

SUPERIOR COURT OF NEW JERSEY
LAW DIVISION - MIDDLESEX COUNTY
DOCKET NO. L-3669-96

ORIGINAL

JOHN NORMAN,

Plaintiff,

Vs.

A.J. FRIEDMAN SUPPLY, CO. INC.,
et al.,

Defendants.

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

Pg 38 - Not a forsterite fan
Pg 40 - meso chrysotile > 100
Pg 46 - Threshold exists ->
what it is ?

Pg 49 - Believes in fiber
synergy

Pg 80 - Asb. substitutes usually

TRANSCRIPT of the deposition of the ^{used ~~as~~ in}
witness, called for Oral Examination in the ^{high temp}
above-captioned matter, said deposition being taken ^{situations}
pursuant to Superior Court Rules of Practice and
Procedure by and before JENNIFER REALMUTO, a Notary
Public and Certified Shorthand Reporter of the State
of New Jersey, at the Offices of PORZIO, BROMBERG,
NEWMAN, ESQS., 156 West 56th Street, New York, New
York, on Thursday, October 31, 1996 commencing at
10:00 in the forenoon.

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1 I N D E X

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22

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25

1 A R T H U R M. L A N G E R,

2 6 Rochambeau Drive, Hartsdale, New York,

3 having been duly sworn according to law,

4 testifies as follows:

5 (Exhibits P-1 through P-3 were marked for
6 Identification.)

7

8 DIRECT EXAMINATION BY MR. CIFALDI:

9 Q Dr. Langer, my name is Angelo

10 J. Cifaldi. I'm with the law firm of Wilentz,

11 Goldman and Spitzer. We represent Mr. Norman in a

12 case against various defendants. We're here today

13 for the purpose of taking your deposition. I assume

14 you've had your deposition taken on many occasions,

15 correct?

16 A Yes.

17 Q Can you approximate how many times?

18 A Perhaps four times a year over the last ten

19 years.

20 Q Despite the fact that you've been through

21 this on a few occasions, let me give you a few

22 instructions so we're both on the same wavelength.

23 First and foremost, please listen to the question I

24 ask you. If you don't understand it, tell me. If

25 you answer, I'm going to make an assumption that

LANGER - Direct

1 you're understanding it and that you're answering to
2 the best of your ability. Do you understand?

3 A Yes.

4 Q Number two, if there's an objection by
5 any attorney, let the usual dialogue that takes place
6 go on the record and then you can answer, unless it
7 involves some privileged dialogue and you choose not
8 to answer. Do you understand that?

9 A Yes.

10 Q If you need to take a break, let me
11 know.

12 A Yes.

13 Q Also while this is an informal setting,
14 under certain circumstances the testimony you give
15 here today may be used at the time of trial. Do you
16 understand that?

17 A Yes.

18 Q Can you state your full name and address
19 for the record?

20 A Arthur M. Langer, L-a-n-g-e-r, 6 Rochambeau,
21 R-o-c-h-a-m-b-e-a-u, Drive, Hartsdale,
22 H-a-r-t-s-d-a-l-e, New York, 10530.

23 Q When were you first contacted to consult
24 in an asbestos litigation matter?

25 A This is an historical question, correct?

LANGER - Direct

1 Q Yes, it is.

2 A In the late 1970s probably.

3 Q And do you remember the context of the
4 contact?

5 A I don't recall the specifics. If you'd like
6 me to speculate, I will speculate.

7 Q Well, I don't want you to speculate. I'd
8 let you give me an estimate if you can.

9 A I don't recall.

10 Q Was it through an attorney?

11 A Yes.

12 Q Do you remember who the attorney was?

13 A Again this invites speculation.

14 Q When was your next contact after the
15 1970s regarding the asbestos litigation matter?

16 A Approximately once or twice a year thereafter
17 until approximately 1990, thereupon, perhaps three or
18 four times a year.

19 Q Have you done work for attorneys
20 representing plaintiffs and defendants?

21 A Yes.

22 Q Can you approximate a breakdown
23 percentage-wise over the years on average?

24 A At the outset, I acted as an expert on behalf
25 of many plaintiffs' attorneys and as time went on,

LANGER - Direct

1 the ratio changed to more defense attorney work as
2 compared or ratioed to plaintiff work.

3 Q In the last few years, can you give me a
4 percentage, say '94, '95, '96?

5 A I'm assuming that this involves contacts over
6 the phone in which I'm asked about certain problems
7 as well as --

8 Q That's fair.

9 A -- written reports? I would say the ratio has
10 become perhaps two-thirds defense work, one-third
11 plaintiffs work or 75 percent defense work and 25
12 percent plaintiffs work, somewhere in that order.

13 Q Can you approximate for me how many times
14 a year you testified at trial over the last few years
15 if you can give me an average?

16 A Perhaps once a year.

17 Q And when would that have started? When
18 was the first time you testified at trial?

19 A The first time I testified at trial, I acted
20 as an expert on behalf of the Department of Justice
21 of the United States. This was tried in federal
22 court in Minneapolis, Minnesota. The issue was the
23 contamination of Lake Superior with minerals, some of
24 which were believed to be asbestiform.

25 Q And when was that?

LANGER - Direct

1 A That would be about 1973 and that was in
2 Miles, M-i-l-e-s, Lord, L-o-r-d, Miles Lord Court.

3 Q The ratio you described, approximately 75
4 to 25 percent recently as far as your consultations,
5 can you give me a general overview as to what
6 opinions you were offering when you were representing
7 plaintiffs in that 25 percent of the cases? Is there
8 some general theme that you can relate to me?

9 A Much of the plaintiffs' work today consists of
10 meetings and strategy sessions involving a number of
11 issues. These issues include lead in paint, fiber
12 emission from asbestos wicking, biological
13 circumstances of working as a brake worker,
14 b-r-a-k-e, and similar types of matters.

15 Q Okay. With regard to fiber emissions
16 from asbestos wicking, do you have an opinion as to
17 whether fiber does emit from the use of asbestos
18 wicking?

19 A I was asked to test two products in a
20 laboratory. The wickings were provided to me. The
21 wickings were cut with mechanical shears multiple
22 times in an isolated chamber, air measurements were
23 made. The air filters were examined by transmission
24 electron microscopy.

25 Q What TM standard did you use, NIOSH 7402

LANGER - Direct

1 ihera (phonetic) yamate?

2 A The NIOSH 7402 method is a light microscopy
3 methodology. We did not use light microscopy in this
4 particular study but rather examined the materials
5 following protocols which have been used by the, for
6 example, the Environmental Protection Agency and the
7 characteristics and criteria that we use to identify
8 particulates on air filters follows pretty much the
9 so-called yamate, y-a-m-a-t-e, method. Actually,
10 yamate follows our method but that's a mere
11 embellishment.

12 Q That's okay. So let me follow-up. So
13 then basically you were measuring fibers of any
14 length. You didn't have a cut-off of .5 microns or 5
15 microns just as long as it fit the ratio?

16 A That's a better question.

17 Q Thank you.

18 A The EPA protocol for monitoring air inside
19 buildings calls for a different aspect ratio of 5 to
20 1, a different cut-off point of 0.5 microns in terms
21 of fiber length and a requirement for the distinction
22 of fibers greater than 5 microns and those which lie
23 between 0.5 and 5 microns. We follow that protocol.

24 Q Do you recall what your results were?

25 A I believe the highest value we found was 0.003

LANGER - Direct

1 fibers and I do not believe that any of the fibers
2 were greater than 5 microns in length.

3 Q Is this all chrysotile?

4 A Yes, I'm sorry. Yes, I should have mentioned
5 that, of course.

6 Q That's okay. Now, were these levels you
7 came up with, were these time weighted averages or
8 were they P concentrations?

9 A No, no. I'm sorry, no. These were not time
10 weighted. That's w-e-i-g-h-t-e-d, time weighted
11 average. Rather these were the excursions which were
12 recorded following the actual manipulation of the
13 material and allowing the pump to run for an
14 additional ten minutes so this represents what you
15 would call the initial burst or the excursion.

16 Q Now, was any of this data ever published
17 by you or anyone else?

18 A No, not yet anyway.

19 Q Do you have the data available?

20 A I have the data but they belong to someone
21 else actually.

22 Q Well, I'll make requests. You don't have
23 to respond and we'll follow-up.

24 MR. CIFALDI: I'd like to request the
25 data regarding the wicking test that was just

LANGER - Direct

1 described by Dr. Langer and we'll follow-up in
2 a letter and if you can mark my requests.

3 Q Excuse me. Who was that test done for,
4 plaintiffs' attorney?

5 A Yes.

6 Q Or defendant? Plaintiffs' attorney? Can
7 you tell me who it was?

8 A It was done for the law firm of Gallagher,
9 G-a-l-l-a-g-h-e-r? Did I slur that? Gallagher,
10 DeRobertis, Nakomura and Ono in Hawaii.

11 MR. CIFALDI: Off the record.

12 (A discussion was held off the record.)

13 Q In the last say three years, have you
14 ever given a deposition on behalf of a plaintiff in
15 asbestos litigation?

16 A I can't remember.

17 Q Nothing comes --

18 A It's possible but I just can't remember.

19 Q Have you given any trial testimony on
20 behalf of a plaintiff in asbestos litigation in the
21 last three years?

22 A No.

23 Q Have you given any trial testimony on
24 behalf of a defendant in an asbestos litigation
25 matter over the last three years?

LANGER - Direct

1 A This is trial testimony?

2 Q Yes, it is.

3 A In the last three years, I think two in Judge
4 Freedman's court here in New York.

5 Q In New York. Do you recall who you were
6 testifying --

7 A These are asbestos cases -- I'm sorry to
8 interrupt you. These are asbestos cases only.

9 Q Yes, that's what I was asking.

10 A Okay.

11 Q Do you know of which asbestos defendant
12 called you to testify, which attorneys, who they
13 represented?

14 A The last case was a case for Uniroyal
15 involving asbestos cloth and at the time before
16 that -- this is Freedman's court.

17 Q Sure.

18 A I think it was OCF but I'm not sure.

19 Q Can you recall any of the other asbestos
20 manufacturers, suppliers, et cetera, that you've
21 represented over the years or offered opinions on
22 behalf of over the years?

23 A You mean those that I've acted as an expert
24 for?

25 Q Correct.

LANGER - Direct

1 A Manufacturers?

2 Q Supplies, distributors, anything?

3 A Suppliers, distributors, this is just

4 deposition or trial testimony?

5 Q Exactly.

6 A OCF based on work involving tissue burden

7 studies.

8 Q Okay.

9 A Durabla gaskets, the Claims Resolution Center

10 in Baltimore and --

11 Q And whoever they represented at the time?

12 A Yes, the multitudes, the great masses. I

13 really can't recall because I am in so few trials.

14 Q Have you ever done any work on behalf of

15 Crane Packing?

16 A I don't think so, no.

17 Q Garlock?

18 A I don't think so.

19 Q Anchor?

20 A Again, I don't think so, no.

21 Q Have you ever done any work on behalf of

22 any electric wire companies?

23 A I was deposed in a case involving a Marine

24 Wire and Cable in Seattle Washington but that never

25 went to trial. That was settled.

LANGER - Direct

1 Q Do you know who the attorney represented
2 that called you?

3 A I think it was Erickson.

4 Q Erickson Wire and Cable, right?

5 A Yeah, I think so.

6 Q Can you estimate for me what percentage
7 of your income in 1995 was derived from your
8 litigation related consults?

9 A Are you talking asbestos?

10 Q Everything right now.

11 A Everything, maybe 60 percent.

12 Q What about 1995, if we're just talking
13 about asbestos related consults?

14 A It's dropped considerably, maybe 40, 45, maybe
15 50.

16 Q Okay.

17 A Maybe.

18 Q Fair enough. Can you approximate was it
19 similar in 1994 for asbestos related litigation
20 consults, about 50 percent?

21 A Yeah, maybe.

22 Q Can you tell me so we don't have to go
23 over this ad nauseam here, has it been fairly
24 constant at 50 percent beginning in some year when it
25 was lower and it worked up to 50 percent? Do you

LANGER - Direct

1 know what I'm getting at to try to save time?

2 A Yes, I'm not trying to sound evasive or act as
3 if I'm don't want to share this with you but this
4 fluctuates. As of the last few years, I've been
5 involved in litigation -- litigations in matters
6 pertaining to implant litigation and crystalline
7 silica and so if there's some major trial or some
8 major effort in a certain area, it is a
9 disproportionate amount of income in relation to time
10 meaning that there's some critical issue that's just
11 destroying some entity somewhere and they wish my
12 participation so there may be a lot of time put in in
13 a very short period, meaning many hours over a short
14 time span in terms of calendar time.

15 Q I'm just trying to get a gauge on what
16 percentage of your income say from 1994 which has
17 been related or been derived from asbestos related
18 litigation consults?

19 A Maybe 55 percent, something like that.

20 Q Okay.

21 MR. CAMPBELL: That's under total income,
22 not just your consultative income? I just was
23 unclear about that.

24 A Yeah, total.

25 MR. CAMPBELL: Okay.

LANGER - Direct

1 Q Why don't we go over your CV for a moment
2 if we could.

3 A Sure.

4 Q You obtained your BA in geology in 1956.
5 Did you have any courses that touched on asbestos
6 foreign minerals?

7 A No.

8 Q MA in petrology, Columbia University in
9 1962, anything to do with asbestos during that
10 training?

11 A No.

12 Q Ph.D. mineralogy Columbia University
13 1965, anything with regard to asbestos foreign
14 minerals in that degree?

15 A You mean specifically, not really other than
16 the fact that asbestos is a commodity and it was
17 mentioned in a course in economic geology but no,
18 there's no focus on that, of course, no.

