, which are a constituent of coal tar. They would be contained in both of these materials.

Q And what percentage of coal tar are in those two shampoos, and it's Denerex and Tegrin?

A In Denerex, it's 9 percent, and in Tegrin, it is 7 percent.

Q The level of exposure, if you were to wash your hair with those shampoos, does that present any risk to the user of those products?

A If you use this shampoo, there is no measurable risk associated with the use of this carcinogenic product because the exposure is at a level that is not likely to result in any dose that would increase the risk of cancer as a result of the use of this product.

Q Is there a warning label on that product with regard to the potential cancer-causing ingredient?

A There is no warning label with regard to the potential carcinogenicity of this compound.

Q So is it your opinion as a toxicologist there is no reason to be concerned in using that particular product, even though it has a known carcinogen in the product?

A There would be no reason to be concerned with regard to increased risk of cancer with the use of this product as prescribed.

Q Is that an example of what you're talking about with regard to dose response?

A It is.

Q Are there other common examples of substances that at high doses could be toxic or cause cancer that we deal with in our everyday lives?

A Sure. There are many examples of chemicals that at high concentrations or high doses can be toxic or produce harmful effects.

Q Should we, therefore, place warnings on all of those products and all of those substances?

A No, it would not be reasonable to place

warnings on those because the exposure, as a result of the use of those materials, would not result in a dose or in a concentration that would approach that concentration or dose that would be harmful or toxic.

Q Doctor, have you prepared some charts that you think would be helpful to the jury with regard to this dose response concept?

A I have.

MS. MORETZ: Your Honor, if we could set that up.

THE COURT: Why don't we do that, and you can set that up and do that after we take our morning recess.

MS. MORETZ: Very well. Thank you.

THE COURT: Ladies and gentlemen, we'll take our morning recess at this time, and when we return we will continue with Ms. Moretz' direct examination.

Dr. Harbison, you can step down. Don't discuss the matter with anyone because you're subject to cross-examination.

THE WITNESS: Yes, sir.

(Whereupon, the jury left the courtroom.)

THE COURT: All right. We will recess for about 10 minutes.

(Whereupon, brief recess.)

THE COURT: Be seated, please. Get the jury, please.

I don't think you want to go back there now. Perhaps you want to come up here and stand right behind this small desk, Doctor. That way you're out of the way of the jury and hopefully you'll be able to see and you can explain to the jury and use the pointer.

Ms. Moretz will be seated there. She will be playing Vanna.

Just make sure, if you would, that you don't lift that up without turning it off or you'll hurt your eyes.

(Whereupon, the jury entered the courtroom.)

THE COURT: Be seated, please.

Ms. Moretz, please.

BY MS. MORETZ:

Q Doctor, we were talking about some common substances that at low levels were not toxic and at higher levels were.

Let's just briefly talk about some examples of those, and I believe you prepared a chart with regard to that, is that correct?

A I did.

Q If you would, Doctor, explain the chart to the jury and in what -- can you see okay?

THE WITNESS: Could I move up a little closer to that chart?

THE COURT: Sure. Do you want to borrow Ms. Ritter's glasses?

THE WITNESS: No.

THE COURT: She left.

Q If you would explain that chart and the dose response as relates to that chart to the jury.

A Essentially all substances at some level of exposure or in some dose can produce harm.

Now, this chart demonstrates that for substances which I expect all of you have the

perception that it can't be toxic or produce harm. In fact, it can if the dose is high enough.

For example, water, the normal daily dose is about one and a half quarts. If you ingest 15 quarts of water, it can be toxic or it can actually produce death.

There are certain conditions in which people develop a desire for water in which they ultimately die as a result of the consumption of too much water.

Likewise, sugar, 25 teaspoons, teaspoonfuls per day. A thousand would be toxic or lethal.

Salt, I'm sure many of you are familiar with the potential toxicity of salt. If you take in too much salt, it produces high blood pressure. Normally you take in about three level teaspoonfuls per day. Sixty can be toxic.

Q Are there -- excuse me, Doctor. Let me interrupt you.

Using salt as an example, is salt made up of cancer-causing or toxic substances that are contained in table salt?

A Yes. A good example of another substance that I suspect all of you would think of as toxic would be cyanide, and oftentimes, if you look at the back of your salt shaker or the salt package that you get, it would say contains yellow prosate of soda.

Yellow prosate of soda is cyanide, and it's put in there as an anti-kinking agent, to prevent the salt from congealing or becoming hard.

Yet the dose is not sufficient to be worried about having toxicity from the cyanide because the level in there is too small to produce any adverse effect.

For coffee, two cups. Seventy-five cups can produce toxicity, and I'm sure many of you have read about or heard about its ability to cause arrythmias or it can cause various heart problems.

And then, finally, the aspirin we talked about, the 2 tablets, and 90 tablets would be lethal.

So this is an example of the dose response relationship, essentially for all substances, and there are no exceptions. Essentially, everything in

your life, other than light radiation and sound waves are chemicals.

So for all chemicals that are in your life, there are levels that can be harmful, but there are also levels that don't produce harm.

There are levels which you can be exposed to every single day without producing any adverse effects, and this demonstrates that dose response relationship.

Q Once the risk of a particular substance is recognized by a toxicologist, what kinds of things is that information used for once the risk is recognized?

A Once the risk is recognized, then that information can be used to develop guidelines for exposure such that the exposure will not result in the hazard or the harm that can be produced as a result of exposure to higher levels of that substance.

So once that hazard is identified, that information can now be used to control the substance and to prevent injury from occurring.

Q And hazards are identified through doing

studies, studies that you described previously, animal studies and human studies as well?

A That's correct.

Q Now, you have been asked by Owens-Illinois to review certain documents that have been referred to as the Saranac documents or the animal studies on the Kaylo; is that correct?

A That is correct.

Q You have not been asked to do a general review of the medical and scientific literature from a particular period of time; is that correct?

A That is correct.

Q Now, in doing the review of the Saranac studies on Kaylo, did you apply the same criteria that you discussed earlier or look at the same factors that you would look at in your everyday practice as a toxicologist?

A I did.

Q And have you formed opinions as a toxicologist with regard to the Kaylo dust studies done by Saranac in the 1940s and 1950s?

A I have.

Q First, Doctor, let me ask you about the Saranac Lake Laboratories. Was that a reputable organization?

A Yes, it was a reputable laboratory, and one of the few in the country that could conduct these kinds of studies, that is, to evaluate the potential toxicity as a result of inhalation of various substances.

Q What documents specifically or what did you review at the request of Owens-Illinois with regard to these Kaylo studies.

A I reviewed the deposition of Mr. Hazard and the attached exhibits to that deposition.

Q Doctor, I am going to hand up to you what has been marked previously in this case as Plaintiffs' Exhibit O-17, and it's Hazard Exhibit Number 1. Have you seen that document before?

A I have.

Q Can you tell the jury what that is? Give us the date, who it's to, who it's from.

A This letter is February 12, 1943, from Mr. Bowes to Dr. Gardner. Dr. Gardner is the director of the laboratory at Saranac Laboratories, and Mr. Bowes is the director of research for Owens-Illinois.

Q And you reviewed that letter in your review of the documents on the Kaylo studies; is that correct?

A That is correct.

Q What does this -- is this the first letter or the first communication that you have seen or was presented to you with regard to the Kaylo studies?

A I believe that's correct.

Q Okay. What does this first letter to Saranac reflect as to what Owens-Illinois wanted done as reflected in the letter?

MR. HOFFMAN: Your Honor, I object unless what we're going to do is read from the documents which all speak for themselves.

THE COURT: Overruled.

Go ahead sir.

Q You can go ahead, Dr. Harbison.

A What the document is requesting is that the new material, the Kaylo material, be tested to determine whether or not it can produce any pulmonary fibrosis or any problems in the lung as a result of exposure to this material.

So essentially, what this letter is doing is to establish the objective, and the objective is that, because this is a newly formulated material that contains a variety of constituents which can independently cause pulmonary fibrosis, the objective is to determine whether or not, when these materials are combined, they still have those properties or are still able to produce the pulmonary fibrosis or the lung problems.

So the objective, as set out in this letter, is they are requesting that Saranac Laboratory develop an experimental design to test whether or not this substance is capable of causing some pulmonary fibrosis or pulmonary damage or pulmonary changes or any toxicity as a result of exposure to these materials.

Q Were end users or the users of the product mentioned in that particular letter?

A Yes.

Q And how were they mentioned in that letter?

A They were mentioned in that Owens-Illinois was requesting this testing for the purpose of evaluating the hazards to their employees, as well as to the users of the product or the end users of the product, or in those individuals who would be in the field applying the product.

So their request for the evaluation of the hazard was not only for the employees at the Owens-Illinois facilities, but others as well.

Q If you mix materials together, do their effects change?

A They can.

Q And was that one of the objectives of the test, to determine whether the effects changed?

A Yes. In this process, there was a change in the physical properties of these materials in that there was now a gellation process that occurred that

encapsulated or perhaps made less available these materials as a result of the combination in which these materials were put.

So the objective was to determine whether or not, as a result of that change, there still were or were not hazards associated with this material.

Q I am going to show you what has been marked Plaintiffs' O-20, and this is Hazard Exhibit Number 3, and if you could, is that part of the correspondence and the reports that you reviewed?

A Yes.

Q Okay. Could you identify that letter, the date, who it's to and who it's from.

A The date of the letter is March 12, 1943, and it is from Dr. Gardner, director of Saranac Laboratories, to Mr. Bowes, the director of research at Owens-Illinois.

Q The jury has been read portions of that letter.

What does that letter reflect as to the importance of these Kaylo studies?

A Well, what this letter reflects is that there is a concern for the asbestos being in this product. However, the laboratory does not know whether or not it is in a form that can be inhaleable.

So what Dr. Gardner is referring to is that the asbestos may or may not be in such a form as to be inhaleable, and, therefore, his experimental design would be such that he will test as to whether or not this material can be inhaleable and ultimately result in some pulmonary injury or any other toxicity.

Q What is the significance of the dust being inhaleable?

A Well, the dust has to be inhaleable in order to get it into the lung. If it is not inhaleable and doesn't get into the lung, then the mere fact that it is there doesn't represent a hazard because it isn't a hazard until it gets into the lung.

Q Does that letter reflect any conclusions by the Saranac Lab as to the safety or the nonsafety of the product Kaylo?

A It does not.

Q From your review of those two documents, Exhibit 17, Plaintiffs' Exhibit 17, or O-17, and O-20, can you make any assumptions as a toxicologist as to the toxicity of the product Kaylo?

A No assumptions could be made at this time as to the toxicity of the product based upon this information.

Q Why not? Why couldn't you make any assumptions based on those two pieces of correspondence?

A Because, based upon the knowledge of the production of this material and the gellation process and the mixing of the materials together, that mixing could alter the ability of any of the constituents to produce --

Q Can you give the jury an example of how mixing the materials might change the toxic effect of a single ingredient?

A An example would be lead, lead which can produce toxic effects or can produce damage to the nervous system, as well as other effects.

Lead, for example, is a constituent of good crystal, so that the crystal that you would consume beverages from or store beverages in contains lead, contains about 20 thousand parts per million of lead.

And even though the lead is in that material, it's not likely that you would receive a sufficient dose of lead from that because, essentially, it is now encapsulated in the crystal or the glass and it's not available to be taken into your body.

So that would be an example of which you mix silica or sand together with lead to produce crystal or produce glass, and in this case, the lead, although, if it wasn't in there could potentially produce harm at those levels, the fact that it is now in this new mixture makes it not available for exposure or to get into the body and ultimately can't produce any adverse effects.

Q Did the Saranac Lake Laboratory ultimately perform tests on the product Kaylo as a result of the OI request?

A That's correct. They did.

Q Would you explain to the jury how Saranac set up those tests or how the tests were conducted.

A Well, what Saranac did is to initially look at the potential for the Kaylo material to produce lung damage, and the first set of tests was to inject the Kaylo material directly into the lungs of experimental animals.

The problem was that the particle size was too great, so it impaired the ability to inject the material directly into the lungs, so they had to grind it to make it into a smaller particle size.

When they ground it into a smaller particle size and ultimately injected it into the lungs of the experimental animals, because of its alkalinity, that is, its corrosivity, it resulted in the death of all the animals.

So it was an experimental design that was not very good because there wasn't any useful information that could be derived from that study.

Q Did Saranac report any conclusions as a

result of that particular test that was done that resulted in the death of all the animals?

A They did not.

Q And what did they do next? What was the next test that they conducted?

A Subsequently, what Saranac did was to design a study or a series of studies in which the animals would be exposed via inhalation to the particles of Kaylo or to the particulate of Kaylo, and the animals would be exposed over various periods of time to determine whether or not that exposure would result in any injury or any toxicity as a result of that exposure.

Q What types of animals did they use in the study?

A They used guinea pigs, hamsters and white rats.

Q And how did they go about exposing these animals to the Kaylo product?

A There was a device which suspended the Kaylo particles in the air and kept them suspended, and the

animals were put into a dust room or a room or enclosure in which these materials were suspended for various periods of time.

And the animals were left in that room, left in that room during the suspension of the particulate and also after the suspension of that particulate.

That is, they were left there for some period of time in which there was airborne Kaylo, that is, the suspension of the Kaylo was kept as a result of the apparatus that was used, and then subsequently, overnight or when there wasn't the air suspension, they still resided in that room. And this went on for some period of time.

So during the day, for eight hours a day they would be exposed to the suspended Kaylo, that is, a fan or apparatus was used to suspend it in the air, and then overnight there wasn't any suspension but they remained in the dust anyway because the dust would settle on the cages or in the room.

Q For these tests, not the injection test, but the inhalation test, was the material -- were the

animals exposed to the material as it was sent to Saranac, or did they have to grind that material as well?

A In some cases, they had to grind it, and in other cases they used it as it came to them, so it was used both ways.

Q You mentioned something that was used to keep the dust suspended in the air.

How did they do that?

A With fans, they basically kept it suspended in the air.

Q What level of exposure were these animals subjected to?

A The animals were exposed to levels generally in excess of a hundred million particles per cubic foot of air. They were generally around 115 to 120 to 125 million particles per cubic foot of air.

Q And were there any breaks in this exposure as far as giving them a break during the day, taking them out of the room, that sort of thing?

A No, it was continuous exposure throughout

the day during the eight-hour period.

Q Why was the test performed at such a high level of exposure?

