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August 27, 1991

Stich, Angell, Kreidler & Muth, Esqs.
The Crossings, Suite 120
250 Second Avenue South
Minneapolis, Minnesota 55401

Attention: Robert D. Brownson, Esq.
Re: The Mayor and City Council of Baltimore vs. Keene Corp., et als.

Dear Mr. Brownson:

Enclosed please find the original and one copy of the deposition of Arthur M. Langer, Ph.D., taken on August 13, 1991, in the above-captioned matter.

Please have Dr. Langer review same, and if there are any corrections, please list them on the sheets enclosed by page number and line number. Do not mark the pages of the actual transcript.

When the review is completed, please have him sign the certification page and mail the original back to Jordan Fox, Esq., at Levy, Phillips & Konigsberg, Esqs., in New York City within 45 days.

Very truly yours,

BRODY & GEISER

Jennifer M. Bonfilio, CSR

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Encls.
cc: Jordan Fox, Esq.
Peter Kennedy, Esq.

IN THE CIRCUIT COURT FOR BALTIMORE CITY
CIVIL ACTION NO. 84268068/CL25639

THE MAYOR AND CITY
COUNCIL OF BALTIMORE,

Plaintiffs,

vs

KEENE CORPORATION, et als.,

Defendants.

DEPOSITION UNDER
ORAL EXAMINATION
OF
ARTHUR M.
LANGER, Ph.D.

TRANSCRIPT of the deposition of the witness, called for Oral Examination in the above-captioned matter, said deposition being taken pursuant to Federal Rules of Civil Procedure by and before JENNIFER M. BONFILIO, a Notary Public, Registered Professional Reporter, and Certified Shorthand Reporter at the Offices of WILSON, ELSER, MOSKOWITZ, EDELMAN & DICKER, ESQS., 150 East 42nd Street, New York, New York, on Tuesday, August 13, 1991, commencing at 10:15 a.m.

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170 Broadway - Suite 201
New York, New York 10038
(212) 732-0644

JOB #108135

A P P E A R A N C E S:

LEVY, PHILLIPS & KONIGSBERG, ESQS.
90 Park Avenue
New York, New York 10016
BY: JORDAN FOX, ESQ.
Attorneys for Plaintiffs

STICH, ANGELL, KREIDLER & MUTH, ESQS.
The Crossings, Suite 120
250 Second Avenue South
Minneapolis, Minnesota 55401
BY: ROBERT D. BROWNSON, ESQ.
Attorneys for Defendant, Asbestospray

HECKER, BROWN, SHERRY & JOHNSON, ESQS.
1700 Two Logan Square
18th and Arch Streets
Philadelphia, Pennsylvania 19103
BY: PETER C. KENNEDY, ESQ.
Attorneys for Defendant, U.S. Mineral Products Company

I N D E X

WITNESS NAME	PAGE NO.
ARTHUR M. LANGER, Ph.D.	
Direct by Mr. Fox	4

E X H I B I T S

EXHIBIT NO.	DESCRIPTION	PAGE NO.
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A R T H U R M. L A N G E R, P h. D.,
6 Rochambeau Drive, Hartsdale, New York,
called as a witness, having been
first duly sworn according to law,
testifies as follows:

DIRECT EXAMINATION BY MR. FOX:

Q Good morning, Dr. Langer.

A Good morning.

Q My name is Jordan Fox. I'm an attorney with Levy, Phillips & Konigsberg in New York. We represent the plaintiff, City of Baltimore, in litigation.

And I know you've been deposed before. Let me just say that if I ask you any questions that you want me to rephrase or it's not clear, just let me know.

If you need a break, just let me know. I'll be glad to accommodate you. And that's it.

A Fine. I understand.

Q Okay. Do you have an updated copy of your resume available?

A No, but I will provide you with one.

(Discussion off record.)

Q I have a resume, which I'll just -- I'm not sure where I got it from, but I know I got it, and

I believe it looks like it's from maybe early 1990. Just so that I can feel as if I have some sense of what's been going on with you in the last year or so, if you would -- I'm just going to show this to you to refresh your recollection. Take a look at it and any areas that you're able to supplement in terms of what's been going on since beginning of 1990, if you would just let me know what those areas are and what the activity was.

MR. BROWNSON: Can you tell from looking at this what the date of this particular resume is?

A It's relatively recent. Let me just go to the publications to -- let me see. In the peer-reviewed publications, the article by Freed, et al., that has been published, and it's not in the American Journal of Respiratory Reviews, but it's been published in the British Journal of Industrial Medicine.

The Langer/Nolan paper in the symposium in Harvard, that has been published, and it's indicated here. We have published a paper in the British Journal of Industrial Medicine on the biological potential of a certain fibrous clay mineral that we call palygorskite, p-a-l-y-g-o-r-s-k-i-t-e.

I think that there is another -- I can't recall

the title just yet. I think there's another paper in a peer review journal, which has just been published, but you'll see that in my updated CV, which I will provide you.

In terms of publications in symposia proceedings, we have several papers in press. In the proceedings of International Carcinogenesis meeting, which was held in Albuquerque, New Mexico, in late 1990. One of the papers pertains to the mineralogical distinction of asbestos -- amphibole asbestos as compared to their non-asbestiform analogs which crush to form elongated particles which resemble asbestos but are different.

Within that same proceedings, we have in press a paper on the testing of tremolite in the asbestos and the non-asbestos form, distinguishing between surface properties and biological potential. We have published several discussions and letters to the editor regarding asbestos issues. We've submitted several reports to OSHA for the asbestos hearings. That sums some of our activities.

Q Okay.

A This --

Q I want to get back to --

A Yeah, this CV's about a little over a year

behind, about a year, give or take.

Q I want to get back to a couple things you mentioned, but in terms of --

A Please.

Q -- any other matter in the resume that needs to be updated?

A Well, I've given -- I've appeared in the American Thoracic Society meeting in Anaheim, California, and gave a presentation on biological potential of asbestos and non-asbestiform fibers, but I just can't recall anything further than that.

Q That's fine. When you say "we" when you're referring to some of the articles and papers --

A Right.

Q -- and papers you referred to in terms of your resume, what does "we" mean?

A It's not the royal "we." I'm referring to colleagues who participated in the generation of these papers, the data sets and the documents.

Q When you say "we," what does that indicate in terms of your involvement? Does that mean you're part of the process?

A I'm either senior author or one of the co-authors.

Q Okay.

A And to answer your question, yes, I'm part of the process.

Q Okay. You mentioned several letters to the editor. Can you tell me what publications you've submitted letters to the editor to?

A There was -- actually, there are two letters in the British Journal -- no, one letter in the British Journal of Industrial Medicine, which pertains to the OSHA standard and the standard's lack of distinction between asbestos and non-asbestos amphibole minerals.

And there is another letter in the British Journal of Respiratory Medicine, which criticizes a report by Stein, et al., which appeared in that journal on mesothelioma in a woman who worked in an office building in which a sprayed amosite material was present.

Q Do you recall where that woman worked?

A We tried to find that out. We could not get that information.

Q I want to get back to that in a second, but what other letters to the editor do you recall?

A I don't recall others, but we always -- "we" meaning my colleagues and I -- are always writing something, and I think that those are the two most recent.

Q All right. What were the areas of criticism regarding the article in the British Journal of Respiratory Medicine? Is that -- did I misstate --

A You mean the journal in which the Stein article appeared.

Q Thank you. The Stein article.

A The criticism was based on the following: Analysis of the data presented in that paper disclosed that the materials they identified as amosite could not be identified by the data they provided. The chemistry was -- the chemistry determined by energy dispersive X-ray spectrometry was not the chemistry of amosite; it was the chemistry of another mineral.

Secondly, all of the mineral fibers shown were less than 0.5 microns in length, which was disturbing to us. Thirdly, there was no structural characterization of the mineral by electron diffraction. Fourthly, the number of fibers which Stein and colleagues suggested was present in this particular woman's lung was similar to those values that I found in the lungs of United States insulation workers, and it seemed rather incredible that a passive occupant of a building would suffer the same quantitative exposure as an insulation worker who was engaged in insulating activities.

So based on these characteristics and shortcomings with this report, we communicated this through the normal process, which is a letter to the editor of the journal.

Q This is kind of a hard question to ask. What provoked you -- what interest do you have in responding to an article like that? I mean, what provoked you to respond to that kind of a study?

A Well, it isn't that kind of study so much as any kind of study. I believe that this field involving passive exposure in buildings and exposures in buildings has generated a lot of observations. Some of these observations are credible and supported by data, and others are not credible. And some data which are -- which are offered in support of these observations are incorrect. And still others -- other reports are just not supported by any data or data extrapolated from other instances and other places.

And I have become more active in writing letters because the literature is replete with reports which are -- now, what's the right word? You said it's a difficult question. It's not a difficult question. I'm not saying that there are people out there producing fudge cakes per se, but I'm saying that the interpretation of the data is incorrect.

Q Who is Stein, do you know?
A I wrote to Stein first before I -- and this is -- who is Stein. Stein was a fellow at the institution that -- from which this report was generated. And Stein is no longer affiliated with that institution, but rather I received a response from a senior pathologist in that institution as one of the co-authors on that paper who indicated Stein is no longer present, so the report carried Stein's name but he -- he's somewhere else in Great Britain.
Q Was Stein a pathologist?
A I think he was, yes.
Q All right. Did you request the opportunity to conduct any analysis on your own regarding the case of the woman in the Stein article?
A I wanted two materials. I wanted a piece of material from the building, and I wanted the tissue.
Q You wanted to conduct a bulk analysis?
A Yes. I wanted to actually see the building.
Q I'm sorry. And the second thing you wanted was? Tissue?
A Tissue.
Q And what was the response you got?
A The response was that the situation had already been ameliorated and that the senior person who

responded to me, Robin -- I can't think of the last name, but the response was that the building in question that that information was privileged and that there was certain legal proceedings which were underway in Great Britain and they could not give us that information and there was no tissue available.

Q The woman died?

A That's my understanding.

Q And what -- do you know in what capacity she worked in the building according to the article?

A She was an office worker. That's my understanding.

Q And your recollection of the data in the Stein article, what was the number of fibers that they identified in her lungs?

A The values were high. The fibers were short, and they weren't amosite.

Q They were not amosite.

A No.

Q According to?

A To my diagnostics.

Q According to them, they identified these as amosite?

A Yes.

Q Subsequent to being denied an opportunity

to review the tissue, analyze the tissue, and to review the -- look at the building, --

A Right.

Q -- you wrote a letter to the editor? Was that what the next step was or --

A No, no, no, no.

Q What happened next?

A The first step was to contact the authors. I heard of the report. There were many people interested in this field. I read the paper. I looked at the data, and I looked at the photographs. And I wrote to the senior author, who was Stein. I did not get a response for three months, and I decided that I would write a letter to the editor. I had given them ample opportunity to respond to me. And in due course, we heard all of the other information.

They responded to our letter, but in due course, then we found out that, one, the building was somewhere in London, but they couldn't give us any information as to where it was but it was already taken care of; secondly, that there were no more tissues available, and that was it.

Q Was there a response to your letter to the editor?

A Yes.

Q From Stein?
A Yes.
Q And what was the nature of his response?
A That they would stand by their results.
Q Period, or was there any explanation?
A Well, there were explanations there, and we could sit down. But the original report with my letter to the editor in response to that report and their response and I'll tell you what's right and what's wrong according to my own perception and evaluation.
Q All right. I would ask if it's not a burden on you to provide me with what you just discussed, the article, --
A I'll see if I have it.
Q -- the letter to the editor, --
A Sure.
Q -- any kind of correspondence you have.
A Sure.
Q That might be helpful.
A Sure.
Q How did you discover that the article was published?
A Well, we're all in the same field. How do you discover --
Q Did you get the magazine in the mail --

A No.

Q -- and read it?

A No, no, no, no, no, no, no. We -- I serve on a committee up in the Cambridge area with people who are looking at asbestos literature. It's the Health Effects Institute Committee. We exchange many articles together. We're in contact together. And I know many people in the field, and I have colleagues who call me and say, Have you seen such and such and article? What do you think? That happens all the time.

Q Do you recall who called you on this particular article?

A No, but maybe I have it in my notes. Maybe Mossman called me. Maybe someone else called me.

Q But it was another person in the field as opposed to somebody in the industry?

A No, but it just so happened that with about a later, I think Bob Brownson called me and said, "Have you seen this article?"

And I said, "Yes, I've heard about it. I'm going to get a copy of it and read it."

"What do you think?" That was the generic question, "What do you think of it?"

Q Bob Brownson being an attorney for one of the companies that --

A Yes.

Q -- hires you -- that hired you?

A That asked for my service, that's right.

Q Did you speak to any other attorneys who represent manufacturers of asbestos products during the process of responding to the Stein article?

A Well, during the process of response, many people called me, and many people asked me interesting questions. Are there some representatives of other companies? Probably so. Does that have any influence or effect on what I write or say? Absolutely none.

I'm sure others in the field have called me. There may be people from U.S. Gypsum or National Gypsum or W.R. Grace, "Have you seen this article?" I mean these people have a vested interest in material in-place and passive occupants of buildings obviously, so --

Q Why --

A -- it's possible, yeah.

Q Why would they call you about the Stein article?

A Why would they --

MR. BROWNSON: Wait a minute. I guess I'm going to object to the question that there's no evidence that anybody did call him about the

Stein article other than myself, so I think we're just hypothesizing.

Q I'm sorry. Other than Mr. Brownson, do you recall any phone calls from attorneys representing the manufacturers of --

A You mean specifically about the Stein article?

Q Yes.

A No.

Q To your knowledge, were there any other letters to the editor criticizing the Stein article?

A I don't know.

Q How did you begin your involvement with the Health Effects Institute? How did that originate?

A They called me.

Q "They" being who?

A The Health Effects Institute, their representatives.

Q Had they ever worked -- you worked with them before that?

A No.

Q When was this? When did they call you?

A I'm shrugging. I really don't know.

Q It's all right.

A You know, a year -- has to be more than a year ago, two years ago maybe, maybe a year and a half ago.

Q All right. And do you have a specific title, or are you assigned to a particular committee or subcommittee with HEI or -- is there a way in which you fit into the overall plan there?

A The Health Effects Institute -- according to my understanding, the Health Effects Institute wanted to generate a -- an internal activity rather than automobile emissions, which is the main thrust of the Health Effects Institute, wanted to expand their activities to asbestos in buildings. And they solicited funds from, from my understanding, the Environmental Protection Agency and various interested parties, which include manufacturers of products and various other interested entities.

And one of their first objectives was the generation of some background document concerning the status of asbestos-containing materials in buildings and any perceived risks which may be attributed to the presence of those materials. And it's my understanding they had a list of a large number of people, 100, 150 people, and through some process, which is unknown to me, various individuals were asked to serve on the committee.

Q And you were one of them. And you were one of them?

A Yes, I was one of the people who was asked.

Q And you accepted?

A Not at first, no.

Q Why were you reluctant to accept at first?

A I was reluctant to serve on this committee because I -- I perceived there would be a lot of problems.

Q How so?

A Just problems in general, generic problems, and I didn't think it was worth the time and the effort to serve on the committee.

Q I don't know what you mean by "generic problems."

A Well, this is just my own perception. I mean, we're sitting here in this room and you may have a problem going from here to Hartsdale, and I'll say, Yeah, I can understand that because it's a commute. You have to go to the train and buy a ticket and do this and do that.

I knew that in order to do this properly, you would have to do a lot of reading. There's a tremendous time commitment. It was a politically sensitive area, and that whatever way this committee formulated some document, no -- not everyone could be satisfied with it. And you'd always alienate someone,

and they would attack you. And the attacks which come are -- tend to be personal and vindictive and petty, and who needed it? But after long discussions and many calls, I agreed finally.

Q Were you concerned at all about the integrity of the work itself at first?

A What does that mean?

Q Well, concerning whether or not it would be a -- perceived as being an objective report as opposed to a political or subjective report?

A Well, of course, I asked for the makeup of the committee and saw the names, and I thought that it would be reasonably balanced. And then what was the final deciding factor was that I -- I decided it was a literature review committee, that we weren't making policy, that we're only reviewing the literature. So I decided, okay, I would -- I would agree to sit.

I mean, we had people that I considered to be rather -- very different viewpoints concerning the problem, and I said, well, maybe it'll be balanced and I'll serve.

Q And to date, are you satisfied that the committee's work is balanced?

MR. BROWNSON: Well, I'm going to object to the question. I think because I've got to

ask Dr. Langer, I know that there are certain confidentiality requirements which were put in place when he was asked to sit on this committee, and if he can answer that question without violating those, because no report has been issued yet, he can go ahead and do so. But I would caution him to make sure that you're not doing that.

A Without breaching any agreement of confidentiality before the release of the report, I think it's a balanced report. I don't think any one of the 15 members of the committee agrees with every statement in the report, but that's what happens when you have so many people looking at the data. But I think it's generally an okay report, yeah.

Q Are you -- the report is scheduled -- had been scheduled to be released. I understand it was delayed; is that correct, or --

A Yeah. Correct. I'm sorry. Correct.

Q And are you at liberty to discuss the contents of the findings or?

A Am I at liberty? No. There should be an executive summary shortcoming -- shortcoming. -- forthcoming very, very shortly. There are just so many statements. There are so many conclusions drawn that

it's difficult to -- even if I could. It's a very balanced report, I think.

Q Are the findings consistent with your views of the hazards of asbestos in buildings?

A Not all of them them, no.

Q Are there any particular areas you can identify that -- where you take exception to the findings of that report?

MR. BROWNSON: Again, before you --

A I just can't comment on it.

MR. BROWNSON: -- I caution you.

A Wait till the report comes out. Then we'll sit down and go over it together. And I'll be more than happy to discuss that.

Q All right. Are you assigned to a particular -- well, first of all, was the HEI review, was that in any way divided into committees or subcommittees or --

A Yes.

Q Okay. Can you tell me -- are you at liberty at least to disclose what subcommittee, committees you were assigned to?

A I actually sat on all of them. The -- I note that that -- that I'm a -- I'm now portraying myself as an asbestos renaissance man. Let me see. I

participated in the epidemiology risk assessment portion. I participated in the biological effects portion. I participated in the exposure group assessment. Let me see. What else? We all participated in the generation of the executive summary. I participated with virtually all of the subcommittees.

Q Okay. Was it the same 15 people from beginning to end?

A You mean those who served on the committee?

Q Yeah.

A Were they the same 15 people. There are still the same 15 committee members, but there are -- some of the membership include some of the people from the Health Effects Institute.

Q I see. Okay. But no one dropped out or anything. It was all --

A Not yet.

Q Is there any further work to be done?

A Statements -- certain statements have to be exchanged between certain individuals for their approval. This has been a very, very carefully thought-through document, and I think that that's -- is a credit to the members of the committee. And it reflects their commitment and their knowledge in the

field.

Q Do you know whether or not the sponsors of this study -- whether or not they received a copy in advance?

A No.

Q Okay.

A No, not at all, as a matter of fact.

Q And that was a conscious decision?

A Yes. No, the sponsors don't know anything about it.

Q What do you mean by that?

A Just that.

Q Including the attorneys for the manufacturers of asbestos products?

A Especially the attorneys for the asbestos products.

Q Why is that?

A Well, because people know that I'm serving on this committee, and they call me and say, "Is the Health Effects document out yet? We know you can't say anything because it's very confidential, but is there anything in that" -- you have to wait for it to come out just as I've indicated to you here today.

Q All right.

A When the document's out, then it's fair game for

everyone.

Q All right. And you mentioned that some of the funding came from the manufacturers?

A That's my understanding, yes.

Q How did you discover that?

A That was one of my inquiries, "Who is funding this?" There's an equal amount of money from the Environmental Protection Agency and these interested groups.

Q Well, who besides the manufacturers of asbestos products would be, in your opinion, an interested group?

A The alliance for safe buildings, the property owners' associations. They would certainly have an interest in them.

Q Is that the Safe Buildings Alliance?

A Safe Buildings Alliance, whatever.

Q But they were also funded by the manufacturers of asbestos products.

A Yes, that's my understanding.

Q Do you know to what extent the study was sponsored by or paid for by the manufacturers of asbestos products?

A I don't have the foggiest notion.

Q Did you inquire as to that?

A That was considered privileged information. There were others who made inquiries.

Q Other participants or --

A No one ever gave us a piece of paper -- certainly not me -- a piece of paper with a list of the names of all of those contributors and the amounts that they contributed, no. That was -- I was never privy to that information.

Q Was this -- was the sponsor -- sponsorship in part by the manufacturers of asbestos products, was that part of your concern at the beginning why you didn't want to -- why you were reluctant at first to participate?

A No, not really. That had nothing to do with it actually.

Q Does the fact that the manufacturers of asbestos-containing building products who have a vested interest and a financial interest in these matters the fact -- is the fact that they, in part, funded a study, does that concern you in terms of the committee's credibility?

A You mean the way outside people perceive it? Well, there are all kinds of people in the world. They say a lot of crazy things based on their perceptions. That shouldn't be of a great concern, no.