19 Q What was your thesis on, sir?

20 A My Master's thesis was on the origin of
21 certain rock types in local rocks called the
22 Manhattan Formation. That's the archetype of
23 pegmatites, the Manhattan Formation. My Ph.D. was on
24 the mineralogy of playa, p-l-a-y-a lake beds in
25 California.

LANGER - Direct

1 Q With regard to the rock formations in
2 Manhattan, was there any reference to any
3 asbestos-containing materials in those formations?

4 A You mean in retrospect or?

5 Q No, when you wrote it.

6 A No.

7 Q In retrospect?

8 A Well, in retrospect with the OSHA regulations
9 as written prior to 1990, New York City had many
10 rocks which contained asbestos, if one crushed,
11 certain portions of units within the Manhattan
12 Formation one, generated an aerosol with fragments of
13 actinolite which would have been regulated by OSHA
14 asbestos but these were not asbestos forms. It's not
15 until recently that OSHA removed cleavage fragments
16 from the asbestos regulations.

17 Q Is that actinolite and amphibole?

18 A Actinolite is an amphibole, yes.

19 Q You had a lot of previous positions
20 here. Let's try to save some time. I see you at
21 least as a consulting mineralogist with Columbia
22 University, you did some work for some oil companies,
23 correct?

24 A Yes, that's right.

25 Q Can you tell me what basically, what

LANGER - Direct

1 Q With regard to the rock formations in
2 Manhattan, was there any reference to any
3 asbestos-containing materials in those formations?

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21 least as a consulting mineralogist with Columbia
22 University, you did some work for some oil companies,
23 correct?

24 A Yes, that's right.

25 Q Can you tell me what basically, what

LANGER - Direct

1 areas you covered?

2 A The professor that I studied under at New York
3 University was the Newberry Professor of Geology or
4 Mineralogy. He was eminent. He was internationally
5 recognized as an expert in his field. His expertise
6 lay in both clay minerals and radioactive minerals
7 and he was contacted by many organizations and
8 industries from around the world to help them with
9 various problems. I was a graduate student at that
10 time. I believe I had finished my Ph.D. and as a
11 graduate student, I participated at some of the
12 research projects involving corporations involving
13 clay mineral analysis or specific problems in which
14 one of the crucial elements in the solution was the
15 determination of certain mineralogical species which
16 may be present in rocks.

17 Q Can you tell me without going over each
18 item of your positions on your CV when you first had
19 some involvement with either doing research or
20 offering opinions regarding asbestos foreign
21 minerals?

22 A In 1965, I became a part of Irving Selikoff's
23 group, S-e-l-i-k-o-f-f's group, at the Mount Sinai
24 Hospital. I was the first physical scientist in that
25 group. My responsibility was the creation of a

LANGER - Direct

1 pneumoconiosis laboratory and the principal study at
2 that time was the study of asbestos, asbestos
3 exposure and asbestos and its health consequences.

4 Q Who were some of the people that you
5 worked with back then?

6 A You want me to start at the top and work
7 down?

8 Q That would be best.

9 A Irving Selikoff as director. Jacob Churg
10 pathology. E. Cuyler Hammond, vice-president, chief
11 status division and epidemiologist of the American
12 Cancer Society. I was the first physical scientist.
13 Victor Baden came as a histologist, Ph.D. level.
14 Carl Berkley, B-e-r-k-l-e-y, was a medical engineer.
15 Essentially, perhaps Nicholson came, William
16 Nicholson, N-i-c-h-o-l-s-o-n, came in about 1969,
17 1970. At the same time we may have hired Arthur
18 Rohl, R-o-h-l. Ivan Rubin became part of our group
19 as a technical support person in the probe
20 laboratory. Carl Maggiore, M-a-g-g-i-o-r-e, as a
21 physicist. Ann Macklert worked in my laboratory,
22 M-a-c-k-l-e-r-t. There were many laboratory
23 technicians. I had students at that time. I had
24 some superb students. Antonio Sastre who went on to
25 get his Ph.D. at Cornell now is a professor of -- I'm

LANGER - Direct

1 thinking pharmacology. It's not pharmacology. He is
2 a biological theoretician at Hopkins. There are many
3 others.

4 Q That's fine.

5 A There were -- Suzuki came later on as a
6 pathologist. We worked with the pulmonary group
7 which included Al Tierstein, Al Miller.

8 Q Susan Daum?

9 A Susan Daum was a resident. She was finishing
10 her residency. That is correct. If you want to talk
11 about residents --

12 Q No, I just wanted to mention that one. I
13 was curious.

14 A No, Susan was the first chief resident in
15 medicine as a woman.

16 Q Now, as you said, you started in '65 at
17 Mount Sinai?

18 A Correct.

19 Q Then from '67 to '68 you became Assistant
20 Professor of Mineralogy?

21 A Yes, Mount Sinai, I went to Mount Sinai before
22 Mount Sinai had a medical school so it was Mount
23 Sinai Hospital as a research associate.

24 Q And it seems you were at Mount Sinai
25 until approximately 1988?

LANGER - Direct

1 A Correct.

2 Q And then you left Mount Sinai?

3 A That's correct.

4 Q Why did you leave?

5 A I left because the director of the center for
6 polypeptide and membrane research retired and that
7 group was going to be associated into the Department
8 of Physiology and Biophysics. And physiology and
9 biophysics had its own agenda and perception of the
10 future. We couldn't get any space so I decided that
11 the time was correct to leave Mount Sinai.

12 Q What we'll do is we'll go over some of
13 your publications later. Why don't we move on to
14 some of the issues in this case and we'll clean up
15 that stuff at the end.

16 Now, I believe you produced a draft report of
17 the final oral report served in this case; is that
18 correct?

19 A Yeah, I think it's here.

20 Q Could you please remove that from the
21 file if you would?

22 MR. CIFALDI: Why don't we mark the draft
23 report P-4 for identification?

24 (Exhibit P-4 was marked for
25 Identification.)

LANGER - Direct

1 Q What's been marked P-4 for identification
2 appears to be a fax you received from Porzio,
3 Bromberg on July 23, 1996; is that correct?

4 A Yes.

5 Q And the notations on the draft report,
6 are they yours?

7 A Yes.

8 Q And were they conveyed to someone at the
9 Porzio office over the phone or in writing if you
10 recall?

11 A If I understand your question correctly, this
12 original draft is based on other affidavits in other
13 cases and it was used as a draft, as a beginning
14 draft. I reviewed it -- this is probably the second
15 draft and then I conveyed my thoughts over the
16 telephone and then this was sent to me and I just put
17 my own notes on it.

18 Q When was the first time you contacted --
19 someone from the Porzio office contacted you, not
20 necessarily in this case but for asbestos litigation
21 matters?

22 A You mean just asbestos?

23 Q Yes.

24 A Maybe four years ago, '92, '91, something like
25 that, '92.

LANGER - Direct

1 Q Do you remember who contacted you?

2 A It could be Mr. Campbell but I'm not sure.

3 Q And how many times have you done
4 consultations for the Porzio office in asbestos
5 litigation since 1992?

6 A Several times.

7 Q Several?

8 A Three, four.

9 Q Have you ever testified at trial for
10 them?

11 A No.

12 Q Have you ever given a deposition on their
13 behalf?

14 A I don't think so, no.

15 Q First time?

16 A Yes.

17 Q Do you remember the nature of the prior
18 contacts?

19 A I believe one of the first times involved just
20 a general kind of overview on how asbestos interacts
21 in biological systems.

22 Q Was it for any particular defendant if
23 you can recall?

24 A I don't think so.

25 Q What was the next time?

LANGER - Direct

1 A Possibly a mesothelioma case involving
2 chrysotile and an exposure in buildings, like
3 building air but the fiber was supplied by I believe
4 Mr. Campbell's client.

5 Q Do you remember who his client was in
6 that case?

7 A No, I can't recall.

8 Q And when was the next --

9 A It's just a chrysotile supplier.

10 Q Okay. Next contact?

11 A I can't recall because the -- there are lots
12 of times we just chat -- not Mr. Campbell but his
13 colleague, Mr. Fazio and I chat about some issue and
14 of course this time Mr. Norman.

15 Q What do you chat about with Mr. Fazio?

16 A We just chat.

17 Q About what issues?

18 A The kinds of issues that you're chatting about
19 today in the sense if there are multiple exposures,
20 which one would seem to be the most important and
21 what about the time element, what about the dose
22 element, what about the contribution of fiber type.
23 General issues, "what do you think", stuff like that.

24 Q Have you submitted a bill in the Norman
25 matter yet?

LANGER - Direct

- 1 A I believe I submitted a bill after reading
2 materials and discussing this case with Mr. Campbell.
- 3 Q Do you remember what the bill was?
- 4 A A statement for services of, I don't know how
5 many hours, 10 hours, 11, 12.
- 6 Q And what was your hourly rate?
- 7 A Hourly rate is \$225 an hour for general work,
8 \$275 an hour for depositions and \$325 for trial
9 testimony.
- 10 Q Did you meet with Mr. Campbell before
11 today's deposition?
- 12 A Yes.
- 13 Q Today or some other day?
- 14 A We met yesterday.
- 15 Q And how long did you spend?
- 16 A We were here from about 10 until 3 maybe,
17 something like that.
- 18 Q General discussions?
- 19 A General discussions.
- 20 Q Okay. Why don't we take a look at that
21 draft report for a moment if I could?
- 22 A Please.
- 23 Q You have some comments written by the
24 gaskets and the rope, could you tell me what they are
25 and why you've put them in there?

LANGER - Direct

1 MR. CAMPBELL: Before you answer that
2 question, I just want to comment for the
3 clarity of the record, I'm not sure that
4 that's a draft report. It may be exactly the
5 same report as the final report just having
6 his notes on it, so just so the record's
7 clear.

8 Q Okay. Sure.

9 A Hello.

10 Q Yes.

11 A Here we go. This is the context of this,
12 there's the following statement, "Dr. Langer will
13 testify that on the basis of the mineralogic
14 properties of chrysotile, amosite and crocidolite,
15 the geographic source of those minerals and the
16 physical properties needed in asbestos gaskets and
17 rope used in residential boilers, that it is his
18 opinion that such gaskets and rope contained
19 chrysotile asbestos only."

20 Now, I have circled gaskets and my marginalia
21 comment is that generally so, meaning for chrysotile
22 is generally so, crocidolite in aggressive
23 environments and then I have the note "temperature of
24 application" so given these particular gaskets in
25 these particular boilers and I've -- this marginalia

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LANGER - Direct

1 predated the reading of these Rheem Boiler Brochures
2 which coincide the temperature of surface and so
3 forth, so these are my own marginalia. I can't be a
4 good expert unless I discuss all the issues.

5 And rope, now rope also cannot be amosite
6 because amosite is not -- it is not flexible. It's a
7 more brittle fiber. It's used and has different
8 applications. So the temperature, the nature of the
9 environment, how chemically aggressive an environment
10 is will dictate the use of chrysotile and crocidolite
11 and the temperature of the surface application.

12 Now, I've also included in the marginalia,
13 because I've underlined chrysotile and again there is
14 a note that ropes used in these particular boilers,
15 depending on the nature of the temperature of the
16 surface and how aggressive the environment is,
17 crocidolite rope in aggressive environments those are
18 used in the chemical industries, especially in the
19 old fluorohydrocarbon industries. Now, at the
20 bottom --

21 Q Can I interrupt you for one second?

22 A Sure, go ahead.

23 Q In this case, based upon your review,
24 actually did you review Mr. Norman's deposition
25 transcript or his Interrogatories?

LANGER - Direct

1 A Yes.

2 Q Based on your review, would it be fair to
3 say that in the environments Mr. Norman was working
4 in he would not have been exposed to rope or gaskets
5 that contained anything other than chrysotile?

6 A That's a good question. I am basing the
7 answer on my reading of the Rheem Boiler materials.
8 It would not have been crocidolite.

9 Q Okay. Can I see that again, thanks.
10 Could you please tell me what -- you have a note in
11 the margin here, looks like p-l versus I guess it's
12 pleural versus peritoneal, something, something, my
13 loss of -- could you tell me what that is?

14 A All right. In the context of the following
15 statement: Dr. Langer will testify -- further
16 testify as to the how, as to the how -- as to the
17 mineralogic properties of the various types of
18 asbestos fiber and relate their ability to cause
19 mesothelioma and I have circled the word mineralogic
20 and properties and my marginalia consists of pleural
21 versus peritoneal but it's p-l versus p-e-r-i-t and I
22 have an asterisk and in my shorthand I have written
23 chrysotile and degradation and I've underlined
24 chrysotile and degradation and under this the
25 marginalia includes magnesium but it's the chemical

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1 symbol Mg., loss and activity.

2 Q Let's try to figure out, is one of the
3 things that you're saying when chrysotile gets into
4 the parenchymal tissue, magnesium leaches out and the
5 fiber breaks down into fibrils? Is that what you're
6 talking about there?