MR. HOFFMAN: Objection. Calls for speculation.

THE COURT: Keeping in mind that it's the witness' opinion, I'll overrule the objection.

Q Go ahead and answer, Doctor.

A The high level was used because the testing would at that time have been to determine whether or not at any level of exposure there could be harmful effects produced.

So the general procedure would be to use the highest level that could be used without having all the animals die. And one of the problems that Saranac had is that rodents are obligatory nose breathers, they have to breathe through their nose, so that at very high levels of dust, it clogs their nose.

And so there was a high mortality because the levels were so high that many of the animals developed pneumonia, suffocated as a result of,

essentially, the dust clogging or blocking their nose.

So the reason that the high level was used was to try to maximize the likelihood of finding any adverse effects as a result of the exposure, so you would use the highest level that was possible.

Q And at this period of time when these tests were being conducted, what was the threshold limit value for asbestos?

A At this time it was five million particles per cubic foot of air.

Q Why did they use the different types of animals? Why not just use all guinea pigs or all white rats?

A Different species of animals would be used, such as the guinea pig or the rat, to look for a consistency of effect. That is, one species may develop an effect, and then a question would arise as to whether or not it was extrapolatable to other species.

So the reason that two species or three species were used, the guinea pig, the hamster and the

rat, was to look at the effect amongst different species to determine whether or not a consistent finding was observed.

And there are also differences between species. Differences in respiratory rates, that is, how much air is breathed in a certain period of time.

There's also differences in the anatomy and physiology of the lungs between various species. All of those would be reasons for using multiple species.

Q The differences that you just described, are those the same type of differences between the guinea pigs and the rats and human beings?

A Sure.

Q Do the rats and the guinea pigs that were used in the test have the same kind of defense mechanisms for breathing dust as humans do?

A No, there would be differences in the respiratory system between the rodents and humans.

Humans are upright and have an effective procedure, a mechanism for eliminating particles from the lungs called the mucocilliary escalator that is

able to remove particulate from the lung.

Rodents do not have such an effective mechanism, and rodents also are horizontal, that is, their lungs are horizontally located as opposed to upright, so there are physical and morphological differences.

Q Can the results of animal tests such as the Kaylo test be applied directly to humans?

A With regard to the Kaylo tests, they probably can be useful for estimating some risk, but probably can't be applied directly to humans.

Q In interpreting tests like the Kaylo test, is it significant to note the difference between the species, the animals tested and, for example, humans?

A Sure.

Q And why is that, as far as the results of your test?

A Well, because there may be mechanisms that differ between the species which would make the data not useful or less useful depending on what those differences are.

Q Who established the protocol for these tests? Was that something that OI was involved in, Owens-Illinois was involved in?

A Owens-Illinois was not involved in the development of the protocol. The protocol, or the experimental design was that of Saranac Lake Laboratories. Saranac Lake independently developed that experimental design.

Q The type of testing that was done on these guinea pigs and these rats, is that the type of testing that is common today?

A The testing, the inhalation testing, is difficult, expensive and is not very common today, and certainly was very rare during that period of time.

So the testing is, even by today's standards, difficult to perform. And there aren't very many of those studies that are performed because of the requirement, both for the physical facilities, as well as for the design, which is very expensive and very time consuming.

Q Doctor, I'm going to show you two more

documents, and they have been previously introduced as Owens-Illinois 30 and Owens-Illinois 53, and they were Hazard Exhibits 5C and 5D. These are Owens-Illinois exhibits.

If you could look at those, are those part of the documents that you reviewed?

A They are.

Q Could you identify what those documents are for the jury?

A These documents, it's a letter and a report regarding the status of the studies at this particular time. This is May 13th, 1946.

It describes what has been found to date and what the results of the studies are at this particular time.

Q And what was the status of the study, the Kaylo studies, as of May 13, 1946?

A At the present time, there was no adverse findings in the studies that could be reported at this time, so there was not a finding of any adverse effects at this particular period of time.

Q How long had the tests gone on at that particular period of time?

A For approximately 15 months.

Q And this experiment that had gone on for 15 months, is that the dust experiments of these guinea pigs and rats that were exposed to the Kaylo?

A That's correct. The animals would have been exposed for approximately 15 months, every day, six days a week, eight hours a day, to the Kaylo dust, from 100 to 125 million particles per cubic foot of air.

Q Does that document make a recommendation as to what should be done as far as continuation of the study?

A Yes, it does.

Q And what was the recommendation according to that document?

A The recommendation was that the exposure should be continued for at least another year.

Q Were the exposures and was the testing continued for another year?

A It was.

Q I am going to hand you what has been previously marked as Owens-Illinois Exhibit 32 and Owens-Illinois Exhibit 33, and these are Hazard Exhibits 6 and 6A, Doctor, and if you could take a look at those and tell the jury whether or not those are documents that you reviewed with regard to Kaylo studies.

A Yes, these are documents that I reviewed.

Q Okay. And could you identify those documents as to what they are.

A This is another report. This is a letter to Mr. Hazard from Saranac Lake in October, October 31 of 1947, and it is also accompanied by another report of the status of the animal testing at this period of time.

Q And how long had the tests been conducted at this period of time?

A In this case it would be 30 months for the guinea pigs and 18 months for the rats.

Q And what was the current status of that

test?

A At this period of time there were no findings of adverse effects as a result of either 30 months of exposure to the guinea pigs or 18 months of exposure to the rats.

Q What response was Saranac looking for in these animals? What were they testing for?

A They were looking for lung changes, for pulmonary fibrosis or lung changes as a result of the exposure to the Kaylo.

Q And what were the exposure levels of this continued testing?

A It would again be in excess of a hundred million particles per cubic foot of air. It would be around 115, 120, 125 million particles per cubic foot of air.

Q According to that document, what were the conclusions at that point in time?

A The conclusions were --

MR. HOFFMAN: I'm sorry, counsel. Which of the two, 32 or 33?

MS. MORETZ: The report is 32, excuse me, I believe.

A Continue?

Q Yes, I'm sorry.

A At this time, the conclusion was that there was no tissue change or reaction of the sort that would be seen with silicosis or asbestosis, so there were no findings, adverse findings, in the testing up to this period of time.

Q And did Saranac have any recommendations with regard to whether or not the tests should be continued?

A Yes.

Q And what were those recommendations?

A They recommended that it be continued, the testing be continued.

Q Does the document reflect why they recommended that the test be continued?

A Yes. Because they were interested in the influence of this exposure on tuberculosis, so the reason for the request of the continuation of the

studies was to determine whether or not this continued exposure would influence tuberculosis as a result of the exposure.

Q What is the normal life span of rats and guinea pigs?

A The normal life span of rats is about two years, and guinea pigs is around three years, three or four years.

Q In the animal testing that you have either reviewed as a toxicologist or performed yourself, what is a reasonable period of time to conduct these tests?

A In rats, typically 18 months to 2 years would be the life span testing. In guinea pigs, it would be around 30 months, thereabouts.

Q Would it have been reasonable for Owens-Illinois to discontinue the testing at this point in time?

MR. HOFFMAN: Objection.

THE COURT: Sustained.

Q Did Owens-Illinois authorize and ask Saranac to continue with the studies?

A They did.

Q Going to show you what has been previously marked as Owens-Illinois Exhibit Number 60, it's Hazard Exhibit 6K, and ask you if that's also a document that you reviewed.

A It is.

Q And could you identify that document for the jury.

A This is a letter from Saranac to Mr. Bowes, the fellow at Owens-Illinois who was in charge of research.

Q And the date of this letter?

A It is April 26, 1948.

Q And the previous exhibits that I asked you about, what was their dates?

A The ones I just went through?

Q Yeah, Exhibit 6 and 6A, Hazard.

A It was October 31, 1947, for the letter to Mr. Hazard, and October 30, 1947, for the report.

Q Okay. So this letter or communication was about six months later than those communications we

just talked about?

A That's correct.

Q Are there any conclusions drawn in that letter that you just identified for the jury?

A Yes.

Q Okay. What was the status of the study at that time?

A The status of the study was that the investigations to date show that there was not any adverse effect produced as a result of exposure to Kaylo, and that the Kaylo was concluded to be an inert dust.

Q And how long had these animals that were part of the test been subjected to the exposure of Kaylo?

A The guinea pigs were exposed for 30 months, and the rats were exposed for 18 months.

Q Is that as of the date of this letter, or was that the previous report that we discussed?

A That was the previous report.

Q Okay. As of the date of the exhibit OI-60,

how long had the animals been exposed? Is that contained in that letter?

Let me ask it this way. Were the tests ongoing on the same animals, or had they started new tests?

A No, the tests were ongoing.

Q Did Saranac have any recommendations as to whether or not to continue the tests as of April 26, 1948?

A They did.

Q And what was their recommendation?

A To continue testing to look at exposure for longer periods of time.

Q And what was -- did that letter reflect the purpose of that recommendation to continue the testing?

A Yes. Again, they are concerned about the tuberculosis and the effect of exposure on tuberculosis.

Q Doctor, I'm going to hand you two documents that the plaintiff has offered. One is Plaintiffs'

Exhibit O-39, and one is Plaintiffs' Exhibit O-40.

What are the dates of these documents?

A The letter is November 16, 1948. This is a letter from Saranac to Mr. Bowes.

Q Okay.

A And the report is October 30, 1948.

Q And that is approximately six months since the last correspondence that we just discussed?

A That's correct.

Q Would you describe for us, at this point in time, what the status of the Kaylo studies were?

A At this point in time, with the exposure beyond 30 months, up to 36 months, there was a finding of pulmonary fibrosis in the lungs that was consistent with asbestosis.

So at this time, the previous conclusions that Saranac had reached would have to be changed, that, based upon the continued exposure up to 36 months, there clearly was now evidence of a pulmonary fibrosis or a lung change as a result of this continued exposure.

Q The continued exposure, was that done at the same levels of exposure that we talked about previously?

A Yes, it was, again, the hundred -- in excess of hundred million particles per cubic foot of air.

Q Did that complete the Kaylo studies? Was this the last report on the Kaylo studies?

A This completed the experimental part of the studies, yes.

Q As a toxicologist, what conclusions can you draw from that report dated October 30, 1948?

MR. HOFFMAN: Objection. It's irrelevant.

THE COURT: Sustained.

MS. MORETZ: Your Honor, may I be heard on that issue?

THE COURT: No, ma'am.

MS. MORETZ: I'm sorry?

THE COURT: No.

Q From your review of Mr. Hazard's deposition and the documents that were attached to Mr. Hazard's deposition that you reviewed, what were the

recommendations, the general recommendations, by Saranac to Owens-Illinois as a result of these tests?

A The recommendations were that this material was a potentially hazardous material, and, as such, should be handled accordingly in the workplace, and that there should be appropriate procedures taken to regulate or to control the exposure of individuals to these materials.

Q From your review of that deposition and those documents, what did Owens-Illinois do as a result of the Saranac recommendation?

A Owens-Illinois had procedures for regulating the exposure of the workers. They also had information with regard to the levels that were in the workplace.

They also had a medical surveillance program whereby the employees were examined, and also X-rays, chest X-rays, were performed to evaluate any potential adverse effects that would occur as a result of the use of this product.

So they had procedures for controlling

exposure, they were evaluating the health of those individuals who were exposed, and generally regarded this as a hazardous material that should be controlled in the workplace.

MS. MORETZ: Your Honor, there is one more exhibit that I would like to talk with Dr. Harbison about and would like to put the screen up to show to the jury.

THE COURT: Go ahead, please.

Which document is this, Ms. Moretz?

MR. HOOPER: Your Honor, it's Owens-Illinois Exhibit, OI-45.

Q Doctor, I have handled you a copy of the same thing. Can you identify that document for us?

A This is the Industrial Hygiene Survey of May 1951 of the Sayreville, New Jersey, Owens-Illinois facility.

Q And who was this study done by, or this survey done by?

A This was done by Saranac Laboratory.

Q I think this is page 4 of the study, Doctor.

This table, or the samples that we are looking at, Doctor, what are we referring to or what was that report referring to?

A What this was is a sampling of the dust in the air at various locations in the plant, and it reports the particles per cubic foot of air and then also the percent of asbestos or silica that was found in those various levels in the various workplaces.

Q For example, the first sample, I think, is the router machine?

A Correct.

Q What was the particles per cubic foot there?

A At the router machine the concentration was 4.4 million particles per cubic foot of air.

Q And what would the asbestos content of that dust have been?

A The asbestos content was 6 to -- it looks like 12 percent.

Q All right. Going down to the next one, it says center aisle. What was the total dust particles per cubic foot of air?

A 3.4 million particles per cubic foot of air.

Q And what percent of asbestos was in that dust?

A It's 32 to 40 something.

Q Going on to the batch weighing room, what was the particles per cubic foot of air?

A The batch weighing room was 8.4 million particles per cubic foot of air.

Q And what about the asbestos component percent?

A It was about 3 to 6.

Q Okay. If you will just go ahead and tell us what all of those readings are, the asbestos unbagging room.

A The asbestos unbagging room was 6.9 million particles per cubic foot of air, with about 40 to 50 percent asbestos.

The east finishing line was 8.3 particles per cubic foot of air, with about 10 to 20 something percent asbestos.

The pre-hardener was 2.2 million particles

per cubic foot of air, with about 30 to 45 percent asbestos.

And the mixer balcony, asbestos tank was 5.2 million particles per cubic foot of air, with about 40 to 50 percent asbestos.

And there were no actual measurements in the boxcar in the air, but the percentage, based upon sampling of the dust collected by a vacuum cleaner, was about 27 to 39 percent.

Q And in the same report, was there a reference to the threshold limit values?

A There was.

Q I think that is page 6 of the report.

What is this a reference to?

A This -- I'm sorry.

Q Go ahead. I'm sorry.

A This refers to the threshold limit values in this case for asbestos of five million particles per cubic foot of air for New Jersey and five million particles for the American Conference of Governmental Industrial Hygienists.

Q Is there also a total dust number that is included in that document?

A There is.

Q And what was the total dust threshold limit value?

A It is 50 million particles per cubic foot of air.

Q Thank you, Doctor.

Doctor, in your opinion, to a reasonable degree of scientific certainty, did the Kaylo dust studies give us any information with regard to exposures to Kaylo that were within the current TLV?

MR. HOFFMAN: Objection. Beyond his expertise. Calls for speculation.

THE COURT: Overruled.

Q Was my question unclear, Doctor?

