PARTIAL REPORTER'S RECORD

CAUSE NO. 67145

EMMA JOSEPHINE MALONEY MARTIN, ET AL. Plaintiffs,	)	IN THE DISTRICT COURT
VS.	)	ELLIS COUNTY, TEXAS
QUIGLEY COMPANY, INC., ET AL Defendants	)	40TH JUDICIAL DISTRICT

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TRIAL ON THE MERITS

DR. DAVID BERNSTEIN

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On the 16th day of October, 2007, the following proceedings came on to be heard in the above-styled and-numbered cause before the HONORABLE GENE KNIZE, Judge presiding, held in Waxahachie, Ellis County, Texas.

Proceedings reported by computerized stenotype machine; Reporter's Record produced by computer-assisted transcription.

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C H R O N O L O G I C A L I N D E X

Trial on the Merits

October 16, 2007

	Direct	Cross	Voir Dire
Dr. David Bernstein	4	94	
	134	137	

Reporter's Certificate..... 142

A L P H A B E T I C A L W I T N E S S I N D E X

	Direct	Cross	Voir Dire
Dr. David Bernstein	4	94	
	134	137	

08:58:52 P R O C E E D I N G S

08:58:52 (Jury ushered in the courtroom.)

08:59:06 THE COURT: All right. Be seated. Call your next witness.

08:59:12 MS. KAROS: Thank you, Your Honor. Georgia-Pacific calls Dr. David Bernstein.

08:59:26 THE COURT: Raise your right hand and be sworn, please, sir.

08:59:30 (Witness sworn by the Court.)

08:59:34 THE COURT: Have a seat, please.

08:59:34 DR. DAVID BERNSTEIN,

08:59:34 having been first duly sworn, testified under oath as follows:

08:59:34 DIRECT EXAMINATION

08:59:42 BY MS. KAROS:

08:59:42 Q. Good morning, Dr. Bernstein.

08:59:46 A. Good morning.

08:59:48 Q. If you would, sir, please introduce yourself to the jury.

08:59:52 A. Yeah, my name is David Bernstein.

08:59:54 Q. And, Dr. Bernstein, where do you currently live?

08:59:56 A. I live in Geneva, Switzerland.

08:59:58 Q. And what is your occupation?

09:00:00 A. I'm a toxicologist specializing in inhalation toxicology, things we breathe.

09:00:06

09:00:12 Q. Doctor, if you would, please, explain to the jury
09:00:16 what a toxicologist does.
09:00:20 A. A toxicologist evaluates chemicals and
09:00:24 pharmaceuticals to determine whether they will have a
09:00:26 toxic effect in humans potentially.
09:00:30 Q. And what are some of the substances you have read
09:00:38 about or written about or studied?
09:00:40 A. Well, I've studied pharmaceuticals, chemicals and
09:00:46 fibers of all sorts. Gasses and vapors as well.
09:00:50 Q. And do some of the fibers that you looked at
09:00:54 include asbestos fibers?
09:00:56 A. Yes, certainly. Uh-huh.
09:00:58 Q. Doctor, explain to the jury how it was that you
09:01:02 came to live in Geneva.
09:01:04 A. Well, I did my -- I'm a -- actually born and bred
09:01:08 American, fourth generation American you might say. And
09:01:12 when I had finished my doctorate in toxicology I was
09:01:14 looking for a job. And I had some possible offers in
09:01:18 the US, but then an offer came from a laboratory, an
09:01:22 American laboratory in Geneva, and I said this sounds
09:01:24 very interesting because of the work they were doing.
09:01:28 So I took that offer and moved to Geneva.
09:01:32 Q. How many times have you been to Europe prior to
09:01:34 moving to Geneva?
09:01:34 A. Actually, I was only there once before for the

09:01:38 interview, and my second trip to Europe I moved.

09:01:40 Q. All right. And do you have family here in the
09:01:42 United States?

09:01:42 A. Yes, I do. Yes, uh-huh.

09:01:46 Q. And who's here in the United States?

09:01:46 A. Well, my whole family. My father and mother are
09:01:52 still alive. They live in New York. And my brother and
09:01:54 sister live in New York and Connecticut. And, in fact,
09:01:58 my father -- my parents at one time lived in El Paso.

09:02:00 Q. And when you come to the United States, do you
09:02:06 only come to visit family?

09:02:06 A. No, I come for work as well.

09:02:08 Q. Doctor, if you would, please, explain to the jury
09:02:14 a little bit about your education, if you would.

09:02:16 A. I was originally studying to be a physicist and
09:02:20 there were no more -- the work situation wasn't real
09:02:24 good for people with doctorates in physics. So I
09:02:26 decided to change. And this was in the early 1970s when
09:02:30 the United States Environmental Protection Agency was
09:02:32 being created. And, to me, it seemed like something
09:02:34 very interesting to do something related to the
09:02:38 environment rather than pure physics.

09:02:40 So I reeducated and took my doctorate in
09:02:42 toxicology and specialized in inhalation toxicology,
09:02:48 things we breathe, since I was able to sort of

09:02:52 conceptualize and understand how the particles move, the
09:02:54 physics of particles.
09:02:56 Q. Now, I've been calling you doctor. You're not a
09:02:58 medical doctor, are you?
09:02:58 A. No, I'm a doctor of philosophy.
09:03:02 Q. And your bachelor's degree was in physics?
09:03:04 A. Yes, it was.
09:03:06 Q. And you got a -- is it a master's degree as well?
09:03:08 A. Yes.
09:03:08 Q. And was that in physics?
09:03:10 A. It was in physics, yes.
09:03:14 Q. Doctor, before we go into more specifics, do you
09:03:18 have an understanding of why you've been asked to
09:03:20 testify here today?
09:03:22 A. Yes.
09:03:22 Q. And what's that understanding?
09:03:22 A. Well, I'm here to testify about the differences
09:03:26 in the family -- different families of asbestos, how the
09:03:34 lung responds to different fiber types and how those
09:03:36 differences in response in the lung are affected in the
09:03:40 way they impact on the different families of asbestos
09:03:44 and producing disease.
09:03:46 Q. Okay. Let me get this right. You're going to
09:03:48 talk about the differences of asbestos?
09:03:50 A. Uh-huh.

09:03:50 Q. And what's the second thing?

09:03:52 A. How the lung responds to fibers.

09:04:00 Q. And the third thing?

09:04:02 A. How those differences in response to different fibers affects how they -- whether a fiber can produce disease or not.

09:04:20 Q. All right. And, Doctor, you've formulated opinions in this case to a reasonable degree of scientific certainty?

09:04:30 A. Yes, I have.

09:04:30 Q. And what are those opinions?

09:04:32 A. Well, the opinions are that the -- there are two types of minerals called asbestos, chrysotile, which is a serpentine mineral, and amphiboles, such as amosite and crocidolite. And there are very big differences in how these minerals behave because of their mineral structure.

09:04:56 Q. Okay. Now, you said -- chrysotile and amphibole. We've been using -- pronouncing chrysotile chrysotile?

09:05:08 A. Yes. I know that sometimes there's a difference in pronunciation.

09:05:12 Q. All right. So are we talking about the same type of asbestos?

09:05:16 A. We absolutely are, yes.

09:05:18 Q. Okay. All right. Now, do you have an opinion

09:05:20 about how the lung responds to these two different
09:05:22 families of asbestos fibers?
09:05:24 A. Yes.
09:05:24 Q. And what is that opinion?
09:05:26 A. Well, there's two aspects of that. One is that
09:05:30 the lung is -- has the ability to clear the shorter
09:05:34 fibers. And I'll explain just a little bit, if you'd
09:05:40 like, what that entails. And these shorter fibers that
09:05:44 we remove safely from the lung, it's only the longer
09:05:46 fibers which the macrophage cell, which is the cell
09:05:52 which picks up all foreign things in our lung, if the
09:05:54 fiber is longer than this cell then this is when the
09:05:58 fiber could have a potential to cause disease if it has
09:06:04 staying power.
09:06:06 Q. And I guess you kind of answered the third topic
09:06:08 we're discussing is how or with -- how or if these can
09:06:14 cause disease?
09:06:14 A. Right.
09:06:14 Q. Do the shorter fibers have ability to cause
09:06:20 disease in the lung if inhaled?
09:06:20 A. Not in my opinion.
09:06:22 Q. And what about the longer fibers?
09:06:30 A. It depends whether they persist in the lung,
09:06:32 whether they remain in the lung for long enough time.
09:06:36 And that's the difference between things like glass

09:06:38 fibers you have in your house, which are not harmful,
09:06:44 and -- and the amphibole fibers which are.
09:06:46 Q. So --
09:06:50 A. And the difference between the two families of
09:06:52 chrysotile is reflected in this because the chrysotile
09:06:58 fiber, the work I've done shows that it rapidly
09:07:00 disintegrates in the lung, goes away, whereas the
09:07:02 amphiboles fibers persist and stay and can cause
09:07:02 disease.
09:07:08 Q. All right. Now, Doctor, I want to ask you a
09:07:10 little bit about the jobs that you've had and/or studies
09:07:16 that you've participated in since you completed your
09:07:20 formal education. Now, in 1970, it looks like you went
09:07:26 to work in the physics department of Queens College in
09:07:28 New York; is that correct?
09:07:30 A. Yes. That's when I was doing my doctorate in
09:07:30 physics.
09:07:34 Q. Can you explain to the jury a little bit about
09:07:36 what you did during this time period?
09:07:38 A. I was teaching university courses in physics.
09:07:42 Q. In physics. And do you remember about the
09:07:44 subjects that you were teaching primarily, or is it just
09:07:48 general physics?
09:07:48 A. It would be an introductory course in physics to
09:07:52 students who are doing their bachelor's degree.

09:07:56 Q. And explain a little bit about what the science
09:07:58 of physics is.
09:08:00 A. Physics is forces that govern our world,
09:08:04 basically. You know, you drop a ball, when a car moves
09:08:10 forward, airplane takes off. All this is governed by
09:08:12 the laws of physics. And so understanding this is
09:08:14 important to many fields and endeavors.
09:08:22 Q. And it then looks like you went to the Institute
09:08:24 of Environmental Medicine at the New York University
09:08:30 Medical Center. And what did you do there?
09:08:32 A. That's when I was doing my doctorate in
09:08:36 toxicology -- environmental medicine, slash, toxicology.
09:08:40 And when I was doing my doctorate, in order to have an
09:08:46 income, I received a grant essentially to do the
09:08:52 research I was doing. And this grant was a -- sort of
09:08:54 like a salary.
09:08:56 Q. And what was the research that you were doing at
09:08:58 this time?
09:08:58 A. For my doctorate, I studied the impact of
09:09:02 pollution in New York City of people who died
09:09:08 accidentally of a carcinogen.
09:09:10 Q. And what was your specialty at this point?
09:09:12 A. At that point, it was inhalation toxicology.
09:09:18 Q. And is inhalation toxicology somewhat of a subset
09:09:24 of toxicology in general?

09:09:24 A. Yeah. Toxicology is the general subset that
09:09:28 covers all aspects of things to be toxic to us. We eat
09:09:32 them, we drink them, we get them on our skin. But
09:09:38 inhalation toxicology is -- specializes in looking at
09:09:42 things we breathe, that we inhale into our bodies.
09:09:46 Q. And is that the specialty that you've developed
09:09:48 over the years?
09:09:48 A. Yes, it is.
09:09:50 Q. And so you're going to talk to the jury about
09:09:54 what happens when you inhale certain toxic substances?
09:09:58 A. Yes, that's correct.
09:10:00 Q. Next, you went to the -- well, let me back up.
09:10:08 There's so much on here. Okay. So you were at the
09:10:14 Institute of Environmental Medicine of New York
09:10:18 University through 1977, correct?
09:10:18 A. Yes, that's correct.
09:10:20 Q. And above here it lists the different positions
09:10:24 that you had?
09:10:24 A. That's from the previous page, I believe.
09:10:34 Q. After that, the Medical Research Center at
09:10:36 Brookhaven National Laboratory?
09:10:38 A. Yes.
09:10:38 Q. And what was your position during this time
09:10:40 period?
09:10:40 A. I was, what they call, postdoctorate position,

09:10:44 which is a position you take after you get your
09:10:44 doctorate to get more research experience. And there I
09:10:48 was working in two aspects. The two are at the bottom
09:10:54 of that page. Working at the Brookhaven National
09:10:58 Laboratory setting up the facility to test materials
09:11:04 where toxic response by inhalation.
09:11:08 And the other one is the School of Health
09:11:10 Sciences at the State University at Stony Brook working
09:11:14 in the medical school giving a course, basically, in
09:11:20 respiratory toxicology.
09:11:20 Q. Okay. And it looks like that you were invited
09:11:26 took be an adjunct professor in the pathology
09:11:28 department?
09:11:28 A. Yes, that's correct.
09:11:28 Q. Would you explain to the jury what -- what that
09:11:30 entailed?
09:11:30 A. Well, pathology is the study of the disease, and,
09:11:36 specifically, I was interested in the disease of the
09:11:38 lung, to look at the lung cells, just as a medical
09:11:42 doctor might as well, to evaluate whether or not there's
09:11:46 a toxic -- or something wrong going on. And so when I
09:11:50 was with that post, I was working with the dean of the
09:11:52 medical school, who was my mentor, and he actually gave
09:11:58 me, essentially, private training in determining the
09:12:02 pathological response of the lung because it supported

his work in inhalation toxicology to be able to recognize this.

Q. And why is that important to what you do as a toxicologist?

A. Because you have -- what you do with toxicology, it's good to interact with fully trained pathologists, but you've got -- in order to interact and communicate, you have to understand the language in a sense and what they're talking about.

Q. And did you -- was Dr. Kuschner your --

A. Mentor.

Q. -- mentor?

A. Yes.

Q. And you did some joint research with him while you were at this program?

A. Yes, I did.

Q. And what did you study while you were there?

A. We started studying glass fibers. That's when I started studying fibers.

Q. And explain to the jury a little bit about how you went about studying glass fibers at this point.

A. Well, the importance of fiber length was -- was already postulated and it was -- because of the -- if you take a batch of insulation material like you buy for your house that has glass fibers in it, and you look at

it under a microscope and see all different length fibers. You're going to see shorts ones and long ones.

So if you're giving this mixture to an animal, you can't say whether it's the short or long fibers having an effect. So what we did is we had to manufacture it very specially -- I don't know if anybody who works with a machine shop here -- but they put strips of long, thin fibers encased in plastic in order to keep it stiff and then cut it on a micro lath at either five micrometers, which was the short fiber, or I think it was sixty microns, which was the long fiber. So we had very specialized batches of short fibers and long fibers and we gave those to the animals to see what happened.

Q. All right. And then after you left the Health Sciences and Medical School at the University of New York, you then became the principal research toxicologist at Geneva Division of Battelle Memorial Institute?

A. Yes, that's why I went to Europe, to Geneva, and there was a laboratory doing inhalation toxicology research for this company Battelle, which is an American company, had a division there. And -- and they asked us to develop the inhalation toxicology work setting up new systems. And in that context, I designed new technology

09:14:40 to do the work to make it more efficient which today has
09:14:44 become the standard for doing toxicology.
09:14:46 Q. Okay. Tell us a little bit about what your
09:14:48 responsibilities were as a principal research
09:14:52 toxicologist there.
09:14:54 A. Well, as a research -- principal research
09:14:56 toxicologist, I was involved in working on a day-to-day
09:15:02 basis designing the studies and the facilities to do the
09:15:04 inhalation toxicology studies.
09:15:06 Q. And then did you -- looks like you received a
09:15:10 promotion from the principal research toxicologist?
09:15:12 A. Yes.
09:15:14 Q. And you became the section leader in inhalation
09:15:16 toxicology?
09:15:16 A. Yes. We started designing new systems due to
09:15:24 test pharmaceuticals, in particular, which became a very
09:15:26 important area that we were working in. And so I became
09:15:28 the section leader in charge of this.
09:15:32 Q. And what did your inhalation toxicology research
09:15:34 go into at this point with the pharmaceuticals that you
09:15:38 tested?
09:15:38 A. We were testing, primarily -- primarily, drugs
09:15:40 used for asthma. I don't know if anybody has asthma,
09:15:46 but you have those little inhalers. You take a spray
09:15:48 when you have an asthma attack. Well, what we want to

09:15:52 do or were asked to do was to make sure these were not
09:15:54 going to harm you. Were going to help you, but not harm
09:15:56 you.
09:15:58 So we looked for the toxic response for these
09:16:00 kind of asthma drugs that you inhaled when you were
09:16:04 having an asthma attack on those spray cans. And that
09:16:08 -- did quite a bit -- a lot of work with that in
09:16:10 conjunction with some of the pharmaceutical companies as
09:16:14 well.
09:16:14 Q. And then after you were the section leader of the
09:16:16 inhalation toxicology, you then were promoted to manager
09:16:20 of the toxicology and pathology group?
09:16:22 A. Yes, that's right.
09:16:24 Q. And if you would, tell the jury briefly about the
09:16:26 things that you researched or did while you were the
09:16:28 manager of toxicology or pathology.
09:16:30 A. Well, as the manager, I was responsible for the
09:16:32 whole department. And so there were many different
09:16:36 types of things being performed by different Greek
09:16:40 scientists, so I had to supervise making sure the design
09:16:42 was correct and the performance was correct, as well as
09:16:46 make sure the people were performing well.
09:16:50 Q. And at this point, do you have an idea how many
09:16:52 people were reporting to you or working under you?
09:16:54 A. I think it was around 20, 25, in that range.

09:17:00 Q. Now, what did you do after you were the manager
09:17:02 of the toxicology and pathology crew at the Geneva
09:17:06 Division of Battelle Memorial Institute?
09:17:08 A. Well, Battelle, for internal restructurization,
09:17:14 this American company decided to phase out that facility
09:17:16 in Geneva, and so I needed to look for a new job. And I
09:17:20 took a job with a company called Research and Consulting
09:17:24 Company, which is the -- one of the foremost
09:17:26 laboratories to do what they call contract research,
09:17:30 when a pharmaceutical company or a company is required
09:17:34 to evaluate the product to make sure it's not toxic.
09:17:36 Very often they don't do it in-house because they
09:17:40 don't have the facilities and they contract it out to a
09:17:42 laboratory that has very high standards and
09:17:44 qualifications that meets all the government
09:17:48 regulations. And I took a job with them to be in charge
09:17:52 of the inhalation toxicology division.
09:17:56 Q. All right. And when you were with -- I'll just
09:18:00 call it the RCC for short?
09:18:00 A. Right.
09:18:02 Q. When you were with RCC, did you consult with any
09:18:04 governmental agencies?
09:18:06 A. When we were RCC, yes, actually, what was very
09:18:10 interesting is because we became quite renowned because
09:18:14 we had designed a lot of the equipment also, as a

09:18:16 facility that really knew how to do these studies well,
09:18:20 we were approached by the National Toxicology program of
09:18:26 the U.S. government to -- they asked us to apply for a
09:18:28 certification to perform toxicology studies for the U.S.
09:18:34 government in Geneva because of our expertise. And so
09:18:38 we did that work application and -- during that time,
09:18:40 yes.
09:18:40 Q. And did you ever work with the U.S. EPA?
09:18:46 A. Yes, I had also.
09:18:46 Q. And what about the FDA?
09:18:48 A. I utilized the FDA on behalf of pharmaceutical
09:18:48 companies, yes.
09:18:54 Q. And did you consult with any European
09:18:56 authorities?
09:18:56 A. Yes, I was -- within my career, I've worked with
09:18:58 the European Commission quite a lot. I have, in fact,
09:19:02 had a mandate to help evaluate the toxicology data
09:19:06 associated with fibers and developing a law in Europe
09:19:10 for regulation of fibers, mineral fibers, synthetic
09:19:16 mineral fibers.
09:19:18 Q. Now, after you worked at the RCC facility, what
09:19:20 did you do next?
09:19:22 A. When I left the RCC, I became an independent
09:19:26 consultant working for myself advising companies and
09:19:30 governments on issues related to inhalation toxicology.

09:19:32 Q. And you've been doing this since 1991?

09:19:36 A. Yes, I have.

09:19:36 Q. And what type of clients have you consulted with since you left the RCC?

09:19:44 A. Well, I consulted with many different kinds of companies, pharmaceutical companies, fiber companies, and governments around the world.

09:19:54 Q. Have you been assigned to the advisors to the European Commission and to other government agencies?

09:20:00 A. I have, yes.

09:20:00 Q. Have you attended meetings with toxicologists from all over the world?

09:20:04 A. Certainly, yes.

09:20:06 Q. Have you performed, what we call, original research in the area of inhalation toxicology?

09:20:14 A. Yes.