7 A Well, that's part of it, of course, the one --
8 one has to look at a -- when we talk about properties
9 I have not been asked to discuss epidemiology per se,
10 although we can discuss it but, we were dealing with
11 properties of minerals and the properties of minerals
12 relate to or underscore their importance in imparting
13 biological potential for chrysotile asbestos, the
14 material is not stable in an acidic environment. It
15 tends to lose magnesium and I've studied that with
16 probe studies and it's been found by others around
17 the world including one of Dr. Suzuki's colleagues
18 Dr. Coyama (phonetic), the magnesium leach of a
19 chrysotile surface alters the biological potential.

20 In fact, there are experimental data to show
21 that the magnesium leaching from chrysotile blunts
22 the ability of the fiber to produce mesothelioma at
23 least in laboratory animals. There's a good deal to
24 show that -- a good deal of evidence, experimental
25 evidence and evidence involving fibers recovered from

LANGER - Direct

1 human tissues to show that chrysotile degrades and
2 the degrading blunts its potential. That's merely
3 one of the factors anyway.

4 Q When you say blunts its potential, why?

5 A This goes to the heart of the physical
6 chemical principles of toxicology in which cell
7 membranes interact with chemical function amounts on
8 surfaces of particulates or interacts with different
9 kinds of lichens which hang off organic molecules and
10 these are the mechanisms by which these compound
11 particulates interact in cellular environments.
12 There's a communication between the surface of a
13 mineral and the receptors on cells.

14 Q Are you talking about free radicals?

15 A Free radical is another story. That's the
16 generation of certain active chemical species. I'm
17 not a terribly great supporter of free radicals. We
18 studied free radicals on chrysotile asbestos almost
19 20 years ago. It was kind of interesting. If you
20 grade asbestos, for example, it loses certain
21 structural characteristics and that also decreases
22 its biological potential.

23 Q Let's get to an issue since we're on it
24 now so maybe we can move on a little. Are you of the
25 opinion that to develop mesothelioma, the fiber has

LANGER - Direct

1 to get into the pleural tissue whether it be the
2 visceral or parietal pleura?

3 A That is the general wisdom.

4 Q Do you subscribe to the general wisdom?

5 A I am ambivalent about that.

6 Q What does that mean?

7 A Well, it means I'm ambivalent. What does it
8 mean? It means that before I was up at a meeting in
9 Lake Placid a few weeks ago, I believed that you had
10 to have the agent at the site in order to have this
11 agent communicate with cells and have these cells
12 undergoing certain changes which would first initiate
13 and then promote the development of a new cell line
14 which we would call a malignant cell line. However,
15 up at this meeting, there was -- and this meeting was
16 a meeting of experimental studies of cells exposed to
17 various mineral dusts and man-made materials and
18 there was a paper given in which it was shown that
19 you could use materials like amphiboles, asbestos
20 minerals to cause cells to generate chemical
21 messengers that we call cytokines and these cytokines
22 influenced mesothelial cells without the material,
23 the agent being actually at that cell surface, which
24 I found fascinating.

25 So when I say I'm ambivalent, I think that

LANGER - Direct

1 like everything in the world, it isn't just yes or no
2 but there may be a combination of factors which come
3 into play. Yeah, probably you need the agent in very
4 close proximity.

5 Q Fair enough. Are you familiar with any
6 of the translocation studies of chrysotile fiber by
7 Beyon, Sebastion, Suzuki, et cetera?

8 A Yes.

9 Q Do you have a view as to whether you
10 believe the conclusions reached by those studies are
11 varied?

12 A Which conclusions do you speak of?

13 Q The conclusions generally that the
14 majority of fiber found in the pleural tissue is
15 short chrysotile fibrils?

16 A I think that's probably true. As a matter of
17 fact, I have some data to support that as well.

18 Q What data do you have to support that?

19 A Years ago I did a study of 10,000 -- the
20 contribution of 10,000 fibers in the lung of an
21 asbestos worker.

22 Q He had a mixed exposure?

23 A Primarily amosite but there was chrysotile
24 used in this plant for a very short period of time.

25 Q Excuse me. Where did he work?

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LANGER - Direct

1 A He worked at a little plant in New Jersey, in
2 Paterson.

3 Q Raybestos or Unarco?

4 A Unarco Union Asbestos Rubber Company.

5 Q What did you find?

6 A I found that the chrysotile concentrated in
7 the lymphatics, in the higher node, in the
8 interlobular pleura and areas in the lung in which
9 you would anticipate a lymphatic drainage and the
10 fibers tended to be short and they tended to be
11 fragmented and I believe that chrysotile does "move"
12 around, move, put that in quotes, move around more
13 than the amphiboles.

14 Q Do you think that the research that
15 you've done and others have done with regard to this
16 issue have any significance with regard to the
17 biological activity of chrysotile to induce a
18 malignant mesothelioma in man and if so, what is your
19 opinion?

20 A You want my opinion today currently as we sit
21 here?

22 Q Yes.

23 A Based on all of the evidence which is evidence
24 which is experimental, which is cohort related, human
25 experience?

LANGER - Direct

1 Q Yes.

2 A The coughing up and swallowing of chrysotile
3 asbestos, let's say the elimination of asbestos from
4 pulmonary tissues up the mucociliary escalator
5 whereupon these fibers are swallowed and attacked by
6 stomach acids and so on. Based on the cohort data in
7 the world, there's not a single case verified of
8 peritoneal mesothelioma, peritoneal mesothelioma
9 following exposure to chrysotile asbestos only.

10 Q What about Dr. Dement's Carolina studies
11 on the textile? I believe he indicates there is no
12 other exposure that he's found other than to
13 chrysotile.

14 A That is not true. The predominant exposure
15 was chrysotile but crocidolite was used in that
16 plant.

17 Q But he indicated that that individual
18 never worked in that area of the plant based upon his
19 review of the employment records. Are you aware of
20 that?

21 A Well, I am aware that that statement has been
22 made but I would challenge that statement with an
23 Irving Selikoff statement, that fugitive dust does
24 not respect the jurisdictional boundaries of trades
25 and if fugitive dust played such a large role and

LANGER - Direct

1 outcome in shipyard settings, there is no reason to
2 believe that an individual who did not weave or braid
3 crocidolite asbestos in Charleston by definition was
4 not exposed and the data produced in Fred Pooly's
5 laboratory in Cardiff showed that many of those
6 workers in Charleston did have crocidolite in their
7 pulmonary tissues. So whether or not the employment
8 records demonstrated that this person worked in that
9 area of Charleston, I'm not sure that that is a
10 guarantee that that person was not exposed.

11 Q What about some of the brake studies in
12 Connecticut, is it, on the brake lining? You've done
13 some work on brakes, haven't you?

14 A Yes, I have.

15 Q Weren't some of those, and maybe I'm
16 mistaken, just a chrysotile?

17 A I don't believe these were peritoneal. I
18 think those were pleural.

19 Q They're all pleural. Wasn't there a
20 peritoneal in one or two in an article by Dr. Rohl?

21 A Are you talking about Corbett McDonald's study
22 of the Raybestos?

23 Q Maybe I'm getting confused.

24 A I don't think so. I can't recall and I don't
25 want to mislead you but this would be an interesting

LANGER - Direct

1 paper to review.

2 Q Since this case doesn't involve a
3 peritoneal mesothelioma, I'd like to get more on to
4 the pleural mesothelioma and my question was directed
5 to the biological activity of the chrysotile fibrils
6 that transudate to the pleura. With regard to pleura
7 mesothelioma, do you think that has some significance
8 in a medical or scientific --

9 A You mean the short fibrils that reach the
10 pleura?

11 Q Yes.

12 A I don't think they have much significance.

13 Q You said much.

14 A Correct.

15 Q Do you think they have some?

16 A Well, I'm sitting here as a scientist, you
17 asked me a very interesting question, I believe that
18 the world data supports the conclusion that very
19 short fibers, not terribly important, especially very
20 short chrysotile, when I say very short, I'm talking
21 about the materials that are even discounted by the
22 Environmental Protection Agency, 0.5.

23 Q Okay.

24 A Now, if you find less than one and it's 0.9,
25 if you were to have an index of biological potential

LANGER - Direct

1 from 0 to 10,000, is it possible that this is 10,000,
2 I don't think so. Do I think it's zero? I don't
3 think so. There's also a continuum. Is it 100 or
4 200, well, it could be. 500, I don't think it's as
5 high as 500. That's 5 percent of the total
6 biological potential. I think it's small.

7 Q Do you have a view as to fibers from say
8 1 micron to 5 microns? Do you believe they're
9 biologically inert?

10 A What fiber type?

11 Q Chrysotile?

12 A Chrysotile, how did they get to be 5 -- this
13 is not an inconsequential question.

14 Q Let me cut you off. I'm sorry. Would
15 you agree with me that maybe 80, 85 percent of the
16 chrysotile used in the United States is under 5
17 microns?

18 A Probably higher.

19 Q Maybe 90, 95?

20 A Could be.

21 Q So let's assume then it got into that
22 state because of processing and then if you could
23 answer my question.

24 A All right. Let's say we're dealing with short
25 fiber produced at the interface of a friction pad and

LANGER - Direct

1 a wheel housing, a brake, if this chrysotile is
2 subjected to the shear forces and the thermal
3 stresses at that interface, that dust may be
4 biologically inert.

5 Q Because it turns into fosterite?

6 A No.

7 Q Why then? 

8 A I'm not a fosterite fan.

9 Q I didn't think so. I thought maybe you
10 changed.

11 A I think that -- I'll let you know when my
12 opinions change. I think that we're dealing with a
13 sheared material and a ground or sheared structural
14 degradation of chrysotile lowers its biological
15 potential significantly. Now, if you crush the
16 material or if there is a vigorous mechanical force
17 brought to bear on that surface, that surface
18 property alters.

19 Now, there may be a way of breaking apart
20 chrysotile so that you have a fresh surface. That's
21 a little different and that may still retain
22 biological potential. This short dust if you look at
23 the bulk of the data, in the literature, this short
24 dust produces less effects, laboratory animals in
25 various tissue culture -- in various in vitro systems

LANGER - Direct

1 and I believe that the biological potential is
2 greatly reduced and I think that there's an
3 interesting overview paper which is really hypothesis
4 generating, Frederick Pott of Germany. There
5 Frederick Pott shows a continuum of biological
6 potential but that biological potential starts at
7 about 3 micron length. There's something about the
8 necessity of a macrophage mediated kind of response
9 so I think the very short fiber is unimportant in the
10 grand scheme of things. The longer fiber, we only
11 count 5 micron fibers as a suitable index. It's a
12 microscopy index. It has no biological relevance.

13 Q That's a good answer.

14 A And there are people who have taken on a new
15 position who have collaborated people from California
16 and Edinburgh who believe you need a fiber 20, 30 or
17 40 microns in length before you begin to see
18 carcinogenesis.

19 Q That's certainly not generally accepted
20 at this time, that theory?

21 A Is it generally accepted, no, it's not.

22 Q You kind of touched on the answer and
23 maybe it's because there isn't a definite answer to
24 the question but is there some length of fiber below
25 which you believe there is no risk to develop

LANGER - Direct

1 mesothelioma when we're talking about chrysotile?

2 A Well, with chrysotile, I don't count fibers
3 less than 1 micron in length. There is something
4 that you find in the ambient air, all of the data
5 indicate that this is dead in the water.

6 Q You would then think there's some
7 biological relevance of 1 micron to 5 microns in
8 length in chrysotile?

9 A You mean could they have some? We didn't put
10 an index to it. Could they have some activity, sure.

11 Q How about if we take a short break?

12 (A brief recess was taken.)

13 Q My question is, now we're going to deal
14 specifically with pleural mesothelioma. Let's put
15 the peritoneal mesothelioma aside for the moment. Do
16 you believe that chrysotile asbestos can induce
17 malignant pleural mesothelioma in man?

18 A If the dose is high enough, yes.

19 Q And do you have any particular dose you'd
20 like to offer to me?

21 A I can only offer the doses which are residues
22 of populations which remained in the lung tissue
23 after cessation of exposure, these are generally more
24 than a hundred million fibers per gram of dry light
25 tissue, something on that order.

*How many fibers
induce the tumor? → I (one)*

LANGER - Direct

1 Q Did you say wet gram or dry gram, I'm
2 sorry?

3 A Dry.

4 Q How does that compare with say for
5 example, some of the numbers that Dr. Rogley came up
6 with when he was measuring occupational exposure to
7 asbestos if you're familiar with those?

8 A It would be unfair of me to compare values in
9 our laboratory, my laboratory with those in
10 Dr. Rogley's laboratory because we use different
11 instruments.

12 Q Fair enough. How would you compare this
13 number that you've come up with to your laboratory to
14 an occupational exposure?

15 A I don't understand the question.

16 Q You said approximately a hundred million
17 fibers per dry gram of lung tissue, correct?

18 A Something on that order but this is the low
19 end. I said at least.

20 Q Do you have any experience as to what
21 number of fibers per dry gram of wet tissue you found
22 in occupational exposures in your laboratory?

23 MR. CAMPBELL: You just said wet.

24 Q Dry then.

25 A You just said wet.

LANGER - Direct

1 Q Let's take dry.

2 A Well, without going over all of the techniques
3 and all of the findings, one has to look at
4 averages. They may be arithmetic averages. They may
5 be geometric averages which is derived from logs
6 converted to antilogs. I have recently finished a
7 study of a number of workers in the United States who
8 are occupationally exposed to asbestos. The
9 occupational settings included insulation work and
10 pipe covering, shipyard work in which any trade other
11 than insulation work, any trade which had experience
12 in a shipyard was grouped into a shipyard setting and
13 other trades, meaning brake workers, plasterers, and
14 so on and so forth and these tissues were analyzed
15 and there are differences noted in each of these
16 groups among the different trades so when one says
17 occupational setting, you have to define the
18 occupational setting, what kind of occupational
19 setting, what kind of trade. Are we dealing with
20 construction? Are we dealing with plumbers? Are we
21 dealing with electricians.