Q Out of the 15 people on the committee, --
A Right.
Q -- do you know how many of them in the past have received either expert fees or been asked to testify on behalf of manufacturers of asbestos-containing products?
A No. No, he said. The deponent laughed. No.
Q Have you been involved with the Safe Buildings Alliance at all?
A No, not really. You mean have they ever funded me for anything?
Q Let's start with that.
A No.
Q Have you been involved with them in speaking or any kind of activity?
A No.
Q You're aware of their activity generally would you say?
A Not really.
Q Can you tell me -- I know you spent 20 some years at Mount Sinai. --
A Yes.
Q -- What were the circumstances upon which you exited or --
A I just left.

Q I know that you left, and I read somewhere in another deposition of yours something about you not being reappointed. I don't know. I --

A Oh, you want to hear the whole history? I don't want to bore you unduly.

Q Well, whatever -- I just -- I just didn't have an understanding --

A A clear understanding --

MR. BROWNSON: Wait. What's actually the question now?

MR. FOX: The circumstances that resulted in his leaving Mount Sinai.

MR. BROWNSON: What caused him to leave Mount Sinai?

Q What caused you to leave Mount Sinai?

A What caused my to leave Mount Sinai? What caused me to leave Mount Sinai was the retirement of the director for the Center for Polypeptide and Membrane Research, that's a Dr. Irving Schwartz, and the disbanding of his group of which I was a member. And at that time the remnants of that group was to be incorporated into the Department of Physiology and Biophysics. That's Herwel Weinstein's (phonetic) group. And there were no space available, and I wouldn't ask Herwel Weinstein not only for an

appointment but for the time -- the right time. So I decided that it was time for me to leave the institution and to go elsewhere.

Q Had you been tenured at Sinai at that time?

A No, no one's tenured at Sinai unless you're a department chairman.

Q Okay. Again, it's difficult for me --

A Is this an awkward question? Please.

Q Not for you. For me. I'm just trying to come up with the right way to ask the question. Just give me a second here.

Was your impression at that time that they had tried to get you to leave or to pressure you to leave, or was it strictly -- well, we'll leave it at that.

A Well, it's not a very good question but --

Q I know.

A What was the story? I mean, the basic story is I spent 20 years in Irving Selikoff's group making him a great man, or one of the people helping to make him a great man. And Irving Selikoff retired. A new director came in, and my appointment to that group was -- was not renewed. So I went to the Center for Polypeptide and Membrane Research, and when the Center

for Polypeptide and Membrane Research became a defunct unit reaching their climax with the retirement of Irving Schwartz, then it was time to leave the institution. I had no other base of operation.

Q All right. Now, I just -- the reason I ask is because I sense some either bitterness or anger in you in terms of the circumstances upon which you left after 20 years. Was it --

MR. BROWNSON: Wait a minute now. Let's -- wait for his question.

A What's the question?

Q Is that an accurate assessment?

A Am I bitter?

MR. BROWNSON: That's the question.

A Was I bitter then.

Q Were you bitter then?

A Why should I be bitter? Note that counsel laughed why should I be bitter, yes. Why should I have been bitter?

Q I don't know. I'm asking you whether or not you were bitter at the time. After 20 years, all of a sudden, there's no position for you --

A You mean after 20 years of making that organization what it was?

Q Yes.

A And in participating and my group being responsible for its refunding?

Q Right.

A And elevating that group to what it was and paying my own salary all those years and my own fringe benefits and paying for my secretary and her fringe benefits and paying for everybody in the laboratory and buying my own equipment and giving a million-dollar-a-year operation to Phil Landrigan, you think I should feel bitter? Please. Note counselor is laughing.

Well, I didn't like it. What could I tell you? No, I didn't like it. Of course not. But that was the nature of the system. You know, that fine group of individuals who strive for the betterment of all mankind?

Q Have you kept in contact with Dr. Selikoff after your --

A I haven't spoken to Irving Selikoff in six years.

Q Before you left Sinai, did you have a conversation with him? Did you talk to him about your exit?

A No.

Q What was the reason for that?

A Well, he was responsible for it.

Q Okay. All right. Let's move on to other matters. Have you been deposed in the past -- well, how many cases have you been deposed on approximately in cases that involved buildings as opposed to personal-injury cases?

A You mean actual deposition.

Q Yes.

A Maybe five, maybe six, maybe.

Q Can you recall which -- which -- identify them by either buildings or cases where you've testified by deposition in product property damage?

A Well, the first one is Greenville, South Carolina. The second was a case involving a school district in Cleveland. The third was a South Carolina schools.

Q Brought by the state or board of education?

A I don't remember, but it involved state universities or something.

Q Okay.

A I'm trying to think if there are any others. I can't recall now, but those are just general, generic kinds of things. Oh, there's one in Baltimore.

Q Baltimore? Was it --

A State of Maryland.

Q State of Maryland. Oh.

And how many personal-injury cases have you testified in? Can you estimate for me? With respect to asbestos, by deposition.

A Over the last 15 years. One a year, maybe.

Q Approximately 15?

A Something like that. It's possible.

Q Okay. And you've testified for plaintiffs and for defendants --

A Yes.

Q -- in PI cases?

A Yes.

Q How about in building cases; have you ever testified for a plaintiff in a building case involving asbestos?

MR. BROWNSON: You mean by way of deposition or trial testimony --

Q By way of deposition. I'm sorry.

A By way of deposition. Yes.

Q And can you tell me where that was?

A Cleveland.

Q Okay. And you testified on behalf of was it the city of Cleveland or a sub-unit or --

A Gee, I don't know, but the chief counsel for the plaintiffs was Bob Sweeney.

Q Bob Sweeney?
A Yeah, senior.
Q Was it a public building, or was it a private building?
A I think these were schools, and they included the Catholic Archdiocese of Cleveland. That's my recollection.
Q Okay. And what was the nature of your testimony in that case?
A I don't remember.
Q Did it involve asbestos in buildings?
A Yes.
Q You testified for the plaintiffs?
A Yes.
Q And you don't recall what the nature of your testimony was?
A No. You look shocked. What can I tell you? I just don't know. Maybe we talked about fiber lengths and bio -- I don't -- who knows. Or what the condition of the ceiling was, whatever.
Q Do you recall you testified that the materials in-place presented a hazard?
A I don't recall saying that. You'll have to get the transcript and have to read it, but I don't recall -- I don't recall.

Q All right. That's fine. And this was -- do you recall when approximately this deposition took place?

A Greenville, South Carolina, was 1983, maybe '82, something like that. Cleveland was about a year or two later.

Q Okay. Approximately 1985 or --

A Approximately, '84, '85, something like that.

Q How about trial testimony; have you testified in a trial in a product property-damage case involving asbestos?

A Only in the insurance litigation, Phase 5 in California.

Q And who were you testifying on behalf of in that case?

A Commercial Union, insurance, insurance carrier.

Q On behalf of an insurance company?

A Yes.

Q And that was a trial?

A Yes.

Q Were you also deposed in that case?

A Yes.

Q All right. When was the last time before today that you were either deposed or testified at trial?

A I was deposed out in San Francisco in another phase of the insurance carrier's litigation.

Q Okay. And when was that?

A Three weeks ago.

Q How much of your time over the past two years has been spent in deposition?

A Hours?

Q Do you have any way of estimating that? Either preparation for or actual deposition.

A I don't know. When you say "preparation," that's almost impossible.

Q All right. Well, withdraw the question.

What -- have you -- in the building cases that you've testified in regarding asbestos -- you mentioned Greenville, Cleveland, and South Carolina and Maryland --

A Right.

Q -- have you visited any of the buildings at issue in those cases?

A No.

Q Have you been provided any information

about the buildings?

A No.

Q Do you know what type of material was at issue, what types of asbestos materials are at issue?

A It is my understanding, as I represent Asbestospray, it's an amosite-containing material in a single building. And I have been provided and provided air filters taken by Hunter Associates in that building, and these filters have been analyzed in my laboratory.

Q Did you issue a report --

A Not yet.

Q -- in this case?

A I will issue a report to Mr. Brownson, yes.

Q All right. Just so I'm clear here, do you know what building it is?

A This is Walbrook High School, I think.

Q Walbrook?

A Yeah, yeah.

Q It's an amosite what --

A It's my understanding it's an amosite fireproofing that's on the structural elements of the building.

MR. BROWNSON: As long as we're starting in a new area here, why don't we just take a

five-minute break.

(Brief recess.)

Q We left off with Walbrook.

A Yes.

Q And just so I'm clear, your understanding of what happened here is Bruce Hunter & Associates, Hunter, Inc., whatever it's called --

A Right.

Q -- collected the air samples?

A Yes.

Q And forwarded them --

A To my laboratory.

Q And your laboratory analyzed them.

A Right.

Q And you are in the process of or will in the future produce a report which discloses the results of those analyses.

A Exactly.

Q Are you -- do you know at this time what the results are?

A Yes.

Q Can you tell me?

A Why not? This is not a secret document. There were 19 air samples provided and 4 controls. Of the 19 air samples, 14 were negative, no fibers found,

certainly not greater than 5 microns in length. Some had a few structures less than 5 microns.

But for fiber levels greater than 5 microns, which interest us, 14 of 19 are negative. Of the other 5, 4 of them were positive for chrysotile, one fiber -- well, the fiber levels are about 0.001. One was positive. One amosite fiber was found, again greater than 5 microns. Actually it was 4.9, but we counted it as 5.

So 1 of 19 air samples was positive for amosite, and that fiber level was 0.00 something like 17, .0017. That's the calculated figure for that volume of air.

Q All right. Were you able to reach any conclusion as to where that amosite structure came from?

A No.

Q Is that something you're able to do by analyzing air sampling?

A Generally, no.

Q Was the finding of an amosite structure consistent with the -- well, that's a bad question. Withdrawn.

Based on -- well, were you provided with any other information about the building other than the collected air samples?

A Other than from where the sample was collected, the time it was collected, and the volume of air, no.

Q Do you know if any building products containing chrysotile were in Walbrook at the time?

A I have no idea.

Q Were these breathing-zone samples?

A Two were personal samples. That's right.

Q Personal to who? What were the people doing?

A That information was not provided.

Q In any case, they were on somebody.

A Yes, they were indicated as personal, p-e-r-s-o-n-a-l, personal air samples. Right.

Q And I'm sorry, how many breathing-zone samples?

A Two.

Q And the others?

A Area samples and also samples taken outside the building.

Q Were any asbestos fibers identified outside the building?

A Yes.

Q All right. Were they greater concentrations -- lesser concentrations than the one found in the building?

A Interestingly, in the less-than-5-micron category, they were found outside the building.

Q Were any samples taken outside the building where known asbestos fibers were identified, or structures?

A I don't recall specifically. I think some were negative, yes.

Q Did that surprise you?

A No.

Q No. Were they analyzed by TEM?

A Yes.

Q Were these the only samples that you analyzed in terms of city buildings in Baltimore or buildings at issue in Baltimore?

A Yes.

Q What, if any, conclusions could you or did you reach from the analysis of these air samples?

A I don't understand the question. You mean --

Q What does it mean? What does it mean? You have these results. What does it mean in terms of Walbrook and --

A Are you talking about risk? Are you talking about do I have any idea as to whether the ceilings are falling down or --

Q Okay.

A I mean, this is a whole generic field. Can you be more specific?

Q What, if anything, do the results tell you about the exposure to occupants in the building?

A Without -- without appearing to be uncooperative, this -- these samples were taken over a 12-hour period. They represent a -- an assay of what is present in the air during that time period. The levels are low. Some of the levels are -- some of these specimens, air samples, we found no fiber. My impression is derived from this particular sampling, and I'm -- I'm not troubled by what I have found or observed.

Q All right. But I mean --

A I mean, you're asking me what does it tell me about the building. Well, it doesn't tell me very much. I mean, it just tells me --

Q That's fine.

A -- a building in the United States, yeah.

Q That's fine. I don't know whether or not you can conclude anything from this --

A Well, the general conclusion is based on a comparison of these data with the thousands of other data sets out there that this is like any other building found in the United States basically. The

values are either not detectable or very, very low. Period. That's all it tells you.

Q For this period of time that the sample was taken.

A For this particular set of samples. Correct.

Q Did you ask to visit the school and observe the material in-place?

A Well, it's a moot question. It's my understanding it's been removed, so any -- any request for a visit would be, I think, rather fruitless.

Q Did you review any bulk sample reports from the building?

A No.

Q Have you reviewed the, for lack of a better term, custodian studies that have been -- that have been published by Chris Oliver -- I'm not sure -- Levin and Selikoff and Kilburn and, I think, Warshaw, is it, in Los Angeles?

A Well, I'm familiar with all the people. I've seen Christine Oliver's report. It's in the American Journal of Industrial Medicine. I have not seen -- I have not seen the Selikoff/Levin report, but there was a pre-publication manuscript sent up to the Health Effects Institute. I don't think I have seen the Kaye Kilburn/Warshaw study.

Q All right. What was your reaction to the Oliver report? What, if anything, did you -- what, if any, response, if any, would you provide for that report?

MR. BROWNSON: I'm just going to object to the question as broad in form. Go ahead and answer it.

A Well, it is my general impressions, my general impressions, I wasn't terribly impressed with the document, with the report, but that's my general impression.

Q Because?

A Why? If you have some --

MR. BROWNSON: Before you answer, I have the same objection. Go ahead and answer.

A Yeah, it is kind of overly broad. Why. You read a report, and you look at the data. And then you look at the -- you read the discussions, and you read the conclusions. And sometimes you come away with the impression that the discussion and the conclusions exceed the data provided.

The fact that custodians may present pulmonary problems I don't think is in dispute. The question is, the agents involved and the activities of the custodians and whether the activities of the custodians

in a certain instance can be implied to the universal group of people we call custodians.

There are lots of things wrong with the Oliver study, and these are just my general impressions. The fact that she could be a very good clinician and identify pulmonary diseases, I don't think that's in dispute. The interpretation of her results in terms of a specific agent in a complex work environment, that is in dispute. And that's basically it.

Q Well, is there any way that anybody could identify what agents as you say they were working with years back when they had been -- well, when they had worked with these products?

MR. BROWNSON: Again, I'll object to the form of the question as broad and vague, but go ahead and answer it.

A I can't answer that question. You're going to have to be more specific. You're asking many different things. And to --

Q What -- one of your statements was that that the identification of what agents they had worked with was not, in your opinion, adequate. What, if anything, could be done to, in a more significant way, identify those agents?

MR. BROWNSON: Same objection.

A Well, same objection. What do custodians do? Who are custodians? Do they sweep floors? Do they change light bulbs? Do they wash out the men's rooms? Do they empty the wastepaper baskets? Or do they go down into the power plant of a building and help operate and help in the repair of a pipe or a flange or something else?

I don't know what custodians do, and I wish someone would tell me that. I don't know what maintenance workers do. I don't know what building engineers do other than the fact that they would be more in the power plant of some building.

So if somebody says custodians do A, B, and C, this would help improve this particular problem I'm having. I would like to see a study of what particular people do in buildings. I would like to see a study of their contact with asbestos-containing materials. I'd like to see fiber type analysis. I would like to see fiber level data, either time-weighted averages or excursions, to come to some understanding of what their potential risks are.

And the fact that custodians have parenchymal scarring, which may be -- which may be indistinguishable from the kind of patterns generated after exposure to an asbestos-containing material, that

in and of itself is not prima facie evidence that the agent involved is asbestos. Someone has got to come forward with a more detailed study, and frankly, I don't think a pulmonologist could do that.

Q Because why?

A Because they concentrate on the pulmonary effects and the medical effects. Christine Oliver is not an industrial hygienist. Christine Oliver knows that you can make fiber measurements in the environment, but she knows that that's a data set that's missing. She knows that people who work on boilers are exposed to silica-containing products. So how much of the small rounded opacities are related to silica and other kinds of nonfibrous dust? She understands those problems.

Q In your opinion, is there sufficient data at this time to determine whether or not custodial maintenance workers in public buildings are at risk or at elevated risk of contracting asbestos-related diseases from their work?

MR. BROWNSON: Again, I'll object to the form of the question as broad, but go ahead and answer it if you can.

A Let's take the Mobil Building right here we're sitting in. If you are to tell me there are no

asbestos-containing products in this building, I will tell you the custodian and maintenance workers have no elevated risk of developing asbestos diseases working in this building. So that's one category of custodian and maintenance workers we don't have to worry about.

Then there will be custodians and maintenance workers who are in buildings with a sprayed form of insulation above tile ceilings, and they may not go above those tile ceilings once every year. Maybe never. They may be exposed because an engineer goes above there and does some work and there may be some dust that they mop up. That might constitute some exposure. That's another category of maintenance and custodian workers.

Again, it begs the question, what's the nature of the building? What's the nature of the products? How often do they do certain activities? And what is their average exposure? Once you know the average exposure, then you can extrapolate on -- based on the risk assessment models, what their risks are. So you ask, are there some people with elevated risks? Yes, of course.

Q So just so I'm clear, in order -- so in order for you to determine in a particular building that custodial maintenance workers are at an elevated

risk for asbestos-related diseases, you would have to know all those things. You would know all those things before you made some kind of an assessment.

A Right. I mean, as I sit here and as I look at the data from the Walbrook High School, these data are more important to me than a lot of other data. They tell you what's actually in the air, and it is my understanding these were taken several days before the abatement activity took place and they tore the stuff out.

Q Okay. You're not suggesting in Walbrook the air sampling is a sole criteria for determining job safety, are you?

A Well, I think it's an important parameter, yes.

Q Okay. But then you mentioned all those other factors as well --

A There are other factors, yeah.

Q Have you ever requested funds for or suggested to any agency or group or manufacturer that a study of custodial maintenance activities and exposures be taken?

A Well, I'm always asking for money, so the answer is yes, probably. You understand a Ph.D. is nothing more than a license to beg.

Q Okay. And have you ever approached

specifically the manufacturers of asbestos-containing products and asked them to fund such a study?

A Certain studies, yes.

Q What were the nature of those studies that you wanted funding for?

A Well, I wanted some funds to generate a manuscript on some unpublished data I have concerning asbestos bodies in two periods of time, for example.

Q I'm talking about custodial maintenance workers only.

A Oh, custodial maintenance workers. I don't think so, no, other than the fact that the custodian and maintenance workers are part of the group that I studied when I looked at the presence of asbestos and asbestos bodies in lung tissues. So -- but directly did I want funds to study this particular group of people? No. I don't think I've ever requested funds for that.

Q All right. What was your -- did you have any criticism of the pre-published manuscript that you reviewed of the Levin/Selikoff or Selikoff/Levin study of custodians in New York?

MR. BROWNSON: Well, I'll interpose the same objection to the form of that question. Go ahead and answer it.

A My basic objection is that Steve Levin does not tell you the whole picture in terms of -- he doesn't spell out the differences between workers with pleural disease and workers with parenchymal disease, and then he doesn't tell you the severity of the parenchymal disease. And many of the positive cases that he has, there are other radiologists who regard the criteria used by the -- by the Mount Sinai group as rather extreme. And they -- they read these films differently so --

Q They read the particular films differently or --

A In some cases, there have been the same sets of films reviewed by others that were considered to be overread by the Mount Sinai group. So overreading is one of the problems at Mount Sinai, and the way they handle data is that they present a worst-case scenario.

Q Is that, in your opinion, as a matter of policy or is that a --

A You mean is it policy in the Mount Sinai group?

Q Yeah.

A I don't think so.

Q What would be the reason that they would overread or overstate -- overread the X-rays?

A Well, if I were to take a cup and I would pour

that coffee into that cup halfway, it's the old story with the optimist and the pessimist. They tend to overread because that is their -- that's the way they see the world.

Q Can the same criticism be made of people that read the X-rays on behalf of manufacturers of asbestos products?

A Yes.

MR. BROWNSON: Well, again, that's -- I object to the form of the question as overly broad.

A The answer's still yes.

Q Now, that you've had an opportunity -- and I understand that you have certain concerns about these reports, the Oliver report and at least the pre-published manuscript of the Levin/Selikoff study. Does that information inform your opinion to any extent about -- about the potential hazards to custodial maintenance workers in buildings that have asbestos-containing products?

MR. BROWNSON: Object to the form of that question as overly broad, but go ahead.

A What those papers show is something that has been known for many years, that is, that individuals who handle asbestos-containing products, if care is not

taken and there are no controls, no personal protective devices, they may get sick. The nature, the extent of the sickness, the risks, we have to determine, and I think it's a very interesting area that should be studied.

Q Well, why hasn't it been studied today?

A Why hasn't that -- why hasn't this been studied?

Q I mean, if -- if you have to identify what those custodians were doing and the specific activity, why hasn't that been done?

MR. BROWNSON: Well, same objection. Go ahead.

A Well, it's an interesting question. You know, this is like something I've heard years and years ago. This is really classic deja vu. Why wasn't this studied? That's a very good question to ask of people who are in health and human services, HHS today, HEW the decade before that, and the U.S. Public Health Service before that. I don't know. These people should have been doing their job. Why wasn't -- why wasn't this studied? I don't know. Did people perceive this as a problem? I don't know.

Q When you said the first time that -- when was the first time that you became concerned about the issue of asbestos in buildings as opposed to the

industrial exposures in mining and milling and what have you?