A Yes.

Q Okay. Let me start all over again.

THE COURT: In that case, it's withdrawn.

Go ahead. Next question.

Q From your review of the documents that you

have reviewed, the Hazard deposition and the Saranac Kaylo testing documents, can you state, to a reasonable degree of scientific certainty, or tell the jury, whether or not the Kaylo studies by Saranac showed the exposure which might result from the ordinary use of Kaylo in compliance with the TLV of five million particles per cubic foot?

Is there information that would indicate that that was a health hazard as a result of the Kaylo studies?

Is that any clearer, Doctor? I'm not sure I've gotten any better.

MR. HOFFMAN: I don't mean to be rude, I just want to object. Same objection, and it also lacks foundation.

THE COURT: I'm not sure I understand the question, but if the doctor does, I'll let him answer it.

THE WITNESS: I'm not sure I do.

THE COURT: Try the question again. Third time.

MS. MORETZ: Okay. Maybe the third time will be a charm, Your Honor.

THE COURT: You could also strike out.

MS. MORETZ: That's true, Your Honor. We could.

Q Did the documents that you reviewed, the Kaylo studies, did they tell you, as a toxicologist, to a reasonable degree of scientific certainty, or give you any information with regard to exposures to Kaylo for the end user and for the workers in the OI plant?

A Yes.

Q Okay. And what information were you, as a toxicologist, able to glean from those reports and those documents?

A Based upon a review of the information, the information indicates that there was not an exceedence of five million particles per cubic foot of air for asbestos in the workplace at Owens-Illinois where the material was being manufactured and ultimately prepared for shipping.

There was no exceedence of the then threshold limit value or guideline of five million particles per cubic foot of air.

Q Okay. From your review of these documents, do the documents indicate whether or not Owens-Illinois requested that this study be published?

A Yes.

Q Okay. And what did they indicate?

A They indicated that they would like to have this study published.

Q Did they draft a report or draft what they wanted to have published or edit it in any way?

MR. HOFFMAN: Objection. Calls for speculation.

THE COURT: Sustained.

Q Were the reports ever published?

A Yes, they were.

Q Is there correspondence within these documents to indicate how they were published?

A Yes.

Q Could you describe that for the jury?

A The information was published without regard to any input from Owens-Illinois. It was published in the absence of knowledge or any sort of review by Owens-Illinois.

MR. HOFFMAN: Object and move to strike as lacking foundation.

THE COURT: I'll let you bring that out on cross-examination. Overruled.

Q Doctor, I'm going to hand you what was marked as Hazard Exhibit 21. I don't think it has been introduced by either the plaintiff or the defendant at this point in time.

Can you identify that for us please.

A Yes. This is the publication of the results of the study which is entitled, Effect of Inhaled Commercial Hydrous Calcium Silicate Dust on Animal Tissues.

Q What is the date of that publication?

A It is 1955.

Q And where was that article published?

A Published in the American Medical

Association Archives of Industrial Health.

Q And who was the author of that particular publication?

A It was Dr. Schepers, Mr. Durkin and Delante.

Q The AMA Archives of Industrial Health, is that a peer review journal?

A It is.

Q Have you reviewed that publication, Doctor?

A I have.

Q Would you tell the jury if, in that report, Dr. Schepers and his co-authors ever mention or indicate cancer in the animals in the Kaylo study?

A They mention not finding any neoplasia or cancer in the animals.

Q When you refer to neoplasia, what are you referring to, Doctor?

A Cancer, new growth.

Q Was that the only mention of cancer, the fact that they didn't find any?

A Yes.

Q Did Dr. Schepers in that publication mention

mesothelioma?

A He did not.

Q From your review of the Hazard deposition and all the exhibits with regard to the Kaylo studies, did you see any reference that Saranac ever advised Owens-Illinois to stop manufacturing or selling Kaylo?

A I did not find any reference that Saranac advised Owens-Illinois to stop selling Kaylo.

Q From your review of the documents, did you see any reference in the documents or in the deposition that Saranac told Owens-Illinois to remove asbestos from the product Kaylo?

A No, I did not. There was no information or there was no reference by Saranac or recommendation by Saranac to remove asbestos from the product.

Q Did Saranac ever indicate to Owens-Illinois that the threshold limit values were unreliable?

A They did not.

Q What, in doing the dust studies that Saranac did, what standards or guidelines did they use in doing those dust studies?

A They used five million particles per cubic foot of air.

Q That's the threshold limit value?

A That's correct.

Q Did Saranac ever indicate, from your review of these documents, that the end user of the Kaylo product was ever at risk?

A They did not.

Q And that was something that Owens-Illinois had specifically asked for in their first letter or communication to Saranac, is that correct?

A That is correct.

Q In any of these documents, is there ever an indication that Saranac asked Owens-Illinois or told Owens-Illinois to place a warning on the product Kaylo?

A There is no indication that Saranac ever recommended a warning on Kaylo.

Q Doctor, what could a reasonable manufacturer conclude from these Kaylo studies, the Saranac studies?

MR. HOFFMAN: Objection. That's for the jury.

THE COURT: Sustained.

MS. MORETZ: At this time, Your Honor, that's all I have for Dr. Harbison.

THE COURT: Okay. Cross-examine, Mr. Hoffman?

MR. HOFFMAN: Thank you, Judge.

THE COURT: Let's start it. Go ahead.

CROSS-EXAMINATION

BY MR. HOFFMAN:

Q Doctor, from your consultations with various companies, let's say in the chemical business, you would agree, would you not, that it's a good marketing tool to say that a product -- or to be able to say that a product is nontoxic?

A I don't know the answer to that. I don't know if that's a good marketing tool or not.

Q Well, you would agree, would you not, sir, that if a customer or a worker knows that a product is toxic, they may be more hesitant to use it than an

alternative product that is known to be nontoxic?

In other words, if something is known to be toxic and there is another product that could be used that's nontoxic, you would agree, wouldn't you, that a customer or a worker would want to use the nontoxic product rather than the toxic product?

A I don't know the answer to that. Intuitively it would probably seem that yes, that would be the case, although in the industrial setting, with appropriate recommendations, I don't know that that's true.

Q So, for instance, at the Owens-Illinois Kaylo manufacturing plant where they had exhaust ventilation, vacuum equipment on the saws, education for the workers, X-ray monitoring for the workers, that would be an example of an environment where a toxic substance could be used but used safely; would that be fair to say?

A Well, the problem I'm having generally with questions of a toxic substance is that, generally, toxicity is determined by the concentration.

So in that setting where there would be a control of the exposure, then there would be probably little worry about that.

Q You would agree, would you not, that another term for the word toxic is the word poison?

A Could be.

Q Well, lots of things could be.

My question, sir, is you would agree, would you not, that another term for the word toxic is the word poison?

A Under some circumstances, I would agree, yes, that's the case.

Q All right. And I have a dictionary here.

MR. HOFFMAN: And if I can approach, Your Honor.

THE COURT: Please.

Q Doctor, I'm going to show you a dictionary, which interestingly is copyrighted in 1947 -- if I can find that page. Copyrighted in '47, '48, '49, '50, '51, '52, '53, '54, '55, '56, '57 and '58, during all the years that Kaylo was manufactured.

Could I ask you to go to the page I tagged there that starts with the definition of the word toxic, please.

A Well, although it's copyrighted in all of those dates, this is a 1966 dictionary, and certainly the terms could have changed from '47 to -- or the definitions could have changed.

Q All right. I'll grant you that.

Given that it was -- that edition was published in '66, right when I started high school, could you tell me please, sir, how they defined toxic at that time.

MR. HOFFMAN: Shows you how long I keep things, Judge.

A Of, pertaining to, affected with or caused by a toxin or poison.

Q All right. And would you go to the page where they talk about defining what a poison is for me, please.

A Yes.

Q And would you read for the Court and the

ladies and gentlemen of the jury, please, what a poison refers to.

A Any substance, liquid, solid or gaseous, which by reason of a inherent deleterious property tends to destroy life or impair health.

Q You would agree, would you not, that asbestos is a solid substance which, by reason of inhalation, can impair health?

A If the concentration is sufficient.

Q You would agree that the asbestos in whatever concentration you believe is sufficient to cause problems, if it's breathed it can impair health, correct?

A Yes, sir, if the concentration is sufficient, that's correct.

Q And the same is true for Kaylo dust, correct, if the concentration is sufficient?

A That it could result in some harm?

Q Yes.

A I expect that's probably true.

Q Well, in fact, isn't that what the Kaylo

experiments show, that inhalation of dust, Kaylo dust, could cause some harm if, as you put it, the levels of exposure were sufficient?

A Sure, in laboratory animals, that's correct.

Q Well, let me ask you this. The purpose of experiments was -- let's go back to something you said early on, and I think I made a note of it.

Why don't you tell us again, sir, under what circumstances is it appropriate to experiment on human beings, to do experiments on people with drugs or substances, that type of thing?

A Well, where information is needed to evaluate the potential effects or the absorption of material or the bioavailability of material in humans, where the risk is.

Q And you mentioned patch tests or scratch tests, that type of thing; is that correct?

A Patch tests, yes, sir.

Q And are the people who participate in the experiments told what's going on?

A Yes, sir.

Q And are they told about any potential side effects or risks of harm?

A Yes, sir.

Q Why? Why are they told about that?

A Well, because if there is a potential for that risk or harm, there is a necessity to advise those individuals of that potential harm.

Q Now, at the Owens-Illinois Kaylo manufacturing plant -- let's back up a minute.

You agree, do you not, that one of the purposes of the Kaylo studies initiated with the animals in the early '40s was to determine if there would be any hazards to workers at the manufacturing plant in the process of making the Kaylo material, correct?

A No. I think it was to determine whether or not this new substance could cause any sort of pulmonary changes and then to relate that to the exposure at the plant so that, ultimately, the information could be used to determine whether or not the current plant levels or the current guidelines

were consistent or inconsistent with those particular results.

MR. HOFFMAN: Well, if I may approach, Your Honor?

THE COURT: Go ahead, please.

Q Let me hand you what you referred to, what was discussed with you as Plaintiffs' O-17 and O-30, sir.

In those two documents from 1940 -- what is it, '43 and '44? I'm not sure of the dates on it.

A Yes, sir.

Q In those two documents, what they say in there essentially is we have a new material. We want to know about the air hygiene aspects of the material.

We want do you do some studies on it, and we want to know -- we want you to design the studies so you can tell us whether there is going to be any problems in connection with the manufacturer of this product or in connection with the use of it out in the field, correct?

A Yes, sir.

Q Nothing in those letters which says anything about relating it to the conditions in the plan, relating it to threshold limit values or anything like that, correct?

A Well, it's asking for an evaluation of the hazard in the plant and where the material would be used.

Q Right. And I don't mean to be a wise -- some people would start the word with an A, but I'll say guy. I don't mean to be a wise guy, but the people were working in the plant, not guinea pigs or rats, right?

A Right.

Q And people were using the product out in the field, not guinea pigs or rats, correct?

A Correct.

Q So the studies were designed with animals, knowing full well you couldn't intentionally expose people to the product, the study was designed with animals by the laboratories because they wanted to do the best they could to design an experiment that would

give information that would be helpful or translateable to the human experience, correct?

A Well, the animal studies used the maximum concentrations to which life can still be sustained to determine whether or not any adverse effects would be produced, but that's not all Saranac did.

Saranac also looked at the industrial hygiene of the plant, also looked at the medical status of the employees of the plant, so it wasn't just the animal testing, it was a combination of the animal testing, as well as the experience at the plant.

THE COURT: On that note, we'll take our lunch recess, and we will return, continue the cross-examination, Mr. Hoffman, at 2:30.

MR. HOFFMAN: Thank you, Judge.

THE COURT: Members of the jury, don't discuss the matter among yourselves. Be back in the jury room so we can start at 2:30. Have a good lunch.

Doctor, don't discuss the matter with anyone. You're still subject to examination. If you

will be back in your seat, along with counsel in their seats, at 2:25, we will begin again at 2:30.

(Whereupon, the jury left the courtroom.)

THE COURT: Have a good lunch, counsel.

(Whereupon, luncheon recess.)

THE COURT: Be seated, please. Good afternoon.

Bring the jury in, please.

(Whereupon, the jury entered the courtroom.)

THE COURT: Be seated, please.

All right, Mr. Hoffman, please. Continue, sir.

MR. HOFFMAN: Thank you, Judge.

BY MR. HOFFMAN:

Q Good afternoon, Doctor.

A Good afternoon.

MR. HOFFMAN: Your Honor, with your permission, what I'd like to do is put a few documents up on the screen to go over with Dr. Harbison.

THE COURT: Please.

Q Before I do that, I wanted to ask -- Dr.

Harbison, as I understand it, you were provided with the transcript of the deposition of Mr. Hazard; is that correct?

A Yes, sir.

Q And documents attached to that deposition, is that also correct?

A Yes, sir.

Q Did you ask Owens-Illinois counsel for additional documents about Kaylo or Saranac Laboratory or the dust experiments beyond what was attached to the Hazard deposition?

A I did not.

Q Is there any reason you didn't inquire as to whether there were more documents other than just what was attached to the Hazard transcript?

A I don't know of more documents, so I didn't ask for more documents. I mean, I don't know that more exist.

Q The lawyers at Owens-Illinois didn't offer you any additional documents about Kaylo dust or Saranac; is that correct?

A That's correct.

Q What I will ask you to do, Doctor, is -- come on down. After you get into the front area there, I'll get the screen set up for us.

MS. MORETZ: What exhibit numbers are you going to be talking to him about?

MR. HOFFMAN: The first one is the March 12, '43, exhibit.

THE COURT: Who's going to be Vanna?

MR. HOFFMAN: Probably me, Judge.

THE COURT: You're going to do double duty.

MR. HOFFMAN: The first one is --

THE COURT: There's a chair there for you to sit down, Mr. Hoffman.

MR. HOFFMAN: Thank you, Judge. I'll probably stand, if it's all right.

Q Doctor, let me ask you to take a look at this first exhibit, which is O-20.

Were you provided with this March 12, 1943, letter from Dr. Gardner at the Saranac Laboratory to Mr. Bowes, the director of research at

Owens-Illinois?

A Can I get closer? I cannot see that.

Yes, I was provided with it.

Q Now, I think you were asked a question about this paragraph which says 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.

You read that as one of the -- in the materials you were given; is that correct?

A Yes, sir.