22 Q Let's deal with plumbers.

23 A A plumber without a shipyard history tends to
24 have amphiboles in their lung tissues although
25 chrysotile is present and it could be present in high

LANGER - Direct

1 quantities but I did not separately analyze plumbers
2 because I did not have sufficient numbers of plumbers
3 to look at.

4 Q Well, what did you separately analyze
5 that would come close in an analogy to plumbers where
6 we can make an extrapolation?

7 A I'm shaking my head. I don't think that you
8 can use any one group. Perhaps construction trades.
9 What did this plumber do? Did this plumber do only
10 pipe work? Did this plumber engage in activities
11 which more closely resembled steam fitters? Did this
12 plumber engage in activity which was only residential
13 in nature? Did this plumber only engage in specific
14 activities? It's very difficult to think of a data
15 set which might be directly related to this trade.

16 Q Well, what averages did you get with your
17 construction workers?

18 A Construction workers tended to have a moderate
19 amount of dust in their tissues, both chrysotile and
20 amphiboles.

21 Q And what were the measurements?

22 A I just -- I'm blocking on that. Let me tell
23 you what I do have and then we can talk about it if
24 you'd like.

25 Q Okay.

LANGER - Direct

1 A Take insulation workers, insulation workers in
2 the United States, all of them universally have
3 amosite in their pulmonary tissues. About half of
4 these workers have chrysotile as well. A smaller
5 percentage, maybe 20 percent, have some amounts of
6 crocidolite but the crocidolite is less than amosite
7 and it's less than chrysotile for sure. If you look
8 at the geometric means which gets rid of the
9 outliers, you get these odd ball measures, someone
10 who's intensely exposed and smoked cigarettes,
11 therefore the fibers can't get out of the lungs, the
12 geometric means indicate for insulation workers an
13 average of, could be a hundred million fibers per
14 gram of dry lung tissues of chrysotile, maybe less,
15 maybe the hundred is for the mesothelioma case, maybe
16 it's 125 million. I'm sorry. I don't have the data
17 in front of me. I don't want to misspeak.

18 Q Is it published?

19 A Not yet, it is under review.

20 MR. CIFALDI: I'd like to request that
21 information and I'll follow-up with that.

22 Q Do you believe that exposure to fiber
23 concentrations under the now in effect threshold
24 limit value guarantee that an individual won't
25 develop mesothelioma?

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LANGER - Direct

1 MR. CAMPBELL: For what fiber types?

2 MR. CIFALDI: Well, I think the new
3 suggested ruling for ACGIH is it's the same
4 for all fiber types but let's assume
5 chrysotile.

6 A Chrysotile asbestos 0.1 fibers, 0.1 fibers for
7 25 years is 2.5 fiber years. This would be one one
8 hundredth. If we assume of course all factors
9 equal -- we're talking about chrysotile but if we
10 were to compare risks with other occupations, other
11 occupations are exposed to mixed fiber types, that
12 would be one one hundredths. For example, the risk
13 of insulation workers which happens to be an
14 amphibole exposed co-worker but let's assume that it
15 would be one one hundredth of the risk. It means
16 that the risk of mesothelioma is one and one
17 hundredth and the risk of lung cancer would be about
18 that, about one in 1,000 or one in one-half
19 thousand. So if you were to embrace the commonly
20 used models for risk assessment and projection, you
21 know, it is a linear model, you know, it is a model
22 with no threshold. Therefore, for every unit of
23 exposure there is a unit of risk. So your question
24 is will it protect, you have to define what you mean
25 by protection and you must define what you call safe

LANGER - Direct

1 because with the linear dose response, everyone is at
2 risk just for fibers in the ambient air of New York
3 City as an example. ←

4 Q I'll follow-up with a question that could
5 be more specific. Do you believe mesothelioma is a
6 no threshold disease?

7 A Do I?

8 Q Yes.

9 A A no threshold disease, hum, I think that
10 there are data to suggest that there may be a
11 threshold. We're talking about chrysotile?

12 Q Right.

13 A There's a threshold, yes, I do believe that. ←

14 Q And do you have an opinion as to what it
15 is?

16 A No.

17 Q Does amosite have a threshold?

18 A Probably, yes.

19 Q Crocidolite?

20 A Probably, yes, also, but it would have to be
21 less than amosite and amosite less than chrysotile
22 just based on properties.

23 Q Do you believe that mesothelioma is
24 caused by a cumulative exposure to asbestos fiber?
25 Do you have a view about that?

LANGER - Direct

1 A Well, we could talk about the models for
2 mesothelioma, the model includes a dose factor so
3 that the cumulative dose is a factor and calculated
4 risk. However, if one follows the model, the last
5* ten or fifteen years of exposure prior to the
6 clinical appearance of the disease may not factor
7 into the disease itself.

8 Q So you'd -- at least it's your view that
9 the last 15 years would not be relevant to causation;
10 is that fair?

11 A That is the mathematical formulas. That's
12 exactly what it says, the last ten years.

13 Q Okay. The last ten years. So at
14 minimum, you would subscribe to a ten year latency
15 period, a bare minimum?

16 A No, no, no, no, no.

17 Q No, okay.

18 A No, you're talking about a latency period.

19 Q Maybe I'm confusing the two.

20 A That would be -- the latency period and we can
21 use -- let's use Selikoff's data because Selikoff's
22 data is probably the most extensive data set. Irving
23 Selikoff's information published in 1991 at the
24 meeting in New York, there were 4,991 deaths,
25 something like that, and it was insulation cohort and

LANGER - Direct

1 there were 485 mesothelioma. Of those 495 -- 475
2 mesothelioma, no mesothelioma occurred in a time
3 period from onset of exposure to the appearance of
4 the disease less than 15 years. It was somewhere
5 between 15 and 20 and there were very few of them,
6 maybe one or two occurred in that time which means
7 it's a very small percentage. So there the
8 incidence, the proportional mortality increases. It
9 peaks differently for pleural mesothelioma as
10 compared to peritoneal mesothelioma and then after a
11 time period of approximately 50, 55 years, the
12 proportional mortality decreases and there are a
13 number of interpretations as to why that happens.

14 Q So if I can, what is your range of
15 latency period for pleural mesothelioma?

16 A Pleural mesothelioma would be any time
17 after -- generally some 25 years from onset of
18 exposure, it should peak at about 35 years, 40 years.

19 Q Okay.

20 A Something like that. And then it -- the
21 proportional mortality goes down.

22 Q Okay.

23 A It does not continue to rise as the model
24 predicts.

25 Q Now, if an individual has a mixed

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LANGER - Direct

1 exposure, let's say that begins in 1960 for ease of
2 calculation here --

3 A Right.

4 Q -- and they develop mesothelioma in
5 1995 --

6 A Right.

7 Q -- and there is exposure to amosite and
8 chrysotile --

9 A Right.

10 Q -- do you think it is medically sound to
11 ascribe the mesothelioma to one exposure as opposed
12 to another and when I say that amphibole as opposed
13 to chrysotile.

14 A I think you have to look at this in a number
15 of ways. If you're going to talk about fiber
16 synergy, fiber synergy is possible. There are some
17 interesting observations which suggest that mixtures
18 of fibers are more important than single fibers.
19 However, if you look at the data upon which that is
20 based, these data have been derived from trades,
21 occupations and environments that use those kinds of
22 products. So if an insulation worker or a shipyard
23 worker used products which contained both amphibole
24 and chrysotile in poorly ventilated work spaces,
25 shipyard settings where there was a lot of fugitive

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LANGER - Direct

1 dust, very little ventilation, you would see in those
2 highly exposed individuals mixed fiber types. One
3 has to normalize the data on the basis of exposure,
4 and that has never been done.

5 Now, it's an interesting observation. In
6 fact, I have -- some of my data suggests that that
7 may be so. But there are too many confounders which
8 influence the data. There are other factors for
9 which we have little data and little information so I
10 am one of those people who thinks that it may be
11 possible but the information on relative exposures
12 are very, very scant. You can't come to any firm
13 conclusion. I have often said myself that if I found
14 in someone's pulmonary tissues a lot of crocidolite
15 and some chrysotile and this person succumbed with a
16 pleural mesothelioma merely based upon data of fiber
17 type and proportional mortality, I would assume that
18 the crocidolite played a greater role and it's
19 basically the same with amosite. You have to look at
20 the doses.

21 Q But you wouldn't say the chrysotile
22 played no role?

23 A Would I say the chrysotile played no role? It
24 played a much less role, yes. I'd say that.

25 Q Fair enough. If I may, and this may be a

LANGER - Direct

1 little out of the ordinary so I apologize but based
2 upon your review of the information in this matter,
3 actually -- strike that. Let me ask one more
4 question before I get to that. Do you subscribe to
5 the theory expressed by some physicians that the
6 earlier exposures are more important than the late
7 exposures? I.e., if an individual started being
8 exposed in 1958 and developed mesothelioma in 1995,
9 do you subscribe to the belief that his exposures in
10 1958 through 1960 were the cause of the factor and
11 all those thereafter were not and you know what I'm
12 talking about? There's been an article by Morgan
13 some people try to interpret the Peto article based
14 upon the Selikoff data. Do you have a view one way
15 or another on that area?

16 MR. CAMPBELL: I just object to the
17 form. There are about eight different
18 questions in there and my specific objection
19 is I think the first time you asked whether it
20 was more significant and then the second time
21 you asked was it causative and the rest
22 irrelevant, which are two totally different
23 questions.

24 Q You know what I'm talking about? My
25 question is do you have a belief that earlier

LANGER - Direct

1 exposures are more medically significant than later
2 exposures if they're within that period that you
3 discussed? I'm not talking about ten years before
4 diagnosis or thereafter.

5 A Based on the mathematics involved in risk
6 assessment, the answer is yes. The earlier exposures
7 carry far greater risk and greater weight and
8 outcome.

9 Q And why?

10 A You're dealing with an agent which acts over a
11 period of time and it takes a lot of time to produce
12 this particular tumor so the further back one goes,
13 the more likely the earlier exposures are the ones
14 that are responsible. Although, the onset of
15 exposure is terribly important in the generation of
16 risk analysis of cumulative dose factors in there as
17 well. But the earlier exposures drive the time
18 function in that particular mathematical statement.

19 Q Based upon your review of the data in
20 this matter and before we get to the question, what
21 did you review to formulate your opinions
22 specifically in this case and I understand you have
23 vast knowledge that you're aware of. I'm looking at
24 what did you look at for particularly Mr. Norman's
25 case?

LANGER - Direct

1 A Mr. Norman's case, I looked at Mr. Norman's
2 deposition.

3 Q Do you remember whether it was his
4 videotape or his discovery or both?

5 A I believe I had the transcript of his video
6 but it was the transcript of -- let me just follow my
7 notes and I'll --

8 Q Please feel free.

9 A All right. First there are the Answers to
10 Interrogatories which I reviewed. There is his
11 deposition.

12 Q You're reviewing your notes now. What
13 we'll do is we'll mark those P-5 for identification.

14 (Exhibit P-5 was marked for
15 Identification.)

16 MR. CAMPBELL: Dr. Langer has on his
17 notes a date of April 24, deposition I
18 believe.

19 MR. CIFALDI: That would be the discovery
20 dep, I think.

21 A Deposition 24 April '96, correct. I believe I
22 saw some medical reports as well. There was also
23 again notes, I believe this is the transcript of the
24 video deposition of 2 May '96. I believe I saw some
25 medical records as well but they are not -- they're

LANGER - Direct

1 A Well, there is no index in terms of a scale
2 but he lived approximately one, two, three, four,
3 five, six, seven, eight, maybe eight or nine blocks
4 from the plant, maybe ten blocks from the plant.

5 Q Can I see the map for a moment?

6 A Sure.

7 Q I'm not familiar with Paterson. And the
8 Unarco plant was located on Wade Street?

9 A Wade Street, that's right.

10 Q And Mr. Norman lived on Main Street?

11 A East Main Street.

12 Q And how long did he live there based upon
13 your review?

14 A He lived at 70 East Main Street from 1933
15 through 1960.

16 Q And you'd agree with me that his
17 residence is across the river, the Passaic River,
18 correct?

19 A I think that's correct, yes.

20 Q It's across the railroad tracks?

21 A That's correct.

22 Q Okay. Are you suggesting that he had
23 environmental exposure from the Unarco plant?

24 A I'll suggest the following to you, it's a
25 perfectly reasonable question. It is, as you know,

LANGER - Direct

1 there are a number of mesotheliomas which occurred in
2 individuals who are family members of the Paterson
3 Unarco group cohort and environmental mesothelioma
4 has been described in this particular setting, there
5 is one mesothelioma which occurred in the owner of a
6 junkyard which was across the street from the
7 Paterson plant. I know of no other environmental
8 mesotheliomas. However --

9 MR. CAMPBELL: At that location?

10 A Around the Unarco plant.

11 MR. CAMPBELL: As opposed to in the
12 world.

13 A As opposed to in the world, that's correct.
14 We're dealing with a fascinating social history, a
15 fascinating occupational history in which each and
16 every one of these exposures should be studied and if
17 it begins in Unarco with a residence and carries to a
18 father who may carry dust home on his clothes from
19 working with these materials or the fact as a young
20 boy he helped his father in the plumbing trade and
21 helped mix cement or worked as a youngster assisting
22 his father, all of these -- or served in the Navy as
23 a pipe fitter or steam fitter or whatever, all of
24 these are factors which should be studied. I am not
25 suggesting to you that any one of these, for example,

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LANGER - Direct

1 Unarco is the one which produced this mesothelioma.
2 It is a possibility and had this person had no other
3 occupational history, I think that you would focus on
4 the Unarco experience and -- I'm sorry.