A That's a good question. Let see me see if I can get a good answer to meet it. When was I concerned?

Q First concerned.

A Hmm. Well, this is a whole evolution, I suppose. I first became interested -- well, it's a whole evolution. Okay. Let me give you a date. Let me pull a date out of my head. 1969, 1970, 1971, something around there.

Q So --

A I'd say '70.

Q And when was the first time that you became involved or concerned or aware of the issue of -- withdrawn.

When did you first become concerned about the issue of industrial exposures to asbestos? When did that begin?

A That's an interesting word, "concern." You mean when did I first have knowledge of it?

Q Knowledge of it.

A 1965.

Q When did you first learn that asbestos was used in building products?

A 1965.

Q But at that time and for a period of several years, it wasn't an area that concerned you?

A That's an unfair question.

Q I don't know. I'm just trying to figure out what -- what --

A I'm a very concerned, sensitive citizen of this community. Sure, I'm concerned with everything, but you're asking me -- really when you say "concern," you mean focus, research focus?

Q Yeah. When did you first focus or hone in on the issue of asbestos in buildings?

A About 1970.

Q So my question is, between 1965 and 1970 --

A What in the hell was I doing?

MR. BROWNSON: Well, just to be --

Q Knowing that asbestos was in buildings, how come you weren't concerned about it --

MR. BROWNSON: Let's wait to see what the question is. Why don't you either restate it or read it back, because I think we're unclear as to what the question pending is here.

Q Okay. The question is, therefore, between 1965 and 1970 or thereabouts, knowing that asbestos was in the building products, why wasn't it that you

weren't focused on that particular aspect of the asbestos issue?

MR. BROWNSON: Before you answer, you're speaking about him personally or in general or --

MR. FOX: No, him personally.

A And I'm just sitting here thinking isn't this an interesting question. This is kind of fun. I'm sorry that your colleague Mr. Rubin didn't ask me, because he and I could have a go at this and have a good time.

You know, it really -- it really is a matter of the direction of a whole research group and where you focus on problems. It's like saying if someone falls off a bicycle and has a broken arm and abrasions on the knee, do you look at the abrasions on the knee or the broken arm?

We were looking at problems that were focusing on the, let's say, the standard in the United States for the protection of workers.

Q Right.

A The Asbestos Regulations Act in Great Britain, we're talking 1931, going in effect in 1933. The United States did not have a federally regulated -- regulated by statute -- asbestos standard till 1972. So I came in the field in 1965.

Do you think we were interested in asbestos in buildings? We were interested in asbestos in workplaces, people who were in manufacturing facilities, insulation workers, people exposed to aerosols and dust. That was our focus.

It's kind of unfair, because someone might read this ten years from now and think, well, that miserable guy, look at him; he didn't think about us people -- we people in buildings, didn't think about us. We had other problems.

Q Let me ask you this --

A Big problems and big projects, big studies.

Q I was with -- well, somebody who worked at Mount Sinai recently said it was the Willie Sutton problem -- Willie Sutton theory: You go where the money is, meaning that --

A Well, I don't know who that person is --

MR. BROWNSON: Before you answer, again, I'm not sure what question is pending.

Q I haven't asked -- let me ask you this. The reason I'm asking you this -- in your opinion, was it incumbent upon the people who put the asbestos in these building products as the manufacturers to be studying the issue as to whether or not this -- the introduction of asbestos into building products was a

danger to the people that would be working with the products in the buildings, that is, the custodians and the maintenance workers?

MR. BROWNSON: Well, I'm going to object to that question as calling for a legal conclusion. It's the very heart of this lawsuit. He's not being offered as a witness to give any legal conclusions or as to what should or what should not be the standard of care by defendants or anybody else in the historic period of time, and I don't think that's a question that's properly asked. And I'm going to instruct him not to to answer that.

He is being offered as a state-of-the-art witness as to what was known and not known in the scientific and medical communities in which he was involved. He's not being offered as to the standard of care for defendants in this case.

Q Well, to your knowledge, did the manufacturers of asbestos-containing products conduct any studies at any time prior to 1980 regarding the effects -- the effect of asbestos in building products on custodian and maintenance workers?

A You keep saying "custodian and maintenance

workers." Specifically for custodians and maintenance workers prior to 1980. I can't recall. There may have been, but I can't recall it.

Q In 19 --

A I'm sorry. Prior to 1980, were there any studies to determine exposures or products or --

Q Well, any studies that you are aware of conducted by the manufacturers --

A Oh, by the manufacturers.

Q -- regarding any potential health effects to custodians or maintenance workers in buildings which had asbestos products.

A You mean cohort studies.

Q Cohort studies or anything --

A Clinical studies.

Q Any studies or anything by the industry.

MR. BROWNSON: Air levels in buildings? Is that what we're talking about?

A Air levels?

Q However you want to -- I don't know. You tell me. I don't know if -- if you're aware of anything before 1980 that reflected this issue.

A Well, I'm trying to think. The Orange Book of EPA came out in 1979 on friable asbestos-containing materials in school buildings. Were there any studies

done at that time? I think there were air levels measured. People were concerned with the children, not the custodians or the maintenance workers.

Q Okay. Are you aware of any studies by the manufacturers of asbestos-containing products as to whether or not the asbestos in building products presented a hazard to occupants of the building before 1980?

A What kind of occupants?

Q People that are in the building, non-workers.

A You mean passive occupants; they just happen to be there using the space. Did any manufacturer study those people?

MR. BROWNSON: Well, I don't -- wait just a minute before you answer the question --

A No, this is a bad question.

MR. BROWNSON: -- to be clear with what the question is, any studies which -- studies of those people or studies which could indicate risk to those people or what are we talking about?

Q Any studies which would indicate --

MR. BROWNSON: Air level studies in buildings?

Q -- whether in your opinion occupants would be at risk or increased risk for asbestos-related diseases.

A I'm thinking. I'm not sure that anyone would have -- you mean actual studies of building occupants to see whether they were sick because of asbestos-containing products.

Q Any activity to determine whether --

A Any activity?

Q -- to determine whether or not building occupants were at risk from the products they were manufacturing.

A Well, you're talking about activities. You're talking about risks. You mean an actual risk assay. That didn't come into being until '83 or thereabouts.

Q Was there any activity at all determined by the manufacturers of asbestos-containing products to determine whether or not their products constituted a risk to building occupants prior to 1980?

A I can't recall any, but there may have been -- there may have been. And I'm not sure in not recalling any that there weren't any. I'm not sure of that.

Q If -- in 1965 when you began at Sinai --

A Right.

Q -- if a member of the asbestos industry

approached you and said, I'd like to find out whether or not the fact that I put asbestos in my products constitutes a risk to anybody in those buildings, workers or occupants, was Sinai at that time -- were they capable of conducting that kind of a study?

A I suppose we were capable, yeah. Given the -- given the state of the art in 1965, maybe Cuyler Hammond would have said, Yeah, we're going to have to examine 27,000 people to come up with a statistically reliable end point, or we're going to have to separate 27,000 smokers from 27,000 nonsmokers. We're going to have to match them for age and sex, and we're going to have to stratify this according to -- to socioeconomic class and race. And we're going to have to -- I suppose you could have done it.

It would have been an extraordinary undertaking of extraordinary proportion and commitment of resources to find out whether 1 person in 100,000 would be at risk.

If I would have read the protocol then, I would have laughed at it, because in 1965, we were interested in whether insulation workers should be exposed to 12 fibers per ml of air or 5 or 50. Those were the questions. It was the insulation workers succumbing with mesothelioma, not the people here in the -- across

the street in the Chrysler Building. I mean, this was a completely different level of opportunity, and I -- of risk. Put that in quotes.

Q So that the numbers of people --

A I don't think anyone perceived a major problem here. We were looking at other problem areas.

Q When you say no one perceived, you mean in science, in hospitals --

A I think if someone perceived of the problem, they might have considered it a very small problem and that the resources should be spent in areas in which there were larger issues and important issues or perceived to be more important issues.

Q Okay. And to you, this wasn't a -- this wasn't a serious issue whether or not putting a carcinogen in buildings was a concern to custodians?

A Well, of course --

MR. BROWNSON: I'm going to object to the form of the question.

A Of course, it's a concern. I mean, of course, it's a concern.

Q That deserved to be studied?

A Everything deserves to be studied. We ought to study whether there are toxic plants in Central Park. I'm not saying we shouldn't study it. I'm just saying

that given the time and the place in history, this was not an area that deserved the commitment of resources of the United States. And let me go one step further --

Q I'm talking about people that made these products.

A I understand that. I understand that. But the people who made these products were driven by other forces too.

Q Like what?

A Well, what was the Public Health Service doing? What was our Federal Government doing? We did not get our first major grant to study the health effects of asbestos-exposed workers from the United States Government until 1968. We were supported by New York City's Health Research Council.

Q What are the forces that were driving the asbestos industry?

MR. BROWNSON: I'm going to object to that question. It's really broad and vague.

Q It's your words. What are the forces?

MR. BROWNSON: I'm still going to object to it as overly broad and vague.

A What are the forces? A term meaning that there are factors that drive corporations other than the

perceived risk of a small number of people.

Q Profit?

A It's possible, sure.

Q All right. Other than Asbestospray, what other manufacturers of asbestos products have paid your -- asked you to serve as an expert on their behalf?

A I have represented W.R. Grace. I think I once represented National Gypsum. I represented a talc manufacturer, not represented. I don't think I was ever deposed. I just did some work for them.

Q U.S. Gypsum I believe you mentioned before?

A I think so. Well, I'm just --

Q Yeah, I don't know.

A You know, people call me all the time.

Q Okay. How much do you charge for your services?

A Just general background information and preparation, $225 an hour; depositions, 275; testimony at trial, 325.

Q Have you ever calculated approximately how much money from expert testimony or expert assistance you received on asbestos issues over the past year or anything, ever calculate anything like that?

MR. BROWNSON: First just answer the question, have you ever calculated it?

A Have I ever calculated it? No. I'm just sitting here thinking about it.

Q Can you estimate over the last month, let's say, you received in expert fees on asbestos issues?

MR. BROWNSON: Does that include the Health Effects Institute? Does that include --

A That's what I'm thinking.

MR. BROWNSON: -- symposium seminars? Again, I object --

Q For litigation matters?

A For litigation matters only. You mean deposition, trials, or somebody sends me a report and I look at a report --

Q Anything that would include litigation. That would include reports.

A Maybe 40 or 50K, something like that.

Q Okay.

A Over the year.

Q All right. When did you leave Sinai? What year was that?

A '88.

Q Do you make more now than you did then?

MR. BROWNSON: Well, I'm going to object to that question. I don't think it's a proper inquiry. Does he make more money now than he did in 1988?

A Do I make more money now?

MR. BROWNSON: You don't have to answer that question if you don't want to. But if you want to, go ahead. I don't think it's relevant --

A I don't think it's relevant either. Do I make more money now? Yes. I probably do make more money now.

Q When you were at Sinai, were you also being retained as an expert?

A I was never retained as an expert in any matter.

Q At Sinai.

A I was never retained as an expert for any -- in any matter. I'm not on retainer with anyone.

Q I'm sorry. When I say -- I don't mean retain in the strict term. I mean --

A You mean have I been asked to consult or act as an expert on behalf of some client.

Q While at Sinai.

A Yes.

Q And paid for that while at Sinai?

A Well, at Sinai, there were different time periods, and in different time periods, the funds went to different areas.

Q Okay. When you were at Sinai, did the consultation fees go directly to you, or did they go back to the hospital?

A It depends. It depends what time period this took place and where the activity took place, whether it was on the campus or off the campus.

Q Okay. Let me just make sure, because I have this resume. Your present position is director of the Environmental Sciences Laboratory of the Institute of Applied Sciences, Brooklyn College of the City University of New York, Brooklyn, New York.

A Right.

Q And what, if any, activity are you involved in as -- from -- directly related to that position that deals with asbestos, if any, at this time?

A Well, I don't understand that question.

Q In other words, does your job now involve asbestos at all? Does it --

A Yes.

Q In what respect does it involve asbestos issues?

A Well, in this position, we finished our project, for example, on modified chrysotile in Canada, the chrysophosphate project. We have been working on -- through a grant from Battelle Laboratories representing a large corporate client at -- examining and rating various laboratories in the United States that provide asbestos analyses.

We have acted on behalf of a major talc producer in the United States to look at specimens of talc from their talc deposits to determine if there are asbestos fibers present or, if there are other mineral fibers, what is the nature of these other mineral fibers.

Q I don't want you to --

A I'm still involved, yes.

Q Okay.

A Of course, yeah.

Q Just so I'm clear, do you have any teaching responsibilities at the City University Brooklyn College?

A No undergraduate. Occasionally we have two graduate students that work in our laboratory. One we're going to have work on a thesis in our laboratory -- our laboratory.

Q Have you ever had any teaching experience?

A Where?

Q Anywhere.

A Yes.

Q And where was that?

A Well, I began my career as a -- as a instructor of geology up at City College, the City University of New York. I instructed as a graduate student at Columbia. I was a laboratory instructor as a teaching assistant. I am an adjunct professor in the City University. I have taught courses in the City University both on the undergraduate and graduate level.

I participated in the Paige & Black Postgraduate School courses at Mount Sinai. I have participated in other tutorials in various places in the United States, and I still occasionally give lectures. I'm invited to give lectures at various places. I've just been, for example, invited to present at the Grand Rounds down at NYU in the pulmonary division.

Q Okay. Never on a full-time basis. Is that correct? Or was it more invited to speak here, invited to speak there, or was it ever on a full-time basis?

A Yes, it was occasionally on a full-time basis.

Q I have a list here of things that --

A Please.

Q -- that I want to ask you about. You're not a medical doctor. Correct?
A Correct.
Q And when you analyze tissue with the electron microscope, --
A Right.
Q -- your responsibility at that time is not to diagnose or treat disease. Is that correct?
MR. BROWNSON: Well, that's a compound question.
A It's a compound, yeah.
Q Is it your primary duty at that point to diagnose the disease?
A No, I'm to provide information which may help in the diagnosis of disease.
Q And you don't -- and you haven't treated disease, asbestos --
A It would be he illegal for me to do that. That's correct.
Q And is it fair to say you defer to medical doctors on medical issues?
A Of course.
Q Have you ever received any medical training?
A No.

Q Okay. And you're not an epidemiologist?
A No.
Q Okay. And you're not -- do you consider yourself to be a public health specialist?
A Yes.
Q Okay. And are you an industrial hygienist?
A Not certified, no.
Q Okay. Are you going to rely -- withdrawn.
Have you read the articles by Mossman, et al., in, was it, the Science Magazine and New England Journal of Medicine?
A Yes, yes.
Q Is that -- are you going to rely on those articles to any extent in your testimony?
MR. BROWNSON: Again, I'll object to that question as broad, but go ahead and answer it.
A Well, it all depends. What is it that you're going to ask about those articles?
Q Me? Maybe nothing but --
A Well, if you don't ask me anything, then there's no sense --
Q But I'm not the only attorney --
A It's a moot question.
Q -- that's going to ask you questions.

A You mean do I rely on all the contents and all the statements in it? No.

Q Did the Science article or the New England Journal article, did they advance your knowledge in any respect in terms of hazards of asbestos products in buildings?

A In some areas, yes.

Q Can you identify those areas?

A Yes, the review of the biology and the interaction of asbestos fibers in biological systems was a very interesting and informative section of that particular paper.

Q In any other respect that you can identify?

A No. But it was a general review -- let me just correct that. There was a general review of the available environmental data, which was informative in that it was in one place, so that was also an interesting small section of that particular paper.

Q Do you have -- can you tell me what the source of asbestos in am -- in the ambient air is or are?

A Well, there are many sources.

Q For example?

A Natural rocks.

Q Uh-hmm.
A The use of crushed stones, which are asbestos-containing. There are some who believe that the degradation of friction products also produces fiber. In the past, the uncontrolled use of certain applications of asbestos-containing materials such as spraying.
Q Fireproofing type materials?
A I beg your pardon?
Q Sprayed-on fireproofing or acoustical treatments?
A Sprayed-on fireproofing, yes. In proximity to manufacturing facilities and plants and secondary industries which release fibers.
Q How about in-place asbestos-containing products in buildings?
MR. BROWNSON: Again, I'm not sure what the question is. Are you saying is that a source of asbestos into the ambient atmosphere?
MR. FOX: Yeah.
A It's possible, yeah. If you have asbestos in your building, it will blow out.
Q Okay. I noticed one of the things that you had done was a study in Maryland --
A The Rockville Quarry.

Q Was it?
A Well, there's an attribution to that report. The original report is in Science.
Q Okay. And you were involved in that study?
A Yes.
Q And that involved whether or not cars that drive over rocks with a chrysotile content --
A Generate a fiber.
Q -- generate fibers?
A Yes.
Q What was the conclusion of that study?
A That the use of crushed stone containing chrysotile asbestos was a source of atmospheric pollution.
Q Were you able to quantify the release?
A On a mass basis.
Q Can you -- can you tell me generally what quantities were involved?
A I think the highest levels observed was 4500 nanograms per cubic meter.
Q Was there a concern over whether or not this release constituted a hazard?
A Sure.
Q Was there any conclusions drawn from --

A No.

Q Was --

A We stated that in the conclusions of that paper.

Q Stated what?

A That the values were elevated, that the fiber was short, and that the biological effects on the population were generally unknown.

Q Unknown.

A Were unknown.

Q You visited the Lancet -- is it the Lancet area plant or --

A No, no, no, this is Rockville, Maryland.

Q Rockville. There you go.

A Rockville, Maryland.

Q Why did I have Lancet written down?

A Because I have a review -- we wrote a discussion of the problem in the Lancet.

Q Oh, okay.

A Actually, it was a letter to the editor also, which was kind of interesting.

Q When was this study done?

A Rockville was about '77.

Q '77. And the letter to the editor was --

A Maybe '78, maybe the same year.

Q Did it provide additional report --

additional information than the report --

A Well, we summed it up, because they have a -- they, Lancet has -- what does Lancet have? Lancet has a portion of their journal which is given over to the editorial group which comments on certain health matters which arise around the world. And one of the discussions in this section of the Lancet was the report of Rockville, Maryland, and they thought that this was an exaggeration of a health effect.

But we never reported the health effects in that paper, by the way, nor did we say that we knew anything about it other than the fact that there were elevated concentrations and we didn't think it was a good idea to have 4500 nanograms per cubic meter, which was 1,000 greater than the average levels we found in New York City, to have people exposed to those concentrations of dust, and we just said -- we stated that.

Q They claimed you were an alarmist?

A Maybe they did, but the basic facts of the issue were missed.

Q I don't understand that.

A Well, how the problem came into being, how we were approached, our laboratory at that time was approached, what the original concern was, and why we thought it was important to study this.

Q Why did you think it was important to study this?

A Well, my perception of the problem is different than a lot of other people, but you're speaking to me as an individual now. I was interested in the problem because the Environmental Protection Agency had calculated the release of fiber from brakes from friction pads, friction composites, on the basis of the analysis of road-side debris. And one of the roads selected by them was one of the roads that used this rock material as a road ballast.

So it's an interesting observation we had was that the EPA calculation, which is based on the number of vehicles in the United States and passenger models, and this absolutely incredible calculation was based on an artifact of finding a chrysotile fiber which was originating from the rock and not the brakes. So that was our first interest in this, my first interest in it.

And we studied the Rockville Quarry. We looked at the materials in the quarry, and we looked at the air data. And these fibers were being generated from these rocks. So there were lots of reasons we looked at it, and the report in the Lancet did not reflect those reasons, and we decided that it would be

interesting just to set the record straight.

Q Was that study funded in any respect by the state of Maryland or Rockville --

A No, no.

Q Do you know who funded it?

A We had support from the National Institute of Environmental Health Sciences, which provided most of the support for all of our ongoing activities.

Q And you were -- withdrawn.

Was anything done as a result of your study?

A Yes, the state of Maryland conducted an exhaustive survey. And in the end, the unpaved roads that had this crushed serpentine as a road aggregate, these were paved with asphalt. They were -- that's an effective form of encapsulation.

Q Okay. I think you referred to the release of these fibers as air pollution.

A Well, it was.

Q Is release of asbestos fibers always considered a form of air pollution?

A Well, since it's not a natural component of our air, yes, I would consider it to be a pollutant.

Q All right. I noticed one of the -- I don't know where I read it, but somewhere, you had --

and I have trouble pronouncing this. You'll have to help me here. One of the other -- one of the other causes of mesothelioma is erionite. Is that --

A Erionite, yes.

Q And you identify that somewhere as a very potent carcinogen.

A It is.

Q Would you say the same thing about asbestos? Is asbestos a very potent carcinogen?

A For what tumor or what fiber type?

Q Well, I know you have a -- well, would you consider chrysotile asbestos to be a potent carcinogen?

MR. BROWNSON: I'm going to object to that line of questioning, because we are not offering Dr. Langer on the issue of potency of carcinogens. And this is, I suppose, a matter of academic interest but it's not --

MR. FOX: Biological -- I think biologically he can --

MR. BROWNSON: It's not an issue upon which we intend to have him testify in this case, but you can inquire into it if you like.