Q And I think, if I wrote my notes down correctly, you went on to say that you can't make any assumptions about the toxic qualities of Kaylo based on that statement, that it was a first class hazard; is that correct?

A I don't think I was asked about that particular statement. I think the question was, if you mix materials together, can you make an assumption as to whether or not the materials would have a

particular toxic effect, and my answer was no.

Q You would agree, would you not, with Dr. Gardner -- well, let me ask you this. You certainly would agree, wouldn't you, that Dr. Gardner, who was at the laboratory, who was there in the 1940s, who was corresponding with Owens-Illinois, was in the best position to advise Owens-Illinois of what was going on with its product?

A I don't know if he was in the best position or not. I mean I don't know the answer to that question. He was certainly there and certainly had information.

Q All right. Well, let's take a look, if we can -- why don't I hand it to you first.

Were you provided with a copy of what's in evidence as Plaintiffs' O-18?

A Yes, sir.

Q All right. Thank you.

This is Plaintiffs' O-18 from February 23 of 1943, another letter from Dr. Gardner to Mr. Bowes at Owens-Illinois.

And he's talking here about the calcium silicate material, which is the Kaylo, that they are in the process of considering production for; is that correct?

A It's one of the ingredients, yes, sir.

Q Right. Calcium silicate is one of the ingredients in the material?

A That's correct.

Q Along with the asbestos?

A That's correct.

Q Now, Dr. Gardner told Mr. Bowes at that time, I would suspect, and he is referring now to the materials, I would suspect they might be a source of respiratory difficulty, but that point cannot be answered until we obtain considerable more information. Correct?

A I'm sorry. Is that a question?

Q That's what it says there?

A Yes, sir.

Q And you read that?

A Yes, sir.

Q All right. Now, at the same time in 1943, Dr. Gardner advised Mr. Bowes that, because of the nature of the product, that Dr. Gardner would regard it with suspicion, and he recommends that you see that those who are working in the pilot plant or otherwise exposed were protected by respirators if there are appreciable concentrations in the atmosphere.

Again, this is a document you were provided with and that you read, correct?

A Yes, sir.

Q And you would agree that that was a good recommendation at the time?

A Yes, sir.

Q Now, last week and this morning we looked at a series of reports from the 1945, '46, '47 on what was happening with the animal experiments.

Would it be fair to characterize those as progress reports on the Kaylo studies?

A Yes, sir.

Q And what those progress reports basically showed was that during the first 6, 12, 18, 24, 30

months of the experiments, it appeared that the Kaylo dust was inert, not causing any serious health problems, correct?

A Yes, sir.

Q Now, as a toxicologist, and I think you've told us the concept of latency is an important one with regards to toxicology or harmfulness of various materials, because if you do a study on something, and you don't wait long enough for the injury to show up, if there's a long latency period, then your study may not be valid, is that fair to say?

A At the beginning of that, you said that I said latency was -- I don't think I said that. Certainly latency is an important consideration, but in these animal studies, the studies were for a long time, essentially the lifetime of the animals.

Q Right. Now -- and, of course, you recall that Mr. Hazard was the industrial hygienist for the Owens-Illinois Company, correct?

A Yes, sir. That's correct.

Q And let me show you Exhibit O-22, a speech

of Mr. Hazard, and ask you if you were provided with that document, sir.

A I don't believe so.

Q All right. Well, this is in evidence as Plaintiffs' O-22.

Let me ask you if you would agree with this statement of Dr. Hazard, and I'll put it up here for all of us to read. Actually Mr. Hazard, I guess, not Doctor.

By the way, would you agree with me, Doctor, that someone like yourself who has advanced training, with a master's degree and a doctoral degree from a respected institution of higher education, is certainly deserving of the term doctor?

You don't have to just be a medical doctor to be deserving of that title, wouldn't you agree?

A Well, it's not whether you deserve it or don't deserve it. It's whether you earn it. Some people may be very --

Q You're absolutely right.

A -- deserving of it but haven't earned it.

Q You're right. If you earn and you get that degree, whether it be from Johns Hopkins or from the University of Florida, or from wherever, a person who earns that degree is deserving of being called doctor, correct?

A I can agree with the first part of that, and then you said wherever. I don't know what wherever means, but certainly Florida, Johns Hopkins, that is the case.

Q Okay. Now, let's take a look at this exhibit, and I'm going to direct you over here to these comments by Mr. Hazard about the animal experiment protocol that was developed by Dr. Gardner at Saranac Lake.

You recognize the name of Mr. Durkin as well as being one of the scientists at the Saranac Lab that participated in the Kaylo studies?

A Yes, sir. That's correct.

Q And he says Mr. Durkin has reported on animal experiments conducted by him and Dr. Gardner in which animals lived in a dust room for several hours a

day over a period of months exposed to as high a concentration of airborne glass wool dust as could be obtained. No hazard to the lungs was found.

These experiments carry conviction where the technique was one which has been developed by Dr. Gardner, Mr. Durkin and their associates through recent years to a point of great reliability in predicting lung damage or absence of it in humans.

Now, first of all, would you agree with Mr. Hazard, sir, that the Saranac Laboratory, Dr. Gardner and Mr. Durkin, had developed their work with animals to the point where it was -- where they were able to use it with great reliability in predicting lung damage or absence of it in humans?

A I don't know the answer to that because I am not familiar with those studies.

Q All right. You are familiar with the fact, are you not, that when they produced this new fiberglass product, they used animal experiments for purposes of then trying to convince the public that there was nothing wrong with fiberglass?

A I am not familiar with that.

Q It is your understanding that the purpose of the Kaylo dust studies was to experiment on the animals and then use it, use the results of the experiments with great reliability to predict lung damage or the absence of it in humans? That you do agree with? That was the purpose of the Kaylo studies, in your opinion, from reading the documents?

A I wouldn't agree with the way you placed that, that is great reliability. Certainly the animal studies were part of an overall evaluation of the effects of this material and would be used ultimately for determining whether or not there was a potential problem associated with the use of this material in humans.

Q All right. Let me hand you what's in evidence as Plaintiffs' O-39. This is a retyped version. I have the original here if you'd like to see it.

You are familiar with and have reviewed that document, correct? This is the October 30, 1948,

report to Owens-Illinois.

A Yes, sir.

Q And this is the report after 36 months, which, in fact, shows that the animals developed scarring of the lungs, also called fibrosis, and because it was caused by asbestos, termed asbestosis, correct?

A Yes, sir.

Q If I can take that. I don't mean to make this into a visual acuity test.

On the very first page of the report, the authors, in fact, start at the top by referring to the fact that a year ago in their interim report they basically said that they hadn't found any problems as of yet.

Is that a fair characterization?

A Yes, sir.

Q And they then go on to say the original experiment's been completed and the conclusions drawn are based upon full three-years exposure, more than just 30 months now, correct?

A Yes, sir.

Q And they say this experiment constitutes an example of the importance of such prolonged study, where as is to be shown below, the findings at three years were strikingly different from those at two and a half years.

And what was strikingly different was at two and a half years, it didn't appear there would be a problem from Kaylo dust, and at three full years, asbestosis had developed in the animals?

A Yes, sir.

Q And then, finally, they say it will be shown below -- and they're referring to this report, are they not --

A Yes, sir.

Q -- that Kaylo is capable, on prolonged inhalation, of producing asbestosis in the lungs of guinea pigs and that it should be handled industrially as a hazardous dust.

They are referring there, are they not, sir, to handling it industrially as a hazardous dust when

it's used around people, not around guinea pigs?

A Yes, sir.

Q Now, let me show you page 5, if I can, of this, sir.

There is a reference in this same report from October of 1948. They say the laboratory -- and they're referring to Saranac there, am I correct --

A Yes, sir.

Q -- has recently completed a large amount of work with asbestos which has been reported to certain other supporting companies but not as yet published.

The following discussion of the problem is drawn largely from that work, and we would request that those comments be considered confidential.

It is felt that the following information may be of aid to the Owens-Illinois health department in formulating a safety program, which certainly is necessary in view of the results of this Kaylo experiment.

Now, your understanding from that, sir, was that the results of the Kaylo experiment were such

that Owens-Illinois needed to formulate a safety program for its own employees if they were in areas where Kaylo dust might be released into the air, depending on the quantity?

A Yes, it would be important in continuing the safety program that they already had or in revising the one that they had.

Q And the one that they had included exhaust equipment, ventilation, X-rays for workers, information and education to workers in the plant?

A Yes, sir. It included all those things.

Q Now, did you see that they also reported in this, sir, and what they are talking about here is reference to additional work that this laboratory had done, and they say certain investigations have indicated that a seemingly negligible proportion of fibrous asbestos is sufficient to produce the characteristic reaction.

What does that phrase mean, a seemingly negligible proportion of fibrous asbestos?

A A small amount of fibrous asbestos.

Q Is sufficient to produce the characteristic reaction would refer to asbestosis?

A Yes, sir.

Q Thus, an inhalation experiment was carried out with ball-milled asbestos in which an attempt was made to eliminate all fibers with the material.

As a toxicologist, you understand that to mean that they took some asbestos and they tried to get rid of all of the fibers that was contained in the sample, correct?

A Yes, sir.

Q And as a toxicologist, is it your understanding that it's the fibers which are harmful when breathed in?

A Yes, sir.

Q And dust can come in a couple of different shapes. You can have long thin pieces, which would be fibers, and you can have sort of round pieces, which might be referred to as particles, or square pieces or whatever they are, but not long and thin like fibers; is that fair to say?

A Sorry, I didn't quite understand that. They can come in different forms.

Q Right. For instance, Kaylo dust, you can have asbestos fibers in the dust and you can have particles that aren't fiber in shape.

What they did here was they tried to get rid of all the fibers, see what would happen if you breathed dust that didn't contain any fibers.

A Yes, sir.

Q But they couldn't get rid of all of the fibers, correct? And, in fact, it was found to be impossible to break up all of the fiber, and about 1 percent of the air-suspended dust consisted of fibers.

And they went on and they did an experiment, and what they found was characteristic peribronchiolar fibrosis. That's asbestosis, correct?

A Well, it's fibrosis. Yes, it's consistent with asbestosis.

Q And even where only 1 percent of the total dust was fibers, the animals still got asbestosis. It just took 40 months now instead of 36, correct?

A Yes, sir, that's for asbestos, exposure to asbestos.

Q Right. And what the authors of this report said to Owens-Illinois was that, thus, it appears that very small numbers of fibers are capable of producing asbestosis, although the development of the lesion is delayed.

That is a statement basically, is it not, that the more fibers in the dust, the sooner the disease shows up. The less fibers in the dust, the longer it takes for the disease to show up.

Isn't that basically what that says?

A I'm sorry?

Q I'll try and sharpen that up for you.

A I'm sorry. The question is?

Q Sure. This statement where they say it appears that very small numbers of fibers are capable of producing asbestosis, although the development of the lesion is delayed.

In other words, it took 40 months where only 1 percent of the dust was fibrous instead of 36

months, where they used in the regular Kaylo study, this is a demonstration of the fact that, if there is only a small amount of fibers in the air, only 1 percent here, it takes a longer period of time for the disease to show up than if there's a larger number of fibers in the air, correct?

The more harmful material in the air, the sooner the disease shows up. The less harmful material in the air, the longer it takes for it to show up.

A Certainly, that is an example of a dose response relationship, and yes, the more that's in the air, the more likely you are to get the disease over some period of time.

The problem I'm having with your question is I don't think this paragraph refers to Kaylo.

Q Well, let's go to the next sentence, sir.

A It refers to asbestos, and you're sort of --

Q I think you're right. Up to now we have just been talking about using asbestos.

A Right, but your questions were with regard

to Kaylo, and that's not correct.

Q Okay. Well, that's good. But it is true, is it not, as Dr. Gardner said at that time, if we take a look at the next sentence, the present experiment with Kaylo is also an example of this fact?

A Yes, it is an example of that, that is, you didn't see anything at 30 months and you did see something at 36 months. However, the Kaylo was less potent than a corresponding amount of asbestos, so there was a reduction in the potency of the Kaylo as compared to the pure asbestos, and I think what you read earlier on is for the pure asbestos.

Q Take your time, if you would please, Doctor, and find for me where in that report it says that Kaylo is less potent than the pure asbestos, and I'll be happy to wait as long as you need.

A Okay. It's not in this report, it's in a subsequent letter.

Q Okay. Let's get to that.

Let's go to, if we can -- by the way, just on the last portion of this page, there is a

reference, is there not, sir, to the fact -- actually a recommendation by Dr. Gardner where he says that Kaylo, because of an appreciable amount of fibrous chrysotile, is capable of producing asbestosis and should be handled as a hazardous industrial dust.

Do you see that?

A Yes, sir.

Q Is there any place in this report anywhere where Saranac says to Owens-Illinois, you don't have to handle it as a hazardous industrial dust if you are below five million particles per cubic foot?

Does that appear anywhere in this report?

A In this report, it does not.

Q Okay. Let's go to the letter of transmittal which follows immediately after this, if we can. This is O-40.

This is O-40 from November 16, 1948. This is the letter to which that last report was attached when they sent it to Mr. Bowes at Owens-Illinois; is that your understanding?

A Yes, sir.

Q All right. November 16, '48. And I'm going to come down here.

Again, they refer to the fact that -- they talk about up to 30 months they had a tentative conclusion.

The tentative conclusion was that Kaylo alone failed to produce significant pulmonary damage, but then during the 30 to 36-month period, they found definite indications of tissue reaction.

That's what they communicated there, correct?

A Yes, sir.

Q And they told them that their tentative conclusion had to be altered. They told them that Kaylo, on inhalation, is capable of producing asbestosis and must be regarded as a potentially hazardous material.

Now, is it your understanding -- did you also read the portion of this letter where they told Owens-Illinois that they could use the findings here in formulating a safety program, right here?

A Yes, sir.

Q And on the second page of this letter, Dr. Vorwald tells Mr. Bowes, I realize our findings regarding Kaylo are less favorable than anticipated.

However, since Kaylo is capable of producing asbestosis, it's better to discover it now in animals rather than later in industrial workers.

And, in fact, what we have seen in the 1980s and 1990s are cases of asbestos disease in industrial workers using Kaylo and other products, correct?

MS. MORETZ: Objection, Your Honor.

THE COURT: If he knows. Overruled.

You can answer if you know, sir.

A Am I familiar with the fact that asbestos can produce asbestosis?