09:20:14 Q. And have you published, in peer review journals, articles dealing with toxicology?

09:20:20 A. Yes, I believe I have 17 now published.

09:20:26 Q. I believe that you have a list of those. I'll bring this out so you can see it a little bit. Is this an excerpt from -- well, it is going to -- all right. Doctor, is this a list of publications that are included in your resume?

09:22:00 A. Yes, it is.

09:22:02 Q. And it's dated September 2007?

09:22:06 A. Yeah.

09:22:06 Q. Pretty recent update?

09:22:06 A. That's fine.

09:22:08 Q. Let start with the last article on your resume, and it says in press 2007 Synthetic Vitreous Fibers, A Review, Toxicology, Epidemiology and Regulations. Now, you got to break this down for us because I can barely pronounce these words, let alone read it. Tell us a little bit about that study, if you would, please.

09:22:32 A. That's not a study. That's a paper, a review paper of mine saying -- reviewing a large breadth of literature on synthetic and vitreous fibers. What are those? Those are the glass fibers you have in your -- may have in your house for insulation and other fibers that are manufactured minerals as opposed to mined.

09:22:52 And it was called synthetic mineral fibers. And -- and the vitreous refers to sort of a technical word for glass. So there's either glass fibers or that type of fiber. And what I did is I reviewed a broad spectrum of the literature of articles and publications, not only my own but many others, and summarized all this information related to the toxicology of the fibers, what makes one fiber more toxic than another. The epidemiology or human epidemiological studies. Then

09:23:30 they look at how many people were affected in the
09:23:34 workplace environment, this kind of thing, by breathing
09:23:38 these kinds of fibers. Then the regulations summarizing
09:23:40 how the different governments approached the regulations
09:23:44 of these kinds of fibers.
09:23:46 Q. Now, when you looked at these glass fibers in
09:23:48 this paper, did you look at long fibers and short
09:23:52 fibers?
09:23:52 A. Sure did.
09:23:54 Q. And were you able to study how the lung dealt
09:23:58 with the long fibers and short fibers?
09:24:00 A. I did, yes.
09:24:00 Q. And did you also evaluate whether the long fibers
09:24:06 and short fibers could cause disease?
09:24:08 A. Yes.
09:24:08 Q. And how does that relate to this case dealing
09:24:12 with asbestos?
09:24:14 A. Well, the -- the issue of short fibers and the
09:24:16 fact that the lung can pick up short fibers and cells in
09:24:20 the lungs, a macrophage cell, can pick up a short fiber,
09:24:28 you got to -- like this is the fiber and the fiber is
09:24:28 thick like this, and the cell comes and moves it away,
09:24:32 picks it up and moves it away. If the fiber is longer
09:24:32 than this, like this pointer here, you can't move it
09:24:42 away. Why? Because the macrophage moves by rolling

09:24:44 over on itself.

09:24:46 I don't know if any of you remember like the old
09:24:50 science fiction movie The Blob, a long time ago? Well,
09:24:50 the Blob is modeled after a macrophage and the
09:24:56 macrophage rolls over. If you put this pointer here, it
09:24:58 gets stuck. It's an anchor. The macrophage can't roll
09:25:02 over, can't move. The fiber gets stuck and it will
09:25:02 lodge in there.

09:25:06 And so what differentiates, let's say, safer
09:25:08 fibers from not safe fibers is whether that fiber will
09:25:12 dissolve in the lung. That actually was a surprise to
09:25:16 me when I started reading this research back in the
09:25:16 '70s. That glass fibers can readily dissolve in the
09:25:22 lung because we have a food layer problem which moves
09:25:24 very rapidly and actually dissolves the glass. Sort of
09:25:28 like leaving a glass of water under the tap. It's
09:25:34 dripping. You come back a few weeks later there's a
09:25:36 hole in the glass. But it happens more readily in the
09:25:40 lung because the lung is more dynamic. And so it starts
09:25:42 to dissolve or breaks apart. It falls away and is no
09:25:46 longer there to cause disease.

09:25:48 If it's not, what happens is this macrophage cell
09:25:52 will call for backup for more macrophage cells. If they
09:25:56 still can't move it away, if this is still too heavy,
09:25:58 and then it calls for the next line of defense in the

09:26:02 body called neutrophils which is sort of -- sometimes
09:26:04 called killer cells that come and try to attack this.
09:26:06 They still can't move it away then this is the start of
09:26:10 what we call inflammation.
09:26:12 You have a scab on your -- on your -- cut your
09:26:14 hand, you get a scab over it. If you don't treat it
09:26:18 with bacterial -- with antibiotics, then you get a
09:26:18 bacterial infection, and that's an inflammation, all
09:26:24 that pus that you get in your hand. It's the same thing
09:26:26 that happens when you get fibers in the lung, or similar
09:26:28 things, I should say.
09:26:30 Q. All right. You discussed some new terms that I
09:26:32 don't believe we've talked about in this trial yet. One
09:26:36 of those is a macrophage. What is a macrophage?
09:26:40 A. It's a cell. It's what they call a scavenger
09:26:44 cell or sometimes the garbage collector of the lung.
09:26:46 And that is designed to pick up anything that's foreign
09:26:54 to the lung. It's the first line of defense. Its
09:26:58 initial design, we think, is against bacteria. That we
09:27:00 don't get sick from breathing bacteria because the
09:27:04 bacteria -- sitting next to somebody else who's sick,
09:27:06 you don't always get sick.
09:27:10 In fact, rarely you might get sick because he
09:27:12 exhales bacteria, or she, and you may breathe it in.
09:27:16 And what -- the lung has defense against this. And

09:27:22 that's the macrophage that handles that defense.

09:27:24 Q. So do the macrophages that we have in our lungs

09:27:28 work to kind of clean things up?

09:27:30 A. Yeah.

09:27:32 Q. All right. And then you said something about

09:27:36 certain things that dissolve in the lungs?

09:27:38 A. Right.

09:27:40 Q. What were you referring to there?

09:27:40 A. Well, that these longer fibers that the

09:27:42 macrophage can't take away. If the fiber can dissolve

09:27:46 and break apart or disintegrate because of the fluids in

09:27:52 the fabrication of the lung, then the fiber no longer is

09:27:54 a threat. It's no longer -- doesn't have staying power,

09:27:56 you might say, and it actually falls apart and no longer

09:28:00 stays in the lung to cause this inflammatory response.

09:28:04 Q. Now, what if a macrophage comes up and discovers

09:28:10 one of these long fibers and it can't dissolve it in the

09:28:14 lung because of the fluids that it has. What happens

09:28:18 next?

09:28:18 A. That's where we start getting, what we call, just

09:28:22 inflammatory response. Signal -- it has a way to

09:28:24 signal, to ask for more macrophage to come in and they

09:28:28 come in. They're recruited actually through the blood

09:28:32 flow. And the -- and if -- if the fiber is very

09:28:38 persistent, it doesn't dissolve at all because there's a

09:28:42 range of dissolution, you can imagine. This will stay,
09:28:46 stay and stay until the few little fibers come in and
09:28:50 try to take it away again. And this signals the second
09:28:54 level of response called neutrophils. It's another cell
09:28:58 similar to the fiber to the macrophage but it's more --
09:29:04 has more killer potential, you might say because --
09:29:06 Q. Are the neutrophils kind of a backup for the
09:29:10 macrophages?
09:29:10 A. It's the second line of defense, you might say,
09:29:14 yes. So you got your entry and then the next in line or
09:29:20 something like this.
09:29:20 Q. All right. And then, if the neutrophils are
09:29:24 called in and they still can't get rid of the long
09:29:28 fibers, is that what you mean by then they're
09:29:30 persistent?
09:29:32 A. Yeah.
09:29:32 Q. They have staying power. They -- and they just
09:29:36 stay there?
09:29:36 A. They just stay there.
09:29:36 Q. Now, Doctor, this is a 2007 paper. Have you
09:29:42 studied or written on other inhalation toxicology
09:29:50 studies dealing with these fiber differences?
09:29:52 A. Oh, yes. In fact, I don't know the percentages,
09:29:56 but the large majority of the papers I've published have
09:30:00 been on fiber-related articles.

09:30:02 Q. And are any of these articles peer reviewed?

09:30:04 A. They all are peer reviewed except the books which generally are not. There's some book chapters in here.

09:30:10 Q. So you've written chapters in books as well?

09:30:12 A. Yes.

09:30:12 Q. And can you direct us to one of those that will be important to the opinions that you're going to give here today?

09:30:20 A. Yes. There's a book it's, I think, down at page. I don't know if I can see that directly or not.

09:30:34 MS. KAROS: Your Honor, may I approach?

09:30:34 THE COURT: Yes.

09:30:38 A. My eyes aren't what they used to be.

09:30:52 Q. (By Ms. Karos) Let's just go right to the chapter on asbestos fibers. And this is a chapter that you wrote in the book Inhalation Toxicology?

09:31:08 A. Yes, that's right.

09:31:10 Q. And this deals specifically with asbestos?

09:31:12 A. It does.

09:31:12 Q. Explain to the jury a little bit about what you wrote in this chapter.

09:31:16 A. What I summarized is you got the differences in mineralogy, there's two types of asbestos, and how the lung responds to this. How the macrophage responds to this. And then summarized different toxicology studies

09:31:34 and made an evaluation of the validity of those studies
09:31:38 and gave an overview of the difference of the chrysotile
09:31:42 and amphibole fibers that cause disease.
09:31:46 Q. Now, Doctor, I believe you said earlier that not
09:31:48 only companies retain your services, but also
09:31:52 governments as well?
09:31:52 A. Yes.
09:31:54 Q. And what percentage of those clients you have are
09:31:58 governmental agencies?
09:32:00 A. I think they're -- they're not large percentages,
09:32:04 but it's some very, very interesting work.
09:32:08 Q. And when your services are engaged by either a
09:32:10 government or a company, do you put any conditions on
09:32:16 your work for them?
09:32:18 A. I certainly do, yes.
09:32:20 Q. And explain to the jury what those are.
09:32:22 A. Well, my conditions are that I have -- I am the
09:32:28 one that decides how to interpret the results if I'm
09:32:32 doing the study. And that if it's a study of the
09:32:34 toxicology, let's say, of fibers or something, that it
09:32:38 would be published in a peer review journal so that
09:32:42 there's no hiding the data. So if it comes out for the
09:32:44 good, it's published, if it comes out when I say bad,
09:32:46 it's also published.
09:32:48 Q. So regardless of who has hired you to do this

09:32:52 research, you make it known to your client that,
09:32:56 regardless of the outcome, you retain the right to
09:32:58 publish the results of that research?
09:33:00 A. Yes.
09:33:02 Q. Now, Doctor, I want to ask you, have you been --
09:33:04 are you being compensated for your time here today?
09:33:06 A. Yes, ma'am.
09:33:06 Q. And what are you being compensated? How much are
09:33:10 you being paid?
09:33:10 A. I think I'm actually paid, in local currency, in
09:33:14 Switzerland, it's called a Swiss franc, and my rate is
09:33:16 506 francs an hour.
09:33:18 Q. All right. And what is that converted to U.S.
09:33:18 dollars?
09:33:20 A. It changes from day to day. Currently, I
09:33:22 understand, it's around 1.2 Swiss francs to the dollar.
09:33:28 So I guess about $415 an hour.
09:33:30 Q. All right. And have you been involved in
09:33:34 asbestos litigation prior to this lawsuit?
09:33:36 A. I have, yes.
09:33:38 Q. And have you been able to testify at trial
09:33:40 before?
09:33:40 A. I've testified in one other trial, yes.
09:33:44 Q. And how long have you been involved in asbestos
09:33:46 litigation?

09:33:46 A. About a year.

09:33:48 Q. Have you given your deposition in the cases that you've been involved with over the year?

09:33:52

09:33:54 A. I have, yes.

09:33:54 Q. And how many times have you given your deposition?

09:33:58

09:33:58 A. I think it's five or six. I don't remember exactly.

09:34:00

09:34:02 Q. Now, Doctor, have you prepared a series of slides to show the jury to explain your opinions in this case?

09:34:06

09:34:08 A. I have, yes.

09:34:10 Q. And did you prepare those in anticipation of litigation or are these slides that you use outside the litigation context?

09:34:14

09:34:18

09:34:20 A. I say a large majority of the slides I have used outside the litigation context.

09:34:22

09:34:26 Q. And why do you use these slides?

09:34:28 A. Because I have to explain these concepts to people who are not scientists, who are not toxicologists, to regulatory authorities, governments, and even the people who run companies who are not scientists, and they also have to be able to understand what is going on in order to make valid decisions.

09:34:30

09:34:32

09:34:36

09:34:40

09:34:46

09:34:50 Q. All right. So, Doctor, I would like to turn to those, if you could. And I believe I have this.

09:34:52

09:34:52 A. Yes.

09:34:58 Q. Now, before we get into your opinions, I want to
09:35:02 ask you, do you have an understanding of the exposures
09:35:08 that have been presented in the lawsuit that Mr. Martin,
09:35:12 the types of products that he might have been exposed
09:35:14 to?

09:35:14 MR. NEMEROFF: Your Honor, I'm sorry, I have
09:35:16 to object. I asked him this question at deposition and
09:35:18 he knew nothing about this particular case, nothing
09:35:20 about the exposures.

09:35:22 MS. KAROS: Your Honor, perhaps, we should
09:35:24 let him answer the question.

09:35:26 A. I have no --

09:35:28 THE COURT: Wait a minute. Wait a minute.
09:35:30 Okay. In other words, you expect a negative answer?

09:35:32 MS. KAROS: Yes, Your Honor.

09:35:34 MR. NEMEROFF: Fair enough.

09:35:34 THE COURT: All right. Go ahead.

09:35:36 A. I have no understanding of this.

09:35:38 Q. (By Ms. Karos) Thank you. Are you familiar with
09:35:40 any of the types of products that are at issue in this
09:35:46 case?

09:35:46 A. Well, I understand there's this joint compound
09:35:48 involved, yes.

09:35:50 Q. Other than joint compound, do you have an

09:35:50 1 understanding of the types of asbestos in the products
09:35:54 2 that are at issue in this case?
09:35:54 3 A. Not specific to this case, no.
09:35:56 4 Q. And, Doctor, is that important to the opinions
09:36:00 5 that you are giving here today?
09:36:00 6 A. No, none of the specifics of that compound or how
09:36:06 7 the exposures took place will change the specifics of
09:36:10 8 the science that I'm going to talk about.
09:36:14 9 Q. So it doesn't make a difference for your opinions
09:36:16 10 of whether Mr. Martin was exposed to products with
09:36:18 11 chrysotile or amphibole or short fibers or long fibers
09:36:22 12 because you're going to present what the science is
09:36:24 13 regardless of these exposures, correct?
09:36:26 14 A. Exactly.
09:36:32 15 Q. Now, you've told the jury a little bit about
09:36:34 16 toxicology and what a toxicologist does. Would you tell
09:36:40 17 them some of the important principles that you look at
09:36:42 18 as a toxicologist in evaluating toxins and the ability
09:36:48 19 to cause disease?
09:36:48 20 A. Yes, ma'am. Getting used to the pointer. There
09:37:04 21 are actually what we sometimes call -- what we use three
09:37:06 22 Ds because each of the words start with D. The
09:37:10 23 principles of fiber toxicology is -- the first is the
09:37:16 24 dimension. Is the fiber thin enough to be inhaled
09:37:20 25 because it has to go into our bronchial tree to our

09:37:24 lungs and our lungs have ability to filter out larger
09:37:30 material so we don't breathe it.
09:37:30 Q. So, Doctor, are you saying that there are --
09:37:34 there are some fibers that we cannot inhale into our
09:37:38 system?
09:37:38 A. Yes, that's correct.
09:37:38 Q. And why is that?
09:37:38 A. Because they're too big. They get stuck in the
09:37:42 airways or they don't even get into the nose or mouth,
09:37:46 or past the nose or mouth I should say, and --
09:37:50 Q. So the dimension or the size is something that
09:37:54 you look at?
09:37:54 A. Yeah, uh-huh.
09:37:54 Q. All right. What else?
09:37:56 A. Is the fiber long enough to frustrate the
09:38:00 macrophages' ability to safely remove it from the lung.
09:38:04 You know, this is a new concept, this macrophage cell
09:38:08 concept, that I think I have a couple slides later on
09:38:14 that explain this in more clear terms.
09:38:16 Q. What else do you look at?
09:38:18 A. We look at the durability. Will the fiber or
09:38:22 particle persist long enough to cause an effect or will
09:38:26 it quickly dissolve or break apart? This was an
09:38:28 interesting thing when I first discovered when I started
09:38:32 this work many years ago is that the lung can dissolve

some of these types of materials.

Q. All right. And you used a word that I know you're going to use in your testimony and that is persist.

A. Uh-huh.

Q. Now, what does that mean in the context of the opinions that you'll be giving here today?

A. Persist is that -- whether it actually dissolved or falls apart and disintegrates, and in terms of the opinions, my opinion is that, based on the science we've done, the chrysotile does disintegrate, does not persist and the amphibole does persist.

Q. I think earlier you used a phrase staying power?

A. Yeah, that's right.

Q. Is that another phrase that we can substitute in for persist?

A. Absolutely. Yeah.

Q. All right. And is there a third? We said three Ds?

A. Yeah. Dose. There's an adage in toxicology that dose makes the poison. That small quantities of things may not harm you, but large quantities can. And so we know that say one aspirin will not -- may not hurt you if you're not allergic to it, but a bottle of aspirin can kill you, you know. And so the dose makes the

09:39:52 poison. And so dose is very important in the concept of
09:39:58 toxicology is why -- how much you were exposed to.
09:40:00 Q. And is that where your opinions go to whether or
09:40:04 not this is a large enough dose to cause disease?
09:40:10 A. From -- I don't quite understand.
09:40:14 Q. When you talk about dose, when you said that dose
09:40:16 makes the poison, that is then the determination of
09:40:20 whether or not the dose causes disease?
09:40:22 A. Whether -- if the fiber, say we're talking about
09:40:26 fiber, is persistent, does have a potential to cause
09:40:28 disease then the question of dose, how much you're
09:40:34 exposed to comes into play.
09:40:34 Q. All right. So you look at the size and the
09:40:38 dimensions of the fiber. Then whether or not those
09:40:40 fibers have staying power in the lung?
09:40:42 A. Uh-huh.
09:40:44 Q. Whether or not we've got stuff in our lung that's
09:40:46 going to handle them or not, correct?
09:40:48 A. Uh-huh, yes.
09:40:48 Q. And then you look at whether or not there are
09:40:52 enough of these fibers that have staying power that have
09:40:56 the ability to cause disease; is that correct?
09:40:58 A. Yes.
09:41:00 Q. Now, do you apply these principles whether or not
09:41:06 you're looking at asbestos fibers or glass fibers or

09:41:10 other types of fibers?

09:41:10 A. Yes. We don't -- I prefer not to name a fiber.

09:41:14 Q. Okay.

09:41:14 A. I prefer to use these criteria to evaluate whether a fiber is safe or not, and without giving names, because names could be misleading.

09:41:26 Q. All right. So you're going to talk in terms of long fibers and short fibers?

09:41:30 A. And fibers that dissolve or disintegrate and fibers that do not.

09:41:34 Q. Okay. All right. Now, Doctor, I believe that you have told us that you have studied fiber inhalation and exhalation?

09:41:44 A. Yeah.

09:41:46 Q. And have you developed a demonstration showing what happens when there actually are fibers that the body does inhale?

09:41:56 A. Yes.

09:41:56 Q. What are we seeing now?

09:42:04 MR. NEMEROFF: Your Honor, can we stop a second? May we approach for a moment?

09:42:06 THE COURT: All right.

09:42:08 MR. NEMEROFF: Thank you.

09:42:10 (Off-the-record discussion at the bench.)

09:43:34 THE COURT: All right. You go into the jury

09:43:38 room for about five minutes.

09:44:08 (Jury ushered out of the courtroom.)

09:44:08 THE COURT: All right. The defense has been exhibiting in the presence of the jury to the witness a -- what appears to be an animation video to me, and the plaintiff is objecting to it. And now that's what we're determining. All right. Go ahead.

09:44:38 MR. NEMEROFF: Your Honor, I'm going to put up on the screen, this is the deposition -- this is the notice of deposition for this witness in this case. Specifically item number 19, all demonstrative evidence this expert will use during any asbestos trial. He came to the deposition basically with nothing more than was attached, one article and maybe a hand drawn piece of paper.

I've never seen this before, and this video that he's now showing is new to me. So I don't object to his testimony. I'm not objecting to his -- whatever he's talking about, but to show this, I have nothing -- I've never -- I don't know what to do with this.