MR. FOX: Well, talks about here that he will testify about disease mechanism, disease processes, difference in fibers, medical

literature, epidemiological literature, low-level exposures, fiber release. Has all kinds of issues here that go well beyond --

THE WITNESS: Mineralogy.

MR. FOX: Mineralogy. I don't know whether or not you want to just take some of this stuff out. I mean, I know that he's -- it's clear that he's not a medical doctor, but since he's already characterized another mineral as a very potent carcinogen, I think that it's fair game to ask him if he considers -- I mean --

MR. BROWNSON: I'm not saying you can't ask him. I'm just saying you're wandering far afield.

MR. FOX: I don't know if I am.

MR. BROWNSON: You can ask these questions if you'd like.

MR. FOX: Yeah. Okay.

Q Well, then, is chrysotile, in your opinion, a very potent carcinogen from a biological standpoint?

A Depends.

Q Depends on?

A It depends on the disease. It depends on the

nature of the chrysotile. It depends on the nature of the chrysotile itself. It depends on the doses.

Q Can it be a very potent carcinogen?

A I don't know.

Q Amosite, is that a very potent carcinogen in your view?

A It depends.

Q Depends on?

A Same set of factors: Which of the diseases do you speak? What is the dose? What are the characteristics of the amosite?

Q Can amosite be a very potent carcinogen?

A I think so, yes.

Q All right. What diseases in your opinion can chrysotile cause?

A Asbestosis.

Q Any other diseases?

A Possibly pleural mesothelioma and, under certain circumstances, possibly lung cancer.

Q Okay.

A That's the most conservative view of this field that you're going to hear, I suppose.

Q What is your basis for stating that chrysotile can possibly cause pleural mesothelioma?

A If you examine the world literature, the cohorts

of world literature, and you examine the details of studies, it becomes apparent that there are other factors which come into play in the appearance of certain diseases.

Now, we're looking at pleural mesothelioma only. There are some 17 pleural mesotheliomas that have been described from the Rochdale experience in the midlands of Great Britain. Fred Pooley has conducted tissue burden studies of these 17 workers -- well, not all, maybe 14 or 15 up to now. And if one looks at the 14 or so lung tissues that he has looked at, those individuals succumbing with pleural mesothelioma have elevated levels of crocidolite in their pulmonary tissues.

Now, only 2 percent of the fiber used in Rochdale was a crocidolite fiber, but it was confined to a certain part of the works, a certain building. The individuals in Rochdale who succumbed with pleural mesothelioma worked in that particular part of the plant, were exposed to crocidolite.

Now, when one looks at the work mates of these 17 who succumbed with mesothelioma, if you look at their pulmonary tissues, they have high concentrations of chrysotile and low concentrations of crocidolite. Now, that's an isolated kind of observation.

Now, you look at another group of people, 46 product manufacturing facilities in Ferodo, again Great Britain. And if you look at that group, there are 13 pleural mesotheliomas there, 11 of them, again, in a certain part of the plant, there was a specialty item made with crocidolite. They also have crocidolite in their pulmonary tissues. There was one individual with some complicated exposure which involves amphiboles.

If you look at a comparison of cohorts of gas-mask manufacturers, compare Nottingham, a military gas mask with crocidolite, and compare the Nottingham workers with the Blackburn workers who made civilian gas masks with chrysotile, there are 55 mesotheliomas in Nottingham; there's one in Blackburn now, but that individual had a prior exposure in the other facility making the gas masks, the same generic groups of people, by the way, females during the war time in Great Britain.

And if you follow this through and we -- let's look in Canada, McDonald's groups in Canada, McDonald's group in Canada. There may be a confounder of another mineral, another amphibole; some think tremolite is the confounding variable there.

So if you look at the really well established cohorts, and you look in detail, there's always some

confounding variable.

Q Did McDonald implicate chrysotile?

A Yes, and I think that -- when I say possibly this and possibly that, I think that there are some number which cannot be explained other than by chrysotile.

Q All right.

A Not the percentage that we see but some portion of that, and it may be a small portion. So without exonerating chrysotile, do I think it can cause a human pleural mesothelioma? I think in certain circumstances, yes, it probably can. But those circumstances are more well defined than just inhaling chrysotile.

Q Have you personally seen chrysotile cause mesotheliomas not reported in the literature?

A I have personally looked at tissues of individuals and found only chrysotile in mesotheliomas not yet reported in literature, yes, that's true.

Q Is that going to be reported in literature?

A Yes, because I am publishing a major group of workers exposed to asbestos in the United States, and I think the 81 or 82 cases I'm going to report on, there may be as many as five mesotheliomas which are exposed

to chrysotile only. I can't find any other fiber. So I think it's possible.

Q Is there any alternative explanation?

A Well, there are others who like to offer other explanations. One of the other explanations is that I didn't look hard enough or long enough to look around for amphiboles. I mean, it's possible, but I don't know. So I have these few cases exposed to chrysotile only.

Q What kind of workers are these that have the chrysotile mesos?

A I have to check, because there are two, I think, who worked in shipyards. So there's a possibility that there was other exposures to other am -- fibers, amphibole fibers. It's possible.

Q Were they all industry workers?

A All but one or two, which are conjugal household. So about 79 are workers, and two are family members, something like that.

Q Okay. Are any of the household members -- were any of them part of the five that had the --

A No.

Q -- meso with chrysotile?

A No.

Q Were these people that lived with workers?

A The two --

Q The other two.

A -- were housewives.

Q And what do they have? They have mesothelioma?

A One had lung cancer. I think both are lung cancers.

Q Were they smokers?

A I don't have that information unfortunately.

Q Did you determine -- well, did you determine that their lung cancers were asbestos relateed?

A Well, they had asbestos in their pulmonary tissues.

Q Does that answer the question?

A No, it doesn't at all.

Q Can you answer the question?

A No, I don't think anyone in the world can.

Q All right. This was a study that -- was this one of the ones you mentioned in going over your resume, this study here, updating your resume or --

A No. This is -- I have all of these data, and I'm in the process of putting them into some manuscript, but this has nothing to do with those that are published thus far. In fact, the two manuscripts

that were -- well, I don't need to go into the details. It doesn't matter. Go ahead.

Q When did you anticipate publishing --

A As soon as I have a moment's chance to sit down and do it, I'll do it.

Q All right. Has the results of this study that you've just mentioned -- has that informed or advanced your knowledge regarding the -- I hate to say -- the carcinogenicity of chrysotile?

A Well, this generic study -- I keep on using the term "generic." It's a general study basically, has certainly changed my thoughts and my overview of the problem, of course.

Q In what respect?

A Well, all studies do. All -- new studies have new data, and new data mean that something's different; otherwise it's old data, where you verify someone else's observation.

This -- my study of workers, the first 54 cases certainly changed my perception of the way we look at the world, yeah, changed my perception at the way I look at the world.

Q How?

A Well, for example, the old saw was that chrysotile consumption in the United States represented

95 percent of the fiber used, and therefore, 95 percent of the exposures of chrysotile, therefore, 95 percent of the asbestos diseases we see, should be related to that fiber.

Q But you knew that before you did the study. Right?

A I knew that saw -- that litany was repeated and repeated by many before that study, but the problem is when I looked in the lungs of workers in the United States, I found that three-quarters of them had amphibole fibers in their lungs. For example, the insulation workers; 100 percent of the insulation workers had amosite in their pulmonary tissues.

Now, the consumption figures show only 3 percent of the fiber consumed in the United States was amosite, and yet 100 percent of the insulation workers are exposed. Now, to me, that meant that consumption figures have no bearing nor relevance with exposure data. It depends on the product, and it depends on the place where it's used, and it depends on the occupation, and so on.

Q Do you know whether or not chrysotile -- well, this is -- here I am again -- I'll try this. Whether or not acting -- whether or not chrysotile and amosite acting in concert can increase a person's risk

of a mesothelioma whether or not they kind of act together?

A You mean do I know that or do I suspect it? Do I think about it?

Q Do you think about it, and if so, what are your opinions about that?

A Yes, I think about it, yes. That's true. I think that when we talk about synergy, we talk about interaction of different agents.

Q Right.

A And is it possible that minerals add synergy to each other? Yes, I think that's so. There was a report down in Albuquerque, New Mexico, that experimentally if you introduced quartz, which is a silica polymorph, silica material, into an experimental system with a fiber, it increases the activity of that fiber, because it renders membranes more -- more -- what's the right word? -- it allows fibers to move across membranes more easily.

So the answer is yes, you can have a mineral/mineral synergy. And years ago, we were talking about -- we, when I was at Mount Sinai with my former colleagues and former friends, we talked about mineral/fiber synergy. Chrysotile may be more cytotoxic than amphiboles.

Q Do you have an opinion at this time whether or not there is a synergy between amphiboles and chrysotile?

A Well, this was looked at by Marty Gardner in some of the epidemiology in Great Britain. He said no, he didn't think so, but I'm not so sure. I'm not so sure, and I would like some data to study that problem and look at it.

Q Do you know how -- I know you've testified in the past about clearance mechanisms for chrysotile. Do you know how much -- what percentage of chrysotile fibers are cleared in the lungs?

A You talking about animal lungs or human lungs?

Q Human lungs.

A I don't know that.

Q Is it true in animal studies that chrysotile tends -- withdrawn.

Is it true with humans that chrysotile tends to migrate to the pleura?

A Chrysotile, as other small particles, tends to migrate to the pleura, yes.

Q Is it also true that you almost exclusively find chrysotile in the pleura when workers have mixed exposures?

A I don't think that's true.

Q You don't think that's true?
A No. You can also find -- I have unpublished data that show you can find small amphiboles in the pleuras.
Q I understand that, but in terms of quantification --
A You mean is it preferentially transported to the pleura?
Q Yes.
A In regard to the other asbestos mineralogist.
Q Yes.
A I think that's true.
Q And do you find that a great majority that you identify in the pleura tend to be chrysotile?
A I think that's true.

(Discussion off record.)

(Luncheon recess taken.)

* * * * *

A F T E R N O O N S E S S I O N

BY MR. FOX:

(Last question and answer read back.)

Q I think what I'd like to do is just go through this statement and see what's worth talking about.

A Everything's worth talking about.

Q I'm --

MR. BROWNSON: Not necessarily. Withhold judgment.

MR. FOX: Just for the purpose of the record, I'm going to ask that this two-page document be marked as Langer-1, and it's a statement of -- witness statement for Dr. Langer that I received from Richard Koehler, K-o-e-h-l-e-r, on July 29th, 1991.

(Witness Statement is marked Langer-1 for Identification.)

Q Have you -- let me show you this and ask you if you've seen a copy of it.

(Witness reviews document.)

A No, I don't think so.

Q Okay. What I'd like to do is just go through certain parts of it --

A Please.

Q -- with you and ask you to what extent you can offer testimony on these topics.

Under Category B, "Testimony," it says, "Dr. Langer will testify that asbestos is a term for a number of minerals from around the world, some of which had been used commercially and some of which have not." We don't need to go through that.

"He will testify that there has been a great deal of confusion in the medical and scientific literature concerning the term asbestos and that it is often improperly defined."

Can you summarize for me what that means, if you know?

A It means what is stated there, that "asbestos" is a term that is misused by individuals who are not mineralogists. For example --

Q For example.

A Would you like an example?

Q Sure.

A There was a report in the New England Journal of Medicine in 1986 which alleged that there was two -- that's the number 2 -- to, t-o, 4 percent tremolite asbestos present in a crushed carbonate rock marketed in the New England states as a play sand.

My laboratory examined and analyzed these

materials for the Consumer Products Safety Commission and found that tremolite was present, but it was not in its asbestos form but, rather, existed as crushed common tremolite, which formed elongated objects that -- which mineralogists call cleavage fragments. So that was a misuse of the term.

Q Okay. "He will testify concerning historical and current scientific knowledge concerning how asbestos fiber enters the human body, the disease mechanism within the human body, and disease processes."

First of all, is that -- are you an expert in those areas?

A In parts of those areas, portions of those areas. I have some expertise.

Q What would your expertise be in terms of the "historical and current scientific knowledge concerning how asbestos fiber enters the human body"?

A That would merely be a review of the inhalation of fiber in various environmental circumstances, of what size, of the size distribution of various asbestos fibers in different environmental settings, and how -- we have come to understand how they are inhaled and possibly the dissemination to organs distal from the lungs.

Q Okay. And how about your testimony regarding "historical and current scientific knowledge" regarding "the disease mechanism within the human body"?

A Well, it's kind of overly broad, isn't it? I am expert in the area of properties of minerals and how these properties influence biological outcome. That's a sub-component of that particular statement.

Q Do you know how asbestos causes disease?

A No, and neither does anyone else. Everyone's stating that now, whatever the disease process is, lung scarring or mesothelioma or lung cancer or other diseases.

Q Does the fact that no one has yet to determine how asbestos causes disease -- does that fact -- should that fact make us more cautious in terms of whether or not we permit asbestos-containing building products to remain in buildings?

MR. BROWNSON: Well, I'm going to object to the form of that question, but go ahead and answer if you can.

A Well, I don't think I could answer it. There are several parts to that actually, and I -- it wasn't phrased the way I could really answer it. Why don't you take another shot at it.

Q Well, given the fact that no one really knows how asbestos causes disease, --

A All right.

Q -- shouldn't that fact, from a public health perspective, increase the desirability of taking the asbestos-containing building products out of buildings instead of hoping that it doesn't cause disease?

A Phrasing your question that way, I would disagree with that statement.

Q Because? Why is that?

A I don't think that that correctly reflects our knowledge. You don't have to be -- there is no substance that we know of as a carcinogen that we can absolutely say with certainty what the mechanism is by which it produces a malignancy.

Q There's no carcinogen that we can say that?

A I cannot think of any carcinogen as I sit here now. For example, let's call cigarette smoking as a carcinogen. With its hundreds of compounds that have been identified, with the multitude of mechanisms that are possible with each of these compounds, we think we know a great deal about the mechanisms of carcinogenesis, but to say that there is a proven

mechanism with a compound known to produce a specific tumor in which we know with absolute certainty everything about the process, the answer is no, of course not.

However, if you don't know those mechanisms, you certainly can extrapolate from other data sets. And the other data sets will be data sets involving exposures to humans in the workplace, exposure to certain fibers, exposure to fibers in certain -- with certain dimensions and chemistries and surface properties, with and without cigarette smoking at certain doses from which we, given a worst-case scenario, extrapolate to lower doses can we come to some reasonable approximation of risk and can we use those data to base certain -- certain decisions regarding removal of asbestos from buildings. I think you could do that. I think that's what the Environmental Protection Agency has been trying to do.

So that you don't have to know the precise mechanisms by which fiber induces these malignancies, but there are other data sets that help you come to some rational conclusion. So you don't have to know everything. It would be nice to know everything, and it would make for a very good decision, but we don't have those data.

Q It says, "He will testify that different fiber types are not equally biologically active."

A Yes. I think that's true.

Q Is it fair to say that your opinion is amosite is a more potent carcinogen than chrysotile?

A Yes, for mesothelioma.

Q For mesothelioma.

A You want me to embellish on that? No.

MR. BROWNSON: Not unless he asks you.

A Okay.

Q I guess my question is, since 1989, has there been any -- any other activity.that has -- you're going to rely on in terms of your opinion, that particular opinion, any studies or articles that you will rely on?

MR. BROWNSON: With respect to biological activity of amosite?

Q Yes, versus chrysotile.

A I think I will rely on the body of the text of the report of the Health Effects Institute. Now, I note that -- I understand that you don't have that report, but it's forthcoming. This trial's not going to be for months and months.

MR. BROWNSON: Well, not too many months.

Q Well, it's scheduled for September 23rd,

so I don't know what you've been told but --

A Really?

Q Yeah, really. But in any case, it may not happen on that day.

A I understand that.

Q As things happen. But it may.

A Okay.

Q In any case, I take it, at least one of the conclusions of the report, therefore, is that amosite has more of a potent carcin --

A No.

Q No?

A No.

Q But you said you're going to rely on that to support your conclusion.

A Yes.

Q Can you explain that?

A There are other data sets. This is a -- a work that reviews the asbestos literature, and there are studies of mechanisms. There are studies of fiber levels in buildings. There are studies of products inside of buildings. There are studies of the epidemiological data sets throughout the world, which together provide an overview of the problem. And of course, I will rely on the expertise, experience, of my

colleagues and the data which were reviewed.

Q But when you say you're going to rely on the HEI report, does that mean that the HEI report supports your opinion that amosite is of greater carcinogenetic quality, potency, than chrysotile?

A In terms of peritoneal mesothelioma, yes, you will see in the body of the text some attribution to that.

Q Has any government agency taken the position that chrysotile is not as dangerous as amosite?

A Yes.

MR. BROWNSON: Are you -- okay. I have a question. Are you limiting that to United States Government agency, or are you talking any agency?

Q Has any United States Government agency taken the position that amosite is more dangerous than chrysotile?

A Yes.

Q Who that?

A The Mining Safety and Health Administration in the Department of Labor takes the position that amphibole asbestos minerals are more dangerous than chrysotile.

Q In what context do they take that position?

A In their regulatory approach to mineral dust in the mines and quarries of the United States.

Q Has OSHA taken the position that amosite is more dangerous than chrysotile?

A No.

Q No. Any other governmental agency in the United States --

A The Consumer Products Safety Commission also espouses the belief that amphibole asbestos minerals are more dangerous than chrysotile.

Q In what context is that?

A Just in their pronouncements pertaining to asbestos and their recent review of tremolite in-place. In fact, this is cited in our letter in the British Journal of Industrial Medicine on asbestos regulation in the United States.

Q When you say "this is," you mean the -- your reference to the Consumer Products Safety Commission findings?

A No, no, no, no, no, the generic OSHA regulation for asbestos does not distinguish, for example, between an anthophyllite asbestos fiber and an anthophyllite cleavage fragment, whereas these other organizations

do.

So that there is no such thing as a, quote, federal fiber, a nonspecific entity that one sees with a certain kind of light microscope. There's no such thing as a federal fiber, because different federal agencies analyze materials differently and recognize differences in biological potential.

Q Is there a reason why -- to your knowledge, why OSHA and EPA have not adopted the fiber distinctions?

A That's a good question. Is there any reason that I know of or what I think? What I think really doesn't matter. Is there any official position? They just say that they -- they're unconvinced by the data. That's the official position.

Q Okay. It says here, "He will testify" -- this is Exhibit No. 1 -- "He will testify concerning medical, scientific, and epidemiological literature with respect to persons occupationally exposed to asbestos."

What is the nature of your testimony on that topic?

A I have no idea. That's a discussion of the whole asbestos field.

Q Yeah, that's what it sounds like.

Do you have an opinion as to whether or not custodians are at an elevated risk in general in buildings that contain asbestos-containing products?

MR. BROWNSON: I'll object to the form of the question on two grounds. No. 1, it's overly broad and vague, and No. 2, it's already been asked and answered. Subject to that, go ahead and answer it.

MR. FOX: I'm just trying to --

MR. BROWNSON: I understand that, but you asked the same question this morning.

MR. FOX: All right. I don't think I did but --

A You did. And again, it depends on the circumstances. In a range of circumstances, the answer may be no, and the answer may be yes.

If there's a good operations and maintenance program in a building, the answer is -- could be very well no, in that the exposures of custodians could be the very same as passive occupants.

Q What if a president of the Parents Teachers Association for a given school approaches you --

A Right.

Q -- and says, Dr. Langer, --

A It's happened, yeah.
Q -- we want to make sure that we protect our children, --
A Right.
Q -- and we want to make sure we protect our custodians. --
A Right.
Q -- We don't want to take any chances. We have asbestos containing acoustical plaster --
A Right.
Q -- and fireproofing --
A Right.
Q -- in our building, --
A Yes.
Q -- and we don't want to take any chances with the health of anybody. What should we do?
MR. BROWNSON: Does that include they don't want to take chances that the building might burn down? Is that included in your question?
Q We can discuss the value of asbestos but that will come later. Okay.
A It's a perfectly legitimate question, of course.
Q And?
A My answer has been, -- and people have asked

me -- How safe do you want safe? We put "safe" in quotes. Because nothing is safe. Nothing is safe. Do you want the risks to be one in a million, or do you want the risk to be one in ten?

If you're an insulation worker, your risk of developing and dying with mesothelioma is one in ten. I understand that. That is unacceptable.

Q Okay. I'm sorry.

A Obviously. The benzene decision by the Supreme Court, an injured worker one in a thousand. For school children, that's unacceptable. And at the other end of the spectrum, you generate a risk, you say the risk is one in a million. People say, That to me is safe.

One in a million school children, there are 5,000 school children that pass through this school system every two years. Every two years, 5,000. And then you say, well, how many generations of school children will you have? Well, you're going to have 200 generations of this. It's 200 times 2, 400 years, that in that 400-year time period, one of these children may succumb with some malignancy as the result of the inhalation of fiber.

Now, to me, that's safe, and I'd send my children to that school. And I'm a caring parent. I care about safety, believe me. My kids ride bicycles;

they ride with bicycle helmets. They go roller-blading; they wear all of the equipment. I'm concerned with safety.