5 Q That's okay. You can keep going. I
6 thought you were done.

7 A But basically each and every one of these are
8 possibilities that should be considered and I -- you
9 haven't asked me my opinion.

10 Q I didn't get to that yet.

11 A But I look specifically for amphibole
12 exposures. This is a mesothelioma and I'm delighted
13 that Mr. Norman is surviving and doing well. But
14 tissue burden studies would certainly indicate the
15 kinds of exposures he had and I hope I'm never called
16 upon to analyze his tissues.

17 Q Now, based upon your knowledge of the
18 studies of the Unarco plant --

19 A Right.

20 Q -- it is correct that any mesotheliomas
21 that developed were in family members, other than the
22 one junkyard exposure that you're talking about?

23 A That is my understanding of the data, yes.

24 Q So that from a scientific or medical
25 point of view, that would be fiber brought home on

LANGER - Direct

1 the clothes of the worker?

2 A That is considered to be the factor, yes.

3 Q Are you aware of any environmental cases
4 in the City of Paterson documented from the Unarco
5 plant?

6 A No, there aren't any.

7 Q And in this case, do you have an opinion
8 within a reasonable degree of medical probability if
9 the fact that there was a Unarco plant eight blocks
10 away across the Passaic River played any role
11 whatsoever in Mr. Norman's mesothelioma?

12 A On the scientific evaluation of the literature
13 and on the science basis I believe that the
14 likelihood of this playing a significant role is
15 small. Now, this may be the first case but as I sit
16 here now and judge the literature, I think it's a
17 small role if a role at all.

18 Q Okay. Based upon your review of this
19 case, what do you believe were substantial
20 contributing factors in Mr. Norman's mesothelioma?

21 A First and foremost, I believe that we're
22 dealing with an amphibole etiology. I don't know all
23 of his exposures but I know some of them. I know
24 that his father was a plumber and if we follow the
25 general rules of exposures in dusty places in the

LANGER - Direct

1 '40s and '50s, he's most certainly brought home
2 dusty clothing and I think there's a high probability
3 that he was exposed to dust from his father's
4 clothes. There is also high probability that when he
5 worked with his father as a youngster he was exposed
6 to asbestos containing materials as well. There is
7 also a high probability that when he served in the
8 United States Navy and engaged in activities in the
9 Navy, he was exposed to asbestos further.

10 It is my understanding from reading documents
11 concerning the destroyer that he worked on, the
12 Cassin Young, that the amount of materials on that
13 ship reflected the guidelines used in the United
14 States Navy concerning insulation types and product
15 types which could be used on ship board. There was
16 ample opportunity for amphibole exposure in those
17 circumstances. There was ample exposure for amosite
18 as well. Given the specific product and the
19 brochures provided me with the descriptives of the
20 units which Mr. Norman installed in noncommercial
21 residences, the kind of asbestos products used based
22 on my reading of the literature and my own experience
23 concerning dust is generated from manipulating
24 asbestos-containing gaskets and ropes or wickings,
25 that the chrysotile exposure experienced in those

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LANGER - Direct

1 circumstances were minuscule and played a very minor
2 role in the etiology of his pleural mesothelioma.

3 Q What about if he was removing boilers?
4 Does that figure into your opinion?

5 A No.

6 Q Do you believe the removal of boilers --
7 so not manipulating the rope but actually breaking it
8 apart and pulling it out and scraping out a gasket,
9 do you think that would play a role in his
10 mesothelioma?

11 A Let's talk about boilers. Are we talking
12 about these contained boilers? Are we talking about
13 knock down boilers? Are we talking about commercial
14 boilers?

15 Q We're talking about the boilers that
16 Mr. Norman mentioned in his deposition, packaged
17 boilers, but he's talked about pork chop boilers or
18 sectional boilers.

19 A The contained boilers he would not have to
20 have broken apart. They just go in and out as
21 units. It is my understanding from my own studies
22 that the removal of used gaskets produces, at least
23 in the gaskets that I studied, produces minuscule
24 levels of asbestos exposure. We are talking about he
25 did not replace these, these are old units. You talk

LANGER - Direct

1 about the removal of boilers. I would think that
2 those exposures were very small based on a reading of
3 the literature and time weighted averages, these
4 would be a very minor component to his overall
5 exposure.

6 Q What about his exposure to pipe covering
7 during the time period he was a plumber?

8 A That's a different story.

9 Q What would your opinion be? For example,
10 you recall him being exposed to Owens-Corning pipe
11 covering. Based upon your knowledge, would that be a
12 substantial contributing factor in his mesothelioma?

13 A Well, without specific products, there have
14 been studies of manipulation of asbestos-containing
15 pipe insulation. These products -- this is a rip
16 out. These product, I'm just assuming that you're
17 talking about --

18 Q Let's actually break it down. That's a
19 good point. Let's talk about installation and then
20 let's talk about rip out.

21 MR. CAMPBELL: Does the installation
22 include cutting to size?

23 MR. CIFALDI: Oh, sure.

24 MR. CAMPBELL: Okay.

25 A There was a study completed in the 1970s by

LANGER - Direct

1 Tebbens and colleagues, T-e-b-b-e-n-s on the
2 installation of -- actually and removal of a thermal
3 insulation products, there were four products studied
4 for pipe covering, products were designated by
5 alphabetical notation rather than product type and
6 the products were manipulated by hand sawing, by
7 scouring, by cutting with implements of various kinds
8 and the dust concentrations measured and the dust
9 concentrations varied from 40 fibers to a thousand
10 fibers per cc. So we're talking about an
11 extraordinary mission. The rip out of an old pipe
12 insulation in which the properties of the cementing
13 agent may change with time because of thermal stress,
14 the knock off with a hammer will generate enormous
15 aerosols. There are data from shipyards, poorly
16 ventilated work spaces in which insulation on pipes
17 approaches hundreds of fibers for sure. Again, these
18 are not time weighted averages. These are the
19 initial burst depending on the fiber, type and
20 depending on the fiber dimensions, the aerosol
21 stability will change with time but these are
22 considered to be -- what's the right word, important
23 exposures.

24 Q Were they important exposures for
25 Mr. Norman?

LANGER - Direct

1 A If he --

2 Q Based upon your review of the
3 transcripts?

4 A If he experienced these in poorly ventilated
5 areas for some proportion of his work time, these
6 must be calculated into his risk, yes.

7 Q And when you say that, would you consider
8 them substantial contributing factors in his
9 mesothelioma?

10 A I would consider it if these products
11 contained an amphibole fiber. We've talked about
12 amosite. There are pipe coverings of block that did
13 contain crocidolite as well. In fact, there was a
14 major manufacturing facility outside of
15 Johns-Manville that produced crocidolite block. This
16 could represent and I'm sitting here thinking what do
17 we know about the numerical values, not much, but
18 just on the basis of availability of data in the
19 literature and the availability of an amphibole
20 exposure, this would have a major role in the
21 etiology of the tumor.

22 Q And is it your understanding based upon
23 your review of the Rheem materials that it was
24 intended that the piping that went to and from the
25 boilers would be insulated with pipe covering?

LANGER - Direct

1 A I don't think that that phrase was used. I
2 think that the -- you're talking about the new
3 connections. The new connections called for the use
4 of a -- either an asbestos-containing material or a
5 similar suitable material of the same properties.

6 Q Now, I'd like to ask the same series of
7 questions with regard to asbestos-containing wet
8 cement.

9 A Wet cement already --

10 Q Premixed?

11 A -- premixed.

12 Q Now, you've done some studies on
13 spackling materials after the material is installed
14 or sanded or chipped off?

15 A Right.

16 Q And what levels did you find with the
17 spackling materials? Can you approximate for me?

18 A Well, as you know, the spackling materials
19 represent -- represents a Plaster of Paris carbonate
20 kind of mixture and yes, we did find high levels of
21 of fibers liberated, although as I sit here, I have
22 problems extrapolating that data set to a cement
23 because we're dealing with a different matrix and a
24 different mechanical property.

25 Q Do you have an opinion then with regard

LANGER - Direct

1 to the sanding or chipping of wet cements after
2 they're installed?

3 A The fiber release would probably be of much
4 less and I'm stating that because the matrix material
5 is so much harder. We're really dealing with very
6 different materials after the crystallization. One
7 is a basanite or a Plaster of Paris which is a
8 relatively soft material and the other is a very
9 durable indurated, tough, mechanically strong
10 material.

11 Q Would you agree that the fiber generated
12 on sanding or chipping out the wet cements would
13 certainly be far in excess from packaging or
14 gasketing material?

15 A Far in excess? I think it may be -- it may be
16 higher. I'm sitting here thinking would it be
17 higher. It may be higher. I don't know how much
18 higher, the packings, the wickings could be graphite
19 impregnated and you're not going to see much there.
20 If you use an aggressive physical -- I mean if you
21 use a jackhammer, obviously you're going to generate
22 a dust. But if you're going to whack it off with a
23 hammer, depending on the particle size, I don't
24 know. You know this is an interesting problem here.
25 I don't know.

LANGER - Direct

1 Q If we can, can we refer to your oral
2 report for a moment?

3 A Sure, why not?

4 Q Page 2 and maybe you can just refer to
5 the one you have your notes on.

6 A Right.

7 Q You say that -- this is just above the
8 bottom paragraph there on Page 2A. "Dr. Langer will
9 further base his opinion that the asbestos-containing
10 rope and gaskets contain and certain Rheem and
11 Richmond gaskets contain chrysotile asbestos only on
12 the appearance and characteristics of those
13 products." Have you looked at the products?

14 A They're described in -- I believe in
15 Mr. Norman's deposition. He said that these were
16 white ropes or gray ropes.

17 Q So the appearance you're basing it on is
18 Mr. Norman's description, not looking at the products
19 yourself?

20 A I have not seen the products directly but the
21 characteristics of the products meaning that if you
22 read the boiler brochures like these are residential
23 hot water heaters, these are low temperature gizmos.
24 They heat water to whatever, 140 degrees Fahrenheit,
25 160 degrees Fahrenheit, you would not require

LANGER - Direct

1 terribly high temperature materials. As a matter of
2 fact, you may not even require asbestos on a lot of
3 these things.

4 Q When he says white rope, would that
5 indicate to you that that's not graphite impregnated
6 because if it was, it would be more of a dark gray
7 material?

8 A Yes.

9 Q So is it fair that it is not graphite
10 material at least based on his description?

11 A At least based on his description, yes.

12 Q Fair enough. I don't want to go into a
13 long discussion but certainly should not limit you
14 but on Page 3 it says, "Dr. Langer will state that
15 the difference in the relative carcinogenicity of the
16 different fiber types is largely a result of the
17 mineralogic differences between these fibers."

18 A Among these fibers. Okay. "Between" is what
19 is written.

20 Q Yes.

21 A All right.

22 Q Should it be among?

23 A Well, if you have more than two.

24 Q I didn't think it was highly
25 significant. Could you explain what you mean by

1 that?

2 A All right. This is what I believe, I believe
3 the original description of mesothelioma in South
4 Africa --

5 Q By Dr. Wahner?

6 A Wahner-Sleggs Marchand reported the
7 distribution of mesotheliomas in the area of South
8 Africa, in the western Cape province centered around
9 crocidolite deposits. Interestingly South Africa
10 mined and milled not only crocidolite but amosite and
11 chrysotile and if you look at the distribution of
12 mesotheliomas following up, for example, several
13 years later the development of a South Africa
14 mesothelioma reference manual, the distribution of
15 mesothelioma continued to be mostly around the
16 chrysotile areas, the Kuruman, K-u-r-u-m-a-n area.
17 The Transvaal amosite had very few. There may have
18 been four described of which two had prior experience
19 in the crocidolite area. Now, that was interesting
20 because there's a little bit of crocidolite in that
21 Transvaal area in a mine called Petersburg and then,
22 of course, they had the major chrysotile deposits
23 down in Havelock and Barbitone and they had no
24 mesotheliomas down there. I think there was one
25 reported.

LANGER - Direct

1 Q Did those mines all open at the same
2 time?

3 A A little different, as a matter of fact. They
4 opened at different times but all of them had more
5 than 30 years from onset of exposure.

6 Q So there was sufficient latency?

7 A Yeah, I think there was sufficient latency
8 there. Now, the pneumoconiosis research unit in
9 Wales was struck by an unusual distribution and
10 Vernon Timbrell, T-i-m-b-r-e-l-l and Fuley and
11 Farvaga explored the possibility that there was
12 physical chemical properties of the fibers which
13 controlled this pattern, this distribution of tumors
14 and they examined fibers from the different mines and
15 the different mills and they clearly showed that the
16 amphibole fibers, the crocidolite was very much
17 thinner and that the settling velocity of a fiber was
18 proportional to the diameter. It's actually a --
19 it's about equal to one over the diameter squared,
20 something like that. And what they showed was that
21 the fibers from the Cormin (phonetic) area tended to
22 be aerosol stable because of the narrow diameter they
23 tended to have a greater inhalation potential and
24 these were the fibers that could get out to the
25 distant sites of the pulmonary --

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LANGER - Direct

1 Q And the Cormin area is crocidolite?

2 A Indeed, that's right. And they compared these
3 fibers with the Petersburg crocidolite and the
4 amosites from the various mines of South Africa in
5 the Transvaal, for example, the large Penge Mine
6 P-e-n-g-e and they found -- and they compared this
7 with the fibers produced from Finland which is an
8 anthophyllite fiber, a-n-t-h-o-p-h-y-l-l-i-t-e, and
9 the anthophyllite fiber was very broad and there is
10 no mesothelioma his reported there.