09:45:18 THE COURT: Yes, ma'am?

09:45:18 MS. KAROS: Your Honor, in response, we produced him more than just a couple articles. We produced a box of documents in --

09:45:24 THE COURT: Well, right now, we're talking

about an animation.

MS. KAROS: It's an animation. This was made to help illustrate his concepts which have been fully disclosed. It's no different than the bottles that were brought in the courtroom or the pictures or the pail or anything else that was not disclosed in plaintiffs' case to us because they're demonstrative aids or the pictures used in opening statement. These are simply aids that were not available at the time his deposition was taken to assist him in giving his opinions and explaining them to the jury.

MR. NEMEROFF: Well, I take exception with that, Your Honor, because this witness was deposed on April 13th, 2007, and on October 11th of 2006, he had given trial testimony where he had apparently used this slide show. So I don't know how they get from A to C when you got to get through B, and B would be the trial where he's done this before.

MS. KAROS: Well, he did give opinions at trial. But, Your Honor, those are different in a different case. Well, they're going to be similar opinions, but this was not anticipated for him to use this until after his deposition was taken. I have a printout of his slides which I'll be happy to share.

THE COURT: Of his what?

09:46:48 MS. KAROS: Of what's going to be shown to
09:46:50 Mr. Nemeroff if he --
09:46:50 THE COURT: Were all these slides that he's
09:46:52 talking about -- is this the same subject matter or
09:46:56 what?
09:46:56 MS. KAROS: Yes, Your Honor.
09:46:56 THE COURT: Wait a minute. I mean, it's
09:46:58 going to be the same objection that it's stuff he's
09:47:00 never seen before or what?
09:47:02 MR. NEMEROFF: If there are -- if I can take
09:47:02 over?
09:47:02 MS. KAROS: Sure.
09:47:02 MR. NEMEROFF: If there are words or some of
09:47:06 the photos that I have seen before, that's one thing,
09:47:08 and most of these --
09:47:16 THE COURT: No, you're going to split a gut,
09:47:18 but that's what you'll have to do. Just you don't say
09:47:20 anything.
09:47:20 MR. NEMEROFF: I'm fine with the pictures.
09:47:22 I'm fine with the words. An animation is a far
09:47:26 different thing because now we're getting into a
09:47:28 reconstruction or a recreation of an issue that's
09:47:34 paramount in this case that I've never had an
09:47:36 opportunity to see before. I'm only fussing with this
09:47:38 animation thing. I'm not fussing with the rest of the

09:47:42 slide show. It's just that if he's going to put on some
09:47:44 kind of animation showing fibers going into the body and
09:47:46 everything, that's different.
09:47:48 THE COURT: Well, what kind of animation is
09:47:50 it? How long is this animation?
09:47:50 MS. KAROS: Oh, it's 10 seconds, 15 seconds.
09:47:54 It's not very long. I mean, Judge --
09:47:56 THE COURT: Well, play it. Let's see it.
09:47:56 MS. KAROS: All right.
09:47:58 THE COURT: Maybe after he sees it, it won't
09:48:02 matter. The fact that he hasn't seen it maybe is
09:48:06 causing the problems.
09:48:32 (Slide playing.)
09:48:56 (Slide ended.)
09:48:56 MS. KAROS: That's it. 22 seconds.
09:49:00 MR. NEMEROFF: You know what, I'm fine with
09:49:02 it. Absolutely fine with it.
09:49:04 THE COURT: Okay. I generally find out if
09:49:06 one side knows where the other side's going that usually
09:49:10 resolves the problem.
09:49:10 MR. NEMEROFF: Thank you.
09:49:12 THE COURT: Thank you. Be seated. Bring
09:49:14 the jurors back in.
09:49:14 MR. NEMEROFF: The only thing that I ask is
09:49:14 that on cross-examination, he's ready to show that back

again, because now I like it. I'm sorry for wasting the Court's time.

THE COURT: No, that's all right. That's all right.

(Jury ushered back in the courtroom.)

THE COURT: All right. Y'all can go ahead and be seated as you get to your chairs. All right.

MR. NEMEROFF: Thank you, Your Honor.

THE COURT: Be seated. Proceed.

MS. KAROS: Thank you, Your Honor.

Q. (By Ms. Karos) Now, Doctor, I believe, before we took that short break, you were talking about a demonstration that you had prepared to show the inhalation and exhalation of fibers. Is that true?

A. Uh-huh.

Q. And will you show that to the jury, please.

(Slide playing.)

Q. (By Ms. Karos) Now, Doctor, let me stop you right there. This says a hundred percent of the fibers are inhaled. But you just told us that we don't inhale a hundred percent of the fibers?

A. What this means is a hundred percent of the fibers that reach your nose or mouth go past that place.

Q. Okay. So just the ones that reach the nose and the mouth and then get past that?

09:50:48 A. Right.

09:50:48 Q. And this is what this depicts?

09:50:52 A. Right.

09:51:00 Q. I'm sorry. I keep stopping you midstream.

09:51:00 (Slide playing.)

09:51:16 A. It's a little slow this morning. So what you see is the fibers being inhaled. And here you see the percentage at that point. As they go down, they deposit on the bronchial wall here, which is the bronchial wall here. And they go all the way down into the deep lung and out the alveolar region, the alveolus. I'll explain a little bit what that is.

09:51:38 Then when you go to exhale, they go out and they come back up some of them. So then you have about 50 percent are then exhaled. So not all the fibers that go in stay in the lung every time you breathe in. Some of them stay and when you breathe out, some of them come back out.

09:51:56 Q. Okay. And you said that some of those reach the bronchial wall?

09:52:00 A. Yeah.

09:52:02 Q. Tell us a little bit about that if you would, please.

09:52:04 A. Bronchial wall are the tubes in our lung that bring the air down into the deep lung. The purpose of

09:52:12 breathing is to oxygenate our blood. We oxygenate our
09:52:16 blood to take away the carbon dioxide outside our blood,
09:52:18 the waste products. And so that happens in the deep
09:52:26 lung, this alveolar region of the lung.
09:52:26 And in order to get the air all the way down
09:52:30 there, we have these bronchial tubes, those branches
09:52:32 that look like a tree, an upsidedown tree.
09:52:36 Q. All right. And I believe you said that some of
09:52:38 the fibers are deposited into the bronchial?
09:52:40 A. Yeah.
09:52:42 Q. And do you have a picture showing that?
09:52:44 A. Yeah. Here it is.
09:53:16 (Slide playing.)
09:53:16 Q. There you go.
09:53:34 A. What you see here is the fibers deposited on the
09:53:38 wall of the lung. Then you have this little cilia or
09:53:40 hairs that move back and forth. What they do is they
09:53:44 push up the material up the bronchial tree. And this is
09:53:46 sometimes we go -- you clear your throat if you go to a
09:53:50 dusty environment, that's this stuff coming back out.
09:53:54 The material deposits in the bronchial trach.
09:53:58 Q. Okay. Now, Doctor, what happens when a fiber
09:54:04 actually gets down into the lung?
09:54:10 A. This is a schematic of just to show you what
09:54:14 you're looking at. This is the bronchial tree, these

09:54:20 branches at each of these levels. And this is the
09:54:22 bottom level that looks like this. And the wall -- the
09:54:26 tube is the air coming in and these -- this is what we
09:54:28 call the alveolar sacs. This is where the gas exchange
09:54:32 takes place that's on the outside of this blood flow and
09:54:36 the green lines here. The inside is the air and the
09:54:40 oxygen crosses the wall into the blood and the carbon
09:54:44 dioxide in the blood goes back out this way. So fibers
09:54:46 that land here are the ones that have potential to cause
09:54:50 disease.

09:54:50 Q. And you said that the fibers that land here --
09:54:54 can you go back? You talking about this area right
09:54:58 here?

09:54:58 A. Well, any of -- any of these little sacs here.

09:55:02 Q. All right. What are these little sacs called?

09:55:04 A. This is the alveolus.

09:55:06 Q. And that's where the fibers end up?

09:55:08 A. Some of them end up there. The ones that don't
09:55:10 deposit in the bronchial tree or are exhaled.

09:55:12 Q. All right.

09:55:14 A. And this is a cross-section of one of those
09:55:18 alveolus that you cut them like little circles in the
09:55:22 wall. You cut it, it looks like this. The inside we
09:55:24 have this cell, the macrophages. This is what the
09:55:26 macrophage looks like here. And that shows two kinds of

09:55:30 fibers, long and short fibers here. Those short fibers,
09:55:32 the macrophages pick up. The long fibers, it's too long
09:55:36 for the macrophage to pick up and you can see sort of
09:55:40 the coating that -- I colored it in blue -- which is
09:55:44 sort of like the fluid layer of the lung. So it's being
09:55:48 bathed in fluid all the time. This is how, if it had
09:55:54 dissolved, the fiber would be able to dissolve.
09:55:54 Q. How does the size of these fibers affect how the
09:55:58 lung treats them?
09:56:00 A. Well, the short fibers can be picked up, removed.
09:56:04 I have a couple of slides I can show if you like.
09:56:06 Q. Okay.
09:56:06 A. Essentially, the nonexposed lung, the human lung,
09:56:08 one or two macrophages reside in each alveolus in a near
09:56:14 sterile environment. When you start off, we don't have
09:56:16 disease, we don't have -- we're not sick. We don't have
09:56:20 any pneumonia in our lungs. And so it's a very clean
09:56:24 environment in our lungs. So we have -- here, these
09:56:26 little balls here are macrophages. These are the
09:56:30 alveolar. This is the airway coming in.
09:56:32 So if you look at this, immediately after
09:56:34 exposure many particles and short fibers are present.
09:56:38 You go into a factory, even sometimes downtown Dallas,
09:56:44 there's a lot of dust in the air. You breathe this into
09:56:46 your body. And what happens to this? Well, you have

all kinds of things, long particles, short fibers, long fibers and different kinds of particles.

So after early clearance, the macrophages come out and pick up everything that is short that it can pick up. It leaves the long fibers that it can't pick up. If the fibers are soluble, if they dissolve or disintegrate into the lung, it returns very quickly to the normal situation, nothing happening.

If the fibers are durable, the long fibers remain and it starts asking for more and more cells to come in, and I colored these greenish things like the inflammation, the pus you might think about when you have an inflamed cut. That's what happens in the lung when you have the long, durable fibers present.

Q. So the macrophage is the garbage collectors? They're the ones that pick up the fibers --

A. Yeah.

Q. -- or at least try and pick all of them up?

A. Right.

Q. And if there's some fibers that are left behind that can't be handled by the lung, is this what happens?

A. Yeah. That's -- it's an inflammatory response. We started actually looking in this in the animals that do this, and where we actually see this type of response.

09:58:12 Q. All right. Now, do you actually have a
09:58:18 photograph of a macrophage?
09:58:18 A. Yeah.
09:58:20 Q. This garbage collector?
09:58:20 A. Yeah. This is work I did a long time ago. It's
09:58:24 glass fibers. And this -- if you remember, I talked
09:58:28 about when we -- the first work I did, we gave the
09:58:30 animals long and short fibers. This is the long fibers.
09:58:36 They were all the same size and diameter when we put
09:58:38 them in the animal. And here you can see a macrophage
09:58:40 that dissolved a glass fiber to be thinner. This one
09:58:46 there. This is the macrophage cell. Another
09:58:46 macrophage.
09:58:48 Q. All right. And so these macrophages just move
09:58:52 along the lung and grab up any of these fibers that it
09:58:56 sees?
09:58:56 A. They're designed to pick up anything that's
09:59:00 formed to the lung.
09:59:00 Q. What happens if these macrophages can't deal with
09:59:04 one of these fibers?
09:59:06 A. They will ask more to come.
09:59:08 Q. Okay.
09:59:10 A. Okay. I have a picture here. This is -- we have
09:59:12 a lot of fibers, then, all of a sudden, you have a lot
09:59:14 of macrophages. And you can see all the macrophages.

09:59:20 Sort of like a shish kebab. Looks like shish kebab.
09:59:22 And you can see the fibers, macrophages coming to try to
09:59:30 pick that up. And if the fibers did not dissolve, we'd
09:59:32 just keep having -- coming more and more and more and
09:59:34 more. And this is the start of a disease process.
09:59:38 If you have short fibers, you can see the little
09:59:40 short fibers in the macrophages here, and the only place
09:59:44 the short fibers go is the lymphatic system. The lymph
09:59:48 nodes you may have heard of. This is -- the lung is a
09:59:52 clearer and smaller material.
09:59:56 What's interesting is that all the work that's
09:59:58 ever been done on disease-related lymphatic system show
10:00:02 that asbestos -- the short fiber amphibole has nerve
10:00:06 caused disease in the lymphatic system. So if the
10:00:10 fibers are brought to here, essentially, they're
10:00:14 neutralized in the compartment in the lung.
10:00:16 Q. All right. Now, what happens when the body
10:00:18 clears these fibers?
10:00:20 A. Well, the fiber clearance is affected by
10:00:24 macrophages. And here I'm showing you the macrophages.
10:00:30 The macrophage -- that's a picture of the macrophage and
10:00:32 this is the bacteria. And the way it works is
10:00:34 interesting. Our bodies are a neutral PH or a neutral
10:00:40 water PH acid base, and it picks up the bacteria and
10:00:44 makes a little sac around it and then changes the PH in

10:00:48 that sac to acid, and it kills the bacteria with acid.
10:00:48 It's found in each of us right now to defend ourselves
10:00:48 against bacteria.

10:00:58 And then, when it finishes killing the bacteria,
10:01:00 it essentially spits it out. Then that can create this
10:01:04 acid. Right here, it's going to spit it out. And you
10:01:06 can see how the macrophage rolls over on itself. And I
10:01:14 have another one with actual lab fibers. This is glass
10:01:18 fibers. The study was done by a professor.

10:01:20 Q. All right.

10:01:38 A. This is the University of Munich, Germany. The
10:01:42 professor did this work with glass fibers. These are
10:01:44 glass fibers in a culture dish. And you can see the
10:01:48 macrophages here, these little round guys. And you can
10:01:50 see how it stretches out to try to pick up the fiber.

10:01:52 Obviously, this fiber is too long for that
10:01:54 macrophage to pick up. Here's the macrophage picking
10:02:00 one up completely. If you look at this one, it's
10:02:00 interesting. Here's a medium size fiber. There's a
10:02:02 macrophage. See how the macrophage manipulates around.
10:02:10 And watch that here because the idea of the macrophage
10:02:12 is to try to pull that thing into -- that fiber into
10:02:16 itself to take it away. And it actually does this with
10:02:22 inhalation, bringing it in.

10:02:24 Q. So this is actually how -- a real macrophage?

10:02:30 A. These are real macrophages, real glass fibers. And you can see that it picked it up completely so it can take that fiber away. These fibers are too long to be taken away. Start it again. I think you have to press the button. Okay.

10:02:54 Q. All right. Now, Doctor, why is what you've just shown the macrophages dealing with the long fibers and short fibers important to the disease process in determining whether or not they can start or have the ability to start a disease?

10:03:10 A. Well, this is essentially the fact that determines whether a fiber can cause a disease.

10:03:18 Q. All right. And is that part of why you evaluate whether a fiber is toxic or not?

10:03:24 A. Yes.

10:03:24 Q. And have you written and published in the area of whether or not fibers are toxic and have a potential for causing disease?

10:03:34 A. Uh-huh. This is a publication that was -- a study that was done by -- the U.S. EPA requested this. And a group in Washington, D.C. mandated -- it was mandated by the EPA to make this evaluation of a group of experts. And so a number of experts from around the world, including myself, I was invited, came together to discuss how to evaluate the toxicity of fibers using,

10:04:04 what we call, shorter term tests and animals tests to
10:04:08 determine whether or not the fiber is toxic.
10:04:10 Q. And when was this done?
10:04:14 A. This date, I think it was 2005 or thereabouts. A
10:04:18 few years ago.
10:04:20 Q. All right. And I notice it says, report of an
10:04:26 ILSI Risk Science Institute working group? Who's ILSI?
10:04:30 A. It's the International Life Science Institute in
10:04:30 Washington, DC, which is an independent scientific group
10:04:38 that receives mandates often from the US government to
10:04:40 do evaluations of different products.
10:04:42 Q. And who are the members of the ILSI working
10:04:44 group?
10:04:44 A. They are scientists, like myself, from around the
10:04:48 world.
10:04:48 Q. And, generally, are they toxicologists or are
10:04:52 they scientists in many other disciplines?
10:04:54 A. There were toxicologists, there were
10:04:56 mineralogists, there were cell biologists. So it's a
10:05:02 multiple discipline group.
10:05:04 Q. All right. Doctor, we've seen and we've talked a
10:05:08 lot about how certain cells work and the ability of the
10:05:14 lung to deal with short fibers and long fibers. Can you
10:05:18 tell the jury, as a toxicologist, the types of studies
10:05:22 that you used to evaluate whether or not a fiber is

10:05:26 toxic?

10:05:26 A. Yeah. These are different kinds of studies that
10:05:30 were reviewed by that working group as well, some of
10:05:34 them more than others. There are essentially three
10:05:36 categories of studies. The first is, what we call, in
10:05:40 vitro chemical dissolution studies where they actually
10:05:44 create -- take a fiber and they -- it's a simulated lung
10:05:48 fluid. It's the fluid in the lung process, see how fast
10:05:50 it dissolves. That's used more for research by the
10:05:54 different companies to develop new, more soluble fibers.
10:06:00 They're always looking to do this to have safer and
10:06:02 safer fibers. The other --

10:06:04 Q. Let me stop you. In vitro, what does that mean?

10:06:08 A. Outside of the body.

10:06:10 Q. Okay. And chemical dissolution studies, does
10:06:14 that go back to this concept of staying power and
10:06:16 persistence?

10:06:18 A. Yes. That's right.

10:06:18 Q. And, generally, do you just -- do you take
10:06:20 different chemicals to try to see whether or not they
10:06:24 are -- the fibers are persistent?

10:06:26 A. Well, we use a simulated lung fluid. It's
10:06:30 designed -- it's been described in scientific literature
10:06:34 that includes not all the components of the lung fluid,
10:06:38 but many of the components of the lung fluid. And we

10:06:42 pass this through a bed of the fibers, a circulating
10:06:46 system to see how fast they dissolve.
10:06:50 Q. And this is not only a type of study that you
10:06:54 rely upon, but these are the types of studies that other
10:06:56 scientists rely upon in this field?
10:06:58 A. Yeah. It's on -- people use this study as a sort
10:07:04 of screening technique when they develop new fiber type
10:07:06 materials.
10:07:08 Q. All right. And what are some other studies,
10:07:10 types of studies that you relied upon?
10:07:12 A. The other -- next one is a cell culture. And the
10:07:16 cell culture is when you take the little cells, could be
10:07:20 the macrophage or other cells, in a culture dish outside
10:07:24 the body and you give fiber -- put fibers in there and
10:07:28 see what kind of response happens in the cellular level.
10:07:34 And the thing is, it's not considered relevant
10:07:36 for fiber hazard evaluation. What does that mean? It
10:07:38 means that the cell culture studies have not been
10:07:44 validated, not been compared to animal studies to prove
10:07:48 that they are one-to-one relationship for predicting it.
10:07:52 A lot of the reason is that the fluid of the lung
10:07:56 moving through the fibers is very important to whether
10:08:00 they dissolve or not, whether they fall apart. And the
10:08:04 cell culture has no moving fluid, just fluid standing
10:08:08 there. So there's nothing to dissolve, nothing to move

10:08:12 it. And that makes it very difficult often to interpret
10:08:14 cell culture studies.
10:08:18 Q. So the cell culture studies are missing this
10:08:20 fluid layer we talked about earlier?
10:08:22 A. Uh-huh.
10:08:24 Q. And do you find those as helpful as the animal
10:08:28 studies in what you do?
10:08:28 A. No, the animals studies are used by regulatory
10:08:34 authorities to determine whether a fiber has a toxic
10:08:36 potential.
10:08:38 Q. And explain to the jury why you and other
10:08:42 toxicologists look to animal studies to determine
10:08:46 whether a substance has a toxic effect on humans?
10:08:50 A. Well, the animal, basically use a rat or animal
10:09:08 to predict what happens in humans. The animal has a
10:09:14 respiratory system which is very similar to our
10:09:16 respiratory system. Much smaller, of course. You know,
10:09:20 it's very small. And we use these animals as tests --
10:09:24 in order to test, to evaluate what's going on and what
10:09:28 can happen in humans to determine whether or not
10:09:32 something is potentially dangerous or not.
10:09:38 Q. And there's the phrase in vivo. What does that
10:09:38 mean?
10:09:38 A. Living. A living being.
10:09:40 Q. And how many of these types of studies are done

10:09:46 with fibers using animals?