Q No. Are you familiar with the fact that Kaylo asbestos insulation, pipecovering and block material has resulted in causing asbestosis, lung cancer and mesothelioma in people in the 1980s and 1990s?

A I am not aware of that.

Q You're not aware of that?
A No, sir.
Q Now, the last thing the company was told in this letter was, thus, the company, being forewarned, will be in a better position to institute adequate control measures for safeguarding exposed employees and protecting its own interests.
You read that as well, correct?
A Yes, sir.
Q And you then saw additional documents following this where the company -- where there are back and forth communications about, again, ventilation, exhaust, and I guess what would be called control measures for safeguarding exposed employees; is that fair to say?
A Yes, it is.
Q Let's go to what's in evidence as O-44. Let me hand you that and ask you if you were provided with that document, O-44, I think, June 1, 1950.
A Is this an exhibit to the Hazard deposition?
Q I don't know if it's an exhibit to the

Hazard deposition or not, Doctor. It is an Owens-Illinois document that's in evidence in this case. That's why I was asking you if you had seen it, sir.

A I don't recall specifically. If it's not an exhibit to the Hazard deposition, then I don't think I saw it.

Q All right. Let me ask you to take a look at it now, and I'm going to go to the second page, although I'm happy for you to, and I want you to have a chance to look at the whole thing, if you'd like.

This is another letter, again from Dr. Vorwald.

What had happened, as I understand it, Doctor, is that Dr. Leroy Gardner had been the director of the laboratory. He died, and Dr. Arthur Vorwald took over and continued the dust experiments on Kaylo.

Is that your understanding?

A Yes, sir. That's right.

Q And in June 1950, Dr. Vorwald wrote to Mr.

Hazard, and among the things he told him was, Kaylo dust on inhalation by experimental animals does not produce silicosis, irrespective of the small amount of quartz present.

As a toxicologist, Doctor, it's your understanding that the disease silicosis is different from the disease asbestosis, correct?

A Yes, sir.

Q Then Vorwald goes on to tell Mr. Hazard it does produce the asbestotic type of reaction in the lungs, and, therefore, we believe every precaution should be taken to minimize exposure of industrial employees.

Do you see that, sir?

A Yes, sir.

Q Now, you would agree, would you not, that, again, the phrase we believe every precaution should be taken to minimize exposure of industrial employees means that every precaution should be taken to reduce the exposures of industrial employees to the lowest levels possible?

A Or to those levels which are not associated with an increased likelihood of harm.

Q All right. And, again, why don't -- I'd be happy to hand you back this document.

Is there any place in this document where there is any suggestion about what doses are good or what doses are bad or that it's okay to expose employees to certain amounts?

A There is no specific indication of an amount in this letter.

Q All right. Now, one of the things that you -- one of the things that I thought you testified to this morning was that the threshold limit value was a level below which it would be appropriate to believe that no one would develop any disease if you kept exposures at or below that level, is that correct?

A Yes, sir.

Q And, in fact, didn't Saranac tell Owens-Illinois just the opposite of that in the 1950s?

A I do not know the answer to that.

Q Let me show you what's in evidence as

Plaintiffs' -- I think it's in evidence as O-56.

I'm sorry. This document is in evidence as OI Defendant Exhibit 45. It's also marked as my 56.

You received this May 1951 document, didn't you?

A Yes, sir.

Q Let's put that paragraph up on the board, if we can, for the ladies and gentlemen of the jury, and go through it together.

I'll take off my editorial.

This says -- and this is from Saranac to Owens-Illinois, correct?

A Yes, sir.

Q May 29, 1951. It says 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.

Now, I believe you've already testified that it's your impression that in 1951 in the State of New Jersey, where this plant was, that the threshold limit

for asbestos dust was five million particles per cubic foot, correct?

A Yes, sir.

Q And so that would be the regulations promulgated by local health agencies, correct?

A Those would be the guidelines. I don't think they were regulations, but they were guidelines.

Q All right. What is said in this report by Dr. Vorwald is that maintenance of the working environment in a condition which conforms to regulations promulgated by local health agencies or which is in accordance with accepted standards of good practice should not -- should not be considered as a complete protection for a worker from acquiring a disease as a result of his occupation.

You read that, did you not?

A Yes, sir.

Q And that's a recognition on the part of Dr. Vorwald that threshold limit values are not, as I think you agreed before, are not fine lines between safe and dangerous, correct?

A Well, I wouldn't agree with that. I think what he is saying is that that isn't the only consideration in the workplace, that there are other exposures, there are other dangers in the workplace.

So simply using a threshold limit value would not be the only consideration for -- it says result from his occupation. That is all the things that he does in his workplace.

Q Well, in terms of the -- all of these reports have been about asbestos and Kaylo, correct?

A Well, they have been about silica. They have been about other substances as well, not just asbestos.

Q But it's been established that the dust didn't cause any silicosis, correct?

A That's right, in the experimental testing of it.

Q Right.

A But, remember, in the manufacture of the product, there must be silica and other materials that are put together in the mixture to make a product.

So the only exposure of these individuals is not just to Kaylo, it's to other materials that are used as ingredients in that product.

Q Well, was there a silicosis hazard from the Kaylo dust, sir?

A Not from the Kaylo dust.

Q Now, Dr. Vorwald goes on to recommend at the Kaylo plant that they have -- a medical program be maintained, with pre-employment examinations, chest X-rays, that's roentgenograms of the chest.

And he says such a program should reveal individuals who are unfit for employment in a dusty trade.

Of most importance, any case of disease which might develop in the regularly employed workers would be found early before it becomes a serious health problem to the individual and a liability to management.

That's part of the considerations you gave here, is that not? You considered these statements in the opinions you reached?

A Yes, sir.

Q Now, in this same report, if I'm not mistaken, counsel for Owens-Illinois and you reviewed a chart that -- I'm not sure of the page. Page 4, I guess, of the report.

Let me put that up, if I can.

Do you recall this chart that you reviewed?

A Yes, sir.

Q Now, Sample 6A is referred to as boxcar and trunk. Do you see that?

A Yes, sir.

Q Or truck. I'm sorry. Boxcar and truck.

A Yes, sir.

Q And they say that 27 to what -- 39 percent of the total dust is asbestos?

A Yes, sir.

Q All right. And they have no entry for total amount of dust that was found, correct?

A Right.

Q Have you asked Owens-Illinois' counsel for any of the additional documents which show how much

dust was generated from the process of loading Kaylo into boxcars or trucks?

MS. MORETZ: Objection, Your Honor.

THE COURT: Overruled.

A I asked if there were any numbers, and I did not receive any.

Q All right. Let me show you what is in evidence here, if I can, sir, as Plaintiffs' O-62 and ask you if you were provided with that document.

A So your question is, did I receive this?

Q Yes, sir.

A I don't believe so.

Q All right. If I can take that from --

A Sorry. If you would give me just a moment.

Q Sure. Feel free.

A I do not have this document. I don't believe I have this document.

Q What I wanted to do was to show you this section on page 2, if I could. This is from page 2 of the April 8, 1952, letter, last or second to last paragraph.

Our research laboratory also analyzed sample number 5 and found it to contain 12.9 percent asbestos. This falls within the range of amosite and chrysotile content that you found.

The asbestos content of this sample which represents conditions during the loading of boxcars with Kaylo roof tile is important because the dust concentrations are around 40 to 50 million particles per cubic foot.

Have you ever been provided with any information by counsel for Owens-Illinois other than this, which we know you didn't get, which indicated that the use of Kaylo or handling of Kaylo generated total dust of 40 to 50 million particles per cubic foot?

Have you ever been provided with any other indications of that?

A Well, in the report that we just discussed, there was an estimation of 40 to 50 million particles per cubic foot of air as being associated with the boxcar activity.

Q Right. So then this is confirmation of that estimation?

A Yes, sir.

Q And in the report where they estimated that -- and we'll just go back.

In the report where they estimate boxcar levels at 40 to 50 million, the total dust in there is -- total dust would be 40 to 50 million, and asbestos would be 27 to 39 percent of that, correct?

A In the estimation, yes. In the document you just showed me, it was about 12 percent. So the estimation was obviously off.

Q Right. But either way, above the threshold limit value?

A Oh, no. 10 percent or 12 percent of 40 to 50 million would be about 4 to five million.

Q Well, it was 12.9, and tell me, if you would, please, what is 12.9 percent of 50 million.

A Well, 10 percent would be 5 million, so 12.9 would be a little bit higher than 5 million.

Q Above the threshold limit value?

A It would be slightly above, yes.

Q And if it's above the threshold limit value, certainly workers ought to be informed of the need or opportunity to take precautions to protect themselves.

You would agree with that, wouldn't you?

A Well, it depends on how long above the threshold limit value it is and the magnitude above the threshold limit value.

If it is slightly above the threshold limit value, again, it's not a bright line that exists between no hazard and some hazard arrested or some likely increased to risk of harm, so it depends on how much above.

Q Why does it matter how much above, Doctor, before you're willing to tell people that it's dangerous?

Why does it make any difference how much above it goes before you're willing to inform employees or workers that there's a danger?

Aren't the workers entitled to know there's a danger?

A Only if there's a danger, and the reason it matters is whether there is a real danger or not, so how much above it is would make a difference.

Q All right. Let me ask you if you've seen this document. This is in evidence as O-83.1.

A This is not an attachment to the Hazard deposition.

Q Correct. It is not.

A I don't believe I have seen this.

Q Let me show you, if I can, please, from O-83.1. Start with the first page, which is a retyped version.

This includes -- Dr. Harbison, this is from a dust study done at the Owens-Illinois Kaylo Division, Berlin, New Jersey, April 28th and May 2nd, 1958.

The purpose of the visit was to determine the employee exposure to dust in production operations. You'll notice that among the contacts present were Mr. Gardner, safety director for Owens-Illinois.

I'm going to go down to Air Sample Number 3, horizontal splitting saw for Kaylo. This is taken at the breathing level of the operator separating the pieces as they came through the saw.

Taken between the saw and the operator, the level is 91.8 million particles per cubic foot of air.

Sample Number 4, flatware finishing. Do you understand that to be where they would trim the pieces of Kaylo as they came down the production line?

A I don't have any understanding of that process.

Q All right. Taken at breathing level of operator feeding flatware to the turn saw, 46.3 million particles per cubic foot of air.

You would agree that both of those exposures, as set forth here, Doctor, are hazardous industrial exposures for workers, correct?

A No, I wouldn't agree with that. I don't know what those numbers are. Is that total dust?

Q All right. Well, let me ask you this, sir. You would agree, would you not, at least, that that

91.8 million particles is a dangerous -- dangerously high dust count?

A No, I wouldn't agree with that. It is a nuisance dust count.

That certainly, if it's at that level, it's going to be a nuisance to the worker as getting in the eyes and nose and causing coughing and irritation.

Q But no big deal 'cause it's just a nuisance? Sort of like a dog barking at night?

MS. MORETZ: Objection, Your Honor. Argumentative.

THE COURT: Overruled.

A No, it wouldn't be like a dog barking at night. It would cause a nuisance, it would cause irritation of the eyes, nose, coughing and so forth.

Q But certainly, in your opinion --

THE COURT: Let him finish.

Q I didn't mean to interrupt.

A Let me finish.

Without knowing the particle sizes, whether it's respirable or not, then it may not be a

particular hazard.

Q But certainly, in your opinion, this is not a dangerously high count, correct?

A Well, based upon just dust alone, if it's not respirable, it would certainly be a nuisance, but it may not be a hazard.

Q All right. Let's look at page -- I'll get the page for you in just a minute. Let's continue on with the same document. This is Plaintiffs' O-83.1.

Now, let me show this to you, if I can, Doctor. This is prepared by the Aetna Insurance -- Aetna Life and Affiliated Companies, Special Hazards Dust Survey, is that correct?

A Yes, sir. That's correct.

Q And what the industrial hygienist from Aetna told Owens-Illinois in this document is that Air Sample Number 3 shows a dangerously high count.

You don't agree with that, do you?

A Well, you just asked me that question and I said that it depends on what the particle size is. It may not be a hazard if it's not respirable. It will

certainly be a nuisance in that it's likely to cause eye irritation, nose irritation and difficulty with regard to inhaling.

Q You would agree that asbestosis, lung cancer and mesothelioma are more than a nuisance to a person, wouldn't you?

A Asbestosis, mesothelioma and --

Q And lung cancer. That's more than a nuisance to a person?

A Yes, sir.

Q And they go on to say here that in operation here, which is splitting of flatware on a band saw, the man removing the pieces separates the two pieces and the dust is due to his handling of the ware. The band saw itself does not create too great a problem as it is equipped with a dust collector, which is working quite effectively.

That would be in accordance with your understanding of the fact that Owens-Illinois put on vacuum equipment or exhaust equipment at the saws, correct?

A Yes, sir.

Q Then they go on to say we feel that an exhaust system should be installed which will remove this excessive dust from the breathing area of the man. We noted that this operator was not wearing a respirator. Use of a respirator for this operation should be mandatory.

You would agree, wouldn't you, Doctor, that if someone is exposed to these kinds of dust levels, 91 million particles per cubic foot, it should be mandatory to wear a respirator?

A Yes, sir. It will produce a nuisance, and it would certainly be required to wear a respirator to prevent that nuisance.

Q Now, by the way, Doctor, if I can, as a toxicologist, does the term allergy have a meaning for you?

A Yes, sir.

Q What is an allergy, sir?

A An allergy is a reaction that occurs to a substance that is able to produce an antibody or that

is an antigen, so it would be a response to a material that is potentially allergenic.

Q So if a company manufactured Kaylo and told people that they removed the asbestos from the Kaylo because the asbestos caused an allergic reaction in some people, would that be accurate, sir?

MR. PFEIFFER: Objection. Scope, Your Honor.

THE COURT: Overruled.

Q That wouldn't be accurate, would it?

THE COURT: You may answer, sir.

A Oh, I'm sorry. I didn't hear you.

Would it been accurate to say that, if the asbestos was removed, that the allergenic properties of the material --

Q No, sir. I'll rephrase it, try and make it clearer.

Is asbestosis an allergic reaction?

A No, sir.

Q Is lung cancer an allergic reaction to asbestos when it's caused in connection with asbestos

inhalation?

A No, sir.

Q Is mesothelioma an allergic reaction?

A No, sir.

Q You would degree, would you not, that common folk, which I will include for everybody in the courtroom, don't tend to think of allergies as being very serious reactions or responses to inhaled substances, do they?