So when you say "safe," then you have to say, well, what is it that you want? If they want absolute safety that this particular material will not in any way -- not one in a million, not one in a hundred million, encapsulate it, isolate it, or remove it. Those are your options. Of course, that's absolute safety. Absolute.

However, you couch it in terms that if you remove it, there may be some -- if you don't do it right, you may have even more problems.

Q But if you do it right --

A But if you do it right. Right.

Q Then it's fine?

A Over. That's right. Then you put it out, and you either melt it down into some glass or put it in a dump site, whatever.

Q So if the president of the PTA says to you, Dr. Langer, we don't want to take any chance that someone may be injured from this material, your response would be to either remove it or encapsulate it --

A No, that's not my response. My response as an

expert in the field is to tell them about the world. My response is, What kind of fiber is it? Who has analyzed it? Are you sure there's asbestos in it? Because I have been involved in certain instances where a building had an abatement activity in which it would -- the materials contained cellulose, did not contain chrysotile.

What kind of fiber? Are you sure it's present? Who analyzed it for you? Is the material damaged? Is it accessible? Tell me more about the nature of this -- of air measurements. Have you done any air measurements?

And they'll say, What does this have to do with the price of onions? And I'll say, the "safe" depends on a lot of qualifying factors. Is it this or is it that? And try to explain it to them.

Do these surfaces have to be resprayed with a material? What is the substitute you're going to use? Are you going to use a synthetic calcium silicate? Why, the Johns-Manville Company has just issued a new -- a new safety data sheet as they are -- as they are told to do under TSCA in which this new resprayed material contains a suspected human carcinogen. It's called quartz, free crystalline silica.

What are you going to put in its place? How are

you going to do this, so on and so forth, all of these. But if someone says, What do you think we ought to do? I don't pick up the phone and say, Remove, and put the phone down. You have to tell them where -- where this information is derived, the nature of their problem.

Q Have you ever recommended the removal of an asbestos-containing product in a building?

A I've recommended repair, and I think in one instance where a material could not be repaired, I said remove it in that area, yes, in that area.

Q What kind of a product was that?

A This was in the Greenville, South Carolina, school case. I believe it was a cementitious material on a ceiling. There was one elevated value for asbestos in the air of the building in a room with a damaged ceiling.

I said, If it can be repaired, repair it; if it cannot be repaired, then remove it. But this does not, should not, translate to removal of the entire building. Every room has its own characteristics. Every building has its own characteristics. Every school district has its own characteristics. And with that kind of approach, then you can deal with some of these problems. And that's the information that I conveyed to the -- to those who asked.

Q When you would -- in a hypothetical when you were discussing or giving the options to the PTA president, would you also discuss for them the NESHAPS regulations and -- regarding regulation --

A I generally don't even have to do that, because they have all that information on their desk. They have all the early EPA documents. Some of them are confusing. Some of them don't tell them to do anything. Some leave them hanging in the air.

Normally, when people call me, it's to clarify some issue; it's to determine whether a certain laboratory is a laboratory they can rely on. The very first case in Greenville, South Carolina, the basic question was, is the McCrone laboratory a reliable laboratory? What do these data mean that they gave us? Translate this into an occupational setting. Is there some risk of disease? These were the questions asked. They -- most of the these people have these materials, and what they call me for is clarification.

Q Are there laboratories out there that analyze asbestos materials that are unreliable in your opinion?

A Yes.

Q Is that because they are technological reasons, or is it biased reasons or what?

A I think they are technically incompetent.

Q Are you familiar with any of the laboratories that conducted any of the analyses for the plaintiffs in the Baltimore case?

A No.

Q It says here, "He will testify concerning low-level exposure to asbestos." I assume that refers to testimony about risks associated with low-level exposures.

A I don't know.

Q Do you have an opinion about risks associated with low-level exposures or nonoccupational exposures to asbestos products?

A Sure.

Q What's your opinion?

A Oh, it all depends. Tell me the fiber type.

Q Well, it's amosite.

A Amosite. Amosite asbestos.

MR. BROWNSON: Well, wait a minute --

Q Spray-on fireproofing.

MR. BROWNSON: I want to know what the question is. Is there a question pending here?

Q Yeah. What is the risk associated with low-level exposure containing spray fireproofing?

A Why don't you tell me the level, and I'll tell

you what the risk is for, let's say, mesothelioma.

Q It all depends on the air level?

A Sure, of course.

Q How do you -- what if there's a potential for disturbance of the material or for activity in the proximity to the material? You're never going to know unless you're right there with an air sample what the fiber release is from those episodic activities, so how do you judge whether or not a hazard will be presented from these materials?

A If you don't know --

MR. BROWNSON: Wait a minute. Before you answer, I'm going to object to the form of that question. But go ahead and answer it.

A If you don't know what the levels are, you don't know what the risk is. That's the bottom line.

Q But how do you know -- I don't understand. How do you know what the levels are if you're not sitting there when someone bangs into it or someone is working on a HVAC system next to it? How do you know what the level is if you're not there when it happens?

A I understand that, Counselor. You're absolutely right. If you're not there, then you don't know.

Q Right. So how do you judge the hazard --

A Then again, if it's there, then you don't know

either, unless someone measures some --

Q Right.

A You have a worker. A worker handles materials. A worker manipulates materials. A worker is exposed in some manner. Tell me the level of exposure, and I can tell you what the hazard is.

Q What if --

A For example --

Q Okay.

A I understand your concerns. What you're saying is there's a potential hazard and a potential risk by virtue of the existence of the agent.

Q Right.

A Okay. That I agree with. But don't tell me how large it is or how small it is without any values. That we cannot extrapolate.

Q Have you ever done, I guess, what is termed as "aggressive air sampling"?

A Have I ever done aggressive air sampling. Well, I've done air sampling aggressively, if I may introduce a moment of levity.

You mean with a leaf blower? With a leaf blower or some level of contact with the material --

Q No, to determine, given an impact, what the level of release of fibers --

A No, that's very interesting that you mention that, because the only report that I know of is a report by Gary Burdett, which he presented at the IARC meeting, I-A-R-C meeting, in Lyon in 1988 maybe in which he air sampled in a building in London with amosite asbestos. And in order to get fiber levels generated, he had to hit the surfaces with a crowbar in order to generate any dust.

So have I ever done aggressive sampling with a crowbar or a leaf blower? No, I have not, no, but there are reports of people who do that.

Q Are you familiar with Dr. Sawyer, who did air sampling during maintenance custodial activities in the Art and Architecture Building?

A Yes.

Q And do you recall what levels he indicated in his air samples for those activities?

A No, but I think that they were double digit.

Q That's right. So given that fact -- or given that study, how do you then estimate or know what potential hazard there is in an amosite-containing spray-on fireproofing?

A You can't because, No. 1, Yale Art and Architecture was chrysotile, and the chrysotile was a dry spray application. It was festooned on the

surface.

Q I'm sorry. Festoon?

A Well, you know, like Spanish moss hanging down. It was a unique application and Yale Art and Architecture was probably a statistical outlier. That doesn't represent the population of buildings with asbestos-containing materials.

There's something very different about Yale Art and Architecture. Low ceilings, books in the library being pulled off the shelf, knocking materials loose, dust and debris on top of the books, people blowing it off, changing the light bulbs and knocking into this. It was a lousy design to begin with in the worst possible location, and people who did work in that building, they were exposed and they should have removed. That's what I would have recommended.

The whole damn building had this stuff in it. And Bob Sawyer was right when he recommended to Kingman Brewster to remove that damn stuff, and they did. And they should have. But that doesn't -- has -- may have nothing to do with amosite or chrysotile with a cementitious matrix in an inaccessible place above a suspended tile ceiling in some building somewhere. It has nothing to do with it.

It's the experience of eating in the Four

Seasons or eating in McDonald's. I mean one is not comparable to the other, other than the gross effect of moving your jaw in order to eat.

Q What -- what set of circumstances has to exist before you're willing to recommend a removal of asbestos-containing materials, chrysotile? You can divide it into chrysotile and amosite as you will, but let's start with chrysotile. How bad does -- how bad a condition does it have to be in before you think it should be removed?

A What's the population?

Q Students.

A Children?

Q Children.

A School children.

Q School children.

A Age six, they're entering kindergarten, so they have the longest life expectancy. So their time factor is the greatest out there. Okay. That's fair enough.

Let's assume for the moment that all fibers are the same. So that the first thing we assume is that the biological activity of all fibers are absolutely identical. That means let's -- you keep talking about chrysotile. Now, I know that chrysotile there's only one suspected case of peritoneal mesothelioma following

exposure to chrysotile asbestos in the workplace. And I know that two-thirds of Irving Selikoff's mesotheliomas among the insulation workers are peritoneal. And I know that in order to get peritoneal mesothelioma, there are two factors that are required: You need an amphibole, and you need a high dose, because the mortality experience of workers in peritoneal cohorts show a high mortality from asbestosis. And it follows that they cough up and swallow fibers and there's a lot of other data to support this.

But let's assume all fibers are the same, and let's assume that there's no difference in fiber length in the indoor air as compared to the insulation workers. And let's assume all of these other factors.

Now, if we embrace Nicholson's data, on the average, exposure to insulation workers -- we're gonna take the worst-case scenario -- he said anywhere from 10 to 15 fibers per ml of non-marine settings. Some of them in shipyards were exposed from 15 to 20 fibers per ml because they were below the water line; they were inhalation jammers, poorly ventilated areas. They were walloped.

Let's take the lowest value, so we're taking a worst-case scenario. All fibers are equal. We're

going to take the lowest fiber value of 10 fibers, and we're going to embrace the linear dose response data.

Q Right.

A For every dose there is a response and that there is no threshold. We'll embrace that.

Q Uh-hmm.

A And there's no difference in fiber length. At 10 fibers, 1 in 10 insulation workers dies of mesothelioma. We're going to do this -- 1 fiber, that means in a dose response, 1 in 100, drops down. At 0.1 fiber, it's 1 in 1,000.

Now, if someone came to me and said that these kids were exposed to .1, I'll say, You're crazy. You better do something about that right away. I don't even want those kids in the building. Get them out. 0.01, 1 in 10,000 will die of mesothelioma of some form, pleural, peritoneal, the whole business.

We're bending over backwards to make an error on the side of safety. I'd say 1 in 10,000 at .01. That's the release level, by the way, AHERA in school for a contractor .01. Those people are accepting a risk of 1 in 10,000. Think about that.

0.001 fibers, the risk is 1 per 100,000. They say, gee, it's getting a little better now. Now these kids are going to live a little longer, so it could be

maybe 2 in 100,000, 1 1/2 in 100,000.

If I had 001 with a risk of one in a million under the worst-case scenario, giving all of the doubts on the side of safety, I'd say this thing, 00 -- triple 01, I'd say leave it in. Double 01, 1 in 100,000, I'd say, You folks are going to have to decide this at double 01. I think that this is reasonable. I think that maybe a risk of 1 in 100,000, these are your kids, you have to decide.

I would certainly say at -- an action level would certainly be .01. Someone has to do something for sure. Below that when you go to double 01 or triple 01, I think triple 01, forget about it, you're going to create more hazards. Leave it in place. Don't touch it.

Q What if it's in poor condition; does that increase the risk--

A It might. Is it accessible? Do children vandalize it? Are they exposed to it every day?

Q Well, assume that there is some level of accessibility and there is some damage.

A What if I were to tell you that given all the great people in the United States who do these measurements, the fact that you have damaged material, half of the measurements tend to be measurable; you see

something in the air, and half of them are down here.

Q Uh-hmm.

A What that means is that if you were to do a standard regression line, these factors cancel out. You can't tell anything about it. Generally, if it's damaged, it may be a prognosticator of fibers in the air or it may not.

You're saying a visual inspection. A visual inspection may or may not be good. However, if I thought that above this tile ceiling there was a material that was cementitious and tamped and undamaged and kids were going to use this room for activities, I would have absolutely no qualms in allowing them to sit in a building like that, in this room.

And if it was damaged, I'd say, Well, you folks have money? You want to take this out? You do what you want with your own money. That's your decision.

Q Would you want to look at the condition of a product before you made an evaluation one way or the other if it should be removed?

A That's one of the factors.

Q Isn't it a critical factor?

A May not be a -- no, it may not be critical.

Q Say the air samples are normal, that is, that they're low. Wouldn't you then, in order to make

a determination, want to see the condition of the product?

A That's never been a factor.

Q What's never been a factor?

A The fact that it's damaged or falling down. What do you think of that? Never been a factor.

Q Well, was it a factor for you in Yale when you said to remove it --

A They did that at Yale. I was in the Basic Sciences Building in Mount Sinai. I did a study for the dean of the Mount Sinai School of Medicine. I gave the results to Irving Selikoff. There was damaged fireproofing above a suspended tile ceiling, and they went up there, and they cleaned up the debris that fell down. And they didn't take the rest of the stuff off the building. They didn't think it was necessary.

Q You said the condition was never the factor.

A The fact it was damaged, because it was above a suspended tile ceiling. We did air measurements. We never found anything in the air. I had to report that to the dean. He said, Well, there's nothing in the air. Obviously, when those clumps fall down, they fall down as big clumps. So that condition did belie the fact that the air we thought would have fibers in it

didn't.

Q You're talking about the Art and Architecture?

A I'm talking about the Mount Sinai School of Medicine.

Q So I'm clear on this, do you --

A Yale Art and Architecture Building is an --

MR. BROWNSON: Wait a minute.

A -- accessible area.

MR. BROWNSON: There's no question pending here.

Q So is it condition plus access?

A Yes, of course.

Q Does access include access by maintenance and custodial workers?

A Sure, of course.

Q Okay. Back to Exhibit 1. "He will testify concerning asbestos fiber, how it is used in asbestos products, the concept of 'friability', the aerodynamics of asbestos fibers, the dispersion of asbestos fibers in the air both inside and outside of buildings, and the nature of 'fiber release' from asbestos fireproofing."

What do you have to say?

A Jesus.

Q Just kidding. Let me go one by one here.
A I seem to know an awful lot, don't I?
Q The first one is how asbestos fiber is used in asbestos products.
A Well, that I can generally address, sure.
Q How can you address it?
A Well, what --
Q What --
A What product are you interested in? Are you interested in friction products, in --
Q No, --
A -- in cement --
Q -- building products.
A Building products in general. Well, building products include pipe insulation, surface applications, tiles of ceiling and floors.
Q How -- Phase I of our litigation here has to do with surface treatment. Let's stick with surface-treatment products. How is asbestos used in surface-treatment products?
A It's used as a fireproofing, a soundproofing, an acoustical dampening medium.
Q Have you seen any documents from the asbestos companies --
A Pertaining to what?

Q Regarding their evaluation of asbestos, what asbestos is used for in their products.

MR. BROWNSON: Well, I'm going to object to the form of the question.

Q Well, are you suggesting that asbestos has some acoustical absorption quality --

A That's what I've been told.

Q By who?

A I have to look that up. No, but I think acoustical -- it was used, for example, out on the Brooklyn College campus in lecture halls --

Q Uh-hmm.

A -- just to reduce echo.

Q Are you aware of products on the market today that have equal or better noise reduction coefficient than the products that were manufactured with asbestos?

A Oh, absolutely, sure.

Q So what is --

A In fact, the perforated tiles are perforated not for design but rather acoustical purposes.

Q So therefore, what value does asbestos have in soundproofing, do you know?

A No.

Q All right. How about -- let's take

fireproofing. Is it your opinion or information that asbestos had a particular fireproofing value to it?

A Yes.

Q In what respect?

A If you read all of the documents pertaining to thermal insulation, the -- and the Fire Underwriters' requirements, meaning that a fire or a temperature gradient would not exceed a certain value for a certain unit of time to preserve a structure and a structural integrity until this fire is addressed by the local fire department. These values are given in the various literatures, yeah, the Fire Underwriters specifically.

Q Are you aware that there are materials that do not contain asbestos and have the same ratings?

A Yes.

MR. BROWNSON: Wait a minute. I'm going to object to the form of the question.

A Sure.

Q So if you're able to accomplish both in terms of sound absorption and in terms of fireproofing, the same thing without the material -- the asbestos than you could with asbestos, then tell me what the value of asbestos is in these products.

A I don't -- I don't think it's a very good question. Look, what's the value of asbestos?

Asbestos was there. We're developing new materials all the time. Maybe it's cost. Maybe it's the -- it's the life of the material, whether -- maybe it's ease of manufacture. Maybe it's surface properties. Maybe it's color. Maybe it's resistance to humidity. Maybe it's low iron content if you're going to use a woven product to shield a wire. There are lots of properties.

We're just saying a fire underwriting approval and thermal this and thermal gradient, I mean we're just touching the surface. I mean, you can take Malloy's book Thermal Insulation, and he'll talk about products that are pre-formed. He'll talk about products that are loose-filled. He'll talk about nonfibrous materials. He'll talk about organic materials.

There are all kinds of insulating materials for different purposes, and they have different properties. So whether a spray thermal material has a property that's different than powdered vermiculite -- I'm sure it does. I'm sure it had a certain purpose and a certain function, and it may be -- it may have paid tribute to the product development group at the Johns-Manville Corporation. I mean all of the above.

So is it possible that they use other material?

Yes, it's possible. We can say that now, yeah, it's possible.

Q But I mean without -- I know you don't mean to trivialize it --

A Of course not, no, no, no.

Q But we're talking about a carcinogen in building products --

A Yeah, but the -- hold on a second. Hold it --

MR. BROWNSON: Don't answer --

A -- Mr. Fox --

MR. BROWNSON: Wait. There's no question pending. Counsel is now testifying. Wait for a question.

Q No, I mean I'm trying to find out how asbestos is used in -- how asbestos fibers are used in asbestos products. I'm just trying to figure out what your testimony is going to be.

Are you going to suggest that somehow asbestos is irreplaceable or has certain qualities about it that can't be replaced by present materials in the market? If that's true, I want to explore that with you.

A There are some products that asbestos -- there will be very great difficulties in replacing asbestos.

Q Can you have give me an example of what

those products are?

A For example, a crocidolite gasket used in the chemical industry in which fluorine compounds, which are very reactive, will breach and react with virtually every kind of gasketing material except a crocidolite-containing gasket or a crocidolite paper of some kind.

Q But not surface-treatment materials.

A You mean is crocidolite absolutely required for some surface treatment?

Q No, I mean are you going to suggest that asbestos is somehow irreplaceable in surface-treatment materials?

A What's the purpose of the surface-treatment material?

Q Well, whether it be a fireproofing or acoustical absorption.

A No, no. Look -- oh, I see. Fireproofing or acoustical. I suppose you could get a substitute there, sure.

Q Do you know -- are you aware of any information about the industry's research into non-asbestos-containing alternatives to surface-treatment products?

MR. BROWNSON: Well, I'm going to object to that question, object to the form of the

question. It's broad. It's overly broad. It's vague, and furthermore, Dr. Langer's being proffered in this case on behalf of Asbestospray, not some industry. If you want to ask him about Asbestospray --

Q I was just wondering if you were aware of what was going on in, let's say, the 1950's or 1960's in terms of the exploration into alternatives to asbestos-containing building surface-treatment products.

A No.

Q Also, it says here you'll testify regarding the concept of friability. Is there any particular testimony that you have in line that may relate to friability?

A No.

Q Do you adapt the EPA's definition of "friability"?

A It's reasonable.

Q Is friability a factor in determining whether or not materials should be removed from a building?

A It's a factor, yes.

Q Next topic is, "He will testify" regarding "the aerodynamics of asbestos fibers...."

MR. BROWNSON: You put an issue as to that in this case. If you want to make an issue out of it, we'll talk about it.

MR. FOX: In what respect?

MR. BROWNSON: Your expert says it's re-entrained from surfaces; it floats in the air. If they intend to talk about that, I imagine Dr. Langer might as well.

Q Does asbestos become one -- is it possible it can become re-entrained in the atmosphere once settled?

A It's possible.

Q Is it possible in brushing and sweeping, an activity like that?

A Sweeping, yes.

Q Have you ever taken -- collected settled dust samples?

A Yes.

Q Can you tell me what the value of settled dust samples is, if any?

A I don't know.

Q Is there a reason then that you took them to begin with?

A Sure.

Q What was the reason?

A To find out what the material was to begin with. Did it contain asbestos? What fiber type? What percentage? Did it correlate with some product inside of a building?

Q Does it have a qualitative value in your opinion?

A Of course.

Q Does it have a quantitative value in your opinion?

A No. Oh, in terms of what was in the air. No.

Q In terms of what is in the air or could potentially be in the air.

A Well, you know, potentially. Not really. I think that's an area that should be studied.

Q If you have a bulk sample which indicates presence of asbestos, at that point, does settled dust sampling have any value?

A It might.

Q I mean, does it tell you the stuff, in some respects, has been released?

A Well, that something has been released in the general sense of release, yes.

Q If you were evaluating a building that had a sprayed-on fireproofing, if you were evaluating it to determine what to do with the material, would you

recommend settled dust samples?

MR. BROWNSON: Well, I'm going to object to that question on a number of grounds. First and foremost is Dr. Langer's not testifying in this case about any settled dust samples, but --

MR. FOX: Okay.

MR. BROWNSON: -- beyond that, you can go ahead and try to answer the question.

