PLAINTIFF'S EXHIBIT

UPRC-117

CAUSE NO. 98-317-G

| | | |
|---|---|---|
| WILMA S. CLARK, Individually and as Personal Representative of the Heirs and Estate of HOWARD HAROLD CLARK, DECEASED | § | IN THE DISTRICT COURT OF |
| VS. | § | |
| UNION PACIFIC RESOURCES COMPANY (f/k/a CHAMPLIN PETROLEUM COMPANY (Individually and as successor-by-merger to PONTIAC REFINING CORPORATION); CHEVRON, U.S.A. INC. (Individually and as successor-by-merger to GULF OIL CORPORATION); HOECHST CELANESE CORPORATION (f/k/a CELANESE CORPORATION); and CELANESE, LTD. | § | NUECES COUNTY, T E X A S |
| | § | 319TH JUDICIAL DISTRICT |

**DEFENDANT RME PETROLEUM COMPANY, F/K/A UNION PACIFIC RESOURCES COMPANY F/K/A CHAMPLIN PETROLEUM COMPANY, INDIVIDUALLY AND AS SUCCESSOR BY MERGER TO PONTIAC REFINING CORPORATION'S FIFTH SUPPLEMENTAL RESPONSE TO PLAINTIFF'S RULE 194 REQUEST FOR DISCLOSURES AND EXPERT WITNESS DESIGNATION**

TO: PLAINTIFF WILMA S. CLARK, INDIVIDUALLY and as PERSONAL REPRESENTATIVE OF THE HEIRS AND ESTATE OF HOWARD HAROLD CLARK, DECEASED, by and through her attorneys of record, Holly J.W. Huart and/or Stephanie Finch, Baron & Budd, The Centrum, Suite 1100, 3102 Oak Lawn Avenue, Dallas, Texas 75219.

COMES NOW RME PETROLEUM COMPANY, f/k/a Union Pacific Resources Company f/k/a Champlin Petroleum Company, Individually and as Successor by Merger to Pontiac Refining Corporation, and makes this its Fifth Supplemental Response to Plaintiff's Rule 194 Request for Disclosures (e) and (f) and Expert Witness Designation, in accordance with Rule 194.2(f) of the Texas Rules of Civil Procedure.

(e) the name, address, and telephone number of persons having knowledge of relevant facts, and a brief statement of each identified person's connection with the case;

(f) for any testifying expert:

(1) the expert's name, address, and telephone number;
(2) the subject matter on which the expert will testify;
(3) the general substance of the expert's mental impressions and opinions and a brief summary of the basis for them, or if the expert is not retained by, employed by, or otherwise subject to the control of the responding party, documents reflecting such information;
(4) if the expert is retained by, employed by, or otherwise subject to the control of the responding party:

(A) all documents, tangible things, reports, models, or data compilations that have been provided to, reviewed by, or prepared by or for the expert in anticipation of the experts testimony; and

(B) the expert's current resume and bibliography;

SUPPLEMENTAL RESPONSE:

1. John Pendergrass, CIH, CSP, PE
6700 Milkhouse Court
Mobile, Alabama 36695
(334) 607-0946

Mr. Pendergrass is a certified industrial hygienist who will testify from an industrial hygiene point of view the state of the medical and scientific knowledge regarding asbestos particularly in regard to the time period involved during which the Plaintiff's Decedent was allegedly on the premises of Defendant in this case. The subject matter will also include the use of asbestos during this time period, its importance, the lack of substitute products, and the employer's responsibility pre- and post-OSHA. He will also testify that based on the state of the knowledge and judgment as it has developed over time that Champlin acted appropriately in the circumstances. The general substance of Mr. Pendergrass' opinions, and his C.V. and bibliography, have previously been provided to Plaintiff's counsel. See also his deposition testimony, given on April 20, 2001, and deposition Exhibits 1 and 2 attached. Mr. Pendergrass had been provided depositions of Howard Harold Clark, Jim Tansey, Brack Routh, Joe Gay and Jim Kucera, as well as Plaintiff's responses to written discovery.

2. Patrick M. Conoley, M.D.
Kelsey-Seybold Clinic, Radiology Department
6624 Fannin, Suite 1800
Houston, Texas 77030
(713) 791-8787

The subject matter on which Dr. Conoley will testify, the general substance of Dr. Conoley's mental impressions and opinions, a brief summary of the basis for his opinions, and the documents and things that have been provided to Dr. Conoley are described and included in his Amended Narrative attached hereto as Exhibit "A."

Respectfully submitted,

HAYS, McCONN, RICE & PICKERING

By: _____

B. STEPHEN RICE
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Attorneys for Defendant
RME PETROLEUM COMPANY, F/K/A
UNION PACIFIC RESOURCES COMPANY, F/K/A
CHAMPLIN PETROLEUM COMPANY,
INDIVIDUALLY AND AS SUCCESSOR BY
MERGER TO PONTIAC REFINING
CORPORATION

## CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing instrument has been forwarded to counsel for Plaintiffs by facsimile, certified mail, return receipt requested, Federal Express and/or hand delivery, and to all other counsel of record by regular mail, on this 8th day of May, 2001.

CRAIG S. WOLCOTT

Steve Rice

04/28/01

# Amended Narrative

## Records

Medical records and radiographs on Howard Harold Clark were submitted for review by Craig S. Wolcott. These include:

1) PA and Lateral Chest radiographs from and unknown location dated 8/10/87
2) PA and Lateral Chest radiographs from Internal Medicine & Oncology Associates dated 10/20/88
3) PA and Lateral Chest radiographs from the VAMC Pensacola dated 2/21/92
4) PA and Lateral Chest radiographs and report from Providence Outpatient Diagnostics, Mobile, AL dated 4/20/93.
5) PA and Lateral Chest radiographs from Pensacola Lung Group dated 5/1/93.
6) PA and Lateral Chest radiographs from Mobile Diagnostic Center dated 8/9/93.

## Radiographic Findings

In the earliest study of 1987, the heart appears normal. There is mild uncoiling of the thoracic aorta. The lungs are hyperinflated. There is no evidence of pulmonary fibrosis. There is visualization of smooth extrapleural tissues superoposteriorly on the right chest wall, which is a common normal anatomic variation. There is an area of linear scarring in the right apex, suggesting prior tuberculosis. There is no evidence of pleural plaques or calcifications.

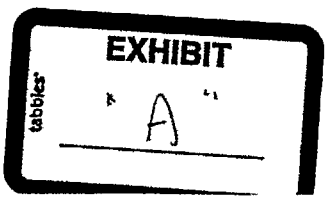
By the study of 2/21/92, there is mild wedge compression of one of the lower vertebral bodies, I believe T-12.

No new finding is seen in the subsequent films. The right apical scarring is stable over the course of examinations.

## Impression

Chronic obstructive pulmonary disease.
Right apical scar suggesting old tuberculosis.
Right extrapleural line, most likely a normal anatomic variation.
No radiographic evidence of pleural or pulmonary changes due to inhalation of pneumoconiotic agents.

Patrick M. Conoley, M.D., DABR, Recertified B-Reader



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| | : | OF NUCES COUNTY, TEXAS |
| VS. | : | |
| UNION PACIFIC RESOURCES COMPANY, et al | : | 319TH JUDICIAL DISTRICT |

* * * * * * * * * * * *

# COMPLIMENTARY CONDENSED TRANSCRIPT WITH CONCORDANCE AND COMPLIMENTARY ASCII, WORDPERFECT™ AND AMICUS™ DISK OF VOLUME 1 ORAL DEPOSITION OF JOHN A. PENDERGRASS, CIH, CSP, PE APRIL 20, 2001

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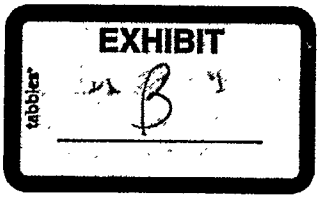


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| VS. | ) | OF NUECES COUNTY, TEXAS |
| UNION PACIFIC RESOURCES COMPANY, et al | ) | 319TH JUDICIAL DISTRICT |

**********

ORAL DEPOSITION OF
JOHN A. PENDERGRASS, CIH, CSP, PE
April 20, 2001

**********

ORAL DEPOSITION OF JOHN A. PENDERGRASS, CIH, CSP, PE, produced as a witness at the instance of the Plaintiff, and duly sworn, was taken in the above-styled and -numbered cause on the 20th day of April, 2001, from 9:19 a.m. to 3:56 p.m., before Debra Amos Isbell, CSR, RDR, and CRR in and for the State of Alabama, reported by machine shorthand, at the Hampton Inn, 5478 Inn Road, Mobile, Alabama, in accordance with Third Amended Notice of Taking Oral Deposition, and pursuant to the Texas Rules of Civil Procedure and the provisions stated on the record or attached hereto.



APPEARANCES

FOR THE PLAINTIFF, WILMA S. CLARK, INDIVIDUALLY AND AS PERSONAL REPRESENTATIVE OF THE HEIRS AND ESTATE OF HOWARD HAROLD CLARK, DECEASED:
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FOR THE DEFENDANTS, UNION PACIFIC RESOURCES COMPANY, ET AL:
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EXHIBITS


| NO. DESCRIPTION | PAGE |
|---|---|
| 1 Curriculum Vitae of John A. Pendergrass, CIH, CSP, PE (Three pages) | 25 |
| 2 Chronology of Asbestos Regulations in the U.S. Workplace (34 page) | 169 |


REQUESTED DOCUMENTS/INFORMATION

(None)



PROCEEDINGS

JOHN A. PENDERGRASS, CIH, CSP, PE, having been first duly sworn, testified as follows:

MR. BARLOW: Put on the record, that this deposition will be taken pursuant to the Texas Rules of Civil Procedure, and all objections save to the form of the question and the responsiveness of the answer will be preserved until the time of trial.

Right?

MR. WOLCOTT: Well, he's being presented under the Texas Rules of Civil Procedure.

MR. BARLOW: Right.

MR. WOLCOTT: I think anything you say to the contrary, we're not agreeing to.

MR. BARLOW: I don't think I said anything to the contrary.

MR. WOLCOTT: Well, sometimes lawyers will say "Objections are waived," and that's certainly not the case here.