10:09:50 A. Well, there -- there are a number of different
10:09:54 kinds of studies that are being done. One is the, what
10:09:58 we call, a shorter-term study and the other is a
10:10:02 longer-term study. The longer-term study is, what we
10:10:04 call, a chronic study where the animal is exposed to a
10:10:10 slice of time or a greater part of a slice of time.

10:10:12 We sort of use proportionality of the working
10:10:14 life. Like humans work maybe up to 60 years old.
10:10:20 Virtually, the rat lives about two and a half, three --
10:10:22 two and a half, three years, so we expose them for about
10:10:26 two and a half years until he retires.

10:10:30 So it's a simulation of the working environment.
10:10:32 And, usually, when we expose these animals, we expose
10:10:36 them every day of the week, five days a week for about
10:10:40 six hours a day. Simulate the working cycle. And the
10:10:42 difference is that they get the same exposure all the
10:10:46 time where, of course, the worker may have some times
10:10:48 that he's exposed and other times not. And in order to
10:10:52 maximize the potential of evaluating these types of
10:10:56 products, we do animal studies.

10:10:58 These are very complex and costly studies. They
10:11:02 take a lot of animals, and today the philosophy is to
10:11:06 use as few animals as possible for -- to not abuse the
10:11:12 use of these animals, you might say. And the -- so we

10:11:18 have looked to see other studies, evaluate other
10:11:22 studies, whether they can be predictive of these chronic
10:11:26 long-term studies, these carcinogenic studies.
10:11:30 Q. So the long-term -- or you said -- you called
10:11:32 that the chronic studies?
10:11:34 A. Yeah.
10:11:36 Q. About how long do those studies go for?
10:11:38 A. The actual exposure is about two years.
10:11:40 Q. Okay.
10:11:44 A. Generally, there have been some studies shorter
10:11:46 time periods, but, generally, it's recommended for two
10:11:48 years.
10:11:50 Q. All right. And, then, the other type of study
10:11:52 you referred to is short-term?
10:11:54 A. Yes.
10:11:54 Q. And how long is short-term?
10:11:56 A. It varies. The five-day exposure, which we use
10:12:00 in evaluating the persistence of the fibers, or it could
10:12:04 be up to 90 days of exposure, which is called a
10:12:10 subchronic study.
10:12:10 Q. What's it called?
10:12:12 A. A subchronic. Shorter than chronic.
10:12:16 Q. All right. Now, have you developed any testing
10:12:28 equipment for the use in these types of studies?
10:12:30 A. Yes. This is a patent I have here. This is a

10:12:34 U.S. patent, an inhalation exposure system that I
10:12:38 designed a couple years ago which allows us to expose
10:12:42 the animals very accurately, make sure we know that the
10:12:44 animal received what we think -- we thought the animal
10:12:46 is supposed to get. And I was -- this is a training
10:12:54 video showing the actual exposure system.
10:12:54 (Video playing.)
10:13:10 MS. KAROS: Just unplug the speakers.
10:13:12 Sorry.
10:13:12 A. It wasn't necessary to have the voice.
10:13:14 Q. (By Ms. Karos) So is that -- is that the machine
10:13:16 that you developed?
10:13:18 A. That is the machine I developed, yes.
10:13:20 Q. Okay.
10:13:20 A. That's used today in the large majority of
10:13:24 laboratories around the world, U.S. and Europe and
10:13:28 elsewhere, for doing inhalation toxicology studies.
10:13:32 Q. And you said that this is patented?
10:13:36 A. Yes.
10:13:36 Q. And it's U.S. patent or European?
10:13:38 A. That is both U.S. and European.
10:13:42 Q. Okay. Now, Doctor, you said the two types of
10:13:50 animal studies. What do we -- what do we hope to gain
10:13:56 doing these two types of studies, the long-term or
10:13:58 chronic and the short-term or subchronic?

10:14:02 A. Well, the long-term studies are, you might say, the ultimate studies because this actually determines the end points of cancer, that can determine whether a fiber is carcinogenic or not, producing cancer. So because these take a long time and cost quite a lot of money, we always evaluate other studies to determine whether they predict these cancer studies. These are the shorter term studies which we referred to while ago.

Q. All right.

A. These include biopersistence and toxicity studies.

Q. Okay. What does biopersistent mean -- biopersistence mean?

A. Biopersistence is how fast the longer fibers disappear from the lung. The ones the macrophage can't take away, we call biopersistence. Persistence in the biological system of the lung.

Q. All right. And then you had toxicity?

A. Toxicity. The fiber produce an inflammatory or toxic response.

Q. And explain that, if you would, please, sir.

A. Well, the -- even in the shorter term exposure, if the fiber is not dissolving at all, we thought that -- we know we have found that we can look and examine what happens even in the shorter-term exposure and see

10:15:36 the beginning of the disease process that later leads to
10:15:40 cancer.
10:15:40 Q. And does that help in forming your opinions about
10:15:44 whether or not fiber can be toxic in the lung?
10:15:46 A. Yes, it does.
10:15:46 Q. And what is it about the biopersistance studies,
10:15:52 or the length of time it takes for the long fibers to
10:15:58 disappear, to help you formulate your opinions about
10:16:02 whether or not long or short fibers can cause disease?
10:16:06 A. Well, we found the fibers that disappear rapidly,
10:16:10 don't cause any kind of toxic response or inflammatory
10:16:16 response.
10:16:16 Q. And have these types of studies been done?
10:16:18 A. Yes, they have.
10:16:20 Q. And what have they told us?
10:16:20 A. Well, the fact that there is a huge difference
10:16:24 between chrysotile asbestos and amphibole asbestos.
10:16:30 Q. All right. And the chrysotile or chrysotile
10:16:34 being the shorter fibers?
10:16:36 A. No, the long fibers. The ones that are
10:16:38 potentially causing the disease.
10:16:40 Q. All right. And the amphiboles being?
10:16:42 A. Also the long fibers.
10:16:44 Q. Long fibers. Okay. Now, Doctor, I believe that
10:16:54 you, in talking about the biopersistence, let's start

10:17:00 with that type of study first. Tell us about
10:17:04 biopersistence studies.
10:17:04 A. The biopersistence study tells us how fast the
10:17:18 fibers are removed from the lung, where the fibers are
10:17:22 in the lung, and also can tell us the short-term
10:17:28 pathologic response, what happens when you're exposed to
10:17:32 a short -- to even a short amount of time to -- in the
10:17:36 lung in response to these fibers.
10:17:38 Q. All right. And what does this tell us, even
10:17:42 though we're looking at a short amount of time of fibers
10:17:46 in the lung, why is that important?
10:17:50 A. Well, because what we found is that study is
10:17:54 predictive of what happens in the carcinogenicity
10:17:58 long-term studies. That means if a fiber is --
10:18:02 dissolves rapidly in the lung, is not biopersistent, it
10:18:06 will not produce cancer. And if it is biopersistent in
10:18:10 the lung, it will produce cancer.
10:18:12 Q. So is it -- is it fair to say, Doctor, that the
10:18:12 start of these short-term studies and seeing what
10:18:14 results come of those, and then, if we see that the
10:18:18 short-term studies that there's no disease or that the
10:18:22 lung can handle these fibers, then we look to the
10:18:26 longer-term studies?
10:18:28 A. That's one way to put it.
10:18:28 Q. Okay. And, Doctor, have there been studies on

10:18:32 these biopersistent short-term tests?

10:18:38 A. Yes, there has.

10:18:40 Q. All right. And do you have one of those that

10:18:42 you've brought with us that you've done?

10:18:46 A. Well, this is how this biopersistent study is

10:18:52 designed. The animals are exposed to five days at six

10:18:54 hours a day, one week, basically, of exposure. The

10:18:58 fiber can build up in the lung as you're getting

10:19:02 exposed. And then we stop exposure and examine the

10:19:08 lungs over different time points afterwards to see how

10:19:12 fast it's removed. And so we can determine how quickly

10:19:16 the fiber is removed from the lung.

10:19:18 Q. All right.

10:19:20 A. And this is a work that I published a number of

10:19:22 years ago on the experimental design of how to do these

10:19:26 studies, how to perform this kind of study. And, again,

10:19:34 these studies are designed -- are useful because they

10:19:38 predict the long-term carcinogenicity studies.

10:19:46 Q. Doctor, do you know when your paper was published

10:19:50 on the experimental approach to the evaluation of

10:19:54 biopersistence?

10:19:56 A. I think it was -- I can't see it from here.

10:19:58 1997, or something like this.

10:20:00 Q. 1997. So a number of years ago?

10:20:04 A. Yes.

10:20:04 Q. All right. I'm sorry. Now, we're talking about
10:20:06 the -- now, we've talked about the short-term exposure.
10:20:08 Now, let's talk about what the long-term exposure
10:20:12 studies show us.
10:20:14 A. Uh-huh. Long-term toxicology studies, these
10:20:18 studies are performed using standard protocols designed
10:20:22 to evaluate the carcinogenic potential of fibers,
10:20:26 whether the fiber will cause cancer. What we found is
10:20:32 that the inhalation of biopersistent study predicts the
10:20:32 carcinogenicity studies.
10:20:42 That is, if the fiber goes away quickly, it won't
10:20:44 cause cancer; and if it stays, it can cause cancer.
10:20:48 This is where it was done by the biopersistence
10:20:52 accurately predicts lung injury and cancer. This is
10:20:56 work that we did -- I did under mandate for the European
10:20:56 Commission.
10:21:02 These are publications which describes the
10:21:04 relationship of how this biopersistence study actually
10:21:08 does predict the cancer studies. And this was, again,
10:21:12 published in the peer review journal.
10:21:16 Q. And who did you do this study for?
10:21:18 A. This was for the Europe Commission. The
10:21:22 government of Europe.
10:21:24 Q. Now, we've talked about the short-term and the
10:21:28 long-term studies. Why are these two types of exposure

10:21:34 studies important in predicting disease or the potential
10:21:38 for predicting disease?
10:21:40 A. Well, the -- ideally, to do long-term studies, I
10:21:46 think the materials, I deal with this, I've done this
10:21:50 many, many years, and they're very, very expensive and
10:21:52 they use a lot of animals. And so we designed studies,
10:21:56 shorter-term studies, which is the emphasis today all
10:22:00 over the world in order to minimize the use of animals
10:22:04 and to maximize our knowledge.
10:22:06 And I think that what is key is developing
10:22:10 shorter-term studies. That means to show that they
10:22:12 actually do relate to the long-term studies and that's
10:22:16 what's so important about this work that we actually
10:22:20 show that the fiber is not biopersistent, does not
10:22:24 produce disease.
10:22:24 Q. And what does this tell us, the results of these
10:22:30 long-term and short-term fibers and the inhalation to
10:22:34 cause disease in the lung?
10:22:36 A. Well, the purpose of this is to -- is in order to
10:22:42 -- for us to know whether there's potential in humans to
10:22:48 cause lung cancer or mesothelioma.
10:22:50 Q. All right. Doctor, now, I want to turn to
10:22:56 asbestos fibers. Okay. We've been talking --
10:23:00 A. This -- just -- maybe I think this is important
10:23:04 because we talked about this subchronic study and this

10:23:08 is a -- this study is in between the short-term and
10:23:12 long-term. The chronic is two years and the short-term,
10:23:18 which is five days of exposure. To me, we call it the
10:23:20 subchronic. It's a 90-day exposure.
10:23:26 Q. Okay. I was thinking that you said the
10:23:26 subchronic included five days and 90 days, but the
10:23:30 subchronic are the 90-day studies?
10:23:34 A. Right.
10:23:34 Q. Okay.
10:23:34 A. I'm sorry if I was unclear.
10:23:36 Q. Go right ahead.
10:23:38 A. And, again, this working groove that was
10:23:42 commissioned by the U.S. EPA, they said that all fibers
10:23:50 that have caused cancer in animals by inhalation have
10:23:54 also caused fibrosis at an earlier time point, that is,
10:23:58 by three-months. What does that mean? That the 90-day
10:24:00 study, the three-month study will identify fiber at that
10:24:04 fibrogenic or carcinogenic potential.
10:24:08 That if in this 90-day toxicity study nothing is
10:24:14 seen, there's no toxic response, the fiber will not be
10:24:18 carcinogenic in a chronic study, long-term study.
10:24:24 Q. All right. So when you do the short-term study,
10:24:26 the five-day study and you see no effect of the fiber
10:24:32 having potential to cause disease and we don't do the
10:24:36 chronic but we do the subchronic, this is to say now

10:24:40 that the subchronic is as far as we need to go in order
10:24:42 to determine whether or not a fiber has the potential to
10:24:48 cause disease.
10:24:48 A. Right. What it says is that in all the chronic
10:24:52 studies that have been done, quite a few of them around,
10:24:56 that never has a fiber caused disease if it was not
10:25:00 fibrosis at the end of the 90-day period.
10:25:04 Q. Okay. Doctor, now, can you turn to asbestos?
10:25:08 A. Yeah.
10:25:08 Q. Now, you said in the beginning of your testimony
10:25:16 today that part of what your opinions were included the
10:25:22 different types or families of asbestos. Do you recall
10:25:26 that?
10:25:26 A. Yes.
10:25:32 Q. And what are the differences in asbestos?
10:25:38 A. Well, there -- as I said, there are two families.
10:25:40 There's the serpentine, which is the chrysotile fiber,
10:25:44 or chrysotile, and the amphibole which are -- the most
10:25:50 common ones are amosite and crocidolite that have been
10:25:54 used virtually. Then --
10:25:54 Q. Doctor, let me interrupt you. Are all asbestos
10:25:58 fibers the same?
10:25:58 A. No. Actually, they're two different minerals.
10:26:02 This is one mineral and this is another mineral.
10:26:04 They're not all the same material. And physically,

10:26:10 they're very different. The amphiboles are like solid
10:26:14 soldiers, they're like this pointer, and you can see
10:26:18 actual amphibole fibers under an electron microscope
10:26:22 here. And the chrysotile look like -- look like a rope
10:26:24 that you can see this like rope like structure in the
10:26:28 chrysotile here.
10:26:30 Q. So, Doctor, when you look at these fibers, do
10:26:30 they -- do they look differently?
10:26:34 A. They certainly do look definitely.
10:26:36 Q. Now, what about the structures of these fibers?
10:26:38 Are they different or the same?
10:26:42 A. The chrysotile structure is actually -- it's
10:26:44 rolled -- it's a rolled sheet. It's like a sheet of
10:26:52 paper and looks like this, roll it up. That's like
10:26:58 chrysotile fiber. It's like a rolled sheet of paper.
10:27:00 The wall of the sheet is extremely thin. It's eight --
10:27:06 one -- less than one thousandths of a micrometer thick.
10:27:10 Much thinner than your hair and very, very fragile
10:27:16 actually.
10:27:18 And what's interesting about this rolled sheet --
10:27:20 the reason it's rolled is because one side has silica
10:27:26 and the other has magnesium. And they don't match up in
10:27:28 terms of the way they join together. It has to curl to
10:27:30 join together. And you can see the actual rolled
10:27:34 structure here.

10:27:36 Q. Is the structure of the chrysotile fiber
10:27:38 important in explaining how the lung responds to the
10:27:44 fiber?
10:27:44 A. It's very important. The mineralogy and the
10:27:48 structure.
10:27:48 Q. And why is that?
10:27:50 A. Well, I'll show you here. This is like the
10:27:52 rolled sheet of chrysotile. This is actually how it
10:27:54 would look. And on the outside of the sheet is the
10:27:56 magnesium. This element is magnesium. It's an element
10:28:00 which we need in our bodies actually. And it's soluble
10:28:04 in our lung fluid. It dissolves very rapidly.
10:28:08 And so what happens is when the fiber gets into
10:28:10 our lung it deposits on the wall of the albulis
10:28:14 (phonetic) and the fluid of the lung, magnesium starts
10:28:18 to dissolve. And then comes this macrophage to pick it
10:28:22 up, the cell. Remember, I told you about how the
10:28:24 macrophage emits acid to go to bacteria? Well, it emits
10:28:30 acid when it tries to pick up anything. That's its
10:28:32 natural response. What happened when the acid attacks
10:28:34 the chrysotile structure that remains? It falls apart
10:28:38 into particles. And this is what happens with
10:28:40 chrysotile. It disintegrates.
10:28:42 Q. So is the -- is the chrysotile fiber durable in
10:28:48 the lung? Does it have staying power?

10:28:50 A. No, it does not.

10:28:52 Q. And that is because of what it's made of?

10:28:56 A. Yeah, what it's made of and the way the lung
10:28:58 attacks it.

10:28:58 Q. All right. Now, what about the amphibole fibers?
10:29:00 How are those made up?

10:29:02 A. Amphibole is quite the opposite. Here the
10:29:06 amphibole facility is around the outside. It's not the
10:29:10 rolled sheet. It's like this pointer, and anything
10:29:14 soluble is in the inside, the very inside. So it never
10:29:18 sees the lung fluid. So the only thing the lung fluid
10:29:20 sees is the outside silica structure. And that's
10:29:24 inside. It does not readily dissolve. And it persists
10:29:28 in the lung. It has staying power in the lung.

10:29:30 Q. So if the macrophage, those garbage collectors
10:29:36 come along and emit that acid in our lungs, is it -- is
10:29:40 it going to dissolve away this outside of the amphibole
10:29:44 fiber?

10:29:44 A. No, it does not.

10:29:46 Q. And that's because it has this -- is it silica?

10:29:48 A. Yeah, it's the silica and it's sort of encrusted
10:29:54 outside of the fiber and which is inside. Well, people
10:30:00 do not have -- people have done studies using hot
10:30:04 boiling acid which was very dangerous, and when they put
10:30:08 these fibers in, they dissolved very rapid in hot acid.

10:30:14 Q. So did the amphibole fibers look different? Is
10:30:16 this structure different than the chrysotile fibers?
10:30:20 A. Yeah. As I said before, the chrysotile looks
10:30:22 like this rolled sheet, whereas, the amphibole is a
10:30:24 solid material, very solid structure.
10:30:30 Q. And how does the structure of the amphibole
10:30:32 affect the way the lung reacts to it?
10:30:36 A. Well, the macrophage will come and try to
10:30:38 dissolve this solid amphibole fiber and it does nothing.
10:30:44 The fluid of the lung does nothing, the acid does
10:30:50 nothing, the fiber stays. And because the fiber stays,
10:30:52 more cells are going to have to try to pick it up and
10:30:54 this is the beginning of this inflammatory process.
10:30:56 Q. Okay.
10:31:04 A. I'm sorry. Here's another picture of how the
10:31:08 amphiboles work. You can see the solids depicted here
10:31:12 and the soluble elements that dissolve are between the
10:31:16 fibers, not as a part of the fiber. So, actually, these
10:31:22 soluble elements, these little orange things are soluble
10:31:24 and it breaks apart into just long thin fibers, which is
10:31:28 why the amphibole is essentially dangerous.
10:31:32 Q. Doctor, have you studied and looked at whether or
10:31:36 not chrysotile and amphibole fibers have the ability to
10:31:42 stay in the lung?
10:31:42 A. Yes, I have.

10:31:44 Q. And have you looked at just one type of
10:31:46 chrysotile fiber in doing that?
10:31:48 A. No, I've done -- actually examined today three
10:31:52 different types of fibers. We have looked at three
10:31:58 different commercial chrysotile fibers. It's very --
10:32:04 besides commercial is -- in the past, there have been
10:32:06 numbers of studies that use a noncommercial artificially
10:32:12 prepared product. We've often used the patented fiber
10:32:16 out of the package, you might say. We would have bought
10:32:18 that, using that material.
10:32:20 We use three studies. One is the Canadian
10:32:24 chrysotile. We want to use sort of the worst case
10:32:30 scenario, the textile grade used for making clothes. It
10:32:34 was said, in some studies, that this is the most
10:32:36 dangerous potentially of material. Another one was the
10:32:42 Calidria mine in California. It's an amphibole mine in
10:32:42 California. Another one was in Brazil, an amphibole
10:32:52 mine in Brazil called the Canabravia. These are all
10:32:52 commercial products.
10:32:54 Q. And have you looked at the actual fiber under a
10:32:56 microscope?
10:32:56 A. Yes, we have.
10:32:58 Q. And what does it -- well --
10:32:58 A. And this is the picture of the fiber. And this
10:33:02 is a scanned microscope picture of the fiber and you can

10:33:06 see the curly structure of the fiber, of the long fiber.
10:33:10 It's not a straight cylinder, but the amphiboles can be
10:33:14 quite curly. You can basically find straighter fibers,
10:33:18 but you're still this rolled sheet structure.
10:33:22 Q. And, Doctor, have you had an opportunity to look
10:33:24 at the staying power of the amphibole fibers?
10:33:30 A. Yes, we have. We've done a study.
10:33:32 Q. Explain how that works.
10:33:36 A. This is a little complex, but I'll try to explain
10:33:38 it to you. On this side of the graph are the number of
10:33:42 longer fibers, these longer fibers I talked about that
10:33:46 stay in the lung after the animal was exposed for five
10:33:50 days. Just five days at a time.
10:33:52 And this is the time after the end of exposure.
10:33:56 And this is an amphibole fiber at the site. You can see
10:34:00 this removal early on. What this is, is the fibers that
10:34:04 are on the bronchial tree are being brought up and spit
10:34:06 out by the animal. So this is -- those fibers are being
10:34:10 removed from the bronchial tree.
10:34:14 The fibers in the deep lung can't get out. The
10:34:16 macrophage comes, can't dissolve it, it acts as an
10:34:20 anchor. What happens is the fibers just stay in the
10:34:22 lung. This is about one year of time and it is almost
10:34:26 -- there's no statistical difference over that one time,
10:34:30 over that one year of time.