They think of it in terms of runny nose, runny eyes, maybe some chest congestion. People don't normally think of allergies as being things that will kill you, do they?

A I'm not sure I would agree with that because you can certainly have a reaction that results in severe broncho-constriction, which can be life threatening.

Q You cannot go to the drugstore and get any Sudafed for mesothelioma, can you?

A No, sir.

Q You would agree, would you not, that to

call -- that to say that asbestos was taken out of Kaylo because some people were allergic to asbestos is misleading and untrue?

MR. PFEIFFER: Objection.

THE COURT: Overruled.

A I don't know the answer to that.

Q Now, I did want to ask you --

MR. HOFFMAN: If I can have just a moment, Your Honor.

THE COURT: Go ahead, sir.

MS. MORETZ: Can the witness sit back down in the chair?

MR. HOFFMAN: We're going to go over some more in a moment.

Does anybody know our exhibit number for the OSHA -- 3811?

MS. MORETZ: What's the date of the document?

MR. HOFFMAN: It's June 1986.

Q And I'll just put it right up here, Doctor. This is in evidence as Plaintiffs' O-3811 --

Miscellaneous 3811.

First of all, you're familiar with an organization known as the Occupational Safety and Health Administration?

A Yes, sir.

Q And that's known as OSHA? It's a branch of the Department of Labor of the United States Government?

A Yes, sir.

Q Do you agree with the statement by OSHA, sir, that -- where they say OSHA is aware of no instance in which exposure to a toxic substance has more clearly demonstrated detrimental health effects on humans than has asbestos exposure? Would you agree with that?

A Would I agree with that statement?

Q Would you agree that -- are you aware of any instance in which exposure to a toxic substance has more clearly demonstrated detrimental effects on humans than asbestos?

A Well, I wouldn't agree with that statement,

and I don't know what the basis is that OSHA used for that statement. I don't know the answer to that.

Q All right. Have there been a lot of studies, sir, that demonstrate the toxic effects of water?

A Lots? There are a couple, two or three.

Q How about 3 or 4,000?

A There are not 3 or 4,000 to water.

Q How about for sugar?

A There are not 3 or 4,000.

Q How about for salt?

A No, sir.

Q Now, as a toxicologist, would I be correct in assuming that you are familiar with the publication of the Agency for Toxic Substance and Disease Registry?

MS. MORETZ: What's the date of the document, please.

MR, HOFFMAN: A 1991 document published by the EPA. December 1990, I'm sorry, is the date on it.

Q Are you familiar with what's referred to as

the ATSDR, for the Agency for Toxic and --

A Agency for Toxic Substance and Disease Registry.

Q Are you familiar with the ATSDR for asbestos?

A Yes, sir.

Q Now, let me ask you to go over to the section on health effects of asbestos.

Do you see the reference there to the very -- the very first article that's referenced there? Do you see that? There's the name of an author from 1983.

A Dement.

Q Yes. Do you know who Dr. John Dement is?

A I do not.

Q Are you referenced anywhere on the ATSDR for asbestos, any of your writings or publications or statements or anything?

MS. MORETZ: Asked and answered.

THE COURT: Overruled.

MR. HOFFMAN: Not about this specific

document.

Q Are you referenced in this document?

A I don't think I'm referenced in this document.

Q Now, let's go, if we can, to the question of toxicity.

You would agree, would you not, that in 1948 and 1949 and 1952, Owens-Illinois was provided with documents or wrote in documents that the purposes of the Kaylo study was to determine the toxicity of Kaylo dust?

A I don't know. I'd have to see the document.

Q All right. Let's start with this first one, and this is -- we'll start with this one while we're getting our papers together, Doctor.

Let's take a look at what I think is in evidence as defendants' 60. Let's go to the last page.

MS. MORETZ: Is that OI-60?

MR. HOFFMAN: Defendant Owens-Illinois 60, I

believe, april 26, 1948.

Q This is a document you have seen; is that correct?

A Yes, sir.

Q All right. Now, in this paragraph where I have the yellow highlighting, they talk about the fact that they agree that their investigations have taken a long time.

But the nature of the studies dictates prolonged observations to make as certain as possible the potentialities of the dust when inhaled into the lungs.

That is a reference, is it not, to the fact that you have got to continue the experiments for the appropriate time period before you decide that there is no reaction to the Kaylo dust?

A Yes, sir.

Q And they say this can only be determined after months of observation. It must be so by reason of the fact that the daily increment of dust localized in the lungs by inhalation are of very low magnitude.

Did I read that correctly?

A Yes sir.

Q So what Dr. Vorwald is saying to Mr. Bowes in this letter is that, whatever the amount of dust that they may be putting in the air, the dust localized in the lungs by inhalation are of very low magnitude, correct?

A That's what he's saying, yes, sir.

Q All right. Now, you've never gone back and looked at any of the slides of the lung tissue of the animals that they examined to see how much asbestos was actually getting into their lungs, have you?

A I have not.

Q Now, he says here, believe me, it demands extreme patience on our part to wait until the desired period of time has elapsed to warrant positive conclusions concerning the potential toxicity of dust when inhaled.

He is referring there to the potential toxicity of the Kaylo dust; isn't that your understanding?

A Yes, sir.

Q That's 1948.

MR. HOFFMAN: If I may have just a moment, Your Honor.

Your Honor, at this time we would like to mark, as Plaintiffs' O-240 -- and I have one for your clerk and for you. This is Plaintiffs' O-240, November 10, 1949, letter from Willis Hazard to Mr. J.F. McMann.

MS. MORETZ: This has not been introduced into evidence; is that what you're saying?

MR. HOFFMAN: That's correct.

Q While you're reading that, Doctor, let me ask you, have you ever seen this document before?

A No, sir.

MR. HOFFMAN: Your Honor, we'd move the admission of Plaintiffs' O-240.

MS. MORETZ: Objection, Your Honor. The witness has never seen the document.

THE COURT: That's not a sufficient reason to sustain the objection. I'll overrule it.

MS. MORETZ: There is no authenticity or no foundation.

THE COURT: Well, it's on Owens-Illinois Glass Company stationery dated November 10, 1949, signed by Mr. Hazard, who has already been identified as the industrial hygienist for Owens-Illinois, so I'll overrule the objection.

MS. MORETZ: I understand, Your Honor.

(Whereupon, Plaintiffs' Exhibit No. O-240 was received into evidence.)

Q Doctor, first of all, let's go to the first page of this document, about, oh, a year and a half later.

Now, the previous document we just looked at was Dr. Vorwald using the word toxicity with respect to Kaylo dust, correct?

A I'm sorry.

Q That's all right. This is 1948. Dr. Vorwald writes and talks about the toxicity of Kaylo dust, correct?

A Well, he's talking about the potential

toxicity of Kaylo dust. That's what he's trying to do, is to determine the toxicity.

Q Agreed. And this is -- but it was Dr. Vorwald, not someone at Owens-Illinois, who used the language toxicity, correct?

A That's correct.

Q Let's take a look at what happens a year and a half later in this letter from Mr. Hazard, sir, Plaintiffs' O-240.

In this letter, November 10, 1949, Owens-Illinois Glass Company, Mr. J.F. McMann, managing director, Industrial Hygiene Foundation of America.

Dear Mac: Some months ago we reviewed with Ted the results of animal experimentation that Saranac had been carrying on for us during the past three years to determine the toxicity of Kaylo dust.

Again, you would agree that that was the purpose of these experiments, to determine the toxicity of Kaylo dust?

A Yes.

Q Now, I think you mentioned early on, and I'm not sure, you do agree, don't you, Doctor, that the dust that they got, the dust that they got was dust from the finished product?

In other words, in doing these experiments, they got dust from the products and the dust that was generated from handling or cutting the products?

A Yes, sir.

Q So there's no issue about them using pure asbestos since they used dust that was actually the same kind of dust that would be generated in the field from using the product?

A I believe that's correct.

Q So, for instance, on the second page of this document, at the top, signed by Bill, W.G. Hazard, Industrial Relations Division, Owens-Illinois, he says if you take the blocks of Kaylo and knock them together, you will see a small cloud of dust is given off.

This is the way the dust was generated that we collected with the vacuum cleaner from the air.

And that dust, in turn, was sent to Saranac and they did their experiments, correct?

A Right.

Q Now, in 1952, three years later, in January of 1952, a final report was issued by Owens-Illinois, correct?

A That's correct.

Q I'm sorry. Issued by Saranac to Owens-Illinois?

A Right.

Q And, again, there is reference here to the fact -- and correct me if I'm wrong, there is reference here, is there not, to the toxic properties of Kaylo?

What I'll read -- do is, I'll read it to you and then ask you.

MR. PFEIFFER: What exhibit number are you referring to?

MR. HOFFMAN: O-59.

MR. PFEIFFER: Plaintiffs?

MR. HOFFMAN: Yes, Plaintiffs' O-59.

Q He says here in the final shipment of Kaylo, received in January 1949 and first used 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 the animals have shown that both 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.

Now, first of all, I read that, correctly, correct?

A Yes, sir.

Q Now, what they're referring to here is the fact that they have amosite asbestos and chrysotile asbestos that they're looking at, and the last sentence says it doesn't make any difference whether you use amosite or chrysotile.

Both of them are going to -- or it doesn't make any difference which one you use, that Kaylo dust still has toxic properties, regardless of which asbestos you put in it?

A That's correct.

Q Now, you were asked some questions about the publication of the Kaylo study. Do you recall that, sir?

A Yes, sir. I do.

Q Now, it is true, is it not, that from the very beginning of the Owens-Illinois Kaylo animal experiments, the agreement was that nothing would be published without first submitting it to Owens-Illinois for review?

A I don't remember that agreement.

Q Let me hand you what's in evidence as defendants' number 27 and ask you if you were provided with that document, OI Defendant Number 27.

MS. MORETZ: Are you going to continue to show --

MR. HOFFMAN: Yes, a few more. Thank you.

A Is this a part of the Hazard deposition?

Q Don't know.

MS. MORETZ: What's the date of it, Doctor?

THE WITNESS: November 27, 1944.

Q You don't know? You don't recognize it one way or the other?

A I don't recognize it, no, sir.

Q All right. It's in evidence as Owens-Illinois' exhibit, and let me just go over to the last page here, if I can, sir.

This is 1944. This is Dr. Gardner writing to Mr. Bowes, the research director at Owens-Illinois.

And he says it is hoped that the results may be such that you might wish to have us publish our findings, but it is understood that nothing will be published without your authorization.

This is an indication in 1944, is it not, that the understanding between Owens-Illinois and Saranac was nothing would be published without authorization from Owens-Illinois?

A It would certainly, on the part of what Dr.

Gardner thought, but Dr. Gardner subsequently died, so I don't know if that was the understanding at Saranac or not.

Q All right. Let's go to Plaintiffs' O-60 and ask you if you were shown that document, sir.

A I don't believe so.

Q Put this up for you to review. This is a letter from Dr. Vorwald to Mr. Hazard at Owens-Illinois, February 7, 1952, Plaintiffs' O-60, and he says, among other things, the results of the investigations with animals show that Kaylo dust is capable of producing peribronchiolar fibrosis typical of asbestosis.

There's a section here I didn't highlight, but I want to go there with you. He says although extrapolation from animal to human experience is difficult -- what does that word mean, extrapolation?

A Transfer, trying to use that information for the purposes of evaluating human health.

Q All right. He says although extrapolation from animal to human experience is difficult,

nevertheless, the results of the study indicate that every precaution should be taken to protect workers against inhaling the dust.

You would agree, would you not, that among what could be every precaution would be respirators, vacuum equipment, ventilation equipment, educating workers?

You would agree all of that is part of every precaution, giving workers every precaution to protect them from inhaling the dust?

A I don't know what every precaution would mean. That would certainly not necessarily be inclusive of everything that you said. It depends on the use and the potential exposure. You may not need to use exhaust or respirators.

Q It depends on the dust levels in your opinion, correct?

A Yes, sir.

Q You would agree, wouldn't you, that if Kaylo was producing 90 million particles per cubic foot when it was being cut or sawed or handled or used, that

workers would need to be educated about the danger, exhausts would be need to be provided, vacuum equipment would need to be provided, respirators would need to be provided in order to protect them from dust levels like that?

A Well, it would depend on what the composition of the dust is and --

Q We're talking about Kaylo dust, Doctor.

A Okay. But it would matter what the overall composition of asbestos in that dust was and the length of exposure to that dust. That is, if it was on a daily basis, for many hours or not.

Q And the only way to know that would be to measure the dust when the product is in use, correct?

A Or to evaluate it based upon the knowledge you would have about the use of the product in the field.

Q Have you been provided any dust tests, air monitoring tests of any kind from Owens-Illinois to show what the dust -- showing what the dust levels were from the use of this product in the field?

A No, sir.

Q None? The only information you had is in that one 1951 report they gave you in terms of dust counts, correct?

A Yes, sir.

Q They say here we hope to publish this study either separately or in combination with similar studies pertaining to either dust.

In doing so, however, reference will be made only to hydrous calcium silicate and not to Kaylo. Thus, the interest of your company will be safeguarded.

Of course, the final manuscript will be forwarded to you for review before being released to the publisher. Your comment in this regard would assist us greatly in preparing the manuscript.

Did you ever see that before today, sir?

A Actually that sounds familiar. You can't -- can you tell me if that's an exhibit to Hazard?

Q I honestly don't know.

MS. MORETZ: It corresponds with a Hazard

exhibit. It is.

A I have seen that.

Q So you've seen that before today?

A Yes.

Q Now, you have never seen any documents, have you, Doctor, one way or the other, as to what changes, if any, Owens-Illinois may have made in the manuscript?

You don't know one way or the other what they did, correct? All we have are the documents.

A That's correct. To the best of my knowledge, Owens-Illinois did not receive the manuscript prior to publication.

Q On what basis, sir, do you make that statement? I want to go back to this one here. It says, of course, the final manuscript will be forwarded to you for review before being released to the publisher.

Do you see that?

A Yes, I do.

Q On what do you base the statement, Doctor,

that what they said they were going to do in the letter they never did?

A Based on the documents that I have, there is no indication that it was ever sent to Owens-Illinois.

Q And there's no indication that it wasn't sent, is there?

A There is not.

Q Right. So you just assumed that it was never done?

A Well, based upon the correspondence, it talks about forwarding the manuscript or the publication to Owens-Illinois, so I assumed that it was not done.