EXAMINATION

BY MR. BARLOW:

Q. Good morning, Mr. Pendergrass.

A. Good morning.

Q. My name is Alex Barlow. I don't know if I properly introduced myself. And I need to ask you a few

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1 questions about the opinions that you're going to be
2 offering in this case.
3 I understand that you've given
4 depositions before; is that correct?
5 A. That's right.
6 Q. And so I'm sure you kind of know how this
7 will work. But so we're clear, I'm going to ask you
8 questions.
9 You need to answer audibly so that the
10 court reporter can get it on the record. You and I, if
11 we shake our heads "yes" or "no," we know what we're
12 saying, but the record won't reflect it.
13 Is that okay?
14 A. That's fine.
15 Q. I will try to also remember to not talk over
16 you in your answers. And if you could please wait for
17 me to finish my questions, so the record will be clean.
18 A. Right.
19 Q. That will help. And finally, if you need to
20 take a break at any time, just let me know, and we'll do
21 that.
22 I usually like to take a break about
23 every hour or so for about five minutes. Everybody
24 stretch their legs, anyway.
25 If you need to take a break before that

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1 for any reason, just let me know, and we will. I'd only
2 ask that if there's a question pending, you answer that
3 question, and then we can take the break.
4 Mr. Pendergrass, where do you currently
5 reside?
6 A. Mobile, Alabama.
7 Q. And how long have you lived here?
8 A. Not quite three years.
9 Q. What brought you to Mobile?
10 A. We were looking for a place to move, sort of
11 semi-retirement.
12 Q. You and your wife?
13 A. Yes.
14 Q. You said you're "semi-retired." What do you
15 do these days?
16 A. I'm a consultant, industrial hygiene and
17 occupational health and safety.
18 Q. You said you were semi-retired. How many
19 hours a week are you working as a consultant in
20 industrial hygiene now?
21 A. It probably averages two or three days a
22 week, something on that order.
23 Q. Eight hours a day?
24 A. Yes. Pretty much.
25 Q. So you're working about half-time now?

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1 A. About that, yes.
2 Q. And when you say you're a consultant in
3 industrial hygiene, what sorts of things do you consult
4 on?
5 Can you be more specific?
6 A. Well, it might be an evaluation of conditions
7 in a plant. Certainly there's the litigation aspect.
8 You know, whenever people will call that I feel like
9 that I can be competent in responding to.
10 Q. How long have you been consulting in this
11 manner?
12 A. I guess, close to 12 years now.
13 Q. Close to 12 years? Over that 12 years, have
14 you been semi-retired, consulting only half-time?
15 A. No. I guess for the first eight or nine
16 years, it was pretty much full-time.
17 Q. You said that in your consulting, there was a
18 litigation aspect, and there was also an aspect where
19 you may go evaluate plants or, I guess, worksites for
20 industrial hygiene conditions.
21 Can you divide up -- how much of your
22 time is spent doing litigation consulting?
23 A. Well, it would be the majority of the time
24 now.
25 Q. So the majority of your consultations now are

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1 litigation related?
2 A. Right.
3 Q. What sorts of litigation do you consult in?
4 Obviously, asbestos.
5 A. There's no specific line. It would be
6 generally what the plaintiff may have been exposed to,
7 or where they may have worked.
8 It might be asbestos; it might be lead;
9 it might be benzene, other hydrocarbons.
10 Q. Let me ask you this: Over the last, say, --
11 well, over the last 12 years, can you tell me all the
12 types of cases you can think of that you've consulted
13 in?
14 A. Types of cases?
15 Q. And by "types," I mean asbestos or benzene,
16 the types of exposures you were evaluating on behalf of
17 defendants.
18 A. I don't think I could be very accurate on
19 those. It would just be a guess, an estimate. But
20 asbestos, lead, benzene, chlorinated hydrocarbons,
21 accidents.
22 Q. Is there anything else you can think of?
23 A. Not right off.
24 Q. I understand you can't think of everything
25 offhand.

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1 A. It's been a very broad area.
2 **Q. You said accidents. What sorts of accidents?**
3 A. Well, one involved injuries that resulted
4 from firefighting. Another one was a case where two
5 women were killed when a tree fell across -- was chopped
6 down, and fell across the road and hit their car.
7 **Q. Fell on top of the car?**
8 A. Yeah.
9 **Q. That's unlucky.**
10 A. Very.
11 **Q. Have you ever consulted on behalf of a**
12 **plaintiff in litigation?**
13 A. That one was a plaintiff.
14 **Q. The one where the tree fell on the car?**
15 A. Yeah. There have been a couple others.
16 **Q. Can you tell me how many times you've**
17 **consulted on behalf of a plaintiff?**
18 A. Well, it has not been very many. I would
19 probably say less than a half a dozen.
20 **Q. How many times over the last -- or I guess,**
21 **how many times over the course of your career have you**
22 **consulted on behalf of defendants in litigation?**
23 A. I have no idea.
24 **Q. Would it be much more than a half a dozen?**
25 A. Yeah. But I still -- I know you're going to

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1 ask, "Is it more than 10? Is it more than 20?"
2 I don't really know. Whatever I would
3 say, would be a guess.
4 **Q. Is it safe to say, the great majority of the**
5 **cases you consult in, you're consulting on behalf of**
6 **defendants?**
7 A. Yes.
8 **Q. Do you remember when it was that you first**
9 **began consulting in litigation?**
10 A. Sometime after 1989. Probably '90, '91,
11 somewhere along in there.
12 **Q. What were the first cases that you began**
13 **consulting in? Were they asbestos cases?**
14 A. No. I think the first case involved lead.
15 **Q. So the first case you consulted in in**
16 **litigation, was a lead case?**
17 A. And that was a plaintiff case.
18 **Q. And it was a plaintiff case.**
19 **Did you sometime after that begin**
20 **consulting in asbestos litigation?**
21 A. Sometime after that, yes.
22 **Q. I saw a deposition that you gave in 1991 in**
23 **Illinois.**
24 **Would that have been your first**
25 **deposition in asbestos litigation?**

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1 A. It was very early on, yes. I don't remember
2 whether it was the first one or not.
3 **Q. But it would have been around '90 or '91?**
4 A. Somewhere in that order.
5 **Q. So you began consulting in asbestos**
6 **litigation around '90 or '91?**
7 A. I think that's correct, yes.
8 **Q. Do you remember who was the first company**
9 **that retained you to testify in asbestos litigation?**
10 A. No, I don't.
11 **Q. Can you tell me all the companies you recall**
12 **testifying on behalf of?**
13 A. No, I couldn't.
14 **Q. Can you name as many as you can right now off**
15 **the top of your head?**
16 A. You're saying -- well, see, sometimes --
17 okay. You said "the company." General Refractories was
18 one; Shell; Texaco; Ethyl Corporation; of course, this
19 case; Coastal; one of the railroads, Kansas City
20 Railroad. I can't remember the exact name of it.
21 **Q. A railroad in Kansas City? Kansas City**
22 **Railroad?**
23 A. Yeah. It's Kansas and something else. I
24 think that's about all I can -- did I say Texaco?
25 **Q. You did. So we have, as far as companies**

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1 **you've testified on behalf of in asbestos litigation,**
2 **GeRefCo --**
3 A. Oh, I'm sorry. I'm not sure all of those are
4 asbestos. Those are just companies, just general.
5 **Q. Let me ask it this way, then, so the record**
6 **will be clear.**
7 **As far as companies you've testified on**
8 **behalf of in litigation generally, we have GeRefCo,**
9 **Shell, Texaco, Ethyl Corporation, Coastal, and a**
10 **railroad, Kansas and something else railroad?**
11 A. You said "testified." I have not been to
12 court in all of those, by any means.
13 **Q. Consulting?**
14 A. I'm talking about depositions.
15 **Q. You've given depositions in those?**
16 A. Or have been contacted. Because a lot of
17 them have settled without depositions, without --
18 **Q. Let's do it this way: Companies you've**
19 **consulted on behalf of that you can recall as you sit**
20 **here today.**
21 A. Consulted, yeah. That's all I can --
22 **Q. So the record is clear --**
23 A. Penelec is another one; Pennsylvania
24 Electric; and Duquaine Light.
25 **Q. Duquaine Light?**

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A. Uh-huh.
**Q. Any more?**
A. I might think of some others as we go along.
**Q. Do you by chance keep a list of the companies that you've testified or consulted on behalf of?**
A. No, I don't.
**Q. Is there any way, if you wanted to go back and compile a list, that you could?**
A. Not with a great deal of accuracy, no.
**Q. Do you keep records of your bills to companies that you consult for in litigation?**
A. I keep a record of whoever my client is. And this would be the law firm generally, not who they are representing.
**Q. If I asked you what law firms you've consulted on behalf of in litigation, could you tell me that?**
A. Well, that's going to be pretty much the same situation with the companies that I have consulted with.
But of course, Hays, McConn, Rice & Pickering. Also, Baker & Budd, isn't it?
MR. WOLCOTT: Botts.
A. Baker & Botts. One down in Beaumont, Martin is the one that I have worked with.
MR. BARLOW:

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**Q. Is it a law firm that Martin is part of the name?**
A. Yeah. Martin is a part of their name.
MR. WOLCOTT: Jenkins & Martin?
THE WITNESS: Three names.
MR. WOLCOTT: Jenkins, Grove & Martin?
THE WITNESS: Yeah. Kirk.
MR. WOLCOTT: Kirk Martin?
THE WITNESS: Yeah.
A. Israel, a firm in Philadelphia.
MR. BARLOW:
**Q. Mr. Israel?**
A. Yeah.
**Q. I believe I remember him from a past deposition.**
A. The Beauchamp firm in St. Louis. And that's another three- or four-name firm. Zimmerman, Koons in Philadelphia -- not Philadelphia, Pittsburgh. There's a firm in Philadelphia, six or seven names.
I've done some work for Baltimore Gas & Light.
**Q. That would be a company that you consulted for?**
A. Yeah. And I'm trying to remember now who their attorney was. Not Angelo. Again, I don't keep a

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list of these, so it's hard to --
**Q. All right. Let's just go ahead and clean up the record. And if you think of some, then you can tell me later on.**
**So as far as companies that you've consulted on behalf of in litigation, we have GeRefCo, Shell, Texaco, Ethyl Corporation, Coastal, Kansas and something railroad, Pennsylvania Electric, Duquaine Light, Baltimore Gas & Light; is that correct?**
A. Yeah. And Phelps, Dodge is another one.
**Q. Anything else right now?**
A. No.
**Q. And then as far as law firms you've consulted for that you can recall today, there's Hays, McConn, Rice & Pickering; Baker Botts; Jenkins, Grove & Martin; you consulted for an attorney named Mr. Israel in Philadelphia?**
A. Yeah. It's Israel and something now.
**Q. The Beauchamp law firm?**
A. Again, he's one of a group of partners.
**Q. And Zimmerman, Koons. Any other law firms you can think of right now?**
A. Not at the moment.
I'll add one, because you folks were there. Atkinson, Perry, Atkinson and something else in