10:34:32 So you have, after five days exposure, almost a million fibers longer than -- these longer fibers remaining in the lung are amphiboles and that is how -- why those just keep staying there and they keep -- the lung responds by trying to send more cells in to pick them up and it just never works. This inflammation starts.

Q. So after -- after you've exposed the animal, you're saying that these amphibole fibers stay in the lungs, gets rid of a little bit of them, but they stay in the lungs all these days after?

A. Right.

Q. Now, have you also, then, looked at the ability of chrysotile to stay in the lungs?

A. Yes. We looked at all three chrysotiles. I showed you this ability. I'll show you them altogether in this very different picture of the amphibole. I'll show you across the top here. The chrysotile disappears very rapidly. In a few days, most of the long fibers have disappeared and disintegrated into smaller pieces and are removed from the lung.

Even this Canadian chrysotile, this textile chrysotile, which is thought to be the worst, disappears very relatively rapidly. And the other commercial chrysotiles are disappearing within a matter of a few

10:36:00 days. Actually, at that time, the next slide shows you
10:36:04 actually the times, this is what they call the half
10:36:06 time, how much -- how much time it takes for half to get
10:36:10 out of the lung, half of what was inhaled. The half
10:36:14 time of the calidria was .57 hours after it was gone.
10:36:20 Brazilian chrysotile was 1.3 days and the Canadian
10:36:22 chrysotile was 11.4 days.

10:36:24 Now, to give you a sense of what this means, what
10:36:30 we did by this evaluation for the European government
10:36:34 when they made a law on synthetic fibers, they used
10:36:38 these tests in the criteria for establishing whether a
10:36:40 fiber was safe or not.

10:36:42 And they said that if a fiber cleared with a half
10:36:44 time of less than ten days it would never be considered
10:36:48 carcinogenic ever. And, of course, there were other
10:36:52 steps, you know, further up the line. And -- but you
10:36:58 can see these commercial chrysotiles clear extremely
10:37:02 faster even than most glass fibers that may be in your
10:37:04 house.

10:37:06 Q. And, Doctor, are these studies that you conducted
10:37:08 on these three different types of chrysotile fibers ones
10:37:14 that were done, what, in 2003 and 2004? Is that what --
10:37:18 what is this reference right here?

10:37:18 A. Yeah. Those are the actual publications,
10:37:20 references. The dates they were published, yes.

10:37:26 Q. So this is a relatively recent research?

10:37:26 A. It is, yes.

10:37:28 Q. Doctor, the jury has heard evidence about different governmental regulatory agencies that have taken the position that all asbestos fibers, regardless of whether you're in the serpentine family and a chrysotile or an amphibole, have the potential of causing disease. And they appear to disagree with what you just told this jury.

10:37:54 A. I think there's two aspects of that. One is the majority of the evaluations that were done by the governments were done before this information was published, and they haven't re-reviewed it for whatever reason. I'm not privy to their operation. And they also -- they're not looking necessarily at the science. They have sometimes a more different picture, as governments sometimes do, as to how to evaluate things and what I'm trying to show and what actually the science is saying.

10:38:24 Q. All right. And where do these government, like the EPA, do you know when the EPA made its announcement about asbestos and the potential for causing disease?

10:38:38 A. I think the first time was in the '80s. As I understand, they're reviewing this whole process now. And so it's still in flux, you might say. Still haven't

10:38:48 made the decisions.

10:38:50 Q. And do we -- the more that we do in science do we
10:38:54 seem to be learning a lot more about asbestos and the
10:38:56 differences that asbestos presents both as a mineral and
10:39:00 then as it affects the body?

10:39:02 A. Uh-huh. That's definitely true, uh-huh.

10:39:06 Q. And, Doctor, have you been able to do a
10:39:08 comparison of how fast chrysotile asbestos is cleared
10:39:16 from the lungs as opposed to the amphibole?

10:39:18 A. Yes. We did one study in both amphibole and
10:39:22 chrysotile. And the amphibole was, again, across the
10:39:26 top here. And this is the time after the end of
10:39:30 exposure. This is the number of fibers remaining in the
10:39:32 lung. And the chrysotile actually drops so quickly you
10:39:38 almost can't see it. That's the large difference
10:39:42 between the way the lung clears chrysotile compared to
10:39:46 the amphiboles. Really, it's dramatic.

10:39:50 MS. KAROS: Your Honor, we're about ready to
10:39:54 go into another topic. I don't know if the Court wanted
10:39:56 to take a break at this time or keep going?

10:40:00 THE COURT: How long is the next topic going
10:40:02 to take?

10:40:04 MS. KAROS: Probably about 15 minutes.

10:40:06 THE COURT: Go ahead.

10:40:08 MS. KAROS: Keep going? Okay. Great.

10:40:08 Q. (By Ms. Karos) All right. So we now learned that
10:40:12 chrysotile can clear a lot faster than the amphibole.
10:40:16 The amphibole has more staying power?
10:40:18 A. Uh-huh.
10:40:18 Q. And why is it that the chrysotile clears so
10:40:22 rapidly?
10:40:24 A. Well, as I explained before -- good question.
10:40:36 This is -- again, you've seen this slide before. It's
10:40:40 because the rolled structure of the chrysotile,
10:40:42 magnesium on the outside dissolves away in the lung
10:40:46 fluid and the walls of the lung, and the acid of the
10:40:50 macrophage attacks the structure and while the fiber
10:40:56 disintegrates -- the fiber disintegrates into particles.
10:41:00 And these particles can be picked up and the macrophages
10:41:02 remove it.
10:41:02 Q. And do you have a demonstration of the macrophage
10:41:06 picking this up?
10:41:12 A. See, again, fibers are inhaled like we saw
10:41:16 before. They have to go down passed the bronchial wall
10:41:20 here and even to the lung. What happens you have the
10:41:24 long and short fiber. The short fiber and the long
10:41:30 fiber. This shows the destruction, the roll destruction
10:41:30 hose. The normal PH of the lung starts to break apart
10:41:34 the outside of the medium.
10:41:36 The macrophage starts to pick up the short

10:41:38 fibers, takes it away, no problem. Macrophage starts
10:41:40 for the long fiber, can't pick it up. Stuff starts
10:41:44 needing acid, the acid starts attacking the structure,
10:41:48 fiber falls apart. Macrophage can pick up those pieces
10:41:52 and remove them.
10:41:56 Q. Okay. Now, have you been able to look at this
10:42:04 not only from the biopersistence of the studies that
10:42:10 we've looked at but also looking into pieces of the lung
10:42:14 tissue.
10:42:14 A. Yeah. We used it in studying a technique called
10:42:18 confloblycoscopy (phonetic). It uses a high-powered
10:42:18 laser beam to scan, much like the medical scanner. You
10:42:26 go in for a medical scan to examine what's going on
10:42:30 inside you. Well, we did the same thing with the lungs
10:42:34 of the rats because we wanted to go in and look what was
10:42:36 happening without touching anything, in a sense, without
10:42:40 moving anything around in the tissues because these are
10:42:42 long fibers. You know, they can -- you can move them
10:42:46 around and actually made a cut through the tissue.
10:42:48 And so we used this confloblyscopy and I can show
10:42:52 you some images of actual lungs and the fibers. And the
10:42:56 computer does other fibers, than chrysotile fibers
10:43:00 readily in this animation. This animation is an actual
10:43:02 video of the lung and the fiber.
10:43:04 Q. Now, Doctor, you said it's -- they're confocal?

10:43:10 A. Yeah. It's confocal microscopy.

10:43:12 Q. So it's a type of like a microscope?

10:43:14 A. Yeah. It's like a scanner almost where you can see it in 3-D, three dimension.

10:43:20 Q. So like if you go in and get an MRI?

10:43:22 A. Yes.

10:43:22 Q. Is it something like that?

10:43:24 A. Not exactly, but it's a similar concept, yeah.

10:43:26 Q. Okay. All right. And so you were able to do this confocal microscopy --

10:43:30 A. Right.

10:43:32 Q. -- on the actual tissue --

10:43:34 A. On the --

10:43:36 Q. On the animals that you had exposed?

10:43:36 A. Right. In this biopersistent study we looked at the different type process they explained. So we looked using this technique what was actually happening in the lung at those -- see for ourselves to actually -- because something new was being discovered that this chrysotile is rapidly disintegrating. And I had to be convinced it wasn't some kind of artifact of the technique I was using. That I was doing something wrong when I was actually doing the study.

10:43:38 So we included this. You know, it's not an inexpensive technique. And it was the only way that I'm

10:44:18 going to be convinced as a scientist that the result
10:44:20 that I showed you just before was a valid result. I can
10:44:24 show you that if you like.
10:44:24 Q. Okay.
10:44:26 A. This is actual images here, and this is one day
10:44:32 after the end of this five days. Here's the airway.
10:44:36 These are the alveolar regions of the lung. And you go
10:44:40 in. We're going to go and out in sort of a 3-D
10:44:44 computer. We can rotate it, things like this so you can
10:44:48 actually see. And you can go in there and you'll see as
10:44:52 you go around some red pieces here. Those are little
10:44:56 pieces of chrysotile in the lung. And here's some right
10:44:58 here. Some red.
10:45:00 These are little short pieces of chrysotile in
10:45:04 the lung. So we were fortunate enough to see where the
10:45:06 long ones were. We did find the long ones one day after
10:45:10 the end of exposure. You can see all those long
10:45:14 chrysotile fibers in the airway -- terminal airway of
10:45:16 the lung.
10:45:16 And I'll show you those when we get closer here.
10:45:22 These sort of have to -- this is the airway of the lung.
10:45:26 All these little puff balls are the macrophages.
10:45:30 They're the actual pictures of the macrophages. You can
10:45:32 see the fibers trying to be picked up by the
10:45:36 macrophages.

10:45:36 So you can see as soon as the fibers deposit in
10:45:40 the lung, the macrophages are called out to come and
10:45:44 take them away. This is the wall of the alveolar. The
10:45:48 blood flow is inside that wall. You can see the long
10:45:50 fibers here. All the macrophages coming to try to pick
10:45:54 them up. Those macrophages are getting the acid we're
10:45:56 talking about which are breaking up the fibers. So look
10:46:00 at seven days later and was very hard to find long
10:46:04 fibers at seven days because most of them had
10:46:08 disintegrated.

10:46:08 There's a little bit of a long fiber there, a
10:46:10 macrophage there. But most of these are these little
10:46:14 pieces, broke up into little pieces. These little
10:46:18 pieces are like a sand like material. They're not
10:46:20 toxic. Three-months there. It was even more difficult,
10:46:20 of course, to find it.

10:46:28 This is the airway. This is the alveloar. These
10:46:30 are the sacs that I told you about. When we went in
10:46:34 there. This is actual pictures of the animal. And
10:46:36 you'll see an occasional red dot. You have to look real
10:46:40 careful to find it of the pieces of chrysotile fiber.

10:46:50 There's one here someplace. I don't know where
10:46:54 it was. But by and large the lung is returning to its
10:46:56 state before the animals were ever exposed to these
10:47:00 fibers. All those long fibers have disappeared. The

10:47:12 short fibers have been picked up by the macrophage and
10:47:14 taken away. And this is what actually happens in the
10:47:18 lungs of the animals.
10:47:18 Q. So why was this important to you in your
10:47:22 research?
10:47:22 A. Well, it really showed me that, one, that the
10:47:26 clearance -- how fast the chrysotiles cleared was
10:47:30 accurate. Here we're looking in 3-D without having to
10:47:36 do anything to the tissue to actually evaluate it.
10:47:38 We've actually used this technique to measure the length
10:47:42 and diameter of each fiber and how many are there.
10:47:44 And so this confirmed the studies that we showed
10:47:46 you I earlier about how fast they cleared. And it also
10:47:50 shows you that the lung returns to a normal situation
10:47:54 very quickly after the end of exposure.
10:47:58 Q. And what impact, if any, did the structure of the
10:48:02 chrysotile have on how it ended up reacting in the
10:48:06 tissue?
10:48:06 A. Well, like I showed you before in the animation,
10:48:08 the macrophages when they do come they break apart. The
10:48:14 whole structure falls into little pieces and the
10:48:16 macrophages pick up those pieces and move them out.
10:48:20 Q. Okay.
10:48:22 A. Because they're not there because it's removed
10:48:24 will not be causing -- have potential to cause disease.

10:48:28 Q. Were you surprised of your finding when you did
10:48:34 the confocal microcopy?
10:48:36 A. I was surprised. The first biopersistent study I
10:48:40 did was on the actual -- timewise was on this one from
10:48:44 Brazil. And I was totally amazed at -- and I was
10:48:48 expecting that it's going to be -- because up to that
10:48:52 point I was of the opinion that it wasn't a difference
10:48:54 between amphibole and chrysotile. And when I did this
10:48:58 study it was a big surprise to me. And this is why we
10:49:02 did all this additional work because it's such a new
10:49:08 result and I wanted to make sure I didn't do something
10:49:12 wrong in making this evaluation.
10:49:14 Q. And when was this done?
10:49:14 A. The actual study 1990 and it was published in
10:49:20 2003 or '04, I think.
10:49:24 Q. Doctor, did you and other scientists perform some
10:49:30 older inhalation studies in the '60s, the '70s and the
10:49:34 '80s?
10:49:34 A. Yes, we did.
10:49:36 Q. And did you and the other researchers, were you
10:49:38 able to produce mesothelioma in rats?
10:49:40 A. Yes.
10:49:42 Q. And based on what we know now today, which you've
10:49:44 discovered in these more recent studies, do you believe
10:49:48 that -- those older studies to be accurate?

10:49:52 A. I do not at this point in time.

10:49:54 Q. And why is that?

10:49:54 A. Because it's right here. Just this reviews how this process takes place. Initially the lung fluid dissolves magnesium on the outside of the fiber like we showed you and then breaks apart with the acid macrophage into these little pieces.

10:50:24 The historical studies due to artifacts in studies -- these studies cannot be used for hazard assessment.

10:50:30 Q. And what do you -- what do you mean by that?

10:50:32 A. Hazard -- whether something is dangerous or not.

10:50:34 Q. Okay.

10:50:34 A. Whether it's hazardous, you might say. Whether it causes a disease.

10:50:44 Q. Okay.

10:50:46 A. Well, a number of reasons why. The studies were performed -- most of them were performed quite a while ago and we didn't know, especially at that time, about how the rat behaves. They exposed the rats to enormous fiber concentrations. A factor to that, in some of the studies, they're up to one million fibers per cubic centimeter of air.

10:51:10 Well, you might say, what's a cubic centimeter of air. I actually made a cubic centimeter. That's a

10:51:16 cubic centimeter of air. It's a cube of one cubic
10:51:20 centimeter across. And the air concentration has a
10:51:22 million fibers in there. Imagine that. You couldn't
10:51:24 even see between here and there, that concentration. It
10:51:28 was enormous, this concentration.
10:51:30 Q. And this is what some of the older studies.
10:51:32 A. Yeah, the older studies used those
10:51:34 concentrations?
10:51:34 Q. Okay.
10:51:34 A. And in those studies the lungs of the rat become
10:51:38 what we now call overloaded. That is you used the rat.
10:51:42 Humans don't have this. What is overload? It means
10:51:46 that if you put too much dust because the rats were
10:51:50 forced to be there. They had no choice. They were
10:51:54 forced to be exposed unfortunately. And the rat because
10:51:56 it's very small you put all this dust in the --
10:52:00 essentially what it does it shuts down the ability of
10:52:06 the macrophage to handle anything because the macrophage
10:52:08 becomes totally wiped out. It's just too much material.
10:52:10 And so you've then shown that even things like
10:52:16 carbon black, Xerox toner, could be carcinogenic if you
10:52:20 put this overload level into rats. Nobody has any
10:52:24 concern for these type of materials, actual human
10:52:28 exposure. In humans you don't have this because of two
10:52:32 reasons. One is the lung is much larger and the other

10:52:36 is that humans are -- we not stay there.

10:52:42 You know, if exposure -- if the dust level is so
10:52:44 high you couldn't persist. You could cough and choke.
10:52:46 You would get out of there. And the rat doesn't have
10:52:50 that choice unfortunately in those studies. Today they
10:52:54 don't do science studies like that. That science also
10:52:58 thinks that's cruel to the animal.

10:52:58 Q. So, Doctor, are you saying that because these
10:53:00 older studies used so much fiber that they created a
10:53:08 condition -- they created cancers in conditions that
10:53:14 would not happen if you took that information and
10:53:18 exposed a human being to it.

10:53:20 A. Yes.

10:53:20 Q. And we know that now because we know a lot more
10:53:26 about science; is that true?

10:53:26 A. Yes. In fact, this is work that was published by
10:53:30 one of the authors who discovered this process is
10:53:38 Professor Boverdine who was at the University of
10:53:38 Rochester of New York and he's published on this and a
10:53:42 number of other authors have published on the concept of
10:53:42 overload in the rat as a new phenomenon, if you give too
10:53:46 much materials to the rat.

10:53:48 Q. All right. And, Doctor, I believe that we've
10:53:52 talked about the chronic and the short term. And you've
10:53:58 told us that the subchronic, the 90-day study is one

10:54:02 that we can actually look to and other scientists rely upon?

10:54:06 A. Yeah.

10:54:08 Q. Go ahead. What is it about the 90-day study that we've learned as far as toxicity and chrysotile?

10:54:08 A. Well, actually the way -- working on forming the 90-day study for chrysotile is that after we saw the Brazilian chrysotile how fast it was removed from the lung, you know, this was very new information. And the -- I met with many of my colleagues, my scientist colleagues and asked them, well, what do you think of this?

10:54:14 They said, well, it's quiet interesting. But, you know, it's not Texas. It's a menace. It shows how fast it goes away. Maybe something unique is happening that's producing an effect anyhow. So they all recommended that we had to do a toxicity study. So we used the 90-day study.

10:54:20 And the 90-day study is a study that's approved by both the European commission and the U.S. EPA as working group. They still say the working group that I mentioned before. And if you remember before I told you about this is a study that will identify fibers that have a fibrogenic or carcinogenic potential. So we did this study on the chrysotile as a confirmation that the

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10:55:28 biopersistence, what it's telling us, what we thought it
10:55:32 or whether or not it was.
10:55:34 Q. Okay. And what did you find out?
10:55:34 A. Well, they exposed the animals that were still
10:55:38 rather large concentration, not the million fibers per
10:55:42 cubic centimeter I told you about, but we exposed the
10:55:44 animals to 5000 times the workplace level. 5000 times
10:55:48 what the U.S. regulates fibers of asbestos at 0.1 fibers
10:55:56 per cubic centimeter gestation and not less than
10:55:58 one-tenth of the average of one-tenth. That means
10:56:00 they'd have ten times the value in one fiber.
10:56:04 And we gave the animals 5000 times that in one
10:56:08 dose. What do we see.
10:56:10 Q. Well, Doctor, did this not create this overload
10:56:12 effect that you've just described for us?
10:56:14 A. We were a little worried about that, but what we
10:56:16 actually saw was that after the 90-day exposure,
10:56:22 actually an additional 90 days of observation period, a
10:56:26 total of 180 days, there was no fibrosis or other
10:56:30 pathological response at any time point. The animals
10:56:32 that received the chrysotile looked the same as the
10:56:38 animals that breathed clean air. Nothing happened.
10:56:42 Q. And that's at a level that's 5000 times the
10:56:48 workplace limit in the United States?
10:56:48 A. Yes, it is. We also used a higher dose response

10:56:52 usually recommended to do dose response to see if you
10:56:56 actually see an effect. We used 15,000 times the work
10:57:02 place level, if you can imagine that. Very high
10:57:04 concentration. And there we saw only minimal fibrosis.
10:57:10 But what was interesting is we started to do the
10:57:14 evaluation. That's actually evaluate for overload. We
10:57:18 saw that this is already in overload range. And what
10:57:22 was saw also were the long chrysotile fibers were
10:57:24 observed to break apart into the smaller particles and
10:57:28 fibers. Very similar to what we saw in the
10:57:34 biopersistent study. So this gave us a solid
10:57:36 confirmation that this rapid clearance we saw in the
10:57:40 biopersistent study was, in fact, telling us that it
10:57:42 wasn't pathological response from chrysotile exposure.
10:57:46 Q. So after doing the staying power, the
10:57:54 biopersistent study, we learned that chrysotile goes
10:57:56 away a lot faster than the amphiboles?
10:58:00 A. Right.
10:58:00 Q. And we also learned then from the 90-day study
10:58:06 that the shorter fibers in the chrysotile caused no
10:58:12 response in the lung for disease?
10:58:14 A. Uh-huh.
10:58:14 Q. At the 5000 times U.S. workplace level?
10:58:18 A. That's right.
10:58:18 Q. And then when you increase it all the way up to

10:58:22 15,000 times, what did you find?