A That would be one of my suggestions if I were to assay some building environment.

Q Next topic, "He will testify concerning...the dispersion of asbestos fibers in the air both inside and outside of buildings."

Let's start with inside a building. Do you have any opinions that you can offer regarding how air is dispersed throughout -- which may contain asbestos throughout a building?

A Just what I read. No primary research of my own.

Q And what is it that you read that you may want to offer testimony --

A Gordon Bragg, Canada, interested in building air, dynamics of air supplies in buildings, air systems in buildings, fate of fibers in the air, where fibers are entrained or stick, the amount of energy required

to get fibers off surfaces, whether or not fibers build up in the air of buildings or the fibers are flushed through, and why we don't find fibers in the air of buildings to begin with.

Q Well, do you have -- what is your opinion regarding why it is that we don't find fibers in the air of buildings?

A I think, by and large, these are low levels to begin with. And these are moved with the building air supply out of the building. Or they impact on surfaces that make it extraordinarily difficult to dislodge them from the surfaces. It takes a lot of energy.

Q So tell me if I'm mischaracterizing your testimony, but --

A I certainly will.

Q -- but are you saying that more asbestos fibers are released and will show up in an air sample from asbestos-containing building products?

MR. BROWNSON: Well, I'm going to object to that question as broad. I think it's hopelessly broad and vague. Are we talking about the Walbrook High School or all buildings or --

Q All buildings.

MR. BROWNSON: -- at all times?

A It's probably so that there are more fibers released than are found in the air.

Q And why --

A It's probably so.

Q How would the fibers be released? What would cause them to be released --

MR. BROWNSON: Same objection. I mean, what are we talking about now? You're talking in such generalities. The question is clearly improper.

Q Can you give me examples of how fibers would be released from building products?

A Pipe in a basement that needs repair, insulation is removed from that pipe. It's ripped off, torn off, hammered off; fibers are released.

Q Contact, walking past the material, I mean walking into the material, would that release fibers?

A If it's an asbestos cement, no. If it's an aircell chrysotile paper, unlikely. If it is a friable non-indurated, non-compacted spray application, it's possible.

Q Are you aware of instances where fibers when released from, let's say, a sprayed-on fireproofing above the ceiling tile are distributed throughout the building, through the building system,

air plenums, what have you?

A No.

Q No?

A No. Maybe I should think more about this. You mean have there been any reports --

Q Are you aware of any instances that you're aware of that there have been reports where fibers released in a --

A In a plenum, in a return air plenum.

Q In a --

A Well, there are some data, yeah, of course. Even Nicholson's 1975 paper on air plenums with a friable asbestos-containing spray material that there were slightly elevated levels of asbestos in those instances, yes.

Q Is -- is the air-distribution system in a building a factor to look at to determine --

A Of course, yes.

Q -- whether to remove from the building?

A Of course.

Q Okay. And also the final one here is -- in this paragraph "...the nature of 'fiber release' from asbestos fireproofing."

Is there anything in particular about spray-on fireproofing that -- in terms of fiber release

that you can testify about?

A I don't know. Ask me something.

Q Is sprayed-on fireproofing more likely to release fibers than cementitious product?

A Well, if it's a cementitious product to begin with --

Q Sprayed-on fireproofing.

A Let's say it's a spray-on fireproofing, and let's say it's in a room that's frequented only once every two years by someone in the maintenance department. Do I think that that's going to be a source of fiber? No. It depends on the circumstances obviously. It depends on a multitude of factors. I mean, it's possible, sure.

Q Okay. Again with Exhibit 1 here, "Dr. Langer will testify that air testing and monitoring is an appropriate method of determining whether an asbestos hazard exists within a building."

Perhaps the question should be what in your opinion is the value of air sampling in hazard assessment?

A Well, it tells you what people are exposed to.

Q During the times that the air sample is being taken.

A Of course, yes.

Q So do you agree that -- I think it was EPA called it a snapshot in time -- air sampling is a snapshot in time?

A Well, so is an OSHA sampling of a worker tearing out a pipe in a basement. That's a snapshot in time. That's the same length of time, temporally -- temporally --

THE WITNESS: You figure that one out.

A -- it's a snapshot in time, but we use these snapshots to create some sense of hazard or lack of hazard or risk or lack of risk.

Q I'm just concerned about how this sentence is worded. You're not suggesting you can look at air samples alone and determine hazard, can you?

A I think you can come to a pretty good understanding of it, maybe more so than a lot of other judgments that are non-quantitative.

Q You would render an opinion on a hazard in a building based on air sampling alone?

A I might.

Oh, that looks like a familiar paper to me, Counselor.

Q It's not the one I want.

A That wasn't a bad paper. Asbestos Air Pollution, Environmental Health 1972, page 349.

Q But you don't remember what you testified about in Cleveland.

A No. That's important; Cleveland wasn't terribly important. Don't tell that to Bob Sweeney.

(Discussion off record.)

Q Just give me a second here.

I'm going to show you one of the articles that you participated in writing. It's entitled "Airborne Fiber Control in Buildings During Asbestos Material Removal."

A Oh, yes.

Q "By Amended Water Methodology."

A Yes, yes, yes. Right.

Q Dated 1983, Robert Sawyer --

A Bob Sawyer. Right.

Q -- Arthur Rohl, R-o-h-l, and you.

A Correct.

Q And it's just one statement on page 53. I'll show it to you in a second. It says, "Air sampling cannot be considered the sole criteria of either work safety or job acceptance." Look at it. It's under "Conclusions."

A Happens to be true.

Q Okay. That's why I was asking you --

A Yeah --

MR. BROWNSON: Wait a minute. Wait for a question --

A There's no conflict with what I've just said.

MR. BROWNSON: Let him ask you a question first.

Q The question is, if that's true, then why would you then be comfortable making a recommendation on a product based on air sampling alone?

A Well, we're talking about two -- we're really talking apples and oranges. The water method was in the study of removal of asbestos-containing products already in place. It's really a study of those who removed those materials. And our concern was it wasn't being done right, that the respirators at that time weren't protecting workers to the efficacy that they should and that the fiber levels during a dry rip out were tremendous.

And this, I think, was a completely different issue than recommending at a fiber level that may be 110 thousandth or 100 thousandth of that just based on the condition of looking at it, based on everyone's experience of air measurements. It's just one of the factors.

Now, I like quantitative data. Tell me if you're going to do an abatement project and you're

going to remove asbestos from this building, let's say this building, and it's going to be better that you have ameliorated this, that you've made these people safer as the result of removing this fiber from a building. Give me a measurement before; give me a measurement afterwards, two measurements five, ten, whatever. That's a big difference.

What was said in that paper, I think it's true. My perception of problems in ambient air buildings, I think that that's true also.

Q But there's no doubt you could find a very low air sampling of fiber level -- fiber level of air sampling in a building even though the material may be in poor shape and is accessible --

A Yes.

Q So how then would you be able to make a recommendation based on air sampling alone?

MR. BROWNSON: Again, I'm going to object to the form of that question as being vague and overbroad.

A I don't think I've ever told someone what to do. What you do is present them with the facts. They have to make the decision. It's their nickel. They have to decide. You give them all the facts.

You say, This is what we know about the field.

This is what we know about this particular product, these particular fiber levels, the occupational groups exposed to this fiber. This is what we extrapolate, and this is what we perceive to be the risk. The ball is in your court.

Do I ever say, Rip that stuff out? I suppose there would be instances where I might say that --

Q My question was if a building --

A It depends.

Q If a building owner calls you up and says, Look, I have asbestos in my building; --

A Right.

Q -- I'm going to send you the air sample results. You get the air sample results, and they are consistent with the air sample levels generally in buildings, that is the --

A Okay.

Q -- .001, let's say.

A Fair enough.

Q Do you then make a recommendation what to do, or do you call the building owner up and say, I need to know X, Y, and Z?

A I need to know X, Y, and Z and that if you can maintain these levels, why don't you institute something like operations and management and train

those people how to deal with asbestos-containing materials.

Q Do you have any opinion or experience that you can relate regarding whether or not workers in buildings follow O & M plans once instituted?

A I don't know that. That's a behavior study, yeah.

Q An important behavior study.

A Oh, absolutely. Quite correct.

Q All right. Okay. Again, this is back to Exhibit 1. "He will testify concerning his own inspection of asbestos-containing materials in buildings, air monitoring in buildings, and asbestos levels both inside and outside of buildings.

A Fair enough.

Q And I assume -- again, you can correct me if I'm wrong -- that your testimony will be that the air samples found in buildings generally does not -- is not significant -- significantly or statistically different from those found outside of the building.

A It depends.

Q Depends on what?

A The building. If someone were to ask me about the Yale Art and Architecture Building, that was extraordinary. If you were to ask me about some of

Nicholson's studies with friable asbestos in buildings, that has a lower degree of consequence and hazard. If we were to discuss floor tiles in buildings, that's another level of, quote, hazard and risk. It depends.

Q Are you aware of the product that was in the Yale Art and Architecture Building? Are you aware that it was a Cafco, U.S. Mineral product?

A I think it was Cafco. Was that Cafco Blaze-Shield? Is that -- why am I asking you? Yeah, go ahead. This is your deposition.

Q Okay. So you're saying it depends on the building. So is there any general overall statement you can make about air levels or the -- well, about hazards in buildings in general in this country that you're going to offer as testimony?

A Well, that's one of the conclusions of the HEI report, that given all of the these factors and given all the measurements that we have in buildings, longitudinal measurements, and the measurements that we have in a range of experiences, a range of settings, there are different levels found. And these are associated with different risks, and the risks will vary among the occupants of buildings.

Q The general conclusion being that it's a -- what's the word I'm thinking of, term? --

case-by-case evaluation?

A Yes, I think that's fair, yeah.

Q Okay. Would it be unfair to say, well, because air sampling in buildings generally is low, therefore the air level in this building must also be low?

A No.

Q It's not -- what?

A It just doesn't make any sense to say that --

(Brief interruption.)

(Discussion off record.)

Q Again, back to Exhibit 1, "Dr. Langer will testify concerning microscopic techniques, proper analysis of air and bulk asbestos samples, and the appropriate measurements of asbestos fiber levels."

First of all is the threshold question. Have you reviewed any bulk or air samples that were analyzed in this case other than the ones you've analyzed --

A Provided.

Q -- by Hunter?

A No.

Q Are you aware of the techniques used by other experts in this case?

A Well, if I haven't seen it, then I'm unaware of

it.

Q I'm differentiating what you were told and actually reviewed --

A I haven't seen anything.

Q Somewhere in my notes I wanted to ask you, are you familiar with or do you know when the electron microscope was first available in the United States?

A For what purpose?

Q For any purpose.

A Well, there was an electron microscope in the United States in the 1930's.

Q All right. Okay. Do you know what it was used for at that time?

A No.

Q Was it a different electron microscope than the one that was used for the detection of asbestos fibers?

A Oh, of course.

Q Could it have detected asbestos fibers?

A The earliest reference that I know on the detection of asbestos is asbestos in the tissues of workers, which was published in Germany in 1941 by someone by the name of Kuhn, K-u-h-n. He wrote on the observations of asbestos fibers in the lungs of asbestos workers by ultra-microscopy. He used the

electron microscope.

Q And that was the first time that you're aware the electron microscopy was used on asbestos?

A There may be an earlier report. I'm thinking of the man's name, Ruska, R-u-s-k-a; he, of course, went on to win the Nobel prize.

Q Of course.

A Many, many years later. As an interesting aside, when he was granted -- he was given the Nobel prize for the development of the electron microscope, his only statement was, "What took them so long?" in the sense that there were many techniques that won, nobody else in medicine and physiology that proved -- were as -- were not as useful as the transmission electron microscope.

But anyway, yes, around 1940 people were looking at small materials including asbestos fibers.

Q Could they have differentiated asbestos fibers from other fibers at that time?

A They knew what the exposures were. Could they distinguish asbestos from other junk, let's say, at that time? No, probably not.

Q Why is that?

A Well, you need other diagnostics to establish unequivocally different kinds of fiber types, and that

would include the imaging of the diffracted electrons which scatter in patterns which are related to the crystal structure, and eventually you need chemistry. And the chemical techniques have only been developed over the last 20 years.

So the answer is, 50 years ago, it was very limited; 20 years ago, you could do a lot of these things that we do today.

Q In the 1940's, would the use of an electron microscope have been more helpful in terms of identifying asbestos concentrations than the other --

A Mr. Fox, that's a bad question. It's like saying if Leeuwenhoek had an electron microscope, could medicine have developed further in the study of infectious diseases? Yes, of course.

Q "Dr. Langer" -- this is back to Exhibit 1. "Dr. Langer will testify concerning threshold limit values, both currently and historically," and the sentence -- it says, "the EPA position on asbestos in buildings and threshold limit values, and the relation of low level asbestos exposure to various diseases including asbestosis, lung cancer, peritoneal mesothelioma, and pleural mesothelioma."

So let's start with the threshold limit values. Do you consider yourself an expert in the

historical development of threshold limit values?

A In the historical development?

Q Yeah.

A Well, if those are the unfortunate words which appear on that paper, no, I'm not part of the historical development of the TLV, no.

Q Are you familiar with TLV as it exists today?

A Yes. Well, it's not called TLV today but --

Q Is it PEL?

A Permissible exposure level, yes. There's no threshold, because some people don't think thresholds exist.

Q Okay. What relevance, if any -- well, withdrawn.

What relevance, if any, do the PEL's have to low-level exposures?

A They may have absolutely none.

Q Why is that?

A A permissible exposure level is a level in the workplace, and if the proposed level, OSHA standard, is 0.1 fiber, that may have no relevance to lower level exposures. Is that sufficiently obscured, do you think?

Q Sufficiently.

A Why don't you ask a different question. Let me see if I can answer it with some more light on the subject.

Q I don't think there is another question.

A All right.

Q Have you testified before a governmental agency in the past year?

A Yes.

Q And which one was that?

A The last year -- well, maybe I should change that. Let me modify that statement. I testified last year before OSHA.

Q On what issue was that?

A That was on whether or not non-asbestos cleavage fragments should be removed from the asbestos standard.

Q Okay. Just a non -- ask you about non-tremolite issues. Have you ever -- have you testified in the past on any issue that didn't involve cleavage versus asbestiform tremolite issues?

A No.

Q Have you ever testified regarding building exposures before any government body?

A This may have been an issue during the hearings on the Toxic Substance Act, but specifically buildings, no, I don't think so.

Q Have you authored any letters to the editor on the issue of building exposure to asbestos-containing products?

A I don't know. I'd have to look at my CV. I don't think so, other than the Stein article.

Q Have you corresponded with Dr. Mossman regarding the articles in Science and New England Journal of Medicine?

A I probably did.

Q What was the nature of that communication, if you recall?

A Well, I was interested in a lot of the interesting statements made in her papers, and I knew of the strengths and the weaknesses of that report. And she was being attacked on the basis of the report's weaknesses, and I wanted to respond and perhaps submit a letter to the editor of Science. But I did it too late, so they couldn't consider it. They wanted all the letters in at the same time.

Q Do you have a copy of the letter that you intended to send?

A I probably do.

Q Again, if you could consult with counsel, I'd request a copy of that. That would contain your evaluation of the Science article, the strengths and

weaknesses?

A Not really, no, no. I said I knew of the strengths and weaknesses, but this letter supported -- well, it was both that there was certain aspects of the report that may have not conveyed the amount of risk which may have existed for certain types of occupants of buildings, but that it was generally correct and that the -- based on these risk models, people in buildings couldn't possibly have the risks that were generated -- what a terrible answer.

In response to Brooke Mossman's letter, there was a letter by Nicholson and colleagues, and he gave a certain value, a certain number of people who were exposed to a certain fiber level in buildings. And he projected a risk of a certain number of people per hundred thousand.

And if you took his numbers and you extrapolated it back upward rather than downward, risk, people, extrapolated downward -- I extrapolated upward -- and if you use Nicholson's figures then for every hundred thousand insulation workers, you would have 60,000 mesothelioma deaths. And that was really ignorant. That was one of my concerns that Nicholson's response was -- I didn't find it very credible, and I found it flawed in its reasoning.

That was the thrust of my letter. It was in support of Mossman and colleagues, who I thought did a reasonable job and I thought conveyed a new -- a different sense of the risk of asbestos in buildings, which I think more properly reflected the basic data.

Q All right. Do you have any problems with providing a copy of the letter you intended to send to Science?

A No, not at all. In fact, the letter was sent to Science but they. They said it was too late to be considered.

Q Do you have any communications with Dr. Mossmann other than -- written communications with her?

A No, I think that we chat on the phone and we do have communications, but these are faxes concerned with the Health Effects Institute and letters concerning the Anaheim meeting of the American Thoracic Society that has nothing to do with anything other than that.

Q Next paragraph in Exhibit 1 says, "Dr. Langer will testify concerning proper responses to asbestos in buildings including, but not limited to, the necessity of removal, the advisability of removal, and operations and maintenance of asbestos in buildings."

Other than what we've already discussed as

an issue, are there any other matters that you'll be able to testify to as an expert?

A I don't know. Ask me. It's kind of broad, isn't it?

Q Uh-hmm. Let me ask you this, because I think in the same article we just discussed --

(Discussion off record.)

Q Okay. Let me go on to the next paragraph, because I think unless I'm missing something, we've covered your general --

A Well, there's not much more to the asbestos field, I'll tell you.

Q At least as -- in terms of removal, can you tell me, let's say, over the past year, how many instances that you had -- where people have called you up and asked you your opinion of what to do with an asbestos-containing building product that was not related to litigation?

A Well, I serve as the asbestos -- in-house asbestos expert out on the Brooklyn College campus. I mean, they're always bringing me over samples, because their workers are about to embark on some projects where they want to know whether a certain material contains asbestos. I do that all the time.

Q Isn't making recommendations regarding

what to do with material an issue that's beyond your expertise?

A No. What do you mean what to do? First of all, you make recommendations. It's like policy in the United States. Who makes policy for the Environmental Protection Agency?

Q Okay --

A Some guy who sits in an office somewhere?

MR. BROWNSON: Wait a minute. Okay.

A You're saying, Do you make recommendations? Sure, this material contains asbestos. Your workers have to follow these guidelines, have to wear respirators, have to do this, have to do that, and you have to dispose of this material according to the guidelines set forth by the Environmental Protection Agency. Of course.

Q But there are buildings where -- where it's a judgment call. Correct?

A That's their call.

Q Okay. But do you believe you're an expert in making a recommendation as to what, if anything, should be done with -- to asbestos-containing building products in place?

MR. BROWNSON: Wait a minute. You just asked that question, and he just answered it.

You know, you're asking the exact same question again.

Q I don't know if you -- I know you gave an answer. I'm not sure if it was the answer --

A I'm just sitting here wondering what it is you're really asking. You're asking two levels of questions.

Q I understand you're an expert in the biological --

A I understand that.

Q -- effects, and you analyze tissue --

A Yeah, you can go up and speak to Irving Selikoff and he'll tell you to rip it out, and you'll say he's a great authority figure in asbestos --

MR. BROWNSON: Wait a minute. Wait for a question here.

Q Notwithstanding Dr. Selikoff or anyone else, I'm asking you if you believe that you have sufficient expertise in order to offer an opinion about what should be done with -- with building products that contain asbestos in place.

A Right. It depends on all of the factors we've been discussing thus far. Depends on all of those factors.

Q Well, what, the recommendation depends on

those things --

A Yeah, you don't have to be --

MR. BROWNSON: Wait. Wait. The question you just asked has already been answered. And so --

A It depends --

MR. BROWNSON: It's been asked and answered.

Q Are there situations where you would not have sufficient expertise to render an opinion? Could you give me an example of what that might be?

A Well, someone calls from Cincinnati, Ohio, and says, I have a building; it has asbestos-containing materials in it. Should I take it out?

And I'll answer, How do you know there's asbestos there? In what product? Where are these products? What's the population of the building? And if they don't understand all that, then I'll say, Why don't you get someone who's an on-site engineer or someone who's in the asbestos abatement business and have them do an on-site evaluation for you. You need someone to tell you what's in the building and what the design of the building is and all of these other factors to render some reasonable opinion. Do I back off on many of these and say, You have to get somebody

to look at these problems for you? Yes, of course.

Q Once you are -- if one comes to you and says I know -- I've had analyses done. I know that there's asbestos in my sprayed-on fireproofing, and it's in good condition --

A Right.

Q -- and there's minimal accessibility. The air levels are low.

A Right. How low are they?

Q They're .0001.

A Okay.

Q -- do you feel that you have the expertise at that point to be able to tell them what, if anything, they should do with the building products?

A Yeah, I have as much expertise than anyone else in the world to tell them under those conditions what to do in that particular instance.

Q More than an industrial hygienist or --

A There may be industrial hygienists who know a great deal about mineral fiber toxicity and characteristics of fibers and can review the world literature on the cohort analyses, knows something about some of the other problems associated with cohort data and analysis, and who understand the asbestos problem better than I do. And that person would be

maybe more qualified, but I think given all of the facets to the problem, there are areas where I think I could render a reasonable, rational opinion as to what to do in those -- in that particular instance, yes.