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Baton Rouge.
**Q. Do you remember what kind of case that was?**
A. I think that was asbestos.
**Q. It was an asbestos case? When you were consulting for Hays -- well, I guess you are consulting for Hays, McConn, Rice & Pickering right now?**
A. Right.
**Q. They're the Defendants in this case?**
A. Right.
**Q. Have you ever consulted for them when they were representing the plaintiffs?**
A. I don't think so.
**Q. When you were working with Baker Botts, were they representing the defendants or the plaintiffs?**
A. As I recall, they were.
**Q. The defendants?**
A. The defendants.
**Q. When you were consulting for Jenkins, Grove & Martin, were they working on behalf of the plaintiffs or the defendants?**
A. I think that was a defendants case also.
**Q. And I believe when you were working with Mr. Israel, he was representing GeRefCo?**
A. Right.
**Q. They were defendants?**

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1 A. Yes.
2 Q. And when you were consulting for Mr.
3 Beauchamp, he was representing defendants or plaintiffs?
4 A. Defendants.
5 Q. And when you were consulting with the
6 Zimmerman, Koons law firm, were they representing the
7 plaintiffs or the defendants?
8 A. That is defendants also.
9 Q. Tell me about the cases that you've consulted
10 on behalf of plaintiffs. You said there were less than
11 half a dozen.
12 You said you consulted on behalf of
13 some people who were injured, or hurt when a tree fell
14 on their car?
15 A. Right. This was a case in Louisiana. The
16 defendant had arranged -- or had purchased timber off of
17 a plot of land, and they contracted out to have somebody
18 else actually cut it.
19 And in cutting the timber, they dropped
20 a tree across the highway at a very inopportune time.
21 Q. Surely. How was it that you were qualified
22 to give expert testimony in that case?
23 A. Well, I'm a Certified Safety Professional.
24 And also the fact that I was knowledgeable as far as
25 certain regulations were concerned.

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1 Q. So part of your training included safe
2 practices in the taking of timber?
3 A. Not specifically that, but safe practices.
4 And that is a part of it.
5 There was really just not much reason
6 for falling a tree across the road any time.
7 Q. You probably don't have to be an expert to
8 know that.
9 A. Not too much.
10 Q. Can you tell me any of the other cases that
11 you consulted as a plaintiff?
12 A. Well, I mentioned the lead case. And this
13 was two companies arguing over whether they should cover
14 a certain -- whether they should have covered a claim
15 that was made by the company that I was representing.
16 Q. So one of your plaintiffs cases was one
17 company suing another company --
18 A. Yeah.
19 Q. -- over --
20 A. An insurance claim.
21 Q. -- an insurance claim.
22 Can you tell me about any of the other
23 cases where you've consulted on behalf of the
24 plaintiffs?
25 A. I'll have to think about that. Those two are

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1 the ones that come to mind right away.
2 Q. As you sit here right now, other than the
3 case where you consulted on behalf of the people who had
4 the tree fall on them, can you think of any other cases
5 where you consulted on behalf of an individual who had
6 been injured?
7 A. There was a case of a fire in a refinery.
8 There were people injured. And I testified as to the
9 actions of the Fire Chief, which I thought were not
10 appropriate.
11 Q. Were you consulting on behalf -- or
12 testifying on behalf of the people who were injured?
13 A. You know, I just don't remember the details
14 of it. But I guess that had to be what it was because I
15 was asked to evaluate in general the activities of the
16 Fire Chief, in general as well as specifically at that
17 fire.
18 Q. Do you know whether or not you were maybe
19 consulting with an insurance company over an insurance
20 dispute, or you're pretty sure that you were testifying
21 on behalf --
22 A. I don't think it involved an insurance
23 company at all, but that I can't be sure. I don't think
24 it was.
25 Q. So you think you may have been testifying on

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1 behalf of the people who had been burned in that fire?
2 A. Well, I can only say what I have said with
3 regard to it. It was the training that had been
4 provided as well as the activities that occurred at the
5 time of the fire.
6 Q. Do you know how many depositions you've given
7 in asbestos litigation?
8 A. No, I don't.
9 Q. Has it been more than the one I've seen
10 previously?
11 A. Well, I don't know what you saw.
12 Q. Well, I'll tell you. I've only seen one
13 prior asbestos deposition of yours.
14 It was a 1991 deposition when you were
15 consulting for Mr. Israel. Have there been other
16 asbestos depositions?
17 A. Oh, yes.
18 Q. How many other asbestos depositions --
19 A. That I could not estimate.
20 Q. Can you tell me if it's more than five?
21 A. It's more than 5; it's less than 100. And I
22 don't know what it was in between there.
23 Q. You knew where I was going with that. More
24 than 5; less than 100.
25 Can you tell me how many times a year

Page 21

1 you give deposition testimony on average?
2 A. Again, that would be just a wild guess. I
3 don't know.
4 Q. Less than ten?
5 A. I would say yes, less than ten.
6 Q. More than five?
7 A. You know, it's going to vary from one year to
8 another. So I don't really know.
9 Q. How many depositions have you given so far
10 this year?
11 A. Two or three, I guess.
12 Q. What kind of cases were they in?
13 A. I think they've all been asbestos.
14 Q. All on behalf of the defendants?
15 A. Yes.
16 Q. Do you remember the companies that you were
17 consulting on behalf of in these depositions?
18 A. No.
19 Q. What about last year? How many depositions
20 did you give?
21 A. That, again, I couldn't say. I don't know.
22 Not a whole lot.
23 Q. Was it more or less than ten last year?
24 A. I would say yes, it's less than ten.
25 Q. Was it more or less than five last year?

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1 A. Again, this is going to be just an estimate.
2 I would say probably less than five, but I don't know
3 for sure.
4 Q. Several, but probably not more than five?
5 A. I think that's fair.
6 Q. And I guess if I ask you for the year before
7 last, --
8 A. You're going to get the same answer, because
9 I just don't keep that kind of a record. I don't try
10 to. So I cannot really give you anything definitive.
11 Q. You don't keep records of the depositions
12 that you give?
13 A. No.
14 Q. Sometimes when a witness is designated in
15 Federal Court to testify, they have to produce a list of
16 their prior testimony.
17 Have you ever been asked to do that
18 before?
19 A. I think yes, that I did one time.
20 Q. Do you remember when that was, approximately?
21 A. No.
22 Q. Do you think you still have that list?
23 A. No. I don't know. I haven't seen it lately.
24 Q. If you were going to try to make one of those
25 lists, say you were designated in Federal Court this

Page 23

1 year, how would you go about compiling that list?
2 A. Well, I'd have to go back -- probably start
3 with my invoices, and try to determine what's in Federal
4 Court, and what isn't in Federal Court, and whether or
5 not I was deposed.
6 Q. If you were asked to compile a list of all of
7 your testimony that you've given in the past, would you
8 be able to do that?
9 A. With some degree of accuracy. But again, I
10 would have to just go back to invoices.
11 Q. You say you began consulting in litigation
12 about, what? Ten years ago?
13 A. Well, I began consulting in '89, which would
14 have been 12 years ago.
15 Q. '89. I said "consulting in litigation."
16 A. I was going to say yeah, it's been probably
17 in the order of ten years ago.
18 Q. Over the last ten years, can you tell me what
19 percentage of your time has been spent consulting in
20 litigation?
21 A. No.
22 Q. You say now, the majority of your consulting
23 is litigation related, correct?
24 A. That's correct.
25 Q. Last year, was the majority of your

Page 24

1 consulting, litigation related?
2 A. Yes.
3 Q. Could you give me a percentage of your
4 consulting time that was spent in litigation-related
5 matters last year?
6 A. I think I better stick with saying the
7 majority because I've not even tried to think about
8 that.
9 Q. Last year were you working about 20 hours a
10 week like you are now?
11 A. Something in that order, yes. Maybe not
12 quite as much.
13 Q. Out of any given week last year, how many
14 hours would you spend in litigation-related consulting?
15 A. Well, obviously it's going to be the majority
16 of the time. I don't know. I'd have to go through and
17 do a whole lot of arithmetic to try to come up with it.
18 Q. How long has the majority of your consulting
19 been litigation related?
20 A. Oh, probably the last six or seven years.
21 Q. Prior to the last six or seven years, how
22 much of your time -- your consulting was litigation
23 related?
24 A. Again, depending on -- well, I started to say
25 '91. At that time, maybe 50/50. Again, this is a

Page 25

1 guess, an estimate.
2 Q. So in your best estimate, starting ten years
3 ago until six or seven years ago, about half of your
4 time was spent consulting in litigation?
5 A. Something on that order, yes.
6 Q. And for the last six or seven years the
7 majority of your consulting has been litigation related?
8 A. Right.
9 MR. WOLCOTT: Did you bring this,
10 (indicating), the chronology?
11 MR. BARLOW: Yes.
12 MR. WOLCOTT: Did he bring it?
13 MR. BARLOW: Yes, he brought it.
14 That's his.
15 MR. WOLCOTT: Can I see it for a
16 second?
17 (DOCUMENTS HANDED TO COUNSEL)
18 MR. BARLOW: Let's go ahead and mark
19 his CV as Exhibit 1.
20 (DEPOSITION EXHIBIT NO. 1 MARKED)
21 Q. (BY MR. BARLOW) Mr. Pendergrass, I'm marking
22 as Exhibit 1, a curriculum vitae that I believe you
23 brought with you; is that right?
24 A. That's correct.
25 Q. And is this curriculum vitae up to date?