10:58:24 A. We saw only minimal response, minimal fibrosis. And we were -- calculated back and we were able to show that starting the overload level the rat cannot handle this material anymore because it's overload.

10:58:42 Q. And when we compare the staying power of the chrysotile to amphibole asbestos, what do you see?

10:58:48 A. Well, I started to -- I got some pictures of the amphibole fibers. Well this is actually interesting in comparison that I put together the chrysotile, this is how fast they move in the lung in time. This is the -- in days here. And the chrysotile goes away from .3 to 11 days.

10:59:12 European Commission, if you'll remember before I mentioned to you, it said it was less than ten days. It's not even entered into any kind of carcinogenic category. Ceramic fibers is about 50 days. But our average which is sometimes used is about 45 days. Cellulose actually produced quiet a large response. And this was a thousand dollars days so insulation trail. And the amphiboles was actually about 466 to infinity, because if you remember it was early clearance and then it was a flat line. Essentially it goes on, stays in there for a long time. And you can see that the large contrast between the chrysotiles and even some of the

10:59:58 other commercial fibers that are still today and the
11:00:02 amphiboles.
11:00:02 THE COURT: All right. Recess for
11:00:08 20 minutes.
11:16:24 (Jury ushered from the courtroom.)
11:16:24 MR. NEMEROFF: At the break I said to the
11:16:26 Court that I was going to attempt to get a copy of the
11:16:28 presentation that this witness had prepared for this
11:16:30 trial. At the break I was informed that they don't want
11:16:32 to give everything that he's prepared for this trial to
11:16:36 me. They only want to give me those things which he's
11:16:36 actually now shown the jury.
11:16:40 I'm entitled to everything this witness has
11:16:42 done for this case. I didn't get it months ago at the
11:16:44 deposition. I'm certainly entitled to it now. I hate
11:16:48 bringing the Court into this, but I don't know how else
11:16:50 to accomplish to get the slides and the show and the
11:16:52 video and all this stuff so that I could use it. So I'm
11:16:56 asking the Court to order counsel of Georgia-Pacific
11:17:00 give me this witness's --
11:17:00 THE COURT: Well, why don't I just order you
11:17:02 to give her everything that your witnesses ever have
11:17:06 touched?
11:17:06 MR. NEMEROFF: We have produced those things
11:17:10 that our witnesses have produced -- have actually

11:17:10 themselves put together. All the Power Points and slide
11:17:12 shows you're seeing are those things which I personally
11:17:16 have put together. There's a difference. The
11:17:18 difference is this is something this witness has
11:17:20 created.
11:17:24 THE COURT: I don't know what you're talking
11:17:24 about.
11:17:26 MR. NEMEROFF: I simply want the
11:17:28 presentation that we've seen on the screen which was put
11:17:30 together not by the lawyers but by the witnesses for the
11:17:32 lawyers.
11:17:34 THE COURT: The presentation's on the
11:17:36 screen. It's in front of you.
11:17:36 MS. KAROS: Your Honor, I told him --
11:17:38 THE COURT: I'm just trying to figure out
11:17:40 what he's trying to ask me. I haven't figured that out
11:17:40 yet.
11:17:44 MR. NEMEROFF: I want copies in my
11:17:44 possession of the videos of the clips of all the things
11:17:48 that he has put together so that I could use or analyze
11:17:50 it between now and the time I have to close. If the
11:17:56 Court's not inclined to do it, I'll --
11:17:58 THE COURT: I'm not inclined to do it.
11:18:00 MR. NEMEROFF: Fair enough.
11:18:02 THE COURT: Okay. Now, since y'all bring

11:18:02 all that up, I got a bag of powder in my office that
11:18:08 nobody has come forward and claimed, and I'm advising
11:18:12 both sides it's going in the trash today. I'm disposing
11:18:16 of it. I'm not going to keep your garbage.
11:18:18 MS. KAROS: Your Honor, Mr. Nemeroff can
11:18:20 explain to the Court how that came to be.
11:18:22 THE COURT: I don't want him to explain.
11:18:24 I'm telling you if somebody doesn't come to claim it,
11:18:26 I'm throwing it away.
11:18:28 MR. NEMEROFF: It will be taken care of
11:18:30 immediately.
11:18:38 MS. KAROS: And, Your Honor, I would request
11:18:38 that plaintiff's counsel keep it so that we can preserve
11:18:42 any objection that we have since they're the ones that
11:18:46 bought it and brought it to the courthouse.
11:18:48 THE COURT: Is the jury ready?
11:18:50 THE BAILIFF: Yes, sir.
11:19:06 THE COURT: I told you I'm not keeping it.
11:19:06 MR. PARKS: That the plaintiffs keep it so
11:19:06 --
11:19:06 THE COURT: I'm not keeping it. That's all
11:19:08 I said. Bring the jury in.
11:19:56 (Jury ushered in the courtroom.)
11:19:56 THE COURT: All right. Be seated.
11:20:02 Continue, please.

11:20:04 MS. KAROS: Thank you, Your Honor.

11:20:06 Q. (By Ms. Karos) Dr. Bernstein, at the beginning of your testimony you said that you were prepared to basically give three opinions in this case, correct?

11:20:14 A. Yes.

11:20:16 Q. And have we now, then, provided the studies and the testing that you've done in order to answer the three questions or give the three opinions that you set out to tell this jury about?

11:20:30 A. Yes, I have.

11:20:30 Q. And are there differences -- would you answer these questions? Are there differences in asbestos?

11:20:34 A. There are definitely differences in asbestos. They're due to completely different mineral types which have very different characteristics. One's a rolled sheet; the other's a solid cylinder. And the way they behave in the lung is very different as well.

11:20:52 Q. And the rolled sheet is what type of asbestos?

11:20:54 A. The chrysotile asbestos.

11:20:56 Q. And the amphibole asbestos, how is that different?

11:21:00 A. It's like a solid cylinder and has very little ability to dissolve in the lung.

11:21:06 Q. And how does the lung respond to chrysotile fibers?

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11:21:10 A. Well, the short fibers picks up and takes away
11:21:14 the macrophage just as with the shorter amphiboles as
11:21:16 well. And the long fibers that are chrysotile, the lung
11:21:20 fluid starts dissolving the outside of the fiber. The
11:21:24 acid in the macrophage attacks the fiber. It falls
11:21:26 apart into particles. The macrophage takes it away and
11:21:30 it's removed from the lung.
11:21:32 Q. And what is it about the ability of the shorter
11:21:36 chrysotile fibers to cause disease?
11:21:40 A. The shorter chrysotile fibers are removed from
11:21:44 the lung and they are not available to cause disease.
11:21:48 MS. KAROS: Thank you, Dr. Bernstein. I
11:21:50 pass the witness, Your Honor.
11:21:50 THE COURT: Yes, sir.
11:21:50 CROSS-EXAMINATION
11:21:54 BY MR. NEMEROFF:
11:22:02 Q. Sir, I'm going to -- I want to go through three
11:22:08 areas with you during cross-examination. First, I want
11:22:12 to talk about your bias, and, that is, whether or not
11:22:14 this jury should consider the fact that all your new
11:22:18 science has been paid for by companies that mine or sell
11:22:20 asbestos, if they should believe what you found. I then
11:22:26 want to talk about your qualifications. And then I want
11:22:28 to talk about your opinions. Are you prepared to do
11:22:30 that with us?

11:22:32 A. I am.

11:22:32 Q. The chrysotile study that you have been talking about with this jury, those are studies that have been done at the request of Union Carbide, a Brazil chrysotile mining interest, The Asbestos Institute and The Canadian government; is that correct?

11:22:50 A. That's correct.

11:22:52 Q. And I believe you told the jury that the earlier studies from the 1960s and 1970s, where you found chrysotile causing mesothelioma, those studies weren't funded by these groups, were they?

11:23:08 A. They were funded by other groups.

11:23:10 Q. Other groups?

11:23:10 A. Uh-huh.

11:23:10 Q. And now that these groups, which are involved in chrysotile mining or manufacturing or, in some cases, litigation, you're distancing yourself from those earlier studies saying we made mistakes back then with our science and we overloaded the rats, there might have been contamination and so forth. Is that your testimony here to the jury?

11:23:32 A. That's part of it.

11:23:34 Q. In terms of your work for Union Carbide, would you agree with me or do you know how much money Union Carbide, as part of their defense in litigation, has

11:23:52 paid you to do your work?

11:23:54 A. I'm not aware they came from defense litigation.

11:23:58 Q. Well, you know that when you got your checks to
11:24:00 do the work on the Union Carbide chrysotile, those
11:24:04 checks came from the lawyers that represented Union
11:24:08 Carbide. You did know that, right?

11:24:08 A. I do know that, yes.

11:24:10 Q. So when the lawyers representing Union Carbide
11:24:14 helped fund your studies, tell the jury how much money
11:24:16 you took from them to do that work that you're relying
11:24:20 upon today in court?

11:24:20 A. They asked me to do the scientific evaluation.

11:24:22 Q. How much money did they pay you? I'll take it in
11:24:28 francs or dollars.

11:24:28 A. I don't have it in front of me at the moment.

11:24:30 Q. Would it refresh your recollection if I showed
11:24:32 you Union Carbide's responses to interrogatories in
11:24:34 litigation where they say they paid you $400,623.20?

11:24:42 MS. KAROS: Your Honor, I'm going to object.
11:24:44 That's an improper use. He's reading from -- reading in
11:24:46 a lawsuit filed by some other defendant.

11:24:50 THE COURT: I'll sustain it. Rephrase your
11:24:52 question.

11:24:52 Q. (By Mr. Nemeroff) Certainly, sir. If I showed
11:24:54 you the interrogatories from Union Carbide about how

much they paid you, would that help refresh your recollection how much they actually -- the lawyers gave you to do the studies?

MS. KAROS: Same objection, Your Honor.

THE COURT: Overruled.

Q. (By Mr. Nemeroff) Do you think this would help?

A. Do you have a complete itemization of all this?

Q. I will show you what's in evidence.

MR. NEMEROFF: May I approach, Your Honor?

THE COURT: Yes.

Q. (By Mr. Nemeroff) I'm going to show you a document before I show it to the jury. See where I filed that up here? Okay. Go to the question. Asked have you been paid money?

A. Uh-huh.

Q. Answer is yes?

A. Uh-huh.

Q. And then asked how much?

A. Uh-huh.

Q. Yes?

A. Uh-huh. Yes.

Q. Why don't you read that and tell me if that helps you refresh your recollection?

THE COURT: No, no, that's not the way to do it, Counsel, to read that.

11:25:58 MR. NEMEROFF: I'm going to ask if that
11:26:00 would help refresh his recollection.
11:26:00 Q. (By Mr. Nemeroff) Would looking at this, in light
11:26:02 of those questions, help refresh your recollection as to
11:26:04 how much they paid you?
11:26:06 A. Can I clarify?
11:26:06 Q. Would this help you to understand how much money
11:26:10 you got from them? That's all I want to know.
11:26:12 A. It's not accurate. Do I need to clarify that?
11:26:18 Q. Sure, if you want to clarify, but just will this
11:26:18 help at all in figuring out how much money --
11:26:20 THE COURT: Well, it'd clarify everything if
11:26:22 you'd just answer his question and answer how much they
11:26:24 paid you.
11:26:26 Q. (By Mr. Nemeroff) Will that help --
11:26:26 THE COURT: Just, if you can answer that
11:26:28 question, we can do away with all those documents. Can
11:26:32 you answer the question how much they paid you?
11:26:32 A. Union Carbide asked me to do these studies in
11:26:36 order to ---
11:26:38 THE COURT: Can you answer my question,
11:26:38 please? I'm just repeating the question the attorney
11:26:42 asked. Can you answer it or you can't answer it?
11:26:44 THE WITNESS: I can answer how much they
11:26:44 paid me, but part of what the sum he's referring to was

for actually funding the conduct of the study.

THE COURT: Listen. Can you listen? Can you look at me and listen? Read my lips. How much money did Union Carbide, through their attorneys, pay you?

A. I think -- I don't have the sum in front of me. My recollection is in the order of about a hundred thousand Swiss francs. And the rest of the sum he's referring to was actually for the actual conduct of the study and independent laboratory that I managed the conduct of that study.

Q. (By Mr. Nemeroff) So, Doctor, a hundred thousand Swiss francs, how much is that? That's what? How many dollars is that?

A. That's 1.2 is the current. I don't have a calculator.

Q. Give or take a hundred grand?

A. No, it's about 80 -- 80,000 or 90,000.

Q. Just to do the work and oversee the study?

A. It was over a period of almost two years, yes.

Q. And, Doctor, during this period of time that Union Carbide lawyers are paying you to do this work, you were preparing to begin to testify in litigation; isn't that correct?

A. That's not correct.

11:27:58 Q. Well, Bruce Bishop is a lawyer that you know that
11:28:00 represents Union Carbide and actually represents
11:28:02 Georgia-Pacific, someone you've known for ten plus
11:28:04 years. You've been working with him; isn't that
11:28:04 correct?
11:28:08 A. But not for litigation.
11:28:08 Q. Well, did he not come to you at various times
11:28:10 throughout the last ten years and ask you your
11:28:14 professional opinions on chrysotile and other medical
11:28:18 legal issues?
11:28:18 A. So did many other people.
11:28:20 Q. The lawyers that represent these folks up here,
11:28:22 the Union Carbide Company, they would come to you and
11:28:24 you're telling the jury now that you had no intention of
11:28:28 getting involved in litigation?
11:28:28 A. I was doing the scientific studies.
11:28:32 Q. Now, these scientific studies that you keep
11:28:36 telling us about, and you have said this repeatedly,
11:28:36 that the EPA and the European Commission came to you to
11:28:40 do something. Neither the EPA nor the European
11:28:46 Commission ever came to you to do an asbestos study, did
11:28:48 they?
11:28:48 A. No, they have not.
11:28:48 Q. So if the jury were left with the impression that
11:28:50 the EPA or the European Commission came to you for your

11:28:54 opinions on asbestos, that would be incorrect, right?

11:29:00 A. Yes.

11:29:00 Q. You said on direct examination that the EPA has not made any final decision or any decisions with respect to asbestos. Did I understand you correctly?

11:29:18 A. It was my opinion. I had not been privy to what was going on inside the EPA.

11:29:22 Q. So if we were to go live to the EPA web site, you're telling this jury that we wouldn't find a position by the EPA that all forms of asbestos, including chrysotile, cause mesothelioma?

11:29:34 A. What I was referring to is the EPA, that's under review, the issue at this time. They have not finished their review.

11:29:38 Q. And that review Dr. Lemen asked the question about, that was something that started in 2003 because of all the conflict of interest, the lack of studies relied upon by the researchers, they rejected the 2003 draft report; isn't that correct?

11:29:54 A. I'm not privy to what's going on at the EPA, sir.

11:29:58 Q. Don't you think it would be important for you, as an expert in asbestos toxicology, to come to this jury prepared to talk about the EPA's position on asbestos if you're going to give opinions about what they're doing or not doing?

11:30:10 A. I'm giving opinions about the science, not about
11:30:12 the regulatory process.
11:30:14 Q. But you answered questions about the regulatory
11:30:16 process. In fact, told this jury earlier that the
11:30:20 regulatory process, and I actually wrote this down,
11:30:24 animal studies are used by regulatory agencies to see if
11:30:28 a fiber has a toxic effect or not. Do you remember
11:30:32 telling the jury that statement?
11:30:34 A. I do, yes.
11:30:34 Q. And if we look at the regulatory agencies, the
11:30:40 one that would probably most be relevant to you, would
11:30:46 be the U.S Department of Health and Human Services,
11:30:50 Agency for Toxic Substance and Disease Registry. I'm
11:30:54 sure, sir, that you are fully familiar with the agency
11:30:58 ATSDR, correct?
11:31:00 A. I'm aware of them.
11:31:00 Q. Are you familiar with this document, the
11:31:04 toxicological profile for asbestos? And I will submit,
11:31:06 it is 400 plus pages long.
11:31:08 A. Uh-huh.
11:31:08 Q. You're familiar with this document?
11:31:10 A. I have seen it.
11:31:12 Q. So you know that when it came to relying upon
11:31:16 animal studies, the truth is that with respect to the
11:31:26 overall health effects the ATSDR said, however, due to

11:31:30 difference in clearance rate and lifespan as well as
11:31:32 other differences, cumulative doses in animals are not
11:31:36 expected to be directly comparable to cumulative doses
11:31:40 in humans. You were aware of that when you talked to
11:31:42 the jury earlier today?
11:31:44 A. Uh-huh.
11:31:44 Q. You'll have to answer yes or no for the court
11:31:46 reporter.
11:31:46 A. Yes.
11:31:48 Q. And, sir, another thing I want to make sure that
11:31:52 the jury is not left with a misimpression, when you
11:31:56 showed during your presentation the pictures of the
11:32:04 person whose mouth seemed closed during all the
11:32:06 inhalation and only breathed through their nose, you've
11:32:12 never actually done any studies on asbestos in human
11:32:18 beings; isn't that correct?
11:32:18 A. That is correct.
11:32:20 Q. So the more accurate -- the more accurate picture
11:32:24 that we should have had for the jury to see would have
11:32:26 been this, correct? You know what that is, right?
11:32:32 A. It's a rat.
11:32:34 Q. It's a Wister rat. Something that you use all
11:32:36 the time in your studies, correct?
11:32:38 A. That's correct.
11:32:40 Q. How big is a Wister rat?

11:32:42 A. About so big.

11:32:44 Q. Probably about the size of two of these cups together?

11:32:46 A. Could be.

11:32:48 Q. Could it be smaller?

11:32:48 A. No, I don't think so. It's hard to tell.

11:32:52 Q. Can you hold a Wister rat in your hand in one of your studies?

11:32:56 A. Probably, yeah.

11:32:58 Q. Well, would you do it? Hold up your hand. Okay. So we know that one of your rats can fit in your hand for one of your studies. How big are those lungs in that little Wister rat?

11:33:12 A. Oh, maybe a few grams, I think.

11:33:18 Q. Okay. All right. So pretty small?

11:33:20 A. Yeah.

11:33:20 Q. How big are the lungs in a human being?

11:33:24 A. About one kilo.

11:33:26 Q. Pretty big, huh?

11:33:30 A. (Witness shakes head up and down.)

11:33:30 Q. Yes?

11:33:30 A. Yes.