Q Is there anybody that you're aware of that has more expertise than you in the biological effects of asbestos fibers?

A Sure.

Q And who would that be?

A Arnie Brody down at the NIEHS. He certainly knows more about macrophage function and fibrosis. Ron Crystal down at the NIH, he's certainly studied more on the neutrophils and exposure to various agents. Paul Nettesheim has done more in the work with tracheal explants. Brooke Mossman has done far more in the mechanisms of carcinogenesis. Chris Wagner has done more experimental work with laboratory animals. J.M.D. Davis has done more work with experimental animals.

It goes on and on. Of course, there are others in the world that are more experienced and expertised than I am. I acknowledge that openly, gladly.

Q "Dr." -- again, back to Exhibit 1, "Dr. Langer will testify concerning the risks to building occupants from asbestos, the lack of epidemiological studies with respect to such risks, and the nature and

extent of such risks based upon fiber levels."

Do you have an opinion about the risks to building occupants to asbestos?

A It depends.

Q It depends on all the factors we've discussed.

A All the factors we've discussed and the nature of the occupant.

Q You mean if they're a child or an adult?

A Children have greater risks than -- let's say mesothelioma than a working adult.

Q The reason for that is?

A Longevity, they work longer. The risk of mesothelioma is related from time, exposure raised to some expediential power.

Q Is the fact that children regularly occupy a given building -- is that a factor that you would consider in determining whether to remove a material or not?

MR. BROWNSON: Objection.

A Yes.

(Discussion off record.)

Q It says here "...the lack of epidemiological studies with respect to such risks...." Is that your opinion that there's a lack of

epidemiological studies regarding the risks to building occupants?

A Well, there are some studies, but they've never been published.

Q What happened to them?

A I don't know. Why don't you ask Nicholson?

Q What specifically are you referring to?

A The New Jersey schoolteachers study.

Q All right. That's the one he hasn't published yet?

A That's right. That's the one that everyone's --

Q You think -- yeah.

A I'm sorry.

Q That's the one that everyone -- I interrupted you. I'm sorry.

That's the one that everyone is?

A Interested in. Where are those data? Why aren't they forthcoming?

Q You think it's because there's no --

A If they were positive, you would have heard about it, for sure.

Q Is there a danger in evaluating risks to building occupants, epidemiologically due to the fact that the latency period has not run yet from any of the people exposed?

A That's only one of the problems.

Q What are the other problems?

A Detection. Let's assume for a moment that there's a building level in which we use the linear model for risk assessment. We embrace the linear model. All fibers are equal and short fibers are as biologically toxic as long ones. And the risk to a population of building occupants is one in a million. Of those million people, 250,000 are going to die of malignancies. That's just the nature of society now, unless cigarette smoking and alcohol consumption goes down.

Of those 250,000, you're asking an epidemiologist to establish a risk in which the increased natural background is 250,000 and the other risk, the new risk, is 250,000 one. You're asking him to distinguish amongst a cohort of people a difference of one mesothelioma -- you'd have to follow everyone in the United States to extinction, and you might be able to resolve a risk to building occupants, maybe. It's an epidemiological study with the current techniques which cannot be done.

Q Do you know how many mesothelioma cases there are in this country in a given year?

A About 2,000.

Q About 2,000?
A 2200 or something.
Q Per year or --
A Per year.
Q Have they been increasing or decreasing as the years go by?
A Depends on whether you're a male or a female.
Q For males it has been increasing?
A That's right.
Q And for females decreasing?
A Females remains about the same.
Q I'm sorry?
A Remains about the same.
Q Females remains about the same?
A Since these data have been scrutinized.
Q Okay. And do you rely on that fact to make any conclusion -- to draw any conclusions regarding the source of the mesothelioma?
A What do you mean by "the source"?
Q What's the significance of the fact that female mesothelioma experience has remained --
A What's the general consensus?
Q I'm sorry?
A What is the consensus among my peers?
Q Do you have an opinion as to --

A All right. Let me tell you what my opinion is. Probably the environmental exposures and the building exposures have not increased over the past number of years, and that the female mesotheliomas probably reflect a background in that mesothelioma is a human tumor and that there's a natural incidence of all of the tumors that we see.

In other words, there are people who develop lung cancer who are not cigarette smokers. It's just the normal background incidence. Or people who develop laryngeal tumors without drinking alcohol. There's just a normal background incidence. If it's a human cell, there's a human -- there is some background incidence of malignancy. That's just the nature of biology.

Q Just so I'm clear, because you're an expert and I'm not, --

A Please.

Q -- are you saying that mesothelioma can occur --

A Spontaneously.

Q Spontaneously.

A Yes.

Q Out of the 2200 or so mesotheliomas experienced in this country --

A Right --

Q -- in a year, in a given year, how many of them have known asbestos exposure?

A That's interesting. Maybe half. "Known," established you mean?

Q Uh-hmm.

A Maybe about half. I'm just giving you a rough ballpark figure.

Q Again, in a rough ball park scenario, approximately 1100 people in this country contract mesothelioma in a given year, and there's no way -- nobody has established their exposure to asbestos?

A That's right.

Q And is it your opinion that each and every one of these -- how do you break down these 1100 unknowns in terms of what you would expect in terms of the source of their mesothelioma? "Source," I mean causation.

A Well, No. 1, there are -- there are many agents that produce human mesothelioma. Many agents, we said asbestos fibers of many varieties produce mesothelioma. You mentioned some fibrous zeolite mineral which produced mesothelioma. That's erionite.

We know that there are cases of peritoneal mesothelioma in Germany following the use of a

diagnostic radiographic material called Thorotrast. We know there have been reports of malignancies, including pleural mesothelioma, after mid-line radiation for the treatment of Wilm's tumors -- Wilm's tumors in children and that there are purportedly other agents which produce human mesothelioma.

People talk about isoniazid in the first trimester of pregnancy producing pediatric mesothelioma. I mean, there are a number of these things.

Q How many established?

A How many --

Q Causes --

A How many established? Asbestos, erionite, Thorotrast, radiation. Four.

Q Radiation in that particular use or radiation generally?

A Radiation which is therapeutic radiation. Talking about a lot of rads to the --

Q A lot of?

A Rads, r-a-d-s, units of radiation. Given the numbers of mesotheliomas in the country, there are about 180 female mesotheliomas that have remarkably constant. We think that that's background.

Now we think that if you take the male

mesotheliomas, they -- if males and females had the same genetic makeup of their mesothelial cells, then the number of tumors in males should be approximately the same. So let's round this out. There are about 360 mesotheliomas a year. That may be the natural background instance.

If you take the residual, these are probably related to asbestos, probably related to asbestos. But asbestos exposure is only established in a small proportion of those people, but we think they're all exposed to asbestos, in the workplace or bystander exposure or environmentally in some instances, like downwind from a plant or something, something like that.

Q Is there any -- other than speculation, is there any scientific support for the notion that mesothelioma can occur spontaneously?

A Well, there are people who die with mesothelioma without any minerals in their lungs. Let that be a lesson to all of us. I've even analyzed a few.

Q In their lungs --

A That's right.

Q -- none have been identified --

A Have I looked -- yeah, right. Right, right, right.

Q And how many cases of that have you been involved in?

A Just a few. In fact, I was just involved in a case. I did a tissue burden study for someone, a person with a pleural mesothelioma who had no mineral -- no asbestos minerals in the parenchymal tissues.

Q Are you familiar with recent studies that have been done on asbestos in the lungs of children, specifically a study --

A Vic Roggli study, R-o-g-g-l-i, Victor Roggli. Was he the person?

Q The one I'm thinking of is the one that was done by a Dr. Haque, H-a-q-u-e. Evita is her first name, I think, in Texas?

A She works with Ron Dodson. That's D-o-d-s-o-n.

Q That's the University of Texas?

A East Texas. That's right, right, right.

Q Are you familiar with any of those data?

A I think that those data were presented at a meeting in Albuquerque, of all places; you're right.

Q Do you recall generally what the -- what they found?

A Yeah, I have read that paper, and I just don't know what to make of it. I can't even comment on it.

And I wish we had the paper here in front of us.

Q Do you recall whether or not at the meeting they discussed their finding of asbestos fibers in a stillborn child?

A That's right, yes. Correct.

Q And I think it's -- I think necessarily then the asbestos fiber would have had to penetrate the placenta.

A Placental barrier. That's right.

Q Placental barrier.

A Right. Right. All correct thus far.

Q Does that kind of -- well, withdrawn. If you assume that to be true that --

A You mean the findings.

Q Right.

A Do I assume the findings --

MR. BROWNSON: Wait, wait. Just wait for the question.

A Yes, please.

Q Is there anything in your experience which would indicate that asbestos fibers cannot penetrate the placenta -- placental barrier?

A We looked at this problem years ago and years ago, and I didn't find any -- that doesn't mean it's not there. Is there any -- I suppose -- I suppose it

could. It's awfully small. Smaller than a virus.

Q Has anybody ever studied children that die from sudden infant death syndrome to determine whether or not there are asbestos fibers in the children's bodies?

A It's possible. Has anyone ever studied it? That's the question --

MR. BROWNSON: Listen to the question.

Q Yeah, if you know.

A Unless Dodson did. Some of those cases may have been sudden death syndrome.

Q Assuming that is true, that asbestos fibers are capable of infiltrating the placental barrier, --

A Yes.

Q -- would that raise a concern in your mind regarding the presence of asbestos in building -- in buildings?

A No.

Q Why is that?

A Because the levels are so small.

Q Well, do you know -- do you know the biological effects of the inhalation -- well, withdrawn.

Do you know the impact of the entry of

asbestos fibers in -- within the placental barrier --
A No.
Q -- what that would do to a child in vitro -- not in vitro.
A -- in utero.
Q In utero. Thank you.
A No.
Q All right. The last paragraph here is, "Dr. Langer" -- Exhibit 1, "Dr. Langer will testify concerning the state of the art with respect to low-level exposure to asbestos and risks of different asbestos fiber types."
Is there a state of the art of -- regarding low-level exposure that you're aware of? I mean, I don't know what that means. Maybe you can tell me.
A State of the art with low level. There's a model that's followed by many people, and based on what happens in the occupational setting, one extrapolates back to low-level exposures.
Q Let me stop you there. I want to ask you about that.
A Please.
Q I want to ask you about the extrapolation --
A Please.

Q -- how valid an extrapolation is from exposures in industrial settings to low-level exposures. And the threshold question is, is it valid to extrapolate from high-level exposures to low-level exposures in your opinion regarding asbestos?

A What do I think?

Q What do you think?

A Well, there are no data to support it. I think there are a lot of interesting pieces of data which suggest that there is a threshold. However, a linear model is the most protective, and based on the fact that it's most protective, I'll be very happy to use that to predict risks in buildings.

Q The linear --

A It is the worst-case scenario.

Q The linear model has as its fundamental underpinning the fact that there's no threshold below which there is --

A No effect.

Q -- no effect.

A Yes, that's correct.

Q Now, do you -- are you saying that you accept that for the purposes of argument, --

A Yes.

Q -- or do you accept that as -- as a

mineralogist?

A You're good, Mr. Fox. You're very good.

As a mineralogist -- well, look, I consider myself a physical scientist, and I like to look at the data and the relationship of different variables. The fact is that no one has any data that this really happens.

In fact, the bulk of the data suggests the linear model's wrong. And the bulk of the data suggests at very high levels of exposure, there's a completely different biological process that takes over. And for that matter, there are data which suggests at very low levels, there are other biological processes which it changed the effect.

We're saying no, it's going to be exactly the same all the way through here. When we embrace the linear model, we say the excursions experienced by insulation workers have no relevance. The guys who worked in shipyards, they're exposed to 200 fibers per ml in the hull of the ship, but we're not going to say that. We're going to take the time-weighted average of 10 fibers per ml and use that for the risk.

I think that these excursions were enormously important. And then down here, as you go down this curve, so we say, okay, we're going to use a

time-weighted average here and down here where the -- this is overload phenomenon, so the microphages behave differently. Down here your body deals with these particles differently and effectively and very well, but we're saying no, there has to be some -- some mechanism whereby the -- the untoward events manifest themselves.

There are absolutely no data to support this, but we say, okay, let's say for every unit of exposure, there's a unit of risk. It's the most protective model. Everything else points to a sigmoid model, some quadratic relationship between response and dose.

Q Aren't the people that are contracting mesothelioma with no known exposure -- aren't they evidence of the fact that building occupants -- well, that either passersby or building occupants are getting this disease from low levels? Aren't they the best evidence?

A No, not at all. There are people without no -- without known exposure to asbestos who are significantly exposed. You know, it's the old business of people who are household members of asbestos workers.

These people -- for example, the UNARCO plant that was studied by Anderson and colleagues, also from

Mount Sinai, as you know, that 1 percent mesothelioma mortality occurred amongst people who were in households of workers who never changed their clothes at the plant, who came home with dust on their clothes. And these people at home could have been exposed to substantial amounts of asbestos. In the changing rooms of shipyards, workers are exposed to 5 fibers per ml of air. That's a substantial amount of exposure. That's 50 times the proposed OSHA standard today.

Q Has anybody ever taken a look at a given mesothelioma population in this country over a given period of time, taken all of them -- all the reported cases and looked at them in an epidemiological manner to -- work histories and X-rays and what have you, and come to any conclusions?

A No.

Q Why? Is there a reason why no one has done this?

A Yeah, because people aren't funded to do it. The only study that came close was the 3,000 consecutive autopsy studies in New York City. That was a brilliantly planned and well-executed study.

Q By?

A By Mount Sinai, Irving Selikoff. I certainly participated in that; Cuyler Hammond designed it, in

which 3,000 people from three hospitals in New York City -- Mount Sinai and two affiliates -- were examined between 1966 and 1968, and a complete autopsy protocol, complete pathological materials, complete clinical histories and a complete occupational history and personal history, like cigarette smoking, were obtained from the next of kin.

And that was 3,000, and we thought if something was going on that that would be sufficiently sensitive to indicate whether or not asbestos was a problem in the general population. But it wasn't.

Those with asbestos bodies in their pulmonary tissues tended to be people who were occupationally exposed. There were 63 people who had greater than 15 asbestos bodies per unit volume -- 63 of 3,000 -- 2 percent. These 63 people had more than a certain number of asbestos bodies per unit of massive tissue.

Fifty-nine of them were males, three females, and virtually every single one had an exposure which was consistent with an occupational exposure. There were carpenters, electricians, construction workers, shipyard workers, rubber workers, insulation workers. And the rest went out. They were either high or they were low.

They went something like the very high

occurrences were insulation workers, followed by shipyard workers, followed by construction workers. I know because I then pulled out another 300 cases, and I examined different population groups for the presence of these objects.

Q What percentage of the 3,000 were employed in jobs that would likely have resulted in some asbestos exposure?

A You know, that figure I don't have. Are those data available? I'm not sure, because I only have a select number of cases that I pulled out specifically knowing the trades. Isn't that interesting? Where are those data? I may have them. Isn't that interesting.

Q Has anybody followed up on those 3,000 people?

MR. BROWNSON: How can they follow up on them? They're all dead.

Q They were all dead --

A They're all dead, but has anyone analyzed the data that they should have analyzed?

Q Is that the question I'm asking?

A You are, and it's a good one. And you're right; it hasn't been done.

Q Is that something you're going to do?

A For 300 of these cases, yes.

MR. BROWNSON: By September 23.

THE WITNESS: No, no.

Q You're intending to do that?

A 300 of a subset of populations.

Q Picked randomly?

A No, they were consciously selected.

Q By?

A Me. It was a completely different study. I was interested in whether or not brake maintenance and repair workers had more asbestos in their lungs than others.

Q And the result being?

A Not really, no.

Q Some but not significant; is that --

A That's -- something like that. And the different populations, the percent dying with malignancies, the --

Q Do you know how much exposure somebody has to have to asbestos in order to produce disease of any kind?

A What do you mean by that?

Q I'll say mesothelioma. Do you know how much asbestos somebody has to breathe in in order to produce mesothelioma?

A You mean fiber per gram of tissue? Greater than

5 microns in length of a specific fiber type?

Q If you want to start with that. Are fibers shorter than 5 microns not dangerous, not hazardous?

A Depends on the fiber type.

Q Of chrysotile?

A I don't think it's terribly important.

Q Of amosite?

A May be more important.

Q Do you know how many fibers have to be inhaled to produce a disease?

A Depends on the disease. Asbestosis a lot, mesothelioma less.

Q Do you know how much?

A I don't know that.

Q Have you at any time in your experience for Mount Sinai on ever being privy to or given any documents regarding -- or anything regarding manufacturers' knowledge of the hazards?

A No.

Q Did you ever read "Outrageous Misconduct" during the course of your employment at Mount Sinai?

A You mean Brodeur's book?

Q Yes.

A It's a very interesting article from several

standpoints.

Q Which standpoints?

A My standpoint's from looking at the way someone not in the field perceives the field. It's fascinating.

Q Looking --

A "Expendable Americans" and "Outrageous" -- they're both very interesting books.

Q Which is the other one?

A "Expendable Americans." That was the first series in the New Yorker Magazine.

Q How are Brodeur's articles interesting to you as a mineralogist?

MR. BROWNSON: Just to clarify. How are Brodeur's articles relevant to this? Is there some --

A Let's make it short.

MR. BROWNSON: I'm just curious, I mean.

Q How are they relevant?

MR. BROWNSON: Are we wandering here?

MR. FOX: I'm wondering, given the fact that there's some indication here of his testimony regarding low-level exposure in the state of the art, whether or not he's aware of what the industry knew as opposed to what was

known medically or scientifically at that time.

MR. BROWNSON: Well, there will be evidence in this case what Asbestospray knew, and he's Asbestospray's expert. I think what Paul Brodeur might be writing is of no relevance to this --

MR. FOX: I'm not going to spend a lot of time on it. I'm just curious, since he made the point, in what respects it's interesting.

A Well, that people look at the same article or people look at the same letter, people look at the same data, come to different conclusions.

Q In other words, you found the documents -- you found him overstating the case in the documents we cited?

A No, he's not overstating the case. He's stating the case as he perceives it. It's perfectly reasonable. It's just like reading Barry Castleman, and he's looking at the case as he perceives it. You read Bob Murray; he will look at the case as he perceives it. If you look at the recent exchange in the -- it is the Lancet again; there's a section called Forum, and there's an exchange between Barry Castleman and Bob Murray.

The same basic issue and people perceive these

issues differently because they have different experiences and they have different insights. That's the nature of everything.

Q Just want to show you this to refresh your recollection. Tell me if it's accurate. It's the Pennock case.

A Herb Pennock. Pitched for the Yankees. No, this is who?

Q Wilmer.

A Wilmer. What year is this?

Q 1989. It's your testimony on June 23rd, 1989, at trial -- and this is from the attorney that was --

A 1989 I was involved in this trial?

Q Yeah.

A Is it Pennock?

Q Pennock.

A Or Saul Didner?

Q Pennock.

A Pennock. And this is testimony at trial?

Q At trial.

A Where was this trial?

Q Wisconsin, Milwaukee County.

A I was never there. Milwaukee -- oh, yes, I was, of course.

Q If you weren't there, it would be --
A It'd be --
Q Someone played quite a joke on me if you --
A That's right. Yeah, I did go there.
Q Okay. I just want to ask this because of the reference to state of the art in the statement --
A Wait a minute. Now, counsel representing defense -- I represented the defense there.
Q That's correct.
A And that was -- oh, the great fox from Cleveland. What's his name?
Q Who represented you or the --
A Yeah, the -- the defense, who was that? See, I correlate --
Q Hart?
A No, no.
Q Murphy?
A That's it. Yes. Okay. And it was something about fiber type in this case, was very interesting. Go ahead.
Q The question was asked here -- and I'll show you this in a second.
A Please.
Q Okay. -- "And, Doctor, are you an expert

in the state-of-the-art regarding asbestos-related diseases" --

A Okay.

Q -- "and its historical involvement?"

And your answer was, "No."

A Isn't that interesting.

Q I'll show it to you --

A That's all right. Let me see what the content --

Q Yeah, go ahead.

A -- the context...

(Witness reviews document.)

(Discussion off record.)

A Well, I guess --

MR. BROWNSON: Wait for a question --

A The way I understood this, I answered --

MR. BROWNSON: Just wait for a question.

Q I'm just asking if what you said is accurate or not.

A Well, it's written there, and that's what I answered.

Q Is it accurate?

A I think I know something about the state of the art, I mean, as I understand the state of the art. I mean, I've read the literature, and I have as good an

understanding of state of the art as most people, certainly in the last 25 years since I've been developing the field. I certainly know what the development of the state of the art is over 25 years.

Q Well, if you said you weren't an expert in 1989, did you do anything between 1989 to 1991 to make you a state-of-the-art expert?

A Well, there it is in the testimony. I'm not going to refute my own testimony. And whatever I understood him asking me, I answered it no, and I answered no. What can I tell you?

Q Okay. You made a statement -- and again, I'll show you anything you want to see, but I think you won't disagree with me, but you were talking about miners -- the exposure to miners, and you said that their exposure wasn't that great because the fact that the miners -- the asbestos -- the rocks, I guess, were wet during the process, and the real problem was with the millers.

A That's true. That's correct.