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1 A. Yes.
2 Q. To the best of your knowledge, is this
3 curriculum vitae complete? It has all of your work
4 history on it, I guess?
5 A. Yes.
6 Q. There's a section here entitled "Publications
7 In."
8 A. Yes.
9 Q. Does this list all of your publications?
10 A. It lists where they were published.
11 Q. Where they were published. So I see here the
12 first line says, "Publications in American Industrial
13 Hygiene Association Journal."
14 Do I take that to mean, there may have
15 been more than one?
16 A. Yes, there's been more than one.
17 Q. If I wanted to get a list that actually told
18 me which articles you've published in the past, does
19 that exist?
20 A. A single list?
21 Q. Yes.
22 A. No.
23 Q. Have you ever compiled such a list?
24 A. No.
25 Q. Do you know how many articles you've

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1 published in the American Industrial Hygiene Association
2 Journal?
3 A. Not really. Three or four, five. Maybe a
4 half a dozen.
5 Q. Let me ask you this: How many times have you
6 published on the subject of asbestos?
7 A. I don't think I ever have.
8 Q. You've never published on the subject of
9 asbestos?
10 A. No.
11 Q. Have you ever lectured on the subject of
12 asbestos?
13 A. No.
14 Q. Have you ever taught any courses on the
15 subject of asbestos?
16 A. "Courses," you mean like for students coming
17 in?
18 Q. Right.
19 A. No.
20 Q. Was it ever a part of your work to teach
21 safety courses perhaps at a -- well, anywhere?
22 A. Yes. As the Director of Industrial Hygiene
23 at 3M Company, and as an Industrial Hygienist at Boeing
24 and at American Cyanamid, part of my responsibility was
25 to train workers in a variety of subjects, mostly on

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1 industrial hygiene aspects of it.
2 And asbestos could well have been one
3 of those. It probably was at some time.
4 Q. Okay. Other than your work as an Industrial
5 Hygienist at 3M, Boeing, and American Cyanamid, have you
6 ever been called upon to teach?
7 A. Teach anywhere?
8 Q. Yes.
9 A. No, not really.
10 Q. When you were at Boeing, 3M, and American
11 Cyanamid, at any of those places, did any of your
12 teaching concern asbestos?
13 A. Well, as I just said, I cannot specifically
14 say one. But I'm sure that it must have involved
15 asbestos at some point.
16 Probably not at Boeing or at American
17 Cyanamid, but perhaps at 3M.
18 Q. You're thinking maybe some of the training
19 you did at 3M, you may have included asbestos as an
20 aspect of it?
21 A. Yeah.
22 Q. You say you've never lectured on the issue of
23 asbestos?
24 A. Other than what we've just talked about.
25 Q. Other than maybe it was included in one of

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1 your safety meetings at 3M?
2 A. Well, at some point.
3 Q. Have you ever given any lectures for the DRI?
4 A. I don't know what DRI is.
5 Q. The Defense Research Institute?
6 A. No.
7 Q. What about the Toxic Tort Institute? Have
8 you ever heard of them?
9 A. No.
10 Q. Is there anything that you have published
11 that's not listed where it was published on your CV?
12 A. I think that includes everything.
13 Q. Have you submitted anything for publication
14 right now that just isn't published yet?
15 A. Not right now.
16 Q. Have you ever submitted anything for
17 publication in the peer-reviewed literature, and had it
18 rejected or sent back for revisions?
19 A. No.
20 Q. And I take it that some of these publications
21 listed here are in peer-reviewed journals?
22 A. Some are; some are not.
23 Q. We'll go ahead and go through that.
24 The "American Industrial Hygiene
25 Association Journal," is that peer reviewed?

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1 A. Yes, it is.
2 Q. The "American Public Health Association
3 Journal," is that peer reviewed?
4 A. Yes, it is.
5 Q. The "Journal of Occupational Health &
6 Safety," is that peer reviewed?
7 A. That I'm not sure.
8 Q. The "International Encyclopedia of
9 Occupational Health and Safety," is that peer reviewed?
10 A. Yes. It was. That was one publication.
11 Q. "Sampling and Analysis of Toxic Organics in
12 the Atmosphere, ASTM, 721, Chapter Author," was that
13 chapter a peer-reviewed chapter?
14 A. I'm sure it was.
15 Q. "Labor Law Journal," was that peer reviewed?
16 A. I doubt it.
17 Q. What is the "Labor Law Journal"?
18 A. It's a journal that's put out by the labor
19 lawyers.
20 Q. Do you remember what you published in the
21 "Labor Law Journal"?
22 A. I don't remember right now. Let me see
23 something here. I might be able to figure this out.
24 (DOCUMENTS HANDED TO WITNESS)
25 I can't remember now. I think that was

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1 when I was at the Labor Department, but I'm not positive
2 about that.
3 (DOCUMENTS HANDED TO COUNSEL)
4 Q. The "Environmental Law Reporter," is that
5 peer reviewed?
6 A. I don't think so.
7 Q. Do you remember what you published in the
8 "Environmental Law Reporter"?
9 A. Yes. That was a paper that I co-authored
10 with my son, on a proposal for EPA to provide
11 recognition to organizations that had done an
12 outstanding job in environmental controls.
13 Q. So it was an article on a proposal for the
14 EPA to give out some kind of award or recognition?
15 A. Similar to what OSHA does with the Star
16 Award.
17 Q. And you say you authored that with your son?
18 A. Yes.
19 Q. Your son is an attorney?
20 A. Yes.
21 Q. Where does he practice?
22 A. The Environmental Law Institute in
23 Washington.
24 Q. What does the Environmental Law Institute do?
25 A. It's a think tank type of organization which,

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1 of course, deals with the environment, environmental
2 laws.
3 They have their publications. They
4 conduct research projects; they conduct seminars.
5 Normal things that think tank types of institutes do.
6 Q. What is your son's job within the
7 Environmental Law Institute?
8 A. I think he has about ten titles, titles
9 rather than money. He is Director of State
10 Environmental Activities; he has conducted seminars for
11 judges in Brazil and India, as well as in this country;
12 and I guess he's the one who manages their research
13 associates.
14 Just generally, environmental laws in
15 this country, as well as around the world.
16 Q. Does the Environmental Law Institute conduct
17 any lobbying?
18 A. No.
19 Q. Who funds the Environmental Law Institute?
20 A. They have a membership, as well as they are
21 dependent, I think, on contributions from individuals,
22 companies, organizations, as well as they generate some
23 funds from their seminars and courses.
24 Q. Is the Environmental Law Institute,
25 affiliated with industry?

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1 A. No.
2 **Q. Going back to your publications, it says you**
3 **have a chapter that you co-authored in a publication**
4 **entitled "Industrial Hygiene Management."**
5 A. Yes.
6 **Q. Was that a peer-reviewed publication?**
7 A. Not in the sense that, say, the Journal is.
8 Of course, it goes by different editors.
9 But I don't think in the same sense,
10 it's a peer-reviewed article, no.
11 **Q. You have a chapter in "Occupational Injuries**
12 **and Illnesses." Was that a peer-reviewed publication?**
13 A. That would come under the same category as
14 the other one. It was a publication primarily for
15 physicians. But as being peer reviewed, I doubt it.
16 **Q. And then you have a chapter in the "American**
17 **Industrial Hygiene Association History."**
18 A. Yes.
19 **Q. Is that a peer-reviewed publication?**
20 A. No.
21 **Q. What is the "American Industrial Hygiene**
22 **Association History"?**
23 A. They decided -- I don't know, it must have
24 been several years ago -- that there should be some
25 history of the association. And they asked a number of

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1 the still-living past presidents to write chapters.
2 **Q. Are you a former president of the Industrial**
3 **Hygiene Association?**
4 A. Yes.
5 **Q. When were you president of the Industrial**
6 **Hygiene Association?**
7 A. 1974/75.
8 **Q. Help me out here. The Industrial Hygiene**
9 **Association, did it go by other names previously?**
10 A. No.
11 **Q. It's always been the Industrial Hygiene**
12 **Association?**
13 A. American Industrial Hygiene Association, yes.
14 **Q. I want to speak with you briefly about your**
15 **professional experience.**
16 **It says from 1998 to the present,**
17 **you've been a consultant. I guess that's when you moved**
18 **to Mobile, into semi-retirement?**
19 A. Yes. We lived in Virginia until about three
20 years ago.
21 **Q. The next thing on here, is from 1994 to 1996,**
22 **you were Director of Occupational Environmental Health**
23 **at the American Service Corporation; is that right?**
24 A. That's right.
25 **Q. What is the American Service Corporation?**

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1 A. It was a corporation that we were trying to
2 develop systems for indoor air quality control. We were
3 not successful.
4 **Q. There's a gap between 1996 and 1998. What**
5 **were you doing those two years? On your CV, there's a**
6 **gap.**
7 A. Let me look.
8 **Q. Or am I missing something?**
9 A. Well, yeah. See, the consulting of
10 Pendergrass is 1989 to 1998. These are in addition to.
11 **Q. I see. I didn't look down far enough. So**
12 **Pendergrass Associates, was that a consulting firm?**
13 A. Yes.
14 **Q. So from '89 to '98, you were consulting. I**
15 **guess from '96 to -- or to the present --**
16 A. I closed all that down, and it's just
17 individual after that.
18 **Q. I understand that. So the record is clear,**
19 **because I messed up, from 1989 to 1998 and even until**
20 **today, you were consulting?**
21 A. Right.
22 **Q. I guess in 1998, you cut back to go part-time**
23 **with your consulting?**
24 A. Right.
25 **Q. But in addition to your consulting, from 1994**

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1 **to 1996, you were working for the American Service**
2 **Corporation?**
3 A. Right.
4 **Q. Was this a business venture on your part, the**
5 **American Service Corporation?**
6 A. With other people.
7 **Q. And from 1986 to 1989, you were with the**
8 **Labor Department as Assistant Secretary of Labor?**
9 A. That's right. You might add, for the
10 Occupational Safety and Health Administration.
11 **Q. From 1986 to 1997, you were a member of the**
12 **American Conference of Governmental Industrial**
13 **Hygienists?**
14 A. Yes.
15 **Q. What is your opinion of the ACGIH?**
16 A. That is a professional organization with
17 membership confined to people who are employed by a
18 governmental agency.
19 Those who have worked for a
20 governmental agency and go to something else, can also
21 be Associate members.
22 **Q. Has there always been the requirement at the**
23 **ACGIH that you be a present or former governmental**
24 **agency employee?**
25 A. Well, for a long, long time, you had to be

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1 currently an employee of a governmental agency.
2 **Q. Can you tell me what -- probably you can't**
3 **tell me specifically, but can you tell me what time**
4 **period we're talking about where to be a member of the**
5 **ACGIH you had to be an employee of a governmental**
6 **agency?**
7 A. I don't remember when they also included
8 former employees. I don't remember what that date was.
9 **Q. Was it sometime after you were there?**
10 A. Well, I've been a member of ACGIH on two
11 different occasions. When I worked for the Tennessee
12 Valley Authority -- that is, of course, a quasi-federal
13 corporation, and was therefore eligible to be a member.
14 When I left the Tennessee Valley
15 Authority, I was no longer eligible. And at that time,
16 I went to Boeing Airplane Company in Wichita, which was
17 a government contractor.
18 But I still wasn't eligible for
19 membership. When I left OSHA, what? 20-something years
20 later, or 30-something years later, the rules had been
21 changed, and I was allowed to be an Associate member.
22 **Q. So at least back as far as the '50s you had**
23 **to be a current Government employee?**
24 A. It was very strict in the '50s, and I'm sure
25 that extended on probably for another two decades.