11:33:32 Q. And you're telling the jury that all of your studies that had to do with these little rats apply to human beings even though the toxicological profile for

11:33:44 asbestos that is in place in this country caution you
11:33:50 against using that kind of experimental data, correct?
11:33:52 A. That's not what they caution against. Read the
11:33:56 statement again, please.
11:33:56 Q. We're going to go back to that statement in just
11:34:00 a minute. I want to make sure, though, that when we're
11:34:02 continuing to talk about who funded your studies, in
11:34:08 each of the times that your studies have been published,
11:34:12 they've been published recently in a journal called
11:34:18 Inhalation Toxicology, correct?
11:34:20 A. That's correct.
11:34:20 Q. And Inhalation Toxicology, this is -- I'm on the
11:34:28 internet right now and you're probably familiar with
11:34:30 this web site. This is the Taylor and Francis web site.
11:34:34 They're the ones who run the Inhalation Toxicology
11:34:38 Journal?
11:34:38 A. Yes, I am.
11:34:40 Q. In fact, if we look at your resume, they've also
11:34:40 been part of some of your other work in terms of
11:34:44 presenting your views on science; isn't that correct?
11:34:46 A. Presenting my views on science?
11:34:52 Q. Well, I'm going to try and find the actual -- I
11:34:54 was highlighting this because I went through your resume
11:34:56 and I noticed that with respect -- and I only had up
11:35:04 through 68 when I took your deposition. Inhalation

11:35:08 Toxicology, they published one of your papers. The
11:35:12 Taylor and Francis Group, I guess they published a book
11:35:16 or a chapter in a book here?
11:35:18 A. Yes.
11:35:18 Q. And then Taylor and Francis Group published
11:35:20 there?
11:35:22 A. Yes.
11:35:22 Q. And Taylor and Francis, you would agree with me,
11:35:24 has a financial interest in seeing that people buy their
11:35:28 journals and their books?
11:35:30 A. I imagine they're in business.
11:35:32 Q. And we also know that the Taylor and Francis, I
11:35:36 went through the editorial board on this, you -- I
11:35:50 passed you up. You're actually on the editorial board
11:35:52 for this journal, aren't you?
11:35:54 A. I am.
11:35:54 Q. Right there?
11:35:54 A. Yes.
11:35:54 Q. So in terms of this jury assessing whether or not
11:35:58 they should give -- how much weight they should give to
11:36:00 your testimony that you've given today, and the fact
11:36:02 that you published in a journal in which you also happen
11:36:04 to be an editor, and that journal happens to be owned by
11:36:08 a company that also happened to publish the chapters in
11:36:12 your books, do you have a financial interest in this

company as well?

A. I do not.

Q. Have you ever reviewed your own manuscript to decide whether or not you're going to publish yourself?

A. Never has happened, no.

Q. Would you publish yourself if it ever happened?

A. It would never happen. The journal is very reputable, and it would never allow that to happen.

Q. Now, you told the jury a little bit about how much money you are making testifying today and you also made money when you worked outside the litigation context; isn't that right?

A. Yes. It's not my only source of income.

Q. Okay. And correct me if I'm wrong, you get 500 Swiss francs an hour for litigation consulting; is that correct?

A. Yes, sir.

Q. But if you're doing nonlitigation consulting work, you only charge 350 Swiss francs an hour, isn't that correct?

A. That's correct.

Q. So if you're doing -- let me back up. When you give a deposition in an asbestos case, you are charging 500 Swiss francs an hour?

A. That's correct.

11:37:24 Q. And in each of the depositions you've given you, am I -- and correct me if I'm wrong -- you've flown from Geneva to New York to give your deposition; is that correct?

11:37:34 A. Well, not always New York.

11:37:38 Q. Or other places in the United States?

11:37:40 A. Yes.

11:37:40 Q. And to do that you then, instead of charging a per hour rate, you just charge a flat 4000 -- eight-hour day, 4,000 Swiss francs for the day; is that correct?

11:37:56 A. That's correct.

11:37:58 Q. Including preparation time; is that correct?

11:38:02 A. That's correct.

11:38:04 Q. And if you were to do that deposition by telephone from your office in Geneva, you would only charge for the actual time you did the work in the deposition as opposed to travel all the way to New York to do a full day whether or not we asked you a full day's questions or not; isn't that correct?

11:38:20 A. That's correct.

11:38:22 Q. And when I talked about your office in Geneva, your office is in your house?

11:38:24 A. That is correct.

11:38:26 Q. As it goes to some of the things you said earlier in terms of your bias in this case, sir, you told this

11:38:34

11:38:40 jury that that slide presentation is something that you
11:38:42 have given that was not necessarily done for lawsuits;
11:38:44 isn't that correct?
11:38:46 A. Most of it, yes.
11:38:46 Q. But, in fact, when you were deposed in -- on
11:38:52 June 19th of this year, do you recall testifying
11:38:58 differently?
11:38:58 A. I don't know as I sit here, no.
11:39:02 Q. Well, let me show you where I'm reading from.
11:39:12 MS. KAROS: Your Honor, this is not proper
11:39:16 impeachment.
11:39:16 THE COURT: Sustained.
11:39:16 Q. (By Mr. Nemeroff) Sir, you testified earlier that
11:39:18 you had a presentation you use at trial; is that
11:39:22 correct? You've used one before at trial?
11:39:24 A. What was the question?
11:39:26 Q. You have used presentations like you've used this
11:39:30 presentation before at trial; is that correct?
11:39:30 A. I've used a similar presentation.
11:39:34 Q. And with regards to your trial presentation, that
11:39:36 was something that was created with the input of the
11:39:38 lawyers for Georgia-Pacific; isn't that correct?
11:39:42 A. Some of it was, yes.
11:39:42 Q. So when you told this jury that this was
11:39:46 something that you would use for the European Commission

11:39:48 or for the EPA, in fact, the Georgia-Pacific lawyers
11:39:52 helped put this together for you, didn't they?
11:39:54 A. They helped put it together, yes, based on the
11:39:58 actual presentation that we used before. The content is
11:40:02 the same. It's the imagery that's slightly different.
11:40:04 Q. And in other times when you've used a -- when you
11:40:06 made a presentation, and this was The Chrysotile
11:40:10 Institute, you thought it was a little humorous to put a
11:40:16 smiley face on a chrysotile fiber when you gave a
11:40:16 presentation?
11:40:16 A. There's no chrysotile.
11:40:18 Q. Oh, it's the lack of a chrysotile?
11:40:20 A. It's a macrophage.
11:40:22 Q. A macrophage. So you put a smiley face in the
11:40:28 slide right before you're talking about the chrysotile.
11:40:28 You thought that was pretty funny? Sir?
11:40:36 A. It's up to you to decide whether it's funny, sir.
11:40:42 Q. Well, it was funny that you were giving this
11:40:46 presentation, I think, to The Chrysotile Institute up in
11:40:50 Canada where all the folks were lamenting about the fact
11:40:54 that chrysotile was coming under attack and being banned
11:40:58 all around the world. Isn't that funny?
11:40:58 A. The reason the smiley face is on the chrysotile
11:40:58 -- is on the macrophage, is the macrophage is back in
11:41:04 it's natural state and it's a happy macrophage. And

11:41:08 that is the reason it's on there. It's not being
11:41:14 stressed by a toxic response to a fiber. And just like
11:41:18 a human being would be happy if human beings didn't have
11:41:22 a disease.
11:41:34 Q. When you were giving your testimony today and you
11:41:40 showed the videos, you showed all your slides, did you
11:41:44 tell the jury that those slides and the animations and
11:41:48 the presentation had been paid for by the companies
11:41:50 involved in mining of asbestos, selling of asbestos or
11:41:56 the defendant in this case?
11:41:56 A. Actually, developed it myself, sir.
11:41:58 Q. Were you paid to develop those slides?
11:42:00 A. Large majority of those slides, I developed
11:42:04 myself.
11:42:04 Q. My question was were you paid?
11:42:06 A. I was not paid for the large majority of those
11:42:10 slides. I developed them myself.
11:42:14 Q. At the request of lawyers for Georgia-Pacific and
11:42:16 others?
11:42:16 A. I was asked to give a presentation to explain.
11:42:20 In fact, a large majority of the slides were developed
11:42:22 when I gave the presentation to the European Commission
11:42:24 to explain fiber toxicity.
11:42:28 Q. And let's talk about that. You have given a
11:42:30 presentation to the European Commission on fiber

11:42:36 toxicity and did they follow your opinions and conclude
11:42:40 that chrysotile asbestos fibers can be used safely?
11:42:46 A. No, I didn't give a presentation on the
11:42:48 chrysotile to the European Commission. I gave a
11:42:50 presentation on some mineral fibers and they concluded
11:42:54 that my evaluation was valid. It was not just mine. It
11:43:00 was mine and a group of scientists from the European
11:43:02 Commission. And they actually did make a law on
11:43:06 synthetic mineral fibers based on my information.
11:43:08 Q. And, sir, I'm not going to quarrel, and I'm not
11:43:08 going to ask you a single question about your views on
11:43:12 synthetic mineral fibers because they're not at issue in
11:43:14 this case and you understand that, correct?
11:43:16 A. I understand.
11:43:16 Q. I want to talk about asbestos.
11:43:18 A. Uh-huh.
11:43:20 Q. And when it came to asbestos and anything you may
11:43:22 have told the European Commission, the European
11:43:26 Commission hasn't done anything consistent with your
11:43:30 views on chrysotile asbestos; isn't that correct?
11:43:32 A. Yes. The last time they evaluated it was before
11:43:36 this work was published.
11:43:36 Q. And all this work that was published, you're
11:43:40 talking about the work that was funded by asbestos
11:43:44 mining companies from Brazil, Canada and California,

11:43:46 correct?

A. Correct.

Q. Is it that they didn't have this information or is it more likely that they know who funded your studies and looked at all the data in the world and decided that your studies don't make sense?

A. You asking a question?

Q. I'm asking the question.

A. I don't believe it's the case.

Q. You are aware, sir, and I want to turn to your -- let's turn to your qualifications for a moment. I want to see if you can help me out with something. Are you familiar with Dr. Richard Lemen?

A. I know his name.

Q. And I'm sure that in preparation for your testimony here today, seeing that you were going to talk to the jury about chrysotile asbestos, that you reviewed Dr. Richard Lemen's paper that was published in peer review literature Chrysotile Asbestos as a Cause of Mesothelioma. Would I be correct that you've reviewed it for today?

A. I've seen the paper.

Q. Did you review it for today?

A. No, I haven't.

Q. Well, let's talk about your qualifications. Have

11:44:56 you ever been an Assistant United States Surgeon
11:44:58 General?
11:45:00 A. I have not.
11:45:00 Q. Have you ever been the deputy director for The
11:45:04 National Institute of Occupational Safety and Health?
11:45:04 A. No.
11:45:06 Q. Have you ever been a deputy director for the CDC?
11:45:08 A. No.
11:45:08 Q. Do you know what the CDC is?
11:45:10 A. I do.
11:45:10 Q. Do you have a Ph.D. in epidemiology?
11:45:16 A. No.
11:45:16 Q. Do you have a master's in public health and
11:45:18 epidemiology?
11:45:18 A. No.
11:45:18 Q. Have you taken any graduate studies in
11:45:22 epidemiology?
11:45:22 A. No.
11:45:22 Q. Did you help write the criteria document on
11:45:24 asbestos that went from NIOSH to OSHA that actually
11:45:28 helped become the law of this land in terms of
11:45:32 occupational exposure to asbestos?
11:45:34 A. No.
11:45:34 Q. Did you begin studying asbestos literature for
11:45:38 the United States government beginning in 1971?

11:45:40 A. No.

11:45:40 Q. Have you won awards from the United States Public Health Service and NIOSH for your work on asbestos research?

11:45:44

11:45:46

11:45:48 A. No.

11:45:48 Q. Have you ever been on the IARC Carcinogen Committee for Asbestos?

11:45:52

11:45:54 A. No.

11:45:54 Q. Have ever been on any EPA task force for asbestos?

11:45:56

11:45:56 A. No.

11:45:58 Q. Have you ever given any testimony to the United States Congress on asbestos?

11:46:00

11:46:02 A. No.

11:46:02 Q. Did you know that two weeks ago the United States Senate voted to ban asbestos in this country including chrysotile?

11:46:06

11:46:10

11:46:10 A. I'm aware.

11:46:12 Q. And you disagree with that, don't you?

11:46:12 A. It's asbestos. I believe they have.

11:46:14 Q. That wasn't my --

11:46:14 A. I'm talking about the science. The science is very clear on that.

11:46:18

11:46:18 Q. And you're saying the science is clear, but just two weeks ago, even years after your science is

11:46:20

11:46:22 published, our country decided to take the first step to
11:46:26 banning everything, including the product that's at
11:46:28 issues -- the fibers at issue in your studies; isn't
11:46:32 that correct?
11:46:32 A. Seems to be correct.
11:46:34 Q. Have you ever talked or consulted --
11:46:36 THE COURT: Counselor, this line of
11:46:38 questioning, asking him about somebody else's resume and
11:46:42 asking if he has the same resume as somebody else is
11:46:48 argumentative to me. Y'all can argue all that in
11:46:48 closing argument. You can spend that time. But,
11:46:52 otherwise, his resume is in evidence, your client --
11:46:54 your witness' resume is in evidence and that's it.
11:46:58 MR. NEMEROFF: Okay. We'll move off this.
11:47:00 THE COURT: I don't mind you asking some
11:47:02 other question but not about going through somebody's
11:47:06 resume or is this your resume. No, it's not. This is
11:47:08 my resume. Okay?
11:47:10 Q. (By Mr. Nemeroff) Does your resume include -- let
11:47:14 me ask it that way -- any -- well --
11:47:20 THE COURT: Yeah. You can ask it that way.
11:47:20 That's fine.
11:47:20 Q. (By Mr. Nemeroff) Okay. Does your resume include
11:47:24 you being on the -- consulting with the World Health
11:47:28 Organization on Asbestos?

11:47:28 THE COURT: Okay. That's not what I thought you were going to ask. Argumentative.

11:47:32 MR. NEMEROFF: I'll move on to something else.

11:47:34 THE COURT: All right, sir. Thank you. Please.

11:47:38 Q. (By Mr. Nemeroff) Now, Doctor, in summary, you understand -- I think you testified to this in the past, that epidemiology -- epidemiology is the study of people and the things that cause disease. You agree with me on that?

11:47:52 A. I agree with you.

11:47:54 Q. And you, sir, are not an epidemiologist?

11:47:58 A. I am not.

11:47:58 Q. So would this be a fair statement that you study asbestos in rats to see what happens?

11:48:06 A. That's true.

11:48:08 Q. And with respect to your qualifications, sir, you're not an industrial hygienist, are you?

11:48:14 A. I'm not.

11:48:16 Q. And you're not a medical doctor?

11:48:16 A. I'm not.

11:48:18 Q. And you're not a pathologist?

11:48:20 A. I'm not.

11:48:20 Q. And when you showed the jury that, and I'll say

it was pretty neat, that three-dimensional view of the rat's lung and we saw some fibers one day marked in red and then we went seven days out and then the fibers weren't there. And then we went three months out and there was even less there. Do you remember that on your graphic?

A. I remember it.

Q. Was that the same rat's lungs from day 1, day 7 and then three months out?

A. No, it was different rats.

Q. So if the jury was left with the impression that they were actually witnessing the same rat at day one with those fibers in there, and then that same rat seven days later with less fibers in there, and then three months later with even less fibers in there, that would be the wrong impression to the leave the jury with, correct?

A. That is true.

Q. So what you did was you picked the first rat, had this graphic done, saw what you wanted to see. Then you found another rat seven days later of all the rats that you looked at, picked the one that you liked with less fibers and then picked the one three months out with even less fibers, and that's how you created your demonstrative for the jury?

11:49:44 A. It is not.

11:49:44 Q. Well, it's a different rat each time, isn't it?

11:49:46 A. May I explain how the study was created?

11:49:48 Q. I'm asking the question.

11:49:50 A. The answer is no.

11:49:50 Q. It was a different rat?

11:49:52 A. It was different rats. It's not how I performed the study.

11:49:56 Q. Oh, I'm sure that you would explain, and tell me if I'm right, you would tell the jury, oh, no, these rats are all representative and I looked at a whole set of samples and this is a representation of what happened at days one, seven and three months, correct?

11:50:12 A. No.

11:50:14 Q. So, sir, when it comes to your --

11:50:24 A. If you'd like me to explain, I can explain. If you want to interpret for me, it's going to be kind of difficult.

11:50:28 Q. I'm going to let the jury interpret.

11:50:28 A. Okay.

11:50:32 Q. When it comes to your rat studies, you would agree with me that rats and people -- I probably should qualify this. Rats and most people are different.

11:50:52 A. In what respect?

11:50:54 Q. Well, that's why I had to qualify it. Some

people are rats, wouldn't you agree? In terms of their physiology, in terms of the way they breathe, in terms of the way they -- the difference between a rat and a human being breathing, there are some fundamental differences that are important for this jury to understand whether or not to use your study as a basis for concluding anything about chrysotile being able to cause any kind of change in the lung? Would you agree with me with that?

A. Well, we'd have to see what differences.

Q. Well, let's talk about those differences. Would you agree with me that rats are predominantly nose breathers as opposed to humans who breathe through their mouths?

A. That is true.

Q. And nose breathing tends to deposit foreign objects not as deep into the lungs as breathing through the mouth?

A. I'm not aware of that.

Q. You're not?

A. No.

Q. Well, have you -- do you run, bike, exercise at all?

A. Yes.

Q. Okay. When you -- now, you may be a Superman,

11:52:20 but when you exercise, do you breathe through your mouth
11:52:26 when you start to get exerted? Got that deep breath to
11:52:28 breathe in deep?
11:52:28 A. Yeah. If you're in good shape, you don't have
11:52:30 to, no.
11:52:32 Q. I knew you were going to be that guy. Assume the
11:52:34 rest of us are not in as good of shape and when we run
11:52:36 and jump or do things to exert ourselves, maybe we're
11:52:42 sweeping up things in, oh, maybe a 12-by-12 room, and
11:52:44 we're sweeping things up, and we're working up a good
11:52:48 exertion here, we breathe through our mouths?
11:52:50 A. Yes.
11:52:52 Q. And we tend to, by breathing through our mouth,
11:52:56 take deeper and fuller breaths that get things deeper
11:53:02 and fuller into our lungs. Would you agree with that?
11:53:02 A. That --
11:53:06 Q. Do you -- well, let me ask this. Do you even
11:53:06 know that as someone who studies rats and doesn't study
11:53:08 people, do you even know that to be -- do you even know
11:53:16 enough about human physiology to talk to us about
11:53:18 inhalation?
11:53:18 A. I do, yes.
11:53:20 Q. Okay. So what I'm talking about so far makes
11:53:22 sense, that people breathing through their mouths will
11:53:26 breathe in deeper and get in more passed any defense

11:53:28 mechanisms than just simply breathing through a nose?

11:53:34 A. Well, there's -- if you bypass the nose, you

11:53:36 bypass -- you bypass the nasal passages.

11:53:40 Q. And the interesting thing about the nasal

11:53:44 passages is that we -- I know we all have nose hair.

11:53:46 Nose hair, nasal hairs are actually a defense mechanism

11:53:52 that keep bigger particles or bigger things from getting

11:53:52 too far past the nasal passages; isn't that correct?

11:53:56 A. The very big ones, yes.

11:53:58 Q. The very big ones. And we don't --

11:54:00 A. The oversized may also not be respirable to the

11:54:04 deep lung by the mouth.

11:54:04 Q. Sure. And it makes sense that if you're going to

11:54:08 breath in dust through your nose, less will come in

11:54:12 through your nose breathing in that way than taking a

11:54:16 deep breath through your mouth. Wouldn't you agree?

11:54:20 A. Usually. Depends on the particle size.

11:54:22 Q. And simply on a volume basis, I mean, you get

11:54:26 more air breathing in through your mouth than you do

11:54:28 through your nose?

11:54:28 A. You can.

11:54:30 Q. You don't?

11:54:32 A. Depends how you breathe.

11:54:34 Q. Well, rats, seeing as they breathe through their

11:54:38 nose and not through their mouths, comparing that to

11:54:40 people who breathe through their mouth and generally not
11:54:44 exclusively through their nose, we already have the
11:54:46 first fundamental difference in how much actually gets
11:54:48 into the body. Do you agree with that?
11:54:50 A. Well, we design the studies accordingly.
11:54:54 Q. And as we saw from the ATSDR, the United States
11:54:58 Government, which you agree this document is not a
11:55:02 public policy statement. This is actually a review of
11:55:06 science, hard science on toxicology and asbestos?
11:55:10 A. It is.
11:55:10 Q. And one of the things that this review on science
11:55:14 talks about is that animals, specifically rats, have a
11:55:20 different clearance rate, a mechanism, than humans. You
11:55:24 agree with that?
11:55:24 A. Yes.
11:55:24 Q. And the size of the airways that the fibers get
11:55:30 down into, rats' airways, those sizes are smaller than
11:55:38 humans; isn't that correct?
11:55:40 A. Yes.
11:55:40 Q. So that you can get -- and I'm not talking about
11:55:44 size right now. I want to talk about what, and I'll
11:55:48 suggest -- ask you to assume that Dr. Lemen talked about
11:55:50 mass or the impact of all chrysotile fibers coming
11:55:54 through. Would you agree with me that because the human
11:55:58 airways are bigger than the rats, more -- more asbestos

11:56:04 fibers can get in deeper into the lungs of humans than
11:56:08 can comparably exposed rats?
11:56:14 A. Actually, depends on what exposure concentration
11:56:16 is.
11:56:16 Q. I'm just talking about on just as a basic
11:56:20 comparison, let's assume, the same concentrations for
11:56:26 both?
11:56:26 A. Nobody's ever used the same concentrations for
11:56:30 both.
11:56:30 Q. They haven't?
11:56:30 A. In the rat and in the humans?
11:56:34 Q. So you're taking --
11:56:36 A. Rats exposed to much higher concentrations in all
11:56:40 toxicity studies.
11:56:40 Q. Well, they're exposed to higher concentrations
11:56:42 for a much shorter period than, let's say, an industrial
11:56:46 worker who would be working for -- I'll give you a
11:56:52 hypothetical.
11:56:52 A. Actually, they're exposed to the lifetime -- the
11:56:54 working lifetime of the rat is adjusted to the worker
11:57:02 being exposed to his working lifetime. So it's
11:57:02 proportionately similar. The rat doesn't live as long
11:57:02 as we do.
11:57:06 Q. Well, the rat lives what, two and a half, three
11:57:08 years?