Q Well, Doctor, didn't you make the assumption, contrary to what it says in this letter, didn't you make that assumption because that is what would be most helpful to Owens-Illinois in this situation, would be to assume they never got and edited the transcript?

MS. MORETZ: Objection, Your Honor.

THE COURT: Overruled.

A No, I didn't do that.

Q Let's look if we can, sir, at what's in evidence as Plaintiffs' O-73. This is on Owens-Illinois stationery.

MS. MORETZ: I have it right, Doctor.

THE WITNESS: Thank you.

Q Have you received this document, sir?

A Yes, I have.

Q This is October 5th, 1955; is that correct?

A That is correct.

Q And who is -- who signed this document? Is this Mr. Hazard?

A It's not signed by anybody.

Q Okay. Well, let me go over it with you, if we can.

It says in 1943, you will recall animal experiments were begun at Saranac Laboratory to determine the health aspects of Kaylo dust.

These continued for some years with the Saranac group sending us reports from time to time. Just as they reached their conclusions, Dr. Gardner,

director of the laboratory, died.

We had hoped the Kaylo results would eventually be published. We felt this would be the proper procedure for the long run, even though the experiments did not show Kaylo to be lily white.

They showed, to be specific, that Kaylo dust could cause asbestosis, an uncurable lung condition.

Let me just jump down here to the bottom.

It says -- they refer to the fact that -- this is a quote from the article.

It seems likely that the chrysotile asbestos component of the commercial product, rather than the hydrous calcium silicate, was the cause of the deleterious effects on the tissues of the experimental animals.

This means that Kaylo is no more harmful than the universally used heat insulation asbestos, in fact, less so, since Kaylo contains a very small percentage of asbestos.

The names Kaylo and Owens-Illinois appear nowhere in the article. It's completely anonymous.

Do you see that?

A Yes, sir.

Q Now, did you find any documents, one way or the other, that explained why the words Kaylo and Owens-Illinois don't appear in the article?

There's nothing to explain, one way or the other, why those names aren't in there, correct?

A There are not.

Q And you weren't around at the time to know who talked to who or made what requests to who, if any, as to how this article would be written, correct?

A That's correct.

Q Now, let me show you what's in evidence as Plaintiffs' 210-04B and ask you if you were provided with -- now, were you provided with that document, sir?

A I'm sorry. Is this an exhibit to the Hazard?

Q Again, I'm not sure. I get my documents from --

MS. MORETZ: What are you referring to?

MR. HOFFMAN: This is Plaintiffs' 210-04B.

Q That's 210-04B; is that correct?

A Yes, sir.

Q Now, what is the date of that advertisement about Kaylo?

A 1952.

Q Now, can you see the date on there?

A Yes.

Q Okay. And it's April of 1952?

A Yes, sir.

Q And that is about four months after the last report from the Saranac Laboratory to Owens-Illinois; is that correct?

A That's about right.

Q Okay. And now, this reports -- this advertisement for Owens-Illinois Kaylo in 1952 indicates, among other things, that Kaylo material is non-irritating to the skin and nontoxic.

Do you see that?

A Yes, sir.

Q You do agree, do you not, Doctor, that

under certain circumstances, the use of Kaylo, depending upon how much dust it's generating, can be toxic?

A Under certain circumstances of exposure experimentally, it certainly can be.

Q Well, you also agree, do you not, that exposures above the threshold limit value would be toxic exposures?

A No, it would have to be some level above the threshold limit value. It would have to be in orders of magnitude above that.

Q All right, Doctor. In all the Saranac documents that you have, would you tell me where in those documents it says it has to be orders of magnitude above the threshold limit value before Kaylo dust is toxic?

A It doesn't say that in the document. You asked me my opinion.

My opinion, based on the knowledge of the development of a threshold limit value, there is a margin of safety, so, as I discussed earlier, going

above the threshold limit value does not necessarily produce toxicity.

Q Does it anywhere in any of these documents, Doctor, say that the threshold limit value -- does it anywhere in any of these Saranac documents or Owens-Illinois documents say that Kaylo is nontoxic at levels above the threshold limit value?

A It does not.

Q Now, let me hand you what Ms. Moretz has given to me as page 2 of a document we had before.

MS. MORETZ: Here's the complete document.

Q I don't have a page 2.

MR. HOFFMAN: Mr. Slide, we need to make sure what's in evidence as plaintiffs' --

Q Go to the second page of that document, Doctor, at the top of the paragraph there.

I owe you an apology.

The top paragraph of that document indicates, does it not, at least at the time it was written, that this final report was published without the final report being reviewed by Owens-Illinois?

A Yes, sir.

Q So, in fact, at least in one document there, there is an indication that this thing did not go to Owens-Illinois before it was published?

A That's correct.

Q And I apologize for the inference to the contrary before, but I want to came back to my previous question.

Is there anything anywhere in any of these documents, anything anywhere to suggest that Saranac told Owens-Illinois that Kaylo was nontoxic?

Does it anywhere say -- is there anywhere a letter, a document, a paragraph, a statement anywhere from Saranac to Owens-Illinois saying that Kaylo is nontoxic?

A I don't know of any letter that specifically says that, but based upon the consolidation of all the information, it would certainly be the conclusion that, based upon the current use, it was not.

Q I understand that's the conclusion which you would reach. There's nothing in any of these

documents anywhere, is there, Doctor, saying to Owens-Illinois that Kaylo is nontoxic, correct?

A There is nothing that specifically states that, that is correct.

Q Now, were you provided with what's in evidence as O-210.11, which is another advertisement?

MS. MORETZ: What date is that?

MR. HOFFMAN: That's 1956.

A And the question is did I receive this?

Q Correct.

A I don't believe so.

Q Let me just ask you, if I can -- we'll put this up.

Again, in 1956, this is a reference to Kaylo block insulation manufactured by Owens-Illinois Glass Company and distributed nationally by Owens-Corning Fiberglas.

The reference here, the fact that the material is lightweight, pleasant handling, non-irritating, nontoxic nature make it a well-liked workers' material.

Do you see that, sir?

A I do.

Q Again, you would agree, would you not, that it is important to inform people that, if they use a product that is potentially toxic or hazardous, to inform them about the potential danger so they can take precautions in a situation where the danger might arise?

You would agree with that, wouldn't you?

A It would only be appropriate if that danger is realistic or relevant, otherwise, it would not.

Q And in the case of Kaylo, the only way to know that is by monitoring and measuring the dust to determine if the dust levels are above the threshold limit value, correct?

A No. Or about knowing the use or the application of the material and evaluating the use and the application of the material as to whether or not it's possible to produce levels that would be hazardous.

Q Doctor, you would agree, wouldn't you, that

the best way to determine if hazardous levels of dust are produced from sawing or cutting or handling Kaylo is to saw it and measure the dust, cut it and measure the dust, handle it and measure the dust, correct?

A Sure, and that was done.

Q And you saw the levels of 91 million particles per cubic foot and 44 million particles per cubic foot, correct?

A That was total dust, that's correct.

Q Total dust, of which 15 percent or more is asbestos in Kaylo, correct?

A Yes, sir.

Q Thank you. We can put the screen down. I have just a couple more questions.

Doctor, you talked about aspirin as an example for the threshold limit value. Do you recall that?

A Yes, sir.

Q Let me hand you a bottle of aspirin.

A I don't think I talked about it for the threshold limit value. I used it as an example for

the dose response relationship.

Q Okay. For dose response.

A But there is a TLV for it.

Q What would that be?

A It's hundreds of milligrams per cubic meter of air.

Q All right. And I hope I have not given you and did not intend to give you a headache as a result of my examination, but you're welcome to the aspirins when we're done.

A Thank you. I don't have a headache.

THE COURT: With all due respect, unless a doctor recommends it, I won't let anybody take any medicine in the courtroom.

Q Doctor, on the top of that there's a paragraph called Directions --

THE COURT: Medical doctor. Make that clear. Medical doctor.

THE WITNESS: Well, certainly a pharmacologist, Your Honor.

THE COURT: Absolutely not. Unless you're

allowed to prescribe medicine, you're not going to tell anybody what to take.

THE WITNESS: I'm also a pharmacist.

THE COURT: I wouldn't ask you what to take.

Q Would you read the Directions paragraph at the top there for us, please.

A Yes, sir. Adults, 1 to 2 tablets, not to exceed 12 tablets in 24 hours. Take with water every 4 hours. Children as directed by a physician.

Q Why is it important to give people directions when they use potentially hazardous or toxic or dangerous materials, potentially hazardous, even if they are healthful to begin with?

Why is it important to give them directions?

A It is important to give them directions with regard to aspirin so that they take an effective dose, so that they take enough to produce an effect, and it's also important to give directions so that they don't take too much.

Q And you would agree, would you not, that the same thing is true for a product like Kaylo? It was

important to tell users, workers, customers that this is Kaylo.

It contains asbestos. Using this product will create dust. If dust above the threshold limit value is created, avoid breathing the dust.

Wasn't that important to tell people so that back at the time they could avoid the hazards and dangers that ultimately produced asbestosis and lung cancer and mesothelioma many years later?

MR. PFEIFFER: Objection.

THE COURT: Overruled.

A I don't think it was important to provide that kind of information because the use of the product is not likely to result in the level that would exceed the level that would produce harm.

Q And yet you would agree that nowhere in any of the documents does it say that, correct? There's nothing in any of these documents from Saranac that say these product won't create levels of dust above five million particles?

A It doesn't say that. However, the studies

that were done by Saranac show that the levels were below those that were in consensus would not produce it.

Q Except when you load the boxcars, where it's 40 to 50 million, or when you cut it on one machine where it's 44 million, or you cut it on another machine where it's 91 million, even with exhaust equipment and ventilation equipment and everything else, right?

A That's not quite fair because, remember, the boxcar, only 10 to 12 percent of that was asbestos, so it's really not 50 million particles.

Q Let me show you what is in evidence in this case as Plaintiffs' O-232, sir.

You have already indicated you're not an industrial hygienist, are you?

A No, sir.

Q All right. Would you take a look at the first --

MS. MORETZ: What's the date of the document you're referring to?

MR. HOFFMAN: October 1969.

Q Would you take a look at the top two sentences on page 2. Read along with me.

The current threshold limit value for dust containing asbestos is five million particles per cubic foot. The limit is set on the total amount of dust present if it contains asbestos, regardless of the amount of asbestos present.

You see that, don't you?

A Yes, sir.

Q Now -- well, you don't know -- now, as far as you know, that was true back in 1946 or '58. You're not a member of the ACGIH, the group that set this level, are you?

A Okay. Two questions there.

Now, was it true in 1948? I think no. And I don't think this is correct in 1969 either. I am not a member of the ACGIH.

Q All right. Let me show you what's in evidence as O-301, sir, from 1960, nine years before that. Take a look at that, sir, if you would, please.

This is a letter from a Mr. Shaw, and, in fact, Mr. Shaw was referred to in some of the Owens-Illinois documents we have talked about today, correct?

A I don't recall that. Maybe.

Q Well, in this document Mr. Shaw writes, does he not, that the threshold limit of five million particles per cubic foot of air is recognized for asbestos-containing airborne dust?

A I'm sorry. You're on the first page?

Q First paragraph. Yes, sir.

A Yes, sir.

Q You're not telling us, Doctor, you're not telling us that you are more knowledgeable than the past chairman of the American Conference of Governmental and Industrial Hygienists on what the meaning of the threshold limit value was, are you?

A Am I more knowledgeable?

Q Are you telling the Court and jury, sir, that you are more knowledgeable than the past chairman of the American Conference of Governmental and

Industrial Hygienists as to what the threshold limit value, five million particles per cubic foot, meant in terms of counting dust containing asbestos?

A I don't know because I don't know him.

Q You don't know Dr. Dement?

A Do not know Dr. Dement.

MR. HOFFMAN: May I have just a moment, Your Honor?

THE COURT: Sure.

Q Doctor, there was a question earlier on about -- I gave you a dictionary, do you remember that, and I said it was copyrighted in 1947, '48, '49, '50, '51, '52, '53, '54, '55, '56, '57, '58, and you pointed out to me that it wasn't written, but this version came out in '66, do you recall that?

A I do.

Q Doctor, are you telling the Court and jury that the definition of toxic or the definition of poison changed in any material way between 1947 and 1966?

A I don't know if it changed in the dictionary

or not, but I don't know of any substantial change in the definition of toxic.

Q So in 1947, toxic meant poison, and in 1966, toxic meant poison, correct?

A Well, it can, depending upon the use of the word. Yes, it could certainly mean poison, and it may not.

Q And you would agree, would you not, that telling a working person, man or woman of everyday experience and everyday learning, if you tell them that something is nontoxic, what that communicates to them is it's safe, there's no problem, there's no danger, there's nothing to worry about in however you're going to use the product?

Isn't that what it says to them when you tell them it's nontoxic?

MR. PFEIFFER: Objection.

THE COURT: Overruled.

A I wouldn't agree with that.

Q You would not agree with that?

A I would not.

MR. HOFFMAN: I don't have any more questions, Your Honor.

MR. PALMER: I don't have any questions.

MR. NICHOLL: I don't have any questions, Your Honor.

THE COURT: Ms. Moretz, any redirect?

MS. MORETZ: Yes, Your Honor.

REDIRECT EXAMINATION

BY MS. MORETZ:

Q Let me hand you Plaintiffs' O-73, which is Hazard Exhibit 18, and just to make sure that we've got it cleared up, does that letter indicate whether or not Owens-Illinois received a copy of the article to be published prior to the time it was published?

A The document indicates that Owens-Illinois did not receive a copy of the publication prior to its publication by Saranac.

Q Thank you, Doctor.

Doctor, I'm going to hand you this dictionary back. If you would, would you look up asbestos in this dictionary and read to the jury what

the definition of asbestos is in 1966, according to this dictionary?

A I need help spelling it. I'm sorry. You want me to read the definition?

Q If you will, please.

A A mineral, a fibrous amphibole used for making incombustible or fireproof articles. Used for making theater curtains, firemen's gloves and so forth.

Q All right. Thank you, Doctor.

Now, how would you as a toxicologist define the term toxic?

A Toxic is the potential to produce harm as a result of sufficient exposure or a sufficient concentration of the material.

Q Let's go back to the Kaylo dust studies and the animal studies that we have talked about.

How does the level of exposure that the guinea pigs and rats were exposed to compare with the TLV for asbestos?