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1 **Q. Do you know when the ACGIH was founded?**
2 A. 1938.
3 **Q. Do you know if in 1938 when it was founded,**
4 **you were required to be an employee of a governmental**
5 **agency to be a member?**
6 A. Yes, you were.
7 **Q. And that was true until sometime after the**
8 **'50s?**
9 A. Yes.
10 **Q. Do you have any criticisms of the ACGIH's**
11 **positions it's taken historically on the issue of**
12 **asbestos?**
13 A. Well, I was not a part of the -- I was never
14 a part of the ACGIH Threshold Limits Committee. I
15 generally did not have quarrels with them as to what
16 levels they came up with, and probably some -- if not
17 the best, I don't know of any that were any better than
18 they were.
19 So I don't really have any quarrels
20 with the decisions that they made.
21 **Q. Are you familiar with the standards**
22 **promulgated by the American Conference of Governmental**
23 **Industrial Hygienists historically, on the matter of**
24 **asbestos exposure?**
25 A. I think we were well informed on that, yes.

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1 **Q. When was the first standard promulgated by**
2 **the ACGIH for exposure to asbestos?**
3 A. 1946.
4 **Q. That was the threshold limit value?**
5 A. I'm not sure that it was called threshold
6 limit value at that time. But their first publication
7 on exposure to limits was in 1946. Asbestos was a part
8 of that.
9 **Q. And what was the standard set in 1946?**
10 A. 5 million particles per cubic foot of air.
11 **Q. Did the ACGIH ever change its threshold limit**
12 **value or standard for exposure to asbestos?**
13 A. Several times.
14 **Q. When was the first change?**
15 A. The first change, I believe, was 19 -- I
16 believe the first change was in 1972, something like
17 that. Somewhere in that order.
18 **Q. Do you know what they changed it to?**
19 A. At that time, it went to 12 fibers per cc, I
20 believe, or 2 million particles per cubic foot. And
21 then it was changed later to separate the different
22 types of asbestos and lower the limit.
23 And I think this may be 1976. They
24 changed it to two fibers per cc for chrysotile, a half a
25 fiber per cc for -- I know it's two-tenths of a fiber

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1 for crocidolite, so it must have been the other,
2 amocite, that was the half.
3 But there were three different levels.
4 **Q. So in 1976, it was two fibers per cc for**
5 **chrysotile, a half a fiber per cc for amocite, and**
6 **two-tenths of a fiber per cc for crocidolite?**
7 A. I believe that's correct.
8 **Q. And was that the last change to the**
9 **standards?**
10 A. I think it's still the same.
11 **Q. Who did the American Conference of**
12 **Governmental Industrial Hygienists promulgate their**
13 **standards to?**
14 A. I don't think I really understand what you're
15 asking.
16 **Q. When the ACGIH in 1946 or '72 or '76 came out**
17 **with these standards, what was the purpose of it?**
18 A. Well, I think if you go back to the origin of
19 ACGIH. Prior to 1938, there was no publication,
20 organization, that provided consistent threshold limit
21 values -- or exposure limits.
22 In 1938, a group of mostly state
23 hygiene organizations got together and said, "We should
24 standardize this. We'll have one thing." But it was
25 1946 before they got around to actually publishing the

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1 first list of compounds with exposure limits for them.
2 But this was as a service to the
3 practicing industrial hygienists and to anybody else
4 that was interested.
5 **Q. Do you believe employers in 1946 to, say,**
6 **1950, that time period, who had substances that were on**
7 **the ACGIH's list should have sought out and reviewed the**
8 **ACGIH's list to find out what the standards were?**
9 MR. WOLCOTT: Objection to form.
10 A. You say "employers." That includes a
11 tremendous number of people. Probably most of them --
12 and I'm saying probably 99 and 44/100s percent of them
13 didn't even know what ACGIH was.
14 So they probably had no way of knowing
15 that such a list had been published. And there were, of
16 course, not very many industrial hygienists at that time
17 either.
18 **Q. (BY MR. BARLOW) Let me see if I can narrow**
19 **it down for you.**
20 **In the 1950s, would a reasonable**
21 **employer whose business used asbestos products have**
22 **sought out to determine what the ACGIH was saying about**
23 **exposure limits to asbestos?**
24 MR. WOLCOTT: Objection to form.
25 A. In the 1950s, asbestos was not a material

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1 that was considered to be of great concern from a health
2 standpoint, because there was just very little
3 experience in this country that showed that the disease
4 asbestosis was prevalent.
5 It wasn't. It was a very rare disease,
6 and asbestos was considered to be a material of choice.
7 It had a lot of characteristics that were very
8 desirable.
9 MR. BARLOW: Object as nonresponsive.
10 **Q. My question was whether or not a reasonable**
11 **employer who used asbestos in their practice would have**
12 **sought out the ACGIH standards to find out what the**
13 **American Conference of Governmental Industrial**
14 **Hygienists was saying was a safe level of asbestos to**
15 **expose their employees to.**
16 MR. WOLCOTT: Objection to form.
17 A. I think I certainly tried to answer your
18 question before. I think a reasonable employer,
19 whatever that might be, would have considered asbestos
20 to be a material of choice to use.
21 It had a lot of properties that were
22 very desirable. There were very few characteristics
23 that was felt to be undesirable.
24 MR. BARLOW: Object as nonresponsive.
25 **Q. (BY MR. BARLOW) Is it your testimony, that a**

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1 **reasonable employer in the 1950s would not have gone and**
2 **sought out ACGIH's standards on asbestos used in the**
3 **workplace?**
4 MR. WOLCOTT: Objection to form.
5 A. In my opinion, there was very little reason
6 why any employer using asbestos, perhaps other than the
7 people who were mining, processing it, would have
8 thought that there was any reason to seek out additional
9 information.
10 **Q. (BY MR. BARLOW) By that, do you mean that**
11 **no, a reasonable employer who utilized asbestos in their**
12 **business would not have sought out the ACGIH's standards**
13 **on asbestos exposure?**
14 A. I think the vast majority of employers would
15 not have felt that there was any reason to, that's
16 correct.
17 **Q. What about in the 1960s? Wouldn't an**
18 **employer whose business utilized asbestos have sought**
19 **out the ACGIH standards on asbestos exposure?**
20 MR. WOLCOTT: Objection to form.
21 A. There was a great deal of change in the
22 1960s, particularly the mid-'60s, with Dr. Selikoff's
23 report, which was first in 1964 and later published,
24 that aroused the interest and concern of the
25 occupational health and safety professionals.

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1 Again, this was not common knowledge,
2 though. There was probably more publicity provided by
3 the findings of Dr. Selikoff than had ever been on
4 anything else.
5 But it wasn't something that appeared
6 in the "New York Times" front page.
7 **Q. (BY MR. BARLOW) Okay. Let's break this**
8 **down. From 1960 until 1964, when the Selikoff**
9 **publication came out, should a reasonable employer have**
10 **sought out the American Conference of Governmental**
11 **Industrial Hygienists' standards on asbestos exposure?**
12 MR. WOLCOTT: Objection to form.
13 A. The same answer that I gave before with
14 regard to the 1950s. There was really no change until
15 Dr. Selikoff's report.
16 **Q. (BY MR. BARLOW) After 1964, when Selikoff**
17 **came out, should a reasonable employer who utilized**
18 **asbestos in their business, have sought out the American**
19 **Conference of Governmental Industrial Hygienists'**
20 **standards on asbestos exposure?**
21 MR. WOLCOTT: Objection to form.
22 A. You say "utilized," and that covers a lot of
23 things. But if you're considering that most of the
24 employers' utilization of asbestos involved installed
25 insulation, there's probably no reason for them to be

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1 unduly concerned about it, no.
2 **Q. (BY MR. BARLOW) So from, say, 1964 to 1970,**
3 **is it your opinion that a reasonable employer utilizing**
4 **asbestos in their business, would not have -- or should**
5 **not have sought out the ACGIH standards?**
6 A. Well, I think you have to go back and start
7 talking about specific types of employers. Certainly it
8 was known, and I'm sure that many people, other than the
9 professionals in occupational health, were aware, that
10 asbestos exposures, high exposures over long periods of
11 time, could cause the disease asbestosis.
12 That was certainly known. And it would
13 have been known by the people who were mining and
14 processing asbestos, it would have been known by people
15 making asbestos cloth, for example.
16 For other people where the exposures
17 would not be nearly the levels that would exist there
18 nor would it be their primary material would probably
19 have no concern. And there would be no reason why they
20 should have.
21 **Q. And this is up until 1970?**
22 A. Actually, probably until after 1971 or in
23 1971 when the first OSHA regulation was published.
24 **Q. Let me see if I'm understanding your opinion.**
25 **Is it your opinion that until late**

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1 **1971/early 1972 when OSHA came out, that unless you were**
2 **in the asbestos mining or tech style-producing business,**
3 **that you would have had no reason to be concerned with**
4 **asbestos exposure to your employees?**
5 A. Let's add to that, or manufacturing asbestos
6 products. Because you've got the asbestos pipe and this
7 sort of thing that was on the market.
8 But for the other employers, those who
9 were using products that contained asbestos, there
10 should have been no concern on their part about employee
11 overexposure. And that's continued to be the case.
12 **Q. When you say "that's continued to be the**
13 **case," what do you mean by that?**
14 A. Just that. You do not get exposure from
15 having pipes that are insulated with asbestos. You do
16 not get significant exposures from that.
17 **Q. Even today?**
18 A. Even today.
19 **Q. I want to make sure that I'm understanding**
20 **you. Are you of the opinion that today -- I don't think**
21 **anyone uses asbestos insulation on pipes today.**
22 **At least they're not currently**
23 **installing it. But is it your opinion, that today if a**
24 **company were installing asbestos insulation on its**
25 **pipes, that that employer would not need to be concerned**