11 Q Recently there's been some reported in
12 the literature, wasn't there, in Finland with regard
13 to anthophyllite?

14 A Yes, but the anthophyllite typically showed
15 mixed fibers so that is still unresolved but if you
16 look at the delivered dose to the target tissues,
17 certainly crocidolite is far more capable of being
18 inhaled than the other amphibole types. Now, Vernon
19 Timbrell also did some experimental work using glass
20 casts of a pig lung and he mechanically hooked up a
21 breathing apparatus to this mechanical cast and he
22 used aerosols of crocidolite and amosite and
23 chrysotile and that's where the curly hypothesis was
24 generated that it was approximately six times more
25 dust collected on a filter at the end of the terminal

LANGER - Direct

1 bronchial from an aerosol of crocidolite as compared
2 to chrysotile. What this says is that if there's an
3 aerosol with different fiber types, the amphiboles
4 are more efficacious at penetrating the pulmonary
5 architect of chrysotile and this was the beginning of
6 physical chemical properties influencing biological
7 outcome.

8 Q So if I can just maybe put this in more
9 layman's terms --

10 A I thought I did.

11 Q What you're basically describing is that
12 since at least the size is over 20 microns,
13 chrysotile fiber is a more curly, wavy as you were
14 taken straight sticks, it's less likely to be inhaled
15 into the deep portions of the lung. Is that
16 basically what you're describing here?

17 A Well, you use the 20 micron cut-off. That's
18 kind of interesting. It is in our body and it is in
19 most products more curly but you're talking about the
20 stuff that you can get down to vary small particle
21 sizes, is there a difference in chrysotile,
22 chrysotile actually does have a little bit of a curl
23 and has a greater -- because of its radius of
24 curvature, it does have a different diameter.
25 They're very short stuff. I mean if you're talking

LANGER - Direct

1 about stuff less than a micron. It's all straight,
2 sure.

3 Q What about 5 microns five or less, would
4 you agree most of that is straight?

5 A No.

6 Q What's your view?

7 A My view is that when you start to get down at
8 the 5 micron and less, you still see curly, when I
9 say curly bundles, bundles with curvature I'm not
10 saying 180 degree turn around, I'm saying a curvature
11 which is more marked than for the amphiboles. They
12 look like straight sticks certainly amosite of
13 course. Crocidolite, well, it depends on where you
14 get your crocidolite from.

15 Q Do you think that would be the reason
16 that when you look into the pleural tissue the
17 chrysotile you're finding is generally shorter
18 chrysotile based upon maybe the physical chemical
19 characteristics you're espousing here? Would that
20 make some scientific sense?

21 A Well, I think that when you look at the short
22 stuff out there, if it was in the pulmonary tract to
23 begin with, it was removed, could have been removed
24 in the lymphatics and it could drain along the
25 pleura. It could be originally inhaled that way or

LANGER - Direct

1 it could be breakdown product of some other --

2 Q Because you did agree with me that maybe
3 up to 95 percent of the fiber at least used in the
4 United States, chrysotile was at least under 5
5 microns. You agreed to that before?

6 A We're talking about commercial stuff now?

7 Q Yes.

8 A That's a very interesting question. The
9 commercial stuff, there is no such thing as a short
10 commercial fiber, if I may be so bold as to suggest
11 that. If you look at the sizing method, the Quebec
12 Screening Method. The Quebec Screening Method is a
13 method used to size fibers in which 16 -- a pound of
14 material is put on a screen and there are three
15 screens in a series and a catchment plate -- well,
16 that bottom screen is of such size that particles
17 less than, I think it's about a thousand microns --
18 it's about a million meter in length, fall through
19 it. And depending on the amount of material caught
20 on each of these screens, it determines the grade so
21 if you're talking about textile grades there's a lot
22 of long stuff up on top. So the nearest ounce, a
23 textile grade may be 14, 2, 0, 0, something like
24 that. A material used in a floor tile may be 0, 2,
25 6, 8, something like that, or the stuff that's in the

LANGER - Direct

1 throat or the stuff from California, maybe 0, 0, 1,
2 15, but it doesn't mean it's short fiber
3 biologically.

4 Q I guess it may be the next question I
5 should ask you, are you familiar, is there a
6 difference between the fiber, the chrysotile fiber
7 mined in South Africa as opposed to the chrysotile
8 fiber mined in the Canadian mines?

9 A You mean in terms of?

10 Q Physical characteristics?

11 A I believe that the fibers from South Africa --
12 you're talking about the Republic of South Africa?

13 Q Yes.

14 A TRSA, the fibers tended to be a little more
15 harsh. My understanding so that when they made their
16 way to the textile mills or the mills in Great
17 Britain, there was a -- the Canadian fibers at least
18 received in the United Kingdom were more spinnable or
19 "better quality", better quality put that in quotes,
20 for whatever that application was. The South African
21 fibers occupied a more intermediate space quality and
22 the Russian fibers were the poorest qualities. They
23 were very harsh.

24 Q Is there some reason, do you have an
25 opinion as to why in the Quebec chrysotile miners

LANGER - Direct

1 there was clearly a higher rate of mesothelioma than
2 seen in the chrysotile miners in South Africa?
3 A Well, let's talk about rates, the rates in the
4 mines and mills of Quebec, that would be the eastern
5 townships all of the work of Corbett McDonald or
6 let's take Bill Nicholson? Why not. Let's take
7 Nicholson's work 1979, Thedford Miners and Millers.
8 He had approximately -- floor 28 lung cancers, 11
9 were expected, 18 excess and it produced whatever the
10 SMR was, the standardized mortality ratio and it was
11 very similar to some of the values produced by
12 Corbett McDonald. He saw one mesothelioma in the
13 connected materials because they have best evidence
14 in the Mount Sinai groups. So there was one
15 mesothelioma that accounted for about 0.5 percent of
16 the mortality, maybe there were 179 deaths, 181,
17 something like that. South African experience is a
18 little more difficult to deal with because of
19 follow-up. So there are two issues, one is
20 ascertainment. Do you know what you're looking at?
21 Do you know what killed someone and the other is
22 follow-up. If someone works for five years and then
23 returns to Zaire, how good is the follow-up? In
24 other words, not very good. So the data from South
25 Africa are kind of suspect in that regard. Although

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LANGER - Direct

1 the compensation for asbestos disease in South Africa
2 requires that if a miner or miller dies that the
3 thoracic organs be examined. So that -- at least in
4 the northwest cape province in the Transvaal the
5 ascertainment was a hell of a lot better but if it
6 was a migratory population follow-up is difficult so
7 there are some questions about numbers.

8 Q With regard to the mesotheliomas caused
9 in the chrysotile mines in Canada, do you hold an
10 opinion as to whether those mesotheliomas were
11 induced by the chrysotile or by the alleged tremolite
12 contamination?

13 A I like the way you said that, the alleged.

14 Q Well, there is some question as to
15 whether or not there is tremolite contamination.

16 A That's right. If the doses are high enough, I
17 will follow the suggestion of Andrew Churg that if
18 the doses are high enough, in fact the amount of
19 fiber he found in the pulmonary tissues of those six
20 mesotheliomas that he reported on in a number of 90
21 some odd that the amount of fiber is of such high
22 level that it's sufficient to produce asbestosis as
23 well. I think that that's generally correct. You
24 need a whopping dose to see mesothelioma in
25 chrysotile exposed workers. Now, I'm saying

LANGER - Direct

1 chrysotile. You asked about tremolite. The
2 tremolite may be present. Well, it is not
3 ubiquitous. There is a temporal fluctuation, a time
4 fluctuation and geographic distribution and the
5 material that they call tremolite may or may not be
6 tremolite asbestos but rather maybe tremolite
7 cleavage fragment.

8 Q Which would have no biologic activity?

9 A It has about 300,000 times less based on
10 animal studies or it may be some calcium magnesium
11 silicate but there is something very different about
12 the distribution of these other silicate minerals in
13 the eastern township. You see more of them in the
14 Thedford area than down in the asbestos Quebec area.
15 Did I answer your question.

16 Q I'm not sure?

17 A I'm not sure either so let me continue.

18 MR. CAMPBELL: Let him ask another
19 question.

20 Q I think you did answer my question but
21 let me get some sound bite so it's better. Based
22 upon the explanation that you just gave me, are you
23 saying that you're willing to say that in at least
24 those particular cases that chrysotile was the cause
25 of the mesothelioma and it wasn't as a result of some

LANGER - Direct

1 potential or alleged tremolite contaminations?

2 A In those few cases, yes, I think that the
3 chrysotile is implicated. Now, this is not -- this
4 may not be widely held but that is my opinion based
5 upon my knowledge of the mineralogy and geology and
6 the tissue burden studies.

7 Q Fair enough. Do you have a view as to
8 what types of fibers would go into asbestos cements?
9 Was that purely chrysotile?

10 A No, asbestos cements occasionally -- well,
11 asbestos cement pipe, a high pressure pipe with a
12 diameter of greater than 20 inches invariably --
13 well, up until 20 years ago contained crocidolite.

14 Q At least some of them?

15 A At least some of them. Although there have
16 been manufacturing processes which did use chrysotile
17 only.

18 Q Now, can you say with any certainty as to
19 any of the pipe coverings Mr. Norman used contained
20 crocidolite or you have no information one way or the
21 other?

22 A I have no information.

23 Q Fair enough. With regard to asbestos
24 cement, I'm not talking about asbestos pipe now,
25 based upon your knowledge that you've gained, did

LANGER - Direct

1 asbestos dry or wet cements only contain chrysotile?

2 A I don't know.

3 Q Okay.

4 A They may not have contained asbestos. I mean
5 there are cements that do not contain asbestos.

6 Q Well, let's say the one that they did say
7 contained asbestos. Companies manufacture asbestos
8 cement. You're familiar with some of them?

9 A Yes.

10 Q Did they also contain chrysotile or did
11 they also contain amphiboles?

12 A According to my own knowledge, the cements
13 used -- other than pipe, transite pipe contained
14 chrysotile. Whether or not they contained an
15 amphibole as well, I don't know. That may be a
16 formulation of the individual manufacturer.

17 Q And you have no knowledge one way or the
18 other?

19 A No.

20 Q Fair enough. Now, on the last paragraph
21 if I may explore it a little of your oral report.
22 You have that there?

23 A Yes.

24 Q It mentions there are several asbestos
25 free cements suitable for use on or in boilers. Can

LANGER - Direct

1 you tell me when they first became available?
2 A I have a brochure from Johns-Manville and I
3 brought some of these which are dated, we were doing
4 work, the insulation hygiene study at Mount Sinai in
5 the late '60s and early '70s and I knew from my own
6 experience that there were a number of nonasbestos
7 containing cements and products like fire box walls
8 and things like that which contained refractory
9 materials which did not contain asbestos and indeed
10 these are from the late '60s. I cannot speak for
11 time periods before then.

12 Q So --

13 A Mines --

14 Q I'm sorry what you're speaking now is
15 late '60s forward?

16 A That's right.

17 Q Would you agree that the substitutes or
18 the asbestos free cements were generally utilized in
19 higher temperature environments because they ↙
20 withstood more temperature than asbestos did?

21 A Generally, these were high temperature
22 applications.

23 Q Okay.

24 A Generally so, yes.

25 Q So if you were -- like in an industrial

LANGER - Direct

1 setting, I mean if you were in a residential setting
2 you wouldn't need these higher temperature
3 substitutes?

4 A I don't know. That's a question of Mr. Norman
5 and the plumbers whether they -- it's very much like
6 an application in which one of the trades has a
7 material from some other job site? Would they use up
8 the material that they had, they probably would. I
9 don't know. This is a question of the plumbing
10 supply houses and so on.

11 Q Okay. Let's see. Now, there's also some
12 yellow notes here that consists of, it looks like
13 four pages and if we can mark that P-6 for
14 identification.

15 (Exhibit P-6 was marked for
16 Identification.)

17 Q Can you tell me what these yellow notes
18 are that are marked P-6 for identification?

19 A Well, this is obviously my notes on the
20 history in the Navy. I see here -- well, they are a
21 little out of order but I see products on the Cassin
22 Young, a Fletcher Cast Destroyer on which Mr. Norman
23 served. He was a pipe fitter and boiler operator and
24 I went to the -- I read the report showing the
25 various products that were used on the ship as

LANGER - Direct

1 preserved 40 years earlier, preserved in this
2 particular naval museum. I was interested in
3 bystander exposure from work on ships and ship board.

4 Q So you looked at the Harris article?

5 A I looked at the Harris as a starter, that's
6 right and I looked at some of the data that I had on
7 the studies from Mount Sinai when we should I had
8 shipyard workers including Groton, Connecticut which
9 was a pipe fitters local and the amount of materials
10 and so on and so forth and the bystander exposures
11 and the fact that ship board exposures are
12 considerable and important. Then on Page 3 just to
13 calculate relative risk, the early events in fact we
14 spoke about this, the early events as compared to the
15 late events and just based on the time function.