Q And I was -- I wanted to ask you about that because -- did anybody ever quantify the exposure to miners in the process of processing asbestos from --

A You can generate these data and find these data in the original -- some of the papers of Gibbs, Graham

Gibbs up in Canada, and Gibbs and LaChance and the -- the work of duToit in Africa. It's the same, if the mine is an open pit as chrysotile mines are in most of the workings in Canada, there the exposures tend to be very low.

Q Was there a -- any evaluation of -- well, withdrawn.

Were any of the miners -- did any of the miners contract asbestos-related diseases?

MR. BROWNSON: Well, I'm going to object to the form of that question as vague. What are we talking about here? Any asbestos miners?

Q Are you aware of asbestos miners contracting --

MR. BROWNSON: Okay.

Q -- asbestos-related disease?

A This is the problem. The problem is McDonald never separated the workers. He just called them miners and millers. Some people worked in the mine. If he didn't want to, they went to the mills. So he never separated out those who only worked in the mines and those who only worked in the mills.

Q Are you aware of disease in people who only worked in the mines, asbestos-related disease?

A In Canada.

Q In Canada.
A No.
Q It's your understanding a lot of individuals who worked in the mills also worked in the mines; at times they switched off?
A Yes, that's my understanding. That generic mines and mills is just putting everyone in the same basket. It's not a good way of looking at it, but that's the nature of the design.
Q Would you consider the exposure of the miners to be a low-level exposure?
A No. Lower than the mills.
Q But not lower than what you might find in terms of buildings?
A Of buildings? Oh, absolutely not.
(Discussion off record.)
(Brief recess.)
Q Let me ask you about this. There's an article in the New York Times Magazine --
A An unimpeachable source.
Q Yeah, coming from someone who reads the New York Post.
(Discussion off record.)
Q It was published on November 20th, 1990, in the magazine section.

A What does it say?

Q Let me just tell you what it says about you here and I'm not going to --

A What it says about me?

Q Yeah.

A You mean it says something about me?

Q You haven't read this article?

A No, of course not.

Q Come on.

A All right. Maybe I've stretched the truth. Go ahead.

Q It says here that you have "...a particular reason for enjoying the current dust-up," as they put it. They say that you were let go by Mount Sinai after a 20-year collaboration with Selikoff, and they quote you as saying, "I'm not saying these people" -- this is referring to your conversations with Brooke Mossman. -- "I'm not saying these people were virgins in a whorehouse," it says you said, "but I don't think they really knew what they were getting into. I said to Brooke, 'You're attacking the icons, the gods themselves.'"

Now, is that a quote that you made?

A No.

Q No? Do you recall what exactly you said?

A Yes.

Q Tell me what you said.

A I said that they approached this problem as virgins in a brothel.

Q I'm sorry.

A And the -- the context pretty much followed that, indeed, they were attacking the icons, a power structure. That's right.

Q Is that how you view this issue --

A Yes.

Q -- as --

A Absolutely.

Q You think it's beyond science and it's in --

A Most of it. I mean, some of it is in science, of course. Every great debate in this arena has a foundation or part of its foundation in science, true.

Q Well, if it's not all in science, where does that leave the building owner in terms of what to do to protect the people in the building?

A That's another issue. That has -- that's a completely different issue.

Q Why is it a different issue if -- if everything is ensconced in politics, where does that leave the building owner?

MR. BROWNSON: I'm going to object to the form of that question.

A You're asking me where that leaves the building owner. Well, I wish I owned a building, and I would tell you how I feel about it personally. I cannot speak for building owners.

Q It says here, "Langer's hot-and-cold mix of outrage and sarcasm might make him science's answer to Lenny Bruce."

A I'm not that talented.

Q "In the asbestos drama, he plays a Luciferian role. Having been cast out of Mount Sinai, he has since done work on fiber type and mesothelioma at Brooklyn College that the Mossman group has used to buttress his argument." It says here, you contend that "the Mount Sinai group that is going to hell, taking the path paved with good intentions. 'They simply cannot allow certain data to interfere with their public-health policy positions,' he says." You describe "Selikoff as 'a great man' and 'a hero, when there was something to be a hero about.'"

A But that's a --

Q Are those all statements that you made?

A Well, more or less, you know, general context. I can be more articulate than that.

Q Can you? Why don't you tell me?

MR. BROWNSON: I'm going to object to that question. Don't answer it.

Q Do you feel that the Mount Sinai group is headed to hell on the road -- path paved with good intentions?

A I think they're wrong in many of their judgments. I think that their science is weak. I think that they have extrapolated beyond the database. I think they've misled the Government of the United States.

I think Nicholson himself has caused Americans billions of dollars based on a supposition and a model which has no relevance to the real world, or little relevance.

Q Even the EPA under Ann Gorsuch didn't accept -- didn't move from the no-threshold model. Are you suggesting that the EP -- that the Government under Ronald Reagan and George Bush has been misled on an environmental issue by Bill Nicholson?

MR. BROWNSON: Well, I'm going to object to the form of the question. He answer -- he answered your previous question. If you're now trying to characterize his testimony some other way --

MR. FOX: I'm justing trying to ask him if he really thinks the EPA has been --

Q Given their change over the past 11 years or so, whether or not you really think they've been misled by the people of Mount Sinai.

A First and foremost, we have begun this discussion with an article written by someone on the New York Times staff, whatever he is or whatever he purports to be.

Q Right.

A And there are certain quotations that you've made which relate to some specific problem area. Now, we're talking about the Environmental Protection in general, Environmental Protection Agency. And we're talking about policy, and we're talking about directors. We're talking about administrations. We're really going very, very far.

What is it you'd like to talk about, what specific issue? I'd be more than happy to address my thoughts and my perceptions, my experience, and share them with you. That would be my very great pleasure.

You want me to talk about the Environmental Protection Agency, I can tell you what's good about it. I can tell you what's bad about it. I can tell you about the director, and I can tell you about a cadre of

middle management people who do what in hell they want to do.

Don't tell me that the mouthpiece for a beer magnate knew anything about low-level risk assessment. It's just not true. It's not so. She was never a scientist. She wasn't then, and she isn't now. Ann Gorsuch, she didn't have any idea as to what was going on with the basic science issues of that agency. That's ridiculous. Of course not.

Q Do you know John Toddhunter?

MR. BROWNSON: Wait a minute. Now, what's the question?

Q Do you know who John Toddhunter is?

A No.

Q Okay. You disagree with the total ban on all forms of asbestos?

A Yes.

Q What reason?

A Many reasons. It's part of a public docket.

Q What particular forms of asbestos do you think should be permitted?

A There are certain forms -- certain uses of chrysotile asbestos that I thought were reasonable and need not be banned. I thought it was unwise to remove chrysotile asbestos from composite friction pads,

especially in retrofitted automobiles. I believe that asbestos chrysotile without crocidolite would be a useful product with very little risk to humanity, and I thought asbestos in materials like floor tiles would be very little risk to humanity.

Q Do you agree with the ban on asbestos in building-surface treatment?

MR. BROWNSON: Well, I'm going to object to that question. Whether or not Dr. Langer agrees with that ban or not, we've now gone too far. That ban has been in effect since 1973. It remains in effect. There's no prospect it's going to be changed, so that question has nothing to do with any issue in this case, and I'm going to instruct him not to answer.

Q Well, if asked, would you -- would you recommend that asbestos be allowed to be used in building products in the future?

MR. BROWNSON: Well --

A What products? What fiber?

Q Acoustical plaster chrysotile.

MR. BROWNSON: I have the same objection. It's not being used. It's not being allowed to be used, and I see absolutely no possible bearing that question could have on this case.

MR. FOX: Bearing is if he thinks -- goes to the hazards, I guess.

A It's possible that I would make the recommendation that it would be used. It's possible I'd make the recommendation it wouldn't. It depends on all the factors we've discussed today.

Q All right. Do you know what grade of asbestos fiber was used in surface-treatment materials?

A It depends. If it was an asbestos cement, it's probably a 4T. If it's --

MR. BROWNSON: Well --

A Well, whatever.

Q Sprayed fireproofing acoustical plaster?

A Depends.

Q To what extent can animal studies on -- using asbestos be extrapolated to human activity or human exposure?

A Some tests can be extrapolated.

Q Do you intend to offer any testimony on the work done at Saranac Laboratories?

A I don't know. Is someone going to ask me about it?

Q I don't know if they are. I'd like to ask you about it.

MR. BROWNSON: Well, Asbestospray's not,

so you can move on.

MR. FOX: Okay.

MR. BROWNSON: Asbestospray didn't exist when that work was done.

A I guess the answer's no.

Q Is it true that animal experiments conducted internationally have refuted the concept that chrysotile is not capable of producing mesothelioma?

A Not really.

Q Not really?

A Not really. In humans you're talking about?

Q No, in --

A Can you use those data to extrapolate to humans?

Q That's not the question.

A I'm sorry. I didn't hear it then. Please ask that question again.

Q Is it true animal experiments refute the concept that chrysotile is not capable of producing mesothelioma in the --

A Oh, yes, yes, yes. I'm sorry. Yes, you're absolutely right.

Q And isn't it also true that, at least in the animal studies, chrysotile is shown to be as potent a carcinogen as crocidolite?

A Yes.

Q I'm just -- I'm reading from your --
A Harvard paper.
Q -- Harvard paper.
A Yes.
Q Where you talk about thermally aged insulation?
A Yes.
Q What do you mean by "thermally aged insulation"?
A That would be lagging or insulation material that would have been in place for a long period of time subjected to high temperatures.
Q But it's based on the longevity of it, or is it based on the heat exposure --
A Both.
Q Both. Is there a similar concept in terms of surface-treatment materials that contain asbestos?
A No, unless there's surface applications on boilers.
Q Boilers. Okay. Does the fact that building occupants where asbestos-containing materials are housed -- does the fact that they may smoke -- does that increase their risk in that building?
A Well, the fact they smoke increases their risk of many diseases.

Q Synergistically with asbestos I am asking.
A I don't know that. That's a very interesting question. Synergy is usually assoicated with high levels of exposure, and whether this is important for the low level, we assume it to be so, but there's no proof that that exists. Very interesting, yeah.
Q There's one comment here I want to ask you about.
A I'm glad someone read that paper.
Q You make a comment -- if I'm taking this out of context, --
A Please.
Q -- I'm confident you'll let my know.
A I will.
Q On page 114 you say, "The use of data obtained on insulation workers may be appropriate for building maintenance personnel only."
A That's right.
Q Does that mean that the experience of the insulation workers is somewhat comparable to the experience of --
A No.
Q Well, tell me what the relationship is.
A It means given the -- if you read that paper, I say different fibers seem to have different biological

potentials. And if you're dealing with risk in buildings, if you have someone who manipulates the materials that insulation workers manipulate, like a maintenance worker or an engineer may manipulate in a repair job, and may be exposed to the same fibers that insulation workers are exposed to, that you can extrapolate based on the insulation worker experience and their levels, to this person's experience and his levels because it's the same product.

But the guy upstairs on the third floor -- this is happening in the basement; that's one environment. But someone up on the 3rd floor or the 30th floor in an office, their experience is based on other fibers.

Q If I understand you correctly -- again, correct me if I'm wrong -- it's scientifically sound, therefore, to extrapolate from the experience of insulation workers, the experience of building maintenance personnel who work with the same material.

A Yes, I think that that's reasonable, given the model and the acceptance of the model, a linear model, no threshold.

Q But it's not appropriate if you don't accept the linear model?

A That's right.

Q But do you accept the linear model?

A Do I -- do I accept it for --

Q Yeah.

A -- purposes of risk assessment? Yes.

Do I embrace it as a -- as a reasonable scientific model? I think it's wrong. I think it's wrong. I think that the models are more sigmoid. And I think that there are some data, but they're statistically not verifiable because the levels are so low.

Q Okay. You took care of my question, by the way, on this --

A Accomplishments?

Q So I'm not going to ask you about that. I don't want to disappoint you.

A I like that paper.

(Discussion off record.)

Q I'm going to refer you to an article just briefly about -- it's entitled "Asbestos Air Pollution" co-authored by yourself, Bill Nicholson, Irving Selikoff. And the date of it is July 1972, apparently in the archives.

(Discussion off record.)

Q In a summary -- I assume it's a summary. It's in bold lettering -- at the beginning of the paper, it says, "Since most urban air pollution is

derived from commercial and industrial sources, the asbestos industry has both important responsibility and opportunity for its control." And I wanted to ask you what you meant by that, what you meant by that.

A Well, I think --

Q There's no other reference in the article to it.

A That was our perception at the time. At that time it was a reasonable one. We considered the important sources, and we thought that people should look at this because there were no data, and it was an important issue to look at. And the fact we were looking to the industry, which is kind of interesting, doesn't tell you -- or maybe speaks eloquently to the fact that the feds weren't doing what we thought they should be doing.

Q And you thought the asbestos industry had a responsibility to assure that the situation was controlled.

A Yes, of course. I think that's true today too, every industry. Right?

Q All right. Back to the article entitled "Airborne Fiber Control in Buildings During Asbestos Material Removal by Amended Water Methodology."

A It's a hell of a title, isn't it?

Q It's a mouthful.

A Certainly is, as we say.

Q And I just want to ask you about a couple of things in there. Reading this 1983 article, the first paragraph under the summary states, "Contamination of commercial, public, and residential buildings from friable asbestos fireproofing and insulation materials has become a recognized health concern."

Is that a statement that you would differ with at this point?

A You better read it one more time.

Q Sure. "Contamination of commercial, public, and residential buildings from friable asbestos fireproofing and insulation materials has become a recognized health concern."

A It's a recognized health concern. Yeah, it's okay.

Q You agree with that statement now.

A Sure, it's a health concern, yeah.

Q You also -- you go on to say, "Continuing damage and deterioration of these materials and re-entrainment of settled fibers have been shown to cause measurable asbestos contamination of the local environment."

A Yeah. And that's Sawyer's reference, I'm sure.

Q Hang on a second.

That's a reference to Sawyer. That's correct.

A Yeah, it's reasonable, yeah.

Q And you would adopt that statement today?

A I think that in some instances, that may be so.

Q And what is meant by "local environment" in that sense?

A Just that the fact that if you've got a 30-story office building and you got some guy in some area who manipulates an asbestos-containing material, is exposed to asbestos fiber concentrations, doesn't mean everybody in the building is exposed to those concentrations.

Q There's a statement on page 51 that I'll read to you. It says, "Personal sampling gave higher fiber counts than air sampling." Next sentence says, "Asbestos fiber contamination from disturbed materials is local, episodic, activity related, and usually better represented by personal sampling."

Is that a statement that you would agree with today?

A Sure.

Q What is your basis for stating that you

don't -- well, what is your basis for your opinion that short chrysotile fibers that is less than 5 microns do not present a health hazard?

A Well, there are a number of reasons really. Do I think they present absolutely no health hazard? That's ridiculous. Of course not. I think it depends on the nature of the fiber. I believe it depends on the nature of the product from which it came. It depends on its degree of manipulation, and it depends on other factors, whether someone smokes or whether -- certain host factors. Now we're talking only about chrysotile.

Q Uh-hmm, yes.

A The difference between a 5-micron fiber and a 4-micron fiber may be very small, but then the difference between a 5-micron and a 3-micron may be great.

Now, there are investigators who believe that you -- if you get fibers less than 5 microns you cannot prove that they are innocuous, but they believe that the biological potential is much reduced. It's reduced. It's less than.

Q And that's your opinion?

A I think it's less than, yeah, and I think there may be a size of a fibril that could be so short and so

easily phagocytosed and so easily attacked by macrophage enzymes and acids that it is rendered innocuous.

(Discussion off record.)

Q Does your analysis of the samples at Walbrook -- is that able to provide you with any information upon which you can render any opinion of product identification?

A No.

Q All right. I have completed my questions at this time for you. There are two matters which may -- I emphasize may -- necessitate a brief continuation of this deposition. The first one is the fact that we have not received a copy of your report on Walbrook.

A Right.

Q Although you have -- and I am grateful for this -- disclosed the results so we could talk about it. Obviously, there may be things in that report that I may want to hash out with you.

The second thing is, as we discussed, the Health Effects Institute. If that report does come out, as you indicated, there may be occasion to discuss some of the details. Those are the two matters which may result in a need for a continued deposition.

I actually do have one question for you. It will be brief. When did you analyze the air samples at Walbrook?

A We just completed them.

MR. FOX: I have no further questions, and if there is any need, I'll inform counsel to continue your deposition, and I don't know when -- when do you expect that the report will be completed?

THE WITNESS: As soon as my secretary types it.

MR. FOX: Then we can --

THE WITNESS: Sometime -- tomorrow, maybe Thursday.

MR. FOX: Okay. And then we can take it from there.

(Deposition adjourns at 4:25 p.m.)

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C E R T I F I C A T E

I, JENNIFER M. BONFILIO, Notary Public and Certified Shorthand Reporter, do hereby certify that prior to the commencement of the examination

ARTHUR M. LANGER, Ph.D.

was duly sworn by me to testify the truth, the whole truth and nothing but the truth.

I DO FURTHER CERTIFY that the foregoing is a true and accurate transcript of the testimony as taken stenographically by and before me at the time, place and on the date hereinbefore set forth.

I DO FURTHER CERTIFY that I am neither a relative of nor employee nor attorney nor counsel for any of the parties to this action and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested in the action.

Jennifer M. Bonfilio, CSR

Notary Public of the State of New Jersey

My Commission Expires July 27, 1994

I.D. NO. 0007585

Foreign Commissioner of Deeds in and for the State of New York

LICENSE NO. XI01325

DATED: August 27, 1991

CERTIFICATION OF WITNESS

I have read the foregoing transcript of my deposition and find it to be true and accurate to the best of my knowledge and belief.

ARTHUR M. LANGER, Ph.D.

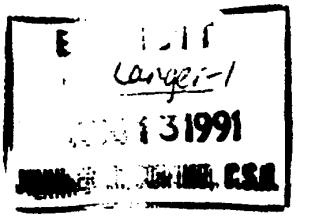
Sworn and subscribed to before me on

this day

of , 1991

Notary

My Commission Expires



1. Arthur M. Langer, Ph.D
Environmental Sciences Laboratory
Ingersoll Hall
Brooklyn College of the City
University of New York
Brooklyn, NY 11210

A. QUALIFICATIONS

Dr. Arthur M. Langer is director of the Environmental Sciences Laboratory of the Institute of Applied Sciences, Brooklyn College of the City University of New York, Brooklyn, New York. He received a Bachelor of Arts degree in geology from Hunter College, City University of New York in 1956, M.A. in petrology from Columbia University in 1962, and a Ph.D. in mineralogy from Columbia University in 1965. From 1965 to 1988, Dr. Langer held various positions at the Mount Sinai School of Medicine in the Department of Medicine, Department of Community Medicine, Environmental Sciences Laboratory, and Center for Polypeptide and Membrane Research.

Dr. Langer has published extensively in the area of asbestos, asbestos fiber type, asbestos mineralogy, asbestos-related disease, and asbestos disease mechanism. He has peer reviewed numerous manuscripts, served on numerous editorial boards, and authored and reviewed numerous documents for NIOSH, ALOSH, MSHA, and EPA. He has served on numerous international committees and has spoken at numerous meetings.

B. TESTIMONY

Dr. Langer will testify that asbestos is a term for a number of minerals from around the world, some of which had been used commercially and some of which have not. He will testify that there has been a great deal of confusion in the medical and scientific literature concerning the term asbestos and that it is often improperly defined. He will testify concerning historical and current scientific knowledge concerning how asbestos fiber enters the human body, the disease mechanism within the human body, and disease processes. He will testify that different asbestos fiber types are not equally biologically active. He will testify concerning medical, scientific, and epidemiological literature with respect to persons occupationally exposed to asbestos. He will testify concerning low-level exposure to asbestos. He will testify concerning asbestos fiber, how it is used in asbestos products, the concept of "friability", the aerodynamics of asbestos fibers, the dispersion of asbestos fibers in the air both inside and outside of buildings, and the nature of "fiber release" from asbestos fireproofing.

Dr. Langer will testify that air testing and monitoring is an appropriate method of determining whether an asbestos hazard exists within a building. He will testify concerning his own inspection of asbestos-containing materials in buildings, air monitoring in buildings, and asbestos levels both inside and outside of buildings.

Dr. Langer will testify concerning microscopic techniques, proper analysis of air and bulk asbestos samples, and the appropriate measurements of asbestos fiber levels.

Dr. Langer will testify concerning threshold limit values, both currently and historically, the EPA position on asbestos in buildings and threshold limit values, and the relation of low level asbestos exposure to various diseases including asbestosis, lung cancer, peritoneal mesothelioma, and pleural mesothelioma.

Dr. Langer will testify concerning proper responses to asbestos in buildings including, but not limited to, the necessity of removal, the advisability of removal, and operations and maintenance of asbestos in buildings.

Dr. Langer will testify concerning the risks to building occupants from asbestos, the lack of epidemiological studies with respect to such risks, and the nature and extent of such risks based upon fiber levels.

Dr. Langer will testify concerning the state of the art with respect to low-level exposure to asbestos and risks of different asbestos fiber types.