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1 **about the health of its employees?**
2 A. If they're an insulating company, of course,
3 they've got certain regulations that they have to
4 follow. If they follow those regulations, yes, their
5 employees should be well protected.
6 But what I'm talking about, is if there
7 is a false ceiling that is in, or if there is insulation
8 on facilities in a plant, in a school, in a hospital, if
9 it is not friable, then no, there's not going to be a
10 hazardous level of asbestos in the environment.
11 **Q. I think that we may be -- I don't know that**
12 **my questions are understanding your answers or your**
13 **answers are with an understanding of my question.**
14 **Are you talking about asbestos in**
15 **place? It's your opinion that today employers don't**
16 **need to be concerned with asbestos in place?**
17 A. As long as it is not friable.
18 **Q. What about when asbestos pipe covering is**
19 **going to be manipulated? Is it your opinion that**
20 **asbestos pipe covering can be manipulated in a manner**
21 **today that will not pose a health hazard to the people**
22 **using it?**
23 A. It can be, yes.
24 **Q. If you were going to be manipulating asbestos**
25 **pipe covering today, are there precautions that you need**

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1 to take?
2 A. Yes.
3 **Q. What are those precautions?**
4 A. Well, those are all spelled out in the
5 standards that have been promulgated. They are highly
6 protective.
7 It is my opinion that you could remove
8 asbestos, certain amounts of it, even if you chose not
9 to follow those precautions without being harmful to
10 people.
11 The standards for asbestos have always
12 been based on an eight-hour daily exposure for a working
13 lifetime. That was true when the standards was first
14 published by ACGIH in 1946.
15 It's still true with the standards that
16 was published in 1994 by OSHA. So it depends on what is
17 the length of the job, how much is the exposure, how
18 often does somebody do it.
19 So yes, you can remove it without
20 presenting a hazard.
21 **Q. Do you believe that it should be legal today**
22 **to allow someone to saw a piece of pipe covering in**
23 **half, say, for installation without using a respirator?**
24 MR. WOLCOTT: Object to the form.
25 A. Well, I think the question is moot, because

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1 regulations are in place, and you should comply with the
2 regulations.
3 **Q. (BY MR. BARLOW) But I'm asking your opinion**
4 **about on what the regulations should be.**
5 **Do you think it should be permissible**
6 **today under the regulations, to allow someone to saw a**
7 **piece of pipe covering that contains asbestos in half to**
8 **not use a respirator?**
9 MR. WOLCOTT: Objection to form.
10 A. The regulations have to be written so that
11 they can be enforced.
12 So what the compliance officer would be
13 faced with, is how often is this done. If you're
14 saying, "If I went out and one time sawed a piece of
15 asbestos, would this be harmful to my health?" No, it
16 would not.
17 **Q. (BY MR. BARLOW) If you were an insulator and**
18 **it was your job to saw in half, pieces of pipe covering**
19 **that contained asbestos for installation, and you worked**
20 **as an average insulator at a rate that an average**
21 **insulator would work at, could you saw that asbestos**
22 **each day of your working career without harmful effect**
23 **to your health, in your opinion?**
24 A. Again, this is going to say how much of each
25 day was that a part of the job. It's very hard to say.

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1 Again, we have regulations. And since
2 I signed one of those regulations, I'm not about to say,
3 "Disregard them."
4 **Q. Sure. And I understand that it's your**
5 **opinion -- well, I'll ask you: It is your opinion that**
6 **employers, companies, should follow state and federal**
7 **regulations on asbestos exposure?**
8 A. Or any exposure, yes.
9 **Q. And I suppose that it's your opinion that**
10 **since 1900, a company should follow whatever regulations**
11 **are in place with regard to asbestos exposure?**
12 A. Well, certainly there were no regulations in
13 place in 1900. The first regulation was 1971, a federal
14 regulation. The states adopted -- some of the states
15 adopted the ACGIH threshold limit values.
16 **Q. When is the first time you know of that a**
17 **state adopted the ACGIH threshold limit value?**
18 A. Some of them were right almost immediately
19 following the publication.
20 **Q. So 1946 -- let me go ahead and ask it that**
21 **way: From 1946 until the present, it is your opinion**
22 **that an employer should be in compliance with state and**
23 **federal regulations such as they exist with regard to**
24 **asbestos exposure?**
25 A. Where there are laws or where there are

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1 regulations, yes, we should obey those, whether it's a
2 traffic light, or whether it's something else.
3 Yes, this is our obligation as a
4 citizen, to try to be in compliance with all laws.
5 **Q. And is it your opinion that employers have a**
6 **duty to know what the law is with regard to asbestos**
7 **exposures for their employees?**
8 MR. WOLCOTT: Objection to form.
9 A. Well, I think you're getting into an area
10 where it is not my expertise. I think you're raising
11 legal questions here, that I don't feel that I'm the one
12 who should try to answer that.
13 **Q. (BY MR. BARLOW) Well, if you were -- say, if**
14 **you were consulting for a company in the 1950s, you were**
15 **acting as their Industrial Hygienist, would you advise**
16 **them to keep abreast of what the laws on asbestos**
17 **exposure were?**
18 A. My responsibility would have been to advise
19 them with regard to possible health hazards, whether it
20 was asbestos or benzene or something else.
21 However, in the 1950s, the potential
22 exposure to asbestos at hazardous levels was very, very
23 rare.
24 **Q. In your opinion as an Industrial Hygienist,**
25 **would a reasonable employer in an industrial setting**

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1 **have kept abreast of what the state and federal laws**
2 **were concerning asbestos exposure during the 1950s?**
3 MR. WOLCOTT: Objection to form.
4 A. The word "reasonable" there bothers me.
5 because I know that the majority of employers didn't
6 know, and don't know today, what they are.
7 **Q. (BY MR. BARLOW) Can you answer the question?**
8 MR. WOLCOTT: Objection to the form.
9 A. I think I did.
10 MR. BARLOW: I object as nonresponsive.
11 **Q. (BY MR. BARLOW) Do you have an opinion as to**
12 **whether or not an employer exercising a reasonable**
13 **degree of care, would have kept abreast of the state and**
14 **federal regulations concerning asbestos exposure in the**
15 **1950s?**
16 MR. WOLCOTT: Objection to form.
17 A. Again, I think you have to say what is the
18 probability that asbestos would have been a problem for
19 employers in the 1950s with the information that was
20 available to them or to anyone else.
21 Most of the situations did not come
22 close to reaching what was felt to be a safe exposure to
23 asbestos.
24 **Q. (BY MR. BARLOW) So is it your opinion that**
25 **in the 1950s, if an employer didn't feel like there was**

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1 **a hazard at their jobsite with asbestos, they nad no**
2 **reason to find out what the laws were concerning**
3 **asbestos exposure in their state?**
4 A. Why don't you run that by me again.
5 MR. BARLOW: Can you read that back?
6 (PREVIOUS QUESTION READ)
7 MR. WOLCOTT: Objection to form.
8 A. I think there's two things here. I think
9 that the employer is, of course, responsible for
10 protecting the health and safety of their workers. And
11 they base their actions on what they know and what is
12 known in their particular aspect of the industries.
13 In the 1950s, asbestos was not one of
14 those things that was of concern.
15 **Q. (BY MR. BARLOW) Of concern to who?**
16 A. To anyone. To the workers – as far as we
17 knew, to the workers or to employers or, for that
18 matter, to the Industrial Hygienists.
19 We just did not have enough information
20 to put asbestos at the level that it is today.
21 **Q. Well, you would agree with me, that by the**
22 **1950s, it was at least enough of a concern to the ACGIH,**
23 **that they would promulgate a standard on it?**
24 A. They promulgated a standard based on a study
25 that was done in 1938. It was based on the best

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1 knowledge that was available at the time.
2 **Q. So it was at least that big of a concern for**
3 **the ACGIH to publish a standard?**
4 A. Which was 5 million particles per cubic foot.
5 When I was in graduate school in the mid-'50s, we had
6 courses on pneumoconiosis. Asbestos was included in one
7 of a group.
8 The primary concern was silicone.
9 Asbestos was included with sugar cane and cotton dust
10 and a lot of other things. It was lumped together as
11 other pneumoconioses.
12 **Q. Let me ask you this: The threshold limit**
13 **value of 5 million particles per cubic foot, was it ever**
14 **intended to protect against cancer?**
15 A. I don't think cancer was included.
16 **Q. I want to get back to what your opinions are**
17 **on whether or not a company should seek out and know**
18 **what the laws are concerning products that it's using on**
19 **its worksites.**
20 **In the 1950s, do you feel like**
21 **companies should have made an effort to find out what**
22 **the laws said about asbestos that they were using in**
23 **their workplace?**
24 MR. WOLCOTT: Objection to form.
25 A. I think we've been over this several times

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1 now, and I've tried to give you the best answer I can.
2 People get information from a number of
3 sources with regard to the products that they're using.
4 This may come from the vendors; it may come from their
5 colleagues in the business. And I have to keep coming
6 back that asbestos was not at the level of concern for
7 protecting workers as other contaminants might have
8 been.
9 **Q. (BY MR. BARLOW) Let me give you a**
10 **hypothetical. Say in State X in 1950, they adopted the**
11 **ACGIH standard of 5 million particles per cubic foot,**
12 **and there was a refinery in that state that used**
13 **asbestos in insulating their pipes and boilers and other**
14 **machinery.**
15 **Would that refinery have a duty to**
16 **affirmatively learn or find out what the law in the**
17 **state of X was concerning asbestos exposures to its**
18 **employees?**
19 MR. WOLCOTT: Objection to form.
20 A. They had a duty to know how to protect their
21 workers. If this included a value, then that would have
22 been a part of their consideration.
23 But you have to also say, "What is the
24 general knowledge with regard to this particular
25 material? What is 5 million particles per cubic foot?