16 Q Is it fair to say that you reviewed the
17 information on the Cassin Young after your oral
18 report was prepared?

19 A Yeah, I think so, yeah.

20 Q Okay.

21 A I basically describe exposure if someone mixed
22 muds, my green sheets shows the insulation hygiene
23 reports that were published in the -- they were
24 published four times a year in the asbestos worker on
25 the nature of dust generated in various insulating

LANGER - Direct

1 activities such as mixing muds and cements and stuff
2 like that, the importance of fugitive dust and the
3 articles by tension and on the pipe fitting and
4 removal, so on and so forth. So these represent my
5 stream of consciousness on where the risks occurred,
6 the finer types, the environments of working on a
7 ship, what kind of an experience is generated there
8 and based on the very early exposures in a ship with
9 an amphibole product using the union carcinogen
10 factor of amosite sufficient like that and the
11 relative dose what would the risks be starting in
12 1940 and 1950 and so on and so forth.

13 Q We'll get to that in a moment. Do you
14 remember when the Cassin Young was decommissioned?

15 A No.

16 Q It the report that you read on the Cassin
17 Young was that a report on the pipe covering and
18 other asbestos products that were on the Cassin Young
19 when Mr. Norman was on it?

20 A This is the Cassin Young frozen in time
21 sitting in a dock in New England somewhere in which
22 insulation products, covers and other materials were
23 examined, specimens obtained and analyzed.

24 Q So that's now?

25 A This is time equals now. This would be 24

LANGER - Direct

1 July 1996.

2 Q So do we know -- does that mean that's
3 what was on the ship when Mr. Norman was on it?

4 A One assumes that. Someone would have to
5 verify that who was there serving on the ship.

6 Q Well, I'm saying how do we know that
7 what's in that report was what was on there? Pipe
8 covering gets installed and removed, right?

9 A Sure.

10 Q So wouldn't it be important when the ship
11 was decommissioned because if the ship was
12 decommissioned in the '60s it would certainly be a
13 fair assumption that that insulation was removed at
14 least once since the 1950s?

15 MR. CAMPBELL: Objection to the form of
16 the question. That's not necessarily a fair
17 assumption. You can argue that to the jury.
18 You can ask him his opinion.

19 A It's possible, sure.

20 Q Wouldn't it be actually probable?

21 A I don't know when the ship was decommissioned
22 and I had the very same question myself. We are
23 looking at an historical sample and the question is
24 how far back do these samples go? It's possible that
25 everything's been changed on the ship. It's possible

LANGER - Direct

1 but if the ship was commissioned during the Second
2 World War, everything on the ship might have been
3 anthophyllite but again this is unknown at least to
4 me.

5 Q And when you reviewed Mr. Norman's
6 depositions, did you note that he indicated he had
7 exposure or didn't have exposure at least to his
8 knowledge in the Navy?

9 A He said he was not exposed.

10 Q Okay.

11 A At least not directly exposed.

12 Q So do you have an opinion if Mr. Norman
13 was exposed on the ship?

14 A Probably yes.

15 Q Directly or indirectly or both?

16 A It could have been he may have forgotten or
17 maybe his testimony is accurate and it may have been
18 fugitive dust.

19 Q Fair enough.

20 A But if we're talking about the pipes being
21 repaired or whatever, he was probably exposed to at
22 least to fugitive dust.

23 Q But there are a lot of cold water pipes
24 on ships, too, aren't there?

25 A Yes, the ships do have insulation on those

LANGER - Direct

1 pipes which are low temperature insulation to keep
2 the pipes from -- I think the term is sweating.

3 Q Sweating and that's most of the times not
4 asbestos?

5 A Or a mixture of cellulose and chrysotile. It
6 could have been fiberglass. That's correct.

7 Q Okay. You were one of the authors in an
8 article entitled Asbestos Exposure During Brake Line
9 Maintenance and Repair that appeared in Environmental
10 Research in 1976, correct?

11 A Yes.

12 Q With Dr. Rohl and --

13 A Yes.

14 Q -- a couple others?

15 A Et al.

16 Q Et al.

17 A Right.

18 Q Okay?

19 A I'm glad you're reading that paper. It's a
20 good one.

21 MR. CIFALDI: Off the record.

22 (A discussion was held off the record.)

23 Q There's a comment -- that's actually a
24 couple of comments that I'd like to go over if I may
25 with you.

LANGER - Direct

1 A Sure.

2 Q I understand that this was written in
3 1976.

4 A Right.

5 Q And please feel free that if there's
6 something you don't agree with anymore, just tell
7 me. I'm not saying this has to be your view now. So
8 you're free to tell me that.

9 A Thank you.

10 Q There's a point here on Page 1250 and the
11 sentence I'm concerned with is as follows, and let me
12 read the whole sentence actually. "In ten brake drum
13 dust samples examined, it was found that asbestos
14 fibers shorter than .4 micrometers predominated. The
15 OSHA asbestos standard does not require that short
16 fibers (Less than five micrometers in length) be
17 counted or controlled. This oversight may have
18 considerable biological significance in that small
19 chrysotile fibers readily produce asbestos disease."
20 Did you agree with that statement at the time it was
21 written?

22 A Yes.

23 Q Do you still agree with that statement?

24 A It's kind of interesting. This statement
25 again is a statement which reflects the data at that

LANGER - Direct

1 time. There were experiments which showed that short
2 fiber did produce disease at least in animals. We
3 knew at that time that the five microns fiber length
4 was an index and it was based on a number of
5 prevailing theories on the origin of asbestosis. We
6 knew that this five micron fiber length was generated
7 as a tool for the microscopies because it was very
8 difficult to diagnose shorter fibers and it led to a
9 lot of variability in assays. We knew all these
10 things. At that time we were unwilling to dismiss
11 very short fiber. However as time went on and a
12 number of other experiments, the work of Davis and JM
13 had Davis in Edinburgh, the work in some of the
14 German laboratories, the work of -- the work of
15 others generally so, short fiber has much less
16 biological potential. Now, I knew at that time in
17 fact we published on this that it depends how you get
18 the short fiber. I believe that the grinding and the
19 stresses to which chrysotile is subjected at that
20 brake interface alters the properties of chrysotile
21 and we followed that up in 1978 with the paper on the
22 progressive milling of chrysotile asbestos and showed
23 that when you milled the hell out of these things
24 they lost biological potential and I think that that
25 is so -- my beliefs are that the bulk of the problems

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LANGER - Direct

1 of the brake industry arose from the beveling and
2 fitting and re-arcing and refurbishing of materials
3 and products using devices which did not produce
4 short fiber but produced an aerosol of virtually
5 unaltered fiber.

6 Q So grinding?

7 A You can grind a brake and because of the
8 phenolic resin binder, you can pull fibers out of
9 that.

10 Q You can?

11 A Can, yes.

12 Q Yes.

13 A C-a-n pull fibers out of it and we believe
14 that some of the levels that we found for example,
15 beveling and fitting truck brakes which is a bigger
16 brake surface and a different kind of device and so
17 on could play -- could generate an aerosol with
18 biologic activity, yes.

19 Q Now, in the article we're referring to, I
20 believe you also did some levels of sweeping the
21 floors around the grinder, correct?

22 A Yeah, there was a few, there was -- there were
23 a few measurements made in sweeping; sweeping raises
24 dust.

25 Q Do you believe with regard to the

LANGER - Direct

1 installation of asbestos products that reentrainment
2 has to be something to be considered when you're
3 looking at the fiber exposure or the total exposure.

4 A It's factor, yes.

5 MR. CIFALDI: Off the record.

6 (A discussion was held off the record.)

7 Q Do you remember writing a paper to the
8 Environmental Protection Agency in 1986 about some of
9 the restrictions and proposals that they were
10 presenting?

11 A Yes.

12 Q As you sit here today, do you believe
13 chrysotile should be banned in the United States?

14 A No, for most applications, no.

15 Q Why is that?

16 A I believe that when you look at the risks
17 associated with chrysotile asbestos and you look at
18 the fiber levels which are found today and you look
19 at the control strategies and methodologies used in
20 most industries, that the risks associated with those
21 low level exposures to chrysotile asbestos compares
22 favorably with risks associated with substitutes and
23 there are applications with substitutes which do not
24 perform as well and these substitutes may be
25 problematic in and of themselves.

LANGER - Direct

1 Q Do you believe there should be any
2 appropriate controls recommended if the use of
3 chrysotile continues?

4 A Of course.

5 Q What would you suggest?

6 A The controls are those controls which are used
7 today that should be a stringent work practice, that
8 workers who handle asbestos products should not smoke
9 cigarettes -- well they shouldn't smoke cigarettes
10 anyway.

11 Q Period.

12 A That there are varied strength respirators
13 available which are comfortable which are safe, which
14 should be used. That the general environment should
15 be protected and we can continue to use a very good
16 product at very little risk.

17 Q You also wrote an article in 1971
18 Chrysotile Asbestos in the lungs of persons in New
19 York City?

20 A Right.

21 Q Did you ever analyze the lungs of persons
22 in New Jersey?

23 A No --- wait a minute, I misspoke, I analyzed
24 maybe a half dozen cases of Unarco workers with
25 amosite, of course. I analyzed the lung tissue of a

LANGER - Direct

1 worker in a plant somewhere in New Jersey exposed to
2 be anthophyllite asbestos. I analyzed the lung of a
3 worker exposed to vermiculite, I analyzed the worker
4 exposed to talc but not a systematic study.

5 Q In the study that you did in New York --

6 A Yes.

7 Q -- and maybe you've updated this date and
8 I'm not sure. What levels did you find for dry gram
9 or wet gram just for nonoccupational exposure?

10 A There was data published in a paper in 1991 or
11 1992. I'm not sure.

12 Q Is it on your CV?

13 A Yes.

14 Q Can you point it out to me?

15 A Yes.

16 Q The article that you've marked is the one
17 you were talking about it's number 60 on your
18 references here --

19 A Yes.

20 Q -- that you've written. Have you ever
21 spoken to DRI?

22 MR. CAMPBELL: Who?

23 Q DRI, Defense Research Institute?

24 A You mean have I ever had any dealings with
25 them?

LANGER - Direct

1 Q Yes.

2 A Yes, they've invited me to present at some of
3 their meetings, their conferences, yes.

4 Q On how many occasions have you presented
5 if you can recall?

6 A Several.

7 Q When was the most recent?

8 A I think they had a meeting in New York and I
9 shared the platform with Bernard Gee G-e-e.

10 Q Was that the Marriott Marquis, was it
11 not?

12 A The Marriott Marquis is correct. Don't ask me
13 to spell that. I think it's two Rs and two Ts.

14 Q And the outline that went with the
15 presentation, was that prepared by you?

16 A I don't recall.

17 Q And I didn't bring it with me, oh, well.

18 A I think that was Bernie Gee's outline.

19 Q Okay.

20 (A discussion was held off the record.)

21 MR. CIFALDI: I believe that's all the
22 questions I have. What I'd request is if we
23 can just kind of assemble. Can I have those
24 for a moment.

25 MR. CAMPBELL: Absolutely.

LANGER - Direct

1 Q Actually there was one thing that I
2 wanted to open up so back on the record. I lied.

3 A You misspoke.

4 Q I misspoke. That's a better term. In
5 what is marked P-6 for identification, Doctor, you
6 have some relative risks, I believe, that you've
7 written down here?

8 A Yes.

9 Q Could you just explain it to me?

10 A What this shows is the general --

11 Q And if you don't mind, I'm just going to
12 go over your shoulder.

13 A Sure, can I have your pen?

14 MR. CAMPBELL: Black good?

15 A Yeah. The general formula, that mathematical
16 formula that we talked about which defines risk in
17 terms of mesothelioma is based on three general
18 factors, one is the cumulative dust which means the
19 more you're exposed, the worst off you are. Second
20 is a value called, it's a constant, a K sub M. That
21 is the unit carcinogenicity basically for
22 mesothelioma and this brings in fiber type because
23 the KSM values change according to fiber type,
24 depending on your cohorts. Then there's a time
25 factor and it's really time from onset of exposure

LANGER - Direct

1 and another time factor which is your time of total
2 exposure over which you have cumulative dose. This
3 is raised time is raised to an expediential power of
4 some kind. Normally it's somewhere between three and
5 four as defined in Julian Peto's paper and that paper
6 is Peto, Sideman and Selikoff.

7 Q That's the one based on he tried to fit
8 the model but he only used ten people, didn't he?

9 A Correct, correct, correct, this is based on
10 ten data points from Irving Selikoff's insulation
11 worker cohort.

12 Q Hasn't he cautioned people in subsequent
13 chapters he's written that you really shouldn't be
14 applying this to situations because it's only a model
15 based on ten people and it's never been formulated to
16 other situations?

17 A This is correct and this has been raised in a
18 number of meetings.

19 Q Okay. I'm sorry.

20 A This is absolutely correct. It has been in
21 some fashion adopted by the Consumer Product Safety
22 Commission of the United States, by the United States
23 Environmental Protection Agency, by the National
24 Institute for Occupational Safety and Health, by the
25 International Program for Occupational Safety so on

LANGER - Direct

1 and so forth.

2 Q All on those ten people?

3 A You are correct. This is based on ten data
4 points and if you were to explore the original
5 description which would be the 1983 paper, there's --
6 or there are contained -- there is contained within
7 that document a number of statements which state that
8 this is for the insulation workers, this follows
9 exposure to amphibole fibers and that given different
10 exposures to different fiber types in different
11 situations, this may vary, yes, you're correct. But
12 you're asking me about these risks.