11:57:08 A. Yes.

11:57:08 Q. Generally speaking, how long do people live?

11:57:10 A. It depends, 80, 90, 70.

11:57:16 Q. Let's use 80 or 90. Let's use 80. Did you know Mr. Martin didn't make it to 80?

11:57:20 A. I did not.

11:57:22 Q. You're familiar, sir, even though you're not a medical doctor, you are familiar with the concept of latency. That is, how long it takes from exposure until you get disease?

11:57:32 A. Yes.

11:57:36 Q. And for mesothelioma in humans, what is the average latency?

11:57:38 A. It's 20 or 30 years.

11:57:44 Q. 20 or 30 years. And your rats only live for two, two and a half years?

11:57:46 A. Yes. Mesothelioma ranges in rats two to two and a half years.

11:57:52 Q. So you have an animal whose latency is so far accelerated compared to a human being? Is that what you're telling us?

11:57:52 A. I'm just telling you what happens.

11:58:00 Q. So if you --

11:58:04 A. That's what happens after -- it only has a lifetime of two or three years.

11:58:12

11:58:14

11:58:14

11:58:16

11:58:18

11:58:22

11:58:24 Q. If you don't kill -- and let's be fair. You're
11:58:26 trying to be nice to the rats when you study them, but
11:58:28 ultimately you're going to kill them, right?
11:58:30 A. Uh-huh.
11:58:32 Q. How long would a rat live if you didn't kill it?
11:58:34 A. About two years -- three years.
11:58:36 Q. And at what point do you kill the rat?
11:58:38 A. Most of the rats are allowed to live to, you
11:58:42 know, virtually old age when they actually would pass,
11:58:48 would dies themselves in a study.
11:58:50 Q. Well --
11:58:52 A. Because this is in order to have a great
11:58:54 sensitivity to see actually what happens.
11:58:56 Q. So you've got to terminate their life earlier
11:58:58 than their natural life expectancy to see what you need
11:59:00 to see inside of --
11:59:00 A. No, I'm saying just the opposite.
11:59:02 Q. You let them live till their natural -- you just
11:59:06 wait until they die.
11:59:06 A. Very close to it, yes. Until they become
11:59:10 invalid.
11:59:10 Q. What about your five-day studies?
11:59:12 A. That's a noncarcinogenic study.
11:59:16 Q. And then there's your 90-day study. That's the
11:59:18 biopersistence study?

11:59:18 A. No, it's a toxicity study.

11:59:20 Q. Toxicology study. Have you done carcinogenicity studies?

11:59:24 A. Yes, I have.

11:59:26 Q. And it's your opinion that the two to three-year rat life is comparable to an 80-year human life where a human takes 20 to 30 plus years to develop mesothelioma compared to a rat which you say is two to three years?

11:59:36 A. Uh-huh.

11:59:40 Q. And, Doctor, what studies do you have to support that here?

11:59:44 A. What?

11:59:44 Q. That a mesothelioma latency for a rat is two to three years?

11:59:52 A. It's in the literature.

11:59:52 Q. What literature?

11:59:58 A. The scientific studies. I was a coauthor on some of the studies.

11:59:58 Q. Well, I guess my point is, if I were to look at this toxicological profile for asbestos, you would agree with me that the ATSDR considered animal studies, didn't they?

12:00:02 A. Yes.

12:00:04 Q. And are the only studies that you believe that have changed your opinion the recent one that you've

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done at the request of the companies we've spoken about here today?

A. Just a cumulative knowledge of all the work I've done.

Q. But you told the jury that you don't like the first studies you did years ago because you found problems with them?

A. Yes.

Q. So the jury to understand all of your opinions as they pertain to chrysotile asbestos come from the three recent studies that you've done at the request of the mining or defendants in litigation; is that correct?

A. Four studies, yes.

Q. Four studies. But I'm correct, though, that your knowledge has changed based upon your four studies?

A. Yes.

Q. And you agree with me that as we sit here today you can show this jury no scientific body that has accepted your conclusions with respect to chrysotile asbestos; isn't that right?

A. That's correct.

Q. And when was the first of these recent studies published?

A. In 2003.

Q. And the most recent one?

12:01:40 A. I think it's 2005. '04 or '05, I don't remember.

12:01:48 Q. Would it be fair you don't remember when your studies were published?

12:01:52 A. I don't have it in front of me today. I published 17 publications. I don't remember all of them.

12:01:56 Q. We're talking about the four that form the basis for your opinion in this case.

12:02:00 A. I think it was 2004.

12:02:02 Q. What's today's date?

12:02:08 A. 2007.

12:02:10 Q. We're actually toward the end of 2007. It's called October 2007. In all the years, we're not talking months, I'm talking years since you published your work, nobody, not one scientific organization, not one scientific body, not one government, not one agency, not one anyone has accepted your view of chrysotile as you've explained it to this jury today; isn't that correct?

12:02:44 A. That is correct.

12:02:52 Q. Now, one of the things that you have done in your studies is you looked at the rats' lungs, correct?

12:03:00 A. Correct.

12:03:02 Q. You agree with me that mesothelioma takes place not inside the lungs, but on the pleura; isn't that

12:03:08

12:03:10 right?

12:03:10 A. That's right.

12:03:12 Q. And you are familiar, sir, are you not, with the
12:03:16 scientific literature that came out of Mt. Sinai
12:03:18 University Hospital that said they found chrysotile
12:03:22 fibers in the pleura where the mesotheliomas were
12:03:26 arising; isn't that correct?

12:03:28 A. I've seen those studies.

12:03:28 Q. Now, you do know that -- would you agree with me,
12:03:34 sir, that Mt. Sinai University Hospital in New York has
12:03:34 played a pivotal key role in the development of science
12:03:40 as it relates to asbestos disease?

12:03:42 A. They have published a number of publications for
12:03:46 this, yes.

12:03:46 Q. And when you look at your rats, you don't look at
12:03:50 the pleura, the place where the mesothelioma would take
12:03:56 place to see if you find chrysotile, you look inside the
12:03:58 body of the lung; isn't that correct?

12:04:00 A. We look at the whole respiratory system.

12:04:04 Q. Did you look at the pleura specifically to see
12:04:08 whether or not there was chrysotile there?

12:04:10 A. In these studies?

12:04:10 Q. Yes.

12:04:12 A. No, we have not.

12:04:24 Q. Doctor, when you talked about exposing your rats

12:04:34 to concentrations of asbestos, you have been approached
12:04:44 by Georgia-Pacific recently to look at their joint
12:04:48 compounds to see if the actual joint compound itself can
12:04:54 cause disease in rats; isn't that right?
12:04:56 A. Yes, we discussed this kind of study.
12:05:00 Q. So in 2007 Georgia-Pacific is finally going to
12:05:06 test its product to see whether or not it can cause
12:05:08 mesothelioma?
12:05:08 MS. KAROS: Objection, Your Honor. It's
12:05:10 misleading and argumentative.
12:05:12 THE COURT: Sustained.
12:05:14 Q. (By Mr. Nemeroff) Doctor, have you ever seen any
12:05:16 tests sponsored by Georgia-Pacific at any point in time
12:05:20 where they determined or tried to determine whether or
12:05:24 not their asbestos-containing product can cause any
12:05:28 disease in any kind of living creature? Have you ever
12:05:32 seen such a test?
12:05:34 A. I have not.
12:05:34 Q. But in 2007 Georgia-Pacific has approached you
12:05:38 now to do such a test on rats?
12:05:42 A. Yes, we discussed this.
12:05:44 Q. Are you willing to do it?
12:05:46 A. I am.
12:05:46 Q. Have you worked out a price yet?
12:05:50 A. No. I don't change my price for anybody. If you

12:05:54 were to come to me to do an asbestos test, I would do it
12:05:58 for you at the same price.
12:06:00 Q. Speaking about asbestos studies, sir, all the
12:06:02 asbestos studies that you've seen, the ones that the
12:06:10 ATSDR relies upon, even the ones you don't agree with,
12:06:12 have you seen that the -- I don't know if I want to say
12:06:16 all of them, and correct me if I'm wrong, were done by
12:06:20 scientists uninvolved or unrelated to litigation?
12:06:28 A. I haven't done that evaluation, sir.
12:06:34 Q. So you wouldn't be able to talk to this jury
12:06:36 about whether or not all the science that makes up our
12:06:40 policies were not based upon litigation paid for
12:06:44 science, but were based upon science from universities
12:06:48 and hospitals?
12:06:48 MS. KAROS: Objection, Your Honor,
12:06:50 argumentative.
12:06:52 THE COURT: Sustained. Don't answer.
12:06:54 Q. (By Mr. Nemeroff) Sir, have you been provided
12:06:56 with any of the fiber released levels from any kind of
12:07:04 asbestos-containing joint compound to determine whether
12:07:08 or not your rats were being similarly exposed to the
12:07:12 thousands upon thousands above background levels found
12:07:16 in joint compound studies?
12:07:18 A. I have not done studies based on criteria that
12:07:24 were established already.

12:07:26 Q. Sir, have you personally ever diagnosed a
12:07:34 mesothelioma?
12:07:34 A. In humans?
12:07:36 Q. I'm sorry.
12:07:38 A. In humans?
12:07:38 Q. I'll start in humans.
12:07:40 A. No.
12:07:40 Q. In rats?
12:07:40 A. I have seen this, yes, sir.
12:07:42 Q. You've seen it?
12:07:42 A. Yes.
12:07:44 Q. But you've never actually made the diagnosis?
12:07:46 That's not what you do?
12:07:46 A. Pathologists actually do that.
12:07:48 Q. Your job is to expose the rats to dust, cut them
12:07:54 up and see what you find; is that right?
12:07:56 A. It's designed to evaluate the study to be
12:08:04 authentic and valid. I don't have true performed
12:08:08 studies. It's performed by an independent laboratory.
12:08:14 Q. And, Doctor, when it comes to the ATSDR, this
12:08:22 document, if I were to look through this document -- if
12:08:40 I were to look -- if I were to search in this document
12:08:54 for Bernstein, is that you? Is says L. Is that you?
12:09:14 A. No, that's not.
12:09:16 Q. Is that you?

12:09:16 A. No, it's not.

12:09:18 THE COURT: Counselor, there's a lot shorter
12:09:20 way to get this done.

12:09:22 MR. NEMEROFF: I'm sorry?

12:09:22 THE COURT: There's a lot shorter way to get
12:09:24 this done. Just ask him if he's done -- if he's done
12:09:26 anything.

12:09:26 Q. (By Mr. Nemeroff) Would I find you at all in the
12:09:28 ATSDR cited for any proposition that you've done in this
12:09:34 case in your research?

12:09:36 A. Obviously not.

12:09:38 Q. But if we were to search for Dr. Richard Lemen,
12:09:40 would you agree with me that what we would find for Dr.
12:09:50 Lemen would be a whole multitude of citations in a
12:09:52 toxicology document pertaining to asbestos fibers
12:09:58 causing disease like chrysotile, we would find Dr. Lemen
12:10:02 again?

12:10:02 MS. KAROS: Objection, Your Honor,
12:10:04 argumentative.

12:10:04 THE COURT: Sustained.

12:10:16 MR. NEMEROFF: Thank you. I'm done, Your
12:10:18 Honor.

12:10:20 MS. KAROS: I have just a few questions,
12:10:20 Your Honor.

12:10:20 REDIRECT EXAMINATION

12:10:22 BY MS. KAROS:

Q. Dr. Bernstein, is there any ethical prohibitions to applying exposure studies to humans?

A. Absolutely.

Q. And what are those?

A. Well, you can't expose humans to something that may be toxic. It can certainly hurt humans, and it's prohibited by almost everybody and agency as well.

Q. In order to do a controlled exposure study to determine if something is toxic and causes disease, must we use animals?

A. Yes.

Q. And is that what you attempted to do?

A. Yes. It's used not only for asbestos, the animals are used for pharmaceutical testing, for chemical testing. For almost everything we use today the animals are how we can determine whether they cause disease or not because we can't expose humans to determine this.

Q. And is it the epidemiologist that studies disease in humans or increased risk of disease in group populations?

A. You know, to study the disease itself you evaluate the relationship between the exposure and what the pathologist finds.

12:11:28 Q. Are you familiar with the ATSDR that Mr. Nemeroff
12:11:34 has spoken about?
12:11:34 A. Yes, I am.
12:11:38 Q. What is the ATSDR?
12:11:38 A. It's the Agency for Toxic Diseases Registry, or
12:11:38 something like that.
12:11:44 Q. And have you attended the ATSDR and given input
12:11:48 to them?
12:11:48 A. Yes. We had a meeting on short fibers. Actually
12:11:50 after the World Trade Center collapse because there was
12:11:54 some asbestos dust, chrysotile dust and ceramic and I
12:12:00 guess it was one of the other fibers also, and it was
12:12:02 all pulverized to be very small when the buildings fell
12:12:06 due to the force of the collapse.
12:12:08 And they had meeting of experts. I was not one
12:12:10 of the experts, but I attended and gave my opinion as an
12:12:18 observer. And the experts all agreed that the large
12:12:24 weight of evidence that there's no health risks from
12:12:26 short fibers.
12:12:30 Q. All right. And is this the report that came out
12:12:34 of the ATSDR meeting that you attended?
12:12:38 A. I believe it is.
12:12:48 Q. And is this the expert panelists that were
12:12:52 involved?
12:12:52 A. Looks like it, yes.

12:13:04 Q. And you said that you had attended and provided
12:13:08 comments at the ATSDR?
12:13:10 A. I did, yes.
12:13:10 Q. And, for example, comment five, David Bernstein,
12:13:14 consultant in toxicology. Is that you, sir?
12:13:16 A. That is me.
12:13:18 Q. And are you aware of what the ATSDR said about
12:13:22 the cancer effects of short fibers?
12:13:26 A. I am aware, yes.
12:13:26 Q. And do you agree with this conclusion, sir?
12:13:28 Given findings from epidemiological studies, laboratory
12:13:32 animals and in vitro genotoxicity studies combined with
12:13:38 the lung's ability to clear short fibers, the panelists
12:13:44 agree that there's a strong weight of evidence in
12:13:46 asbestos and SBFs shorter than five microns are unlikely
12:13:50 to cause cancer in humans. Do you agree with that?
12:13:54 A. I do.
12:13:54 MS. KAROS: Thank you. Dr. Bernstein, Your
12:13:56 Honor, I have nothing further.
12:13:56 RECROSS EXAMINATION
12:13:58 BY MR. NEMEROFF:
12:13:58 Q. And, Doctor, what you didn't tell the jury was
12:14:02 that with respect to this ATSDR document, except as
12:14:06 specifically noted, no statements in this report
12:14:10 represents analysis by or positions of ATSDR or Eastern

12:14:16 Research Group; isn't that correct?

12:14:16 A. That's what it says.

12:14:18 Q. Well, you hadn't seen this document before the

12:14:20 Georgia-Pacific lawyer showed it to you today?

12:14:22 A. No, I've seen this document, sir.

12:14:22 Q. And you know that if we wanted to tell the jury

12:14:26 the whole story behind your comment we could go through

12:14:28 this document and find where other panelists criticized

12:14:32 your opinions in this document; isn't that correct?

12:14:34 A. There was some discussion about my opinion, yes.

12:14:38 Some agreed, some were criticized.

12:14:40 Q. And all it was was your opinion. It wasn't

12:14:44 adopted. It wasn't accepted. All it was is no

12:14:46 different than if you raised your hand in a local town

12:14:48 meeting, raised your hand and made your opinion known.

12:14:52 It wasn't --

12:14:54 A. Just the experts --

12:14:54 MS. KAROS: Objection. Objection, Your

12:14:56 Honor. Argumentative.

12:14:56 THE COURT: Overruled.

12:14:58 A. The expert's conclusion that was just read by

12:15:02 counsel actually agrees with a lot of those opinions

12:15:08 mentioned today.

12:15:08 Q. That conclusion doesn't say that chrysotile

12:15:12 asbestos as found in a particular product like

12:15:14 Georgia-Pacific's joint compound is safe, does it?

12:15:16 A. It doesn't mention Georgia-Pacific I don't think, sir.

12:15:20 Q. And it doesn't say that chrysotile asbestos doesn't cause mesothelioma, does it?

12:15:24 A. It doesn't say that.

12:15:26 Q. Does it?

12:15:26 A. It says short fibers -- it's only referring to short fibers in that information.

12:15:32 Q. And you saw that when we talked about what this report was, that all this was, all this thing is, is a report presented by the Eastern Research Group to the ATSDR. This wasn't the policy of the ATSDR, was it?

12:15:42 A. No.

12:15:48 Q. In fact, if we want to see what the ATSDR had to say, we have to look at this 400 page document that's on their web site that any one of us can get; isn't that right?

12:15:54 A. That's right.

12:15:58 Q. And what this document says is different than what your opinions are here today; isn't that correct?

12:15:58 A. That's right.

12:16:00 Q. And, sir, you disagree with every one of these agencies that chrysotile asbestos can cause mesothelioma; isn't that correct?

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12:16:14 A. That's right.

12:16:14 Q. And you disagree with all of these countries, including the one that you decided to make your home, which has banned the use of this chrysotile study; isn't that correct?

12:16:24 A. That's correct.

12:16:26 Q. And that's based upon the studies that was paid for by this company, excuse me, not by this company, paid for by companies that manufacture and mine asbestos?

12:16:34 THE COURT: Repetitive, Counsel.

12:16:36 MR. NEMEROFF: Thank you. Nothing further.

12:16:38 THE COURT: Are you done?

12:16:40 MS. KAROS: Yes, Your Honor.

12:16:40 THE COURT: Released?

12:16:40 MR. NEMEROFF: Yes, please.

12:16:42 MS. KAROS: Yes, Your Honor.

12:16:42 THE COURT: You're released, sir. Thank you. Okay. Ladies and gentlemen, we're going to recess for today. And I'll remind you again that you will not be meeting tomorrow on this case. And our next session will be the 18th, that's Thursday, the 18th, at nine o'clock.

12:17:06 Let me give you some admonitory instructions just because of something that was raised or referenced

12:17:12 in the courtroom today about internet, what you can find
12:17:14 on the internet. Obviously because what the lawyers
12:17:20 discussed today, there's things to be found on the
12:17:20 internet.

12:17:22 Please, please do not go on the internet and
12:17:26 try to do your own research on that. There's no telling
12:17:30 what you can -- you'll find, especially derogatory
12:17:34 comments about me. And the parties have no opportunity
12:17:36 to cross-examine the other part -- you know, that
12:17:40 information or test the validity of it on either side.

12:17:44 So please don't do that independent research
12:17:46 yourself. So other than that, remember your other
12:17:52 instructions, and I'll see you Thursday morning at nine
12:17:54 o'clock. Thank you.

(End of proceedings.)

STATE OF TEXAS)

COUNTY OF ELLIS)

I, Michele McManus, Official Court Reporter, in and for the 40th District Court of Ellis County, State of Texas, do hereby certify that the above and foregoing contains a true and correct transcription of all portions of evidence and other proceedings requested in writing by counsel for the parties to be included in this volume of the Reporter's Record, in the above-styled and numbered cause, all of which occurred in open court or in chambers and were reported by me.

I further certify that this Reporter's Record of the proceedings truly and correctly reflects the exhibits, if any, admitted by the respective parties.

WITNESS MY OFFICIAL HAND this the 8th day of February, 2008.

Michele McManus

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D I S C L O S U R E

Note: Supreme Court Rule adopted and promulgated in conformity with Chapter 52 of the Government Code, V.T.C.A.

Please be advised that pursuant to Supreme Court Rule IV, B.4, with regards to disclosure, I, to the best of my knowledge, have no existing or past financial, business, professional, family, or social relationships with any of the parties or their attorneys which might reasonably create an appearance of partiality, except as follows:

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