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1 Is this a likely thing to occur when using this
2 particular product?"
3 I don't know whether I can give you a
4 good analogy or not. In 1950, if you bought a toaster,
5 it had a cord on it, that was probably insulated in part
6 with asbestos.
7 Now the general knowledge was that that
8 would protect you from shock, and it carried no other
9 connotation whatsoever.
10 Now did the person who was selling the
11 toaster have an obligation to tell the customer that it
12 contained asbestos? No. There was no reason to.
13 Even in a state that might have had a
14 level, exposure limit, it would not have been a concern.
15 Because the probability of there being an exposure
16 hazard was nil.
17 MR. WOLCOTT: Can we take one of those
18 hour breaks? I think we've been going over an hour.
19 MR. BARLOW: Sure.
20 (RECESS HELD FROM 10:46 A.M. TO 10:52 A.M.)
21 **Q. (BY MR. BARLOW) I think before we left off**
22 **you had said that an employer has the duty to protect**
23 **their workers?**
24 A. That's right.
25 **Q. Is it part of that duty to protect your**

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1 **workers to stay abreast of regulations?**
2 A. It is a part of everybody's duty to stay
3 abreast of regulations as much as they can. Most of us
4 can't possibly keep up with all the regulations.
5 And I think employers do rely on other
6 sources to determine do I have a hazard without
7 necessarily saying is this the law or is it not the law.
8 Because most things are not covered by the law or by
9 regulations.
10 **Q. So in your opinion, an employer may need to**
11 **address a hazard even if it's not covered by**
12 **regulations?**
13 A. Certainly.
14 **Q. Let me ask you if the inverse of that is**
15 **true.**
16 **Can an employer be acting reasonably in**
17 **not addressing a hazard even if it is in violation of**
18 **regulations?**
19 A. Are you saying is it permissible or good
20 practice to violate regulations?
21 **Q. Under any circumstances, yes.**
22 A. No.
23 **Q. I don't want to put words in your mouth, but**
24 **so the record can be clear, to use your words, it's**
25 **never good practice to be in violation of regulations?**

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1 A. I think you asked the question earlier should
2 people comply with regulations. Yes.
3 **Q. And if an employer is not in compliance with**
4 **regulations, then they are not exercising good**
5 **practices, correct?**
6 A. If they're not in compliance with
7 regulations, no, that would not be good practice, no.
8 **Q. The problem with asking questions like that**
9 **is that I think you can agree with me and then it comes**
10 **out and it's unclear on the record.**
11 **If an employer is not in compliance**
12 **with the regulations, then that is not good practices,**
13 **correct?**
14 A. Your question was if an employer is not in
15 compliance with a regulation, it is not good practice?
16 It's not a wise practice. I would say that.
17 I'm not sure -- we're getting into this
18 business of good practice. Yes, I think we're all --
19 good practice is to try to be in compliance with all
20 regulations, whether they're concerning health of the
21 workplace or speed limits or what else.
22 It doesn't necessarily mean that a
23 hazard has been created by noncompliance with the
24 regulation.
25 MR. BARLOW: Object to the

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1 nonresponsive portion of the answer, but I think I
2 understand your gist.
3 **Q. (BY MR. BARLOW) Let me ask you this: Is it**
4 **creating a hazard to expose employees to levels of**
5 **asbestos dust, asbestos-containing dust, over 5 million**
6 **particles per cubic foot?**
7 A. Okay. I'm not sure that I was properly
8 listening there.
9 **Q. We can have it read back if you'd like.**
10 A. Yeah, please.
11 (PREVIOUS QUESTION READ)
12 A. It might or might not be, depending on the
13 circumstances.
14 **Q. Can you explain?**
15 A. Yes. You said dust-containing asbestos over
16 5 million particles per cubic foot. We don't know what
17 percentage of asbestos it is, we don't know how long the
18 worker was exposed to it, whether this is a one-time
19 occasion, or whether it's a daily routine.
20 So more information is needed before
21 that question can be answered.
22 **Q. You said one of the relevant considerations,**
23 **would be the percentage of asbestos in the dust?**
24 A. That's right.
25 **Q. Another would be the amount of exposure or**

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1 **time period of exposure?**
2 A. The length of time per day, the repetition,
3 whether it's a full day or not, whether it's one
4 occurrence or whether it's a routine occurrence. We
5 have to also take into consideration the size of the
6 particles that are there, the size of the fibers that
7 are there.
8 There are many things that go into
9 evaluating a workplace for asbestos or anything else.
10 You can't take just a number. That is a guideline for
11 professionals to use in judging whether a workplace is
12 hazardous or not.
13 **Q. Change gears a little bit.**
14 A. I'm sorry. What?
15 **Q. I said let's change gears a little bit.**
16 **We've been talking about that for awhile. Let's talk**
17 **about something else.**
18 **When is the first time that there was**
19 **something published in the scientific literature stating**
20 **that bystanders could be at risk of developing asbestos**
21 **disease as a result of exposure to asbestos?**
22 A. I don't know what that date would have been.
23 **Q. Can you tell me which author has published**
24 **the most in scientific literature on the issue of**
25 **bystander asbestos exposure and the hazards of that?**

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1 A. No.
2 **Q. Can you tell me which articles you find**
3 **authoritative on the issue of asbestos hazards from**
4 **bystander exposure?**
5 MR. WOLCOTT: Objection to form.
6 A. I question that a good deal of what has been
7 published regarding bystander exposure is very
8 authoritative at all.
9 **Q. (BY MR. BARLOW) Can you explain that**
10 **opinion?**
11 A. Well, based on my own experience, based on
12 air sampling results that I have seen, bystander
13 exposures are very, very low, quite often on the order
14 of ambient levels.
15 You also have to define what is a
16 bystander, who is this person, how long they're there,
17 if this is a walk-by situation, is it a helper to
18 somebody else?
19 There's just many, many factors that go
20 into it that I think generally have been ignored.
21 **Q. Let me ask you this: You are aware that**
22 **there is scientific literature that says that bystanders**
23 **are at risk of developing asbestos disease?**
24 A. I am aware that there have been such
25 publications. I question how scientific they are

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1 because they do not take into consideration the total
2 exposure of the individual.
3 **Q. Do you disagree with the scientific**
4 **literature which says that bystanders are at risk of**
5 **developing asbestos disease?**
6 A. Again, as I had said earlier, I think most of
7 the time there's not enough information available to
8 really say. And also at what levels does asbestos
9 disease occur?
10 What disease are they talking about? I
11 do not concur with the idea that one fiber exposure is
12 going to be harmful.
13 No, I do not agree with that. And
14 that's the basis of many of these bystander studies.
15 **Q. Are you aware of any article in the**
16 **scientific literature which states that bystanders are**
17 **at risk of developing asbestos disease from asbestos**
18 **exposure that you agree with?**
19 A. I can't give you an author, no.
20 **Q. Do you recall ever seeing one?**
21 A. I have seen articles that allege that
22 bystander exposure causes asbestos disease, but I
23 haven't seen any that I feel are soundly based on
24 scientific fact.
25 **Q. And you consider yourself an expert on**

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1 **scientific literature, don't you, concerning asbestos?**
2 A. Well, I think I'm certainly capable of
3 evaluating publications on asbestos or many other
4 possible contaminants.
5 **Q. And do you feel like you've done a thorough**
6 **review of the literature concerning bystander exposure**
7 **to asbestos?**
8 A. I don't know what you mean by "thorough
9 review." Have I read every paper on it? Probably not.
10 From what I have read, I have certainly very, very
11 strong questions as to the validity of the allegations.
12 **Q. And by thorough review I don't mean you've**
13 **read ever single paper that's ever been published on the**
14 **issue of bystander exposure.**
15 **But do you feel that you have done a**
16 **thorough enough review of the medical literature with**
17 **regard to bystander exposure, to opine on that issue?**
18 A. Yes.
19 **Q. And in your review of the scientific and**
20 **medical literature with regard to bystander exposure,**
21 **you were unable to find any articles stating that**
22 **bystanders are at risk which you found to be scientific?**
23 A. I don't agree with the results. I do not
24 believe that the normal definition used by bystander
25 legitimately makes a claim that there can be asbestos-

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1 related disease.
2 **Q. So you disagree with the scientific**
3 **literature which says that bystanders are legitimately**
4 **at risk of developing asbestos disease?**
5 A. Well, I question the use of the term
6 "scientific literature," because I don't think it's very
7 scientifically based.
8 I do not believe that bystander
9 exposure, as I define "bystander," as I think others do,
10 will cause disease.
11 **Q. What articles do you rely on for the**
12 **proposition that bystanders are not at risk of**
13 **developing asbestos disease?**
14 A. I didn't indicate any articles at all. I
15 base this on my knowledge of working conditions, the
16 basis for disease-causing exposures, which again, we
17 have to get back to the idea that these are eight hours
18 a day every day for 40 years or more before disease is
19 likely to occur.
20 **Q. So for your opinion that bystanders are not**
21 **at risk of developing asbestos disease, you rely on your**
22 **experience as an Industrial Hygienist, rather than any**
23 **scientific literature?**
24 A. I rely on my experience as an Industrial
25 Hygienist, as well as the scientific literature

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1 regarding the causes for asbestos-related diseases.
2 **Q. Can you list for me all of the authors who**
3 **have written in the peer-reviewed literature that**
4 **bystander exposure will not cause asbestos-related**
5 **disease?**
6 A. No. Neither can I give you a list of the
7 authors who have alleged that it does occur.
8 MR. BARLOW: Object to everything after
9 "no" as nonresponsive.
10 MR. WOLCOTT: Can I see the CV, if
11 you're not using it right now?
12 MR. BARLOW: Sure. Absolutely.
13 (DOCUMENTS HANDED TO COUNSEL)
14 **Q. (BY MR. BARLOW) Have you done any review of**
15 **the literature specific to this case, scientific**
16 **literature?**
17 A. Specific to this?
18 **Q. Uh-huh.**
19 A. No.
20 **Q. What have you done to prepare for your**
21 **testimony in this case?**
22 A. I have reviewed the documents that were
23 provided to me by counsel; I visited the plant.
24 **Q. You visited the plant?**
25 A. Yes. The materials that I gave you this

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1 morning, the law and the review.
2 **Q. You reviewed the federal regulations, and an**
3 **article entitled "Chronology of Asbestos Regulations in**
4 **the United States Workplace"?**
5 A. Right.
6 **Q. So you reviewed some documents provided to**
7 **you by counsel, you reviewed this article, "Chronology**
8 **of Asbestos Regulations in the United States**
9 **Workplace," --**
10 A. And the federal regulations.
11 **Q. -- and the federal regulations. Did you do**
12 **anything else?**
13 A. No.
14 **Q. Did you meet with Mr. Wolcott?**
15 A. Oh, yes.
16 **Q. When did you meet with Mr. Wolcott first with**
17 **regard to this case?**
18 A. Well, this has been going on for a period of
19 time. I don't remember exactly.
20 Probably shortly after the first of the
21 year. I don't think we actually met until we made the
22 plant visit last week.
23 **Q. You met last week?**
24 A. (Nodding affirmatively.) I think it was.
25 THE WITNESS: Wasn't it last week?