MR. HOFFMAN: Objection. There is no TLV

for guinea pigs and rats.

MR. PFEIFFER: Depends on your definition for rat.

THE COURT: This is a civil trial, not a criminal trial.

All right. Let's proceed.

MS. MORETZ: Is the objection overruled, Your Honor.

THE COURT: I think I know what Ms. Moretz is asking. Perhaps what she's asking is can there be a extrapolation of the TLV from the exposures to rats to humans.

MS. MORETZ: I think I'll rephrase the question because I don't think that's what I was asking, Your Honor. I'll rephrase.

THE COURT: Okay. Perhaps I'm not hearing it as well, so let's rephrase the question and then let's see if there's an objection.

MS. MORETZ: All right.

Q What was the level of the exposure that the animals received in the Kaylo dust studies, Doctor?

A It was in excess of a hundred million particles per cubic foot of air.

Q And, Doctor, what is the TLV, or what was the TLV for asbestos from 1948 to 1958?

A It was five million particles per cubic foot of air.

Q All right. You were asked --

THE COURT: I didn't hear an objection to that question, so I'm not ruling on it, but I don't think the question was very clear, Ms. Moretz.

MS. MORETZ: Well, Your Honor, if there was no objection, I'll go on.

Q You were asked some questions on direct and then on cross-examination about Owens-Illinois Exhibit 45. Show that to you again.

I think, if you'll turn to page 6, first, for the jury's sake, who wrote that document, or where was that document generated?

A This was generated by Saranac Laboratories, by Dr. Vorwald.

Q And did Saranac Laboratories in this report

to Owens-Illinois refer to the threshold limit value?

A They did.

Q Okay. And in their reference to the threshold limit value in their report, what do they refer to? What were the numbers that they refer to?

A Five million particles per cubic foot of air.

Q Was that the threshold limit available for asbestos?

A Yes, it was.

Q Okay. Did they have -- did they refer Owens-Illinois to other numbers as far as the threshold limit values were concerned?

A They did.

Q And what other numbers was Owens-Illinois referred to in that document generated by Saranac Laboratory?

A Referred to total dust of 50 million particles per cubic foot of air, and than to silica, which ranged from 5 to 50 million particles per cubic foot of air.

Q All right, Doctor. You were asked about a quote in some of the correspondence about the findings of the Kaylo studies being less favorable than what was anticipated.

Why were those findings less favorable than what was anticipated?

A What was anticipated is that the mixing of these materials to produce the new product would make them less likely to produce lung damage or lung injury, and, therefore, what was anticipated was an absence of or a less likely result of pulmonary fibrosis, and that's not what was found.

Q Referring back to page 4, I believe, of that article, that's the dust levels, is that correct, that were done in the dust samples at the Sayreville plant of Owens-Illinois?

A Yes.

Q There is a reference to a router machine. Do you know what a router machine is, Doctor?

A I believe it's like a cutting machine that separates materials.

Q Like a saw?

A Yes.

Q Okay. What was the dust concentration, the total dust concentration, for the samples taken at the router machine?

A 4.4 million particles per cubic foot of air.

Q Okay. And what was the percent of the asbestos in that dust sample taken at that router machine?

A 6 to 12 percent.

MS. MORETZ: Your Honor, may I approach the witness?

THE COURT: Sure.

MS. MORETZ: I only have one copy of this document.

Q Mr. Hoffman asked you about a document that was marked as O-83.1, and you indicated that you hadn't seen that document before, before Mr. Hoffman showed it to you?

A I believe that's correct.

Q Okay. If you will look at page 2 of that

document and read the description section of those air samplings.

A Read the whole thing?

Q Yes.

A To assist in the interpretation of the above dust counts, we would like to point out that the maximum acceptable concentration of the dust, which is 100 percent free silica from 100 percent asbestos, is 5 million particles per cubic foot of air.

As we know, the dust here is considerably less than 100 percent free silica or 100 percent asbestos. The maximum acceptable limit generally has been established as 10 million particles for an operation of this type.

With reference to the above, our results of air sampling show that a number of counts are above that.

Q Doctor, in reading that and in looking at the numbers, was this a measure of asbestos dust or total dust?

A This was a measure of total dust.

Q Under what circumstances, according to your reading of the Kaylo studies, was Kaylo dust deemed to be toxic?

A Under the conditions of exposure to hundreds of millions of particles per cubic foot of air for a lifetime.

Q Kaylo exposure, within that threshold limit value, would that be considered a toxic dust?

A It would not.

Q Why not?

A Because the concentration or the level would be insufficient to produce harm as a result of that exposure.

MS. MORETZ: If I may have just a moment, Your Honor.

THE COURT: Go ahead, please.

MS. MORETZ: That's all the questions I have.

THE COURT: Okay. Thank you, Ms. Moretz.

Any redirect -- recross?

MR. HOFFMAN: Just quickly, Judge.

THE COURT: Mr. Hoffman.

RECROSS-EXAMINATION

BY MR. HOFFMAN:

Q Do you have that same document, O-83.1, in front of you that Ms. Moretz just used?

A Yes, sir.

Q Let me just ask you to take a look at it, and you read the paragraph at the bottom of page 2. Do you recall that?

A Yes, sir.

Q They did 12 dust samples at the Owens-Illinois Kaylo plant in this document, correct, air samples 1 through 12?

A Yes, sir.

Q Using the discussion at the bottom of the page, 6 of the 12 samples are above what they describe as their maximum acceptable concentration of dust containing asbestos, correct?

There's one at 91.8 million, one at 46.3 million, one at 16.3 million, one at 10.2 million and one at 20 million, correct?

A Yes, sir.

Q All of those are above, 6 of 12 in 1958, above the level that the authors of this study say are acceptable, and that's with the ventilation and the exhaust equipment, correct?

A Yes, sir. I believe so.

Q Now, in the dictionary you were asked to read the word asbestos, the definition. Do you recall that?

A Yes, sir.

Q Nothing in there saying asbestos causes disease, is there?

A No, sir.

Q Nothing in there saying asbestos causes lung cancer, is there?

A No, sir.

Q Nothing in there saying asbestos causes mesothelioma, is there?

A No, sir.

Q If a worker was using a product containing asbestos and he went to the dictionary to try and

figure out whether asbestos could be harmful, if they went to that dictionary they wouldn't learn anything at all, would they?

A Well, that's not true. They would learn that it's in gloves, it's in curtains at theaters. They would learn that it's a mineral, so yes, they would learn something about asbestos.

Q I must have misspoken myself.

If a worker was using a product containing asbestos and they wanted to know whether the asbestos in the product was in any way dangerous or hazardous or toxic, if they go to that dictionary, they won't learn anything about whether the asbestos is dangerous or hazardous or toxic or causes lung cancer or mesothelioma, will they?

A Not from this dictionary, no.

Q So they got to find out from the company that makes the product as to whether there's any dangers from the ingredients in the products, don't they, or the distributors or whoever it is that knows the most about the product?

MR. PFEIFFER: Objection.

THE COURT: Overruled.

Q It's not in the dictionary, is it?

THE COURT: You may answer.

A It's not in the dictionary.

MR. HOFFMAN: Thank you.

THE COURT: Is that all, Mr. Hoffman?

MR. HOFFMAN: Yes, sir. Thank you.

THE COURT: Okay. You may step down.

MS. MORETZ: Just one more question.

THE COURT: No more. Absolutely not.

MS. MORETZ: Your Honor, if he got to do --

THE COURT: I said absolutely not, Ms. Moretz. No more questions. You've had your two opportunities.

I don't want you to break your pen as you throw it on the table.

And the reason the Court said that is nothing that was covered on recross was new ground covered which opened up any areas that could not have been covered on redirect.

Dr. Harbison, you may be excused, sir. You may step down.

MS. MORETZ: Your Honor -- I'm sorry.

THE COURT: You may step down.

Members of the jury, since you didn't have a break this afternoon, we're going to let you have a break now. We're going to take our recess for the day.

Leave your material on your seats. Please do not discuss the case among yourselves or with anyone else, and return tomorrow morning at the normal time. Get paid and then return here.

We will continue with the presentation of evidence by the defense. We will start as close to 9:30 as possible.

Have a good evening. You should have some new cards back there, by the way.

(Whereupon, the jury left the courtroom.)

THE COURT: Ms. Moretz?

MS. MORETZ: Your Honor, if I could, I would like to recall Dr. Harbison to the stand so that I can

make a proffer of the last question that I would have offered him on recross, re-recross since Mr. Hoffman had the opportunity for re-redirect.

THE COURT: With all due respect, he did not have an opportunity on any witness, more than two occasions, that I can recall during this trial. No one has had that opportunity, Ms. Moretz.

I beg your indulgence, but point out to me where any counsel has had the opportunity of more than two times at any witness in this case.

MS. MORETZ: Very well, Your Honor.

Also, I would like to note for the record that I would object to the comments made by the Court -- very respectfully object to the comments made by the Court as to the doctor's qualifications in response to Mr. Hoffman's comments on the record, which were also inappropriate, about taking aspirin and giving people headaches, and the Court's comment about qualification and the exchange between the Court and the doctor with regard to his qualifications in prescribing medication.

I think they were improper comments in front of the jury.

THE COURT: Are you suggesting that I was incorrect or inaccurate in stating that he as a pharmacist does not have a license to dispense medicine?

MS. MORETZ: I think if the witness would have been asked what his qualifications were to dispense medicine, I think there are certain types of medicine that he can dispense, and I think it's irrelevant to this situation, but I think it was an inappropriate exchange by the Court with the witness.

THE COURT: Ms. Moretz, you've been in this trial from the very beginning and there has been that type of repartee between the Court and counsel, as well as the Court and the jury and the Court and the witnesses on issues that have nothing to do with this case.

If I have said or done anything that would in any way leave a misimpression with the doctor, then I'll apologize to the doctor, but I don't think I said

anything to the doctor that was inappropriate.

He hasn't said anything to me that he was offended by what I said to him, and I certainly didn't intend for any offense to be taken.

MS. MORETZ: Your Honor, I'd just like to --

THE COURT: The record reflects that, and the record should also reflect that the Court is overruling your objection.

MS. MORETZ: I understand that.

THE COURT: Keep in mind that I tell the jury that nothing the Court says or does has any influence on the outcome of this case anyway.

Now, I believe Ms. Halstad wants to say something. Go ahead, Ms. Halstad.

MS. HALSTAD: Your Honor, I'm going to join Ms. Moretz' objection because the jury may choose to interpret that as a point of view of the Court, negative comments towards defense witnesses.

THE COURT: In what respect?

MS. HALSTAD: I think that no other expert witness offered by the plaintiffs received a comment

from the Court that the Court would not take medicine from them, and I don't think it was appropriate to interject that with respect to a defense witness, and, therefore, I make my objection.

I suspect it may and probably will be misinterpreted by the jury.

THE COURT: Anyone else wish to join, make any comments?

MR. PFEIFFER: I'll join in the objection.

THE COURT: Anyone else?

The objection is overruled. Nothing that the Court said in any way impacts or will have any impact on what the qualifications were of the doctor and the opinions which he rendered, and the Court made no comment at all concerning the doctor's opinions as he was questioned by both counsel.

Ms. Moretz, why don't you put on record what the question was you wanted to ask the doctor. I'm not going to let you recall him.

I'll let you put on record what the question was and what you hope his answer would have been so

you can at least have the record proffer -- show what your proffer is.

MS. MORETZ: Thank you, Your Honor. That's what I wanted to do.

With regard to Exhibit O-83.1, I would have asked the doctor does this document indicate what the asbestos dust counts were. And this is document -- is an April and May 1958 report from Aetna, which is a document entered over defendants' objections.

His answer, I presume, would have been since the document does not indicate that there is any asbestos dust counts, just total dust counts, that no, the document does not tell us what the asbestos dust counts were.

THE COURT: Okay. The record so reflects.

MS. MORETZ: Thank you, Your Honor.

THE COURT: Anyone else wish to put anything on record before we recess for the day?

Mr. Loker?

MR. LOKER: Not on this topic, I hasten to stress.

THE COURT: On any topic anyone wants to put on. I don't know what's in the minds or hearts of counsel.

MR. LOKER: I'm not sure what the order is. I want to pass up to the Court, and I will distribute to counsel various objections and counter-designations and so forth with respect to evidence designated for tomorrow, I believe, by Owens-Corning relating to National Gypsum.

I am not asking the Court to do anything with it certainly now, or even tomorrow morning. I just wanted the Court to have it for whenever the Court wanted to get into it.

There is one transcript that I have sort of a global objection to, and that is one that relates to a former secretary at National Gypsum whose name was Christy Henderson.

In addition to the written reasons, this is a witness who has never appeared on anyone's, plaintiffs or defendants, witness list.

And for that sort of early and preliminary

reason, I don't think we need to get into the merits of the objection, but I will tender that to Mr. Slide and the Court can deal with it as it wants to, and I'll be ready at that point.

THE COURT: Well, if I understand you, nowhere on any list that has been supplied by either side up to this point does Christy Henderson appear?

MR. LOKER: Correct. And that would include the names read, the hundreds of names read during voir dire.

THE COURT: Who is sponsoring Christy Henderson's deposition?

MR. PFEIFFER: Your Honor, Mr. Lockwood has made the designation.

I must plead ignorance as to who she is, but I can have Mr. Lockwood here and available tomorrow to address the Court if and when we're ready to put that evidence on.

THE COURT: All right. So you pass the buck.

MR. PFEIFFER: I'm passing the buck as best

I can.

MR. LOKER: That's all I had, thank you, and I'll pass these up when we recess.

THE COURT: Okay. Anyone else?

All right. Everyone have a good evening. I'll see you if you're in your places at 9:25. We'll resume at 9:30.

Have a good evening, everyone.

(Whereupon, proceedings adjourned for the day.)

State of Maryland

City of Baltimore

I, Sharon Mech, a Notary Public of the State of Maryland, City of Baltimore, do hereby certify that the within-named witness personally appeared before me at the time and place herein set out, and after having been first duly sworn by me, according to law, was examined by counsel.

I further certify that the examination was recorded stenographically by me and this transcript is a true record of the proceedings.

I further certify that I am not of counsel to any of the parties, nor an employee of counsel, nor related to any of the parties, nor in any way interested in the outcome of the action.

As witness my hand and seal this 21st day of June, 1994.

Sharon Mech

My Commission Expires 10-28-94

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David Slide, Court Clerk