13 Q Let me short circuit a little because I
14 think I understand it now that you've explained it to
15 me. The numbers you have here from 1940 to 1980,
16 they are not specifically with regard to Mr. Norman?
17 They're just the general presentation of the risks?

18 A Yes, I have time and the event took place in
19 1940, 1950, '60, '70, '80 so we have five decades
20 here.

21 Q What would the constant you would use for
22 the relative carcinogenicity of chrysotile versus
23 amosite what percentages, that's there. I'm sorry.

24 A You'll see down here when you look at
25 proportional mortality if you look at Jeffrey Berry's

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LANGER - Direct

1 description to the 1986 biological effects of
2 chrysotile which was the General Motors meeting held
3 in Cardiff reviewing the world literature, the
4 mesotheliomas produced by chrysotile only average
5 about 0.3 percent where as you if you look at the
6 amosite cohorts, it's about 1.9 percent so there's
7 about a six fold difference in the ability to produce
8 human mesothelioma.

9 Q Have you seen Dr. Rogly's recent
10 publication when he gives a fiber gradient, have you
11 seen that paper?

12 A I've seen the paper but I cannot address the
13 details unless you have a copy here.

14 Q Yeah, I might.

15 A Good. In the exchange that occurred in the
16 American Journal of Industrial Medicine. Oh, there
17 we go. American Journal of Industrial Medicine, an
18 unimpeachable source.

19 Q I must agree with you.

20 MR. CAMPBELL: Let the record reflect
21 that it was said with some degree of sarcasm.

22 Q Let me draw your attention to page --
23 there just happens to be a tab on it, Page 612, are
24 you familiar with that?

25 A Yes.

LANGER - Direct

1 Q Do you have a view as to whether you
2 agree or disagree with that?

3 A I disagree with it.

4 Q Okay. And why?

5 A First of all, we're dealing with apples and
6 oranges. This is what it says. Basically it says
7 that there is a growing consensus that its fibers
8 that actuate within the lung that are responsible for
9 the development of asbestos associated diseases
10 including mesothelioma. So it's not the fibers of
11 the pleura but the fibers in the lung. If this is
12 indeed the case then the results of the present study
13 I indicate that with respect to the occurrence of
14 malignant mesothelioma in the United States the order
15 of importance of various asbestos fiber types and
16 then he gives an order but this is also based on use
17 and exposure and the number of people who are
18 exposed. So he says amosite produces more
19 mesothelioma than tremolite. I want to know the form
20 of tremolite if it's tremolite asbestos tremolite is
21 not used widely in the United States. There are not
22 many people exposed to it. He defines tremolite on
23 the basis of his particular instrument which is a
24 scanning electron microscope so he says that
25 amosite is greater than tremolite. Well, I believe

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LANGER - Direct

1 that, sure, but he says tremolite is greater than
2 chrysotile, is he talking about -- he says chrysotile
3 is about equal to crocidolite. Well, he doesn't find
4 much chrysotile and he says well since we don't find
5 much crocidolite and since we are dealing with people
6 exposed in the United States, then this is for
7 malignant mesothelioma in the United States, this has
8 no relevance to anything other than the fact that
9 this is what he finds and he thinks that this is
10 based on what his findings with a scanning microscope
11 and what kinds of products to which people are
12 exposed. This has no relevance in the large context
13 but let's say that we have a plumber who is exposed
14 to crocidolite containing insulation in 1940 and
15 this person succumbs with a pleural mesothelioma.
16 Although the figures for asbestos consumption in the
17 United States may reflect a general trend like this,
18 in that specific case it may have absolutely no
19 meaning. This particular mesothelioma was caused by
20 crocidolite.

21 Q So you need to look at the facts of each
22 particular case.

23 A Yes, one needs to look at each individual
24 case.

25 Q Good. Back to the chart that you put

LANGER - Direct

1 together here so the numbers we're using for
2 chrysotiles 1.3 and amosite is 1.9. Now, is it fair
3 to say that where you have 1951 and 1957 that's a
4 calculation you made with regard to Mr. --

5 A No, no, no.

6 Q It is not?

7 A No, no, no.

8 Q What is that?

9 A This particular calculation is based --- let's
10 say in 1951 in the United States Navy Mr. Norman was
11 exposed to fugitive dust.

12 Q Uh-huh.

13 A That was 44 years prior to the appearance of
14 that disease. The last ten years don't matter. So
15 it would be 34 years raised to the 3.5 exponential
16 which exceeds a value of about 230,000. Beginning in
17 1957, he started to work with these other materials,
18 that was 38 years ago and we neglect the last ten
19 years of exposure, that's 28 years raised to 3.5. It
20 has nothing to do with fiber type and it has nothing
21 to do with --

22 Q With dose?

23 A -- with dose. It's just a general kind of
24 feel for how does time play into this. And that's
25 why very early on, I talked about the earlier

LANGER - Direct

1 exposures appear to be of much greater importance
2 than the later exposure.

3 Q So these numbers are not taking into
4 account dose?

5 A Not yet, no, that's correct, nor finer type.

6 Q Did you do any calculations any further
7 or is that where you stopped?

8 A I just stopped there. I'm just looking at
9 general time periods. I'm looking at general
10 fibers. I'm looking at onset of exposure and I'm
11 looking at the time.

12 Q Fair enough.

13 A So if we're dealing with Marine Boilers which
14 were installed in residential settings and he
15 installed 50 such boilers over a certain time period,
16 this would all be factored in eventually given fiber
17 type or given dose, given time.

18 Q And you haven't done that in this case?

19 A No, but we can do it now if you'd like.

20 MR. CIFALDI: You raised it.

21 A You raised it. I mean we can certainly go
22 through that exercise. I feel comfortable with my
23 position based on the social history and occupational
24 history that these earlier exposures to these
25 particular products were contained agents which are

LANGER - Direct

1 not to produce human mesothelioma even at lower
2 levels than one generally finds.

3 Q To save time here for all of us --

4 A Please.

5 Q -- if Mr. Campbell plans to have you do
6 that at the time of trial, I request that I be given
7 a calculation in advance?

8 A Sure.

9 MR. CAMPBELL: Absolutely.

10 MR. CIFALDI: That's fine. I believe I'm
11 done. If we could, I'd like to mark the
12 correspondence file as P-7.

13 (Exhibit P-7 was marked for
14 Identification.)

15 MR. CIFALDI: P-7 are letters dated July
16 16, '95, August 14, '96, August 26, '96,
17 September 23, '95, October 15, '95, October
18 23, '95.

19 CROSS-EXAMINATION BY MR. REIMERS:

20 Q Very few questions, Doctor, if I might.
21 Was that the Tebbens and Collins study that you
22 referred to earlier?

23 A It's Tebbens, I think Clark Cooper was part of
24 it and Leroy Balsa was part of item.

25 Q I think you said there were four kinds of

LANGER - Cross

1 insulation products?

2 A ABC and D.

3 Q One was pipe covering?

4 A Pipe covering, I believe there was also some

5 block and there was a tear out as well.

6 Q What are the other two types of products?

7 A I beg your pardon.

8 Q The other two types of products?

9 A There may have been some cloth and there may

10 have been some gaskets.

11 Q Okay.

12 A But I don't want to misspeak. It's an

13 interesting study.

14 Q The asbestos that is contained in the

15 gaskets that are associated with the Marine Boilers

16 was that asbestos encapsulated?

17 A The gasket's impregnated in a latex. It's a

18 rubber base. That is my understanding.

19 Q What effect does that have on would you

20 say the biological potential, is that a good term?

21 A Well, it has several effects. Number one, it

22 encapsulates fibers and they're less likely to be

23 liberated and number two if fibers are released they

24 may contain components of the matrix meaning that

25 certain functional sites on the minerals may be

LANGER - Cross

1 blocked.

2 Q Would that be the same if the, what if
3 asbestos cement which contained the asbestos was
4 encapsulated?

5 MR. CIFALDI: Objection.

6 A There are reports from Europe suggesting that
7 some of the cement components do adhere to some of
8 the fibers.

9 MR. REIMERS: Thank you.

10 MS. STEWARD: No questions.

11 CROSS-EXAMINATION BY MR. CAMPBELL:

12 Q Dr. Langer when Mr. Cifaldi was asking
13 you questions he raised one question concerning the
14 use of high temperature nonasbestos containing
15 cements in domestic uses.

16 A Right.

17 Q Specifically addressing boilers,
18 Dr. Langer, do you have an opinion concerning the use
19 of nonasbestos containing cements within combustion
20 chambers?

21 A There were -- in fact, Johns-Manville, the
22 brochures that I've reviewed, Johns-Manville produced
23 a combustion chamber cement which was a refractory
24 cement with a notation that for best performance one
25 should match the cement and the combustion chamber

LANGER - Cross

1 material so there are refractories which --
2 refractory materials used for combustion chambers and
3 the cements used around the combustion chambers, the
4 same material, refractory.

5 Q And when you say refractories, you mean
6 nonasbestos containing?

7 A Nonasbestos containing, correct.

8 Q You also mentioned generally data of
9 which you were aware concerning shipyard exposure as
10 well as ship board exposure?

11 A Right.

12 Q Can you tell us what data you're familiar
13 with regarding the ship board exposure?

14 MR. CIFALDI: Let me note one objection
15 for the record. I may be mistaken but I
16 thought he was talking about shipyard exposure
17 in the construction of ships.

18 Q Did you ever mention data on ship board
19 exposure, Doctor?

20 A There are data available on ship board
21 exposure as well as shipyard exposure. Most of the
22 data in the world literature concern trades that
23 operation both shipyard and ship board. These are
24 two different exposure categories. Ship board
25 exposure tends to be, you know, in a poorly

LANGER - Cross

1 ventilated environment in which fugitive dust plays a
2 prominent role where as shipyard is, there's a
3 greater capacity for dust to dissipate, disperse.

4 MR. CAMPBELL: Angelo, I just want to let
5 you know on the record that since Dr. Dement
6 you said you were going to make a claim
7 against Marine based on the use of
8 asbestos-containing products on piping, et
9 cetera, it may be used in conjunction with the
10 boilers and that Dr. Dement may address those
11 issues. Dr. Langer may be called upon at
12 trial to address issues relating to
13 nonasbestos insulation materials that would
14 have been available and appropriate in
15 domestic boiler applications.

16 MR. CIFALDI: I think I inquired into
17 that.

18 MR. CAMPBELL: Well. you required
19 specifically about cements and I just want --
20 he may address items broader than cements.

21 MR. CIFALDI: Okay.

22 MR. CAMPBELL: I just want to let you
23 know.

24 MR. CIFALDI: Sure.

25 MR. CAMPBELL: That's it I'm done. No

LANGER - Redirect

1 question pending.

2 REDIRECT EXAMINATION BY MR. CIFALDI:

3 Q Can you tell the difference between
4 asbestos pipe covering and asbestos -- and fiberglass
5 pipe covering?

6 MR. CAMPBELL: Who's you, him?

7 MR. CIFALDI: Him.

8 A Yes.

9 Q How?

10 A The two familiar glasses used for pipe
11 covering is a resinous glass that has a yellow resin
12 on it so that one can actually look at it and
13 speculate that it is glass and using a pair of
14 mechanical forceps, it actually crunches rather than
15 compresses so the color is one of the major indices
16 of identification on a morphological kind of basis.
17 Also, there are pink fibers, the pink fibers tend to
18 be embedded insulation rather than pipe covering but
19 the majority of pipe covers that I've seen with just
20 glass are well --

21 Q What other substitutes would be available
22 for asbestos pipe covering?

23 MR. CAMPBELL: Asbestos pipe covering?

24 MR. CIFALDI: Yes.

25 Q That you offer an opinion on?

LANGER - Redirect

1 A I've seen low temperature pipe covering which
2 consists of glass but glass could also service to
3 much higher temperatures. There are glasses that are
4 mentioned in some of these brochures that are --
5 reach service temperatures of about 600 Fahrenheit.

6 Q Any other substitutes for asbestos that
7 you can think of?

8 A Cellulose is used on pipes and low temperature
9 pipes.

10 Q Would they be used on boiler piping?

11 A On boilers.

12 Q Yes.

13 A Cellulose?

14 Q Yes.

15 A Probably not.

16 Q Probably not. Might burn, right?

17 A Well, if it gets wet and if it gets warm, then
18 it tends to -- that cellulosic material tends to
19 harbor various kinds of biological agents and the
20 gross fungus and so on.

21 Q Any other substitutes?

22 A Generically, I think the man-made variety,
23 rust fibers, the fiberglasses.

24 Q And you could tell the difference if
25 you're looking at an asbestos pipe covering and a

LANGER - Redirect

1 glass pipe covering, correct?

2 A I can, yes.

3 Q And certainly a plumber if he's
4 experienced in the trade could also, right?

5 A I would think so, yes.

6 MR. CIFALDI: That's all I have.

7 (The deposition concluded at 1:00 p.m.)

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C E R T I F I C A T E

I, JENNIFER REALMUTO a Notary Public and
Certified Shorthand Reporter, do hereby state
that prior to the commencement of the
examination

ALFRED M. LANGER, Ph.D.
was duly sworn by me to testify to the truth,
the whole truth and nothing but the truth.

I do further state 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 state that I am neither a
relative nor employee nor attorney nor counsel
of 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 this action.

JENNIFER REALMUTO, CSR
Certificate No. XI01916