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1 MR. WOLCOTT: I think so.
2 THE WITNESS: It wasn't this week.
3 **Q. (BY MR. BARLOW) Where did you meet?**
4 A. At the plant.
5 **Q. At the plant? Was this when you toured the**
6 **plant?**
7 A. Yes. Then we met last night. And, of
8 course, we met today.
9 **Q. You met last night. How long did you meet**
10 **for last night?**
11 A. Well, we met for dinner. And I guess that
12 lasted two, maybe two and a half hours, reviewing some
13 material at dinner.
14 **Q. The material that you reviewed at dinner last**
15 **night, is that included in the documents?**
16 A. Yes.
17 **Q. You said you met for dinner for two or two**
18 **and a half hours and reviewed some documents. After**
19 **dinner, did you meet any more?**
20 A. No.
21 **Q. So your total meeting time was two and a half**
22 **hours?**
23 A About that. I don't know exactly, but
24 somewhere in that order.
25 **Q. When you went to tour the plant, how long**

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1 were you there?
2 A. Three hours, I guess.
3 **Q. Three hours at the plant?**
4 A. Something like that. It was not a long time.
5 **Q. Did you meet with Mr. Wolcott other than at**
6 **the plant, walking around and touring it?**
7 A. We met the night before, and during that day.
8 **Q. You met the night before? What did you do**
9 **the night before at your meeting?**
10 A. Very similar -- just generally discussing the
11 case.
12 **Q. Discussing the case? How long did you meet**
13 **the night before you went to the plant?**
14 A. It was the same thing. It was dinner and
15 discussion, and the whole thing was probably on the
16 order of two, two hours or so.
17 **Q. Did Mr. Wolcott at any point explain to you**
18 **what the defense was in this case?**
19 A. I don't understand what you're saying.
20 **Q. Well, did you and Mr. Wolcott discuss how Mr.**
21 **Wolcott intended to present a defense of the refinery in**
22 **this case?**
23 A. No. We discussed what role I would take.
24 And this is generally the state of the art with regard
25 to asbestos. And of course, Mr. Clark's employment.

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1 **Q. What did you understand your role would be in**
2 **this case?**
3 A. The state of the art over the period of time,
4 state of the art with regard to asbestos over the time
5 period of Mr. Clark's employment.
6 **Q. And what do you understand the period of time**
7 **of Mr. Clark's employment to be?**
8 A. As I recall, it was 1952 to '78.
9 **Q. Is it your opinion, that prior to 1978, the**
10 **Pontiac refinery should not have known that its**
11 **employees were potentially at risk of developing**
12 **asbestos disease?**
13 A. You said "Pontiac refinery," and I have some
14 difficulty figuring out what the name of that location
15 was over the period of years.
16 It may have started out -- I think it
17 maybe started out as Pontiac, and it had a bunch of
18 different --
19 **Q. I think it was Pontiac, and then Champlin,**
20 **and then maybe UPR.**
21 A. It had many different names. Now let's go
22 back and see. Your question was --
23 **Q. Well, whoever the owner of the Pontiac plant**
24 **was, is it your opinion that prior to 1978, the owners**
25 **of the plant would have had no reason to be on notice**

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1 **that asbestos was a potential hazard in their workplace?**
2 A. From the materials that I've reviewed, I
3 think that the people at the plant -- I will say the
4 safety people and, in connection with that, of course,
5 the management of the plant, were of the opinion that
6 asbestos was not a problem for them. And I think their
7 actions were appropriate.
8 Their employees were not being
9 excessively exposed to asbestos.
10 **Q. Prior to 1978?**
11 A. At any time.
12 **Q. Or at any time. Based on your review of**
13 **corporate documents and, I guess, deposition testimony,**
14 **what is the first time that you know of someone at**
15 **Pontiac or Champlin, as it was later called, being aware**
16 **that asbestos was a potential hazard?**
17 A. Well, as I recall, I think Mr. Kucera -- is
18 that the way you pronounce his name -- the man that took
19 over the safety responsibility, indicated that he had
20 some knowledge of it, yes.
21 I think he took on that job in '72. I
22 don't remember exactly -- or maybe it was '68 that he
23 took that job.
24 **Q. So sometime in the late '60s --**
25 A. Whatever the date was that he became -- and

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1 maybe before that. But that's the first that I am aware
2 of it, is from his deposition.
3 **Q. The first time, based on your review of the**
4 **corporate documents and depositions given, that you're**
5 **aware of anyone at the Pontiac facility being aware that**
6 **asbestos was a potential hazard was sometime in the late**
7 **'60s when Mr. Kucera started working at the plant?**
8 A. That is the first indication I have. That
9 doesn't mean that that knowledge wasn't there before.
10 It might have been.
11 I just don't know, because I don't have
12 records about it. No one commented before that.
13 **Q. You haven't been provided to date any**
14 **documents which show knowledge at the Pontiac plant of**
15 **asbestos hazards prior to the late '60s when Kucera**
16 **began?**
17 A. Well, he didn't say that there was a hazard
18 there. Your earlier question and my answer regarded
19 that asbestos itself could be a potential hazard.
20 We were not referring to the actual
21 conditions at the plant.
22 **Q. You haven't been provided with any documents**
23 **or testimony which show that people or employees or**
24 **members, executives at the Pontiac facility knew that**
25 **asbestos generally was a potential hazard prior to**

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1 **Kucera beginning work there?**
2 A. I haven't seen anything like that.
3 MR. WOLCOTT: I'm sorry. Could you
4 read back the last part of that question? When Kucera
5 started work there?
6 THE COURT REPORTER: "...prior to
7 Kucera beginning work there?"
8 A. Oh, no, I'm sorry. I misunderstood too.
9 Because Mr. Kucera worked there before he took over
10 safety.
11 MR. WOLCOTT: He started in '52.
12 **Q. (BY MR. BARLOW) I'm at your mercy, because I**
13 **have not seen Mr. Kucera's deposition. Let me ask it**
14 **again.**
15 **Mr. Kucera testified that he became**
16 **aware that asbestos generally could be a hazard sometime**
17 **in the late '60s.**
18 A. Mr. Kucera, as I recall his deposition,
19 indicated that shortly after he became the safety
20 representative there that asbestos -- along with other
21 things -- could under certain conditions be a problem.
22 He did not indicate that he felt that
23 there was a problem in their plant.
24 **Q. Do you know Richard Lemen?**
25 A. Yes.

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1 **Q. How do you know Dr. Lemen?**
2 A. Professionally.
3 **Q. You know him professionally through what part**
4 **of your profession, I guess?**
5 A. Well, Dr. Lemen has been active in the
6 profession probably for the last 20 or maybe 30 years.
7 I don't know exactly how long.
8 He was in the Public Health Service,
9 and then at NIOSH, and is certainly well known in
10 industrial hygiene professional circles.
11 **Q. What is your opinion of Dr. Lemen**
12 **professionally?**
13 A. Well, as I said, I don't know him really very
14 well personally. But I think that he has generally been
15 respected as a competent individual professionally.
16 **Q. Do you know Dr. David Eagleman?**
17 A. I know of him. I don't know him.
18 **Q. Do you have any opinion about Dr. David**
19 **Eagleman professionally?**
20 A. Since I don't know the man, I'm only going by
21 what I have seen of depositions that he's given. He
22 doesn't impress me very favorably.
23 **Q. What are your criticisms of the opinions**
24 **you've seen Dr. Eagleman offer?**
25 A. He comes across as being quite arrogant, and

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1 not very careful about what he says.
2 **Q. When you say he's "not very careful about**
3 **what he says," what do you mean?**
4 A. Well, I don't think -- I don't know quite how
5 to put this. He's very egotistical -- seems to be, and
6 I'm going only by depositions -- quite egotistical and
7 not much respect for anybody except his own opinions.
8 And I don't think I can go any further
9 than that.
10 **Q. Do you have any criticism of Dr. Eagleman's**
11 **opinions substantively that you've read?**
12 A. As I said, I just don't feel that he gives
13 very good testimony, no. I don't have much respect for
14 him, no.
15 **Q. I guess I'm trying to -- substantively, what**
16 **opinions have you seen him offer that you disagree with?**
17 A. I cannot pinpoint anything. As I said, it's
18 just the impression that I get from his depositions.
19 I don't really think I can go any
20 further than that.
21 **Q. What about Dr. Barry Castleman? Are you**
22 **familiar with him?**
23 A. Again, that's somebody I know of. I don't
24 know him personally.
25 **Q. Have you read Dr. Castleman's book?**

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1 A. No, I have not.
2 **Q. Do you know of Dr. Castleman's book?**
3 A. I know of it.
4 **Q. Do you know what it's about, the subject of**
5 **it?**
6 A. From what I've heard and what I've read of
7 his testimony, it's essentially about asbestos. But no,
8 I haven't read it.
9 **Q. So you have no way to make a determination**
10 **whether or not his book is authoritative about the**
11 **history of the development of knowledge about asbestos?**
12 A. I haven't read it, so I can't say.
13 **Q. Do you have any criticisms of Dr. Castleman,**
14 **based on what you've read?**
15 A. I don't think I have ever read one of Dr.
16 Castleman's depositions. I just don't recall. Not much
17 comment on it.
18 **Q. You don't have any comment on --**
19 A. Not really, no.
20 **Q. -- Dr. Castleman, one way or another?**
21 A. No.
22 **Q. Have you ever done a review of the literature**
23 **for reported cases of asbestos-related disease among**
24 **refinery workers?**
25 A. Well, there are a couple of papers about

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1 refinery workers. I think Dr. Wright was the author of
2 one of them in which he and a co-author, I don't
3 remember, I can't recall right now, reported a couple of
4 cases of cancer in a refinery.
5 **Q. Other than the case reports from Dr. Wright,**
6 **are you aware of any other case reports in the**
7 **scientific literature which discuss asbestos-related**
8 **disease among refinery workers?**
9 A. Well, there are a number of case reports,
10 most of them from England. But I don't think they are
11 necessarily refinery workers.
12 I think they're textile workers more
13 than anything else, and some insulators. There's a
14 study about shipyard workers other than Dr. Selikoff. I
15 can't pinpoint one on refineries.
16 **Q. What trades, in your opinion, would be at**
17 **risk for developing asbestos-related disease?**
18 A. What trades?
19 **Q. Yes.**
20 A. Well, obviously, the insulators. Because
21 these are the people who have more exposure. We're
22 talking about the past really, not present, because I
23 think that the controls that exist and the knowledge
24 that exists today are such that probably the insulators
25 are not much at risk anymore.

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1 **Q. Let me just stop you. I don't mean to**
2 **interrupt you.**
3 **But so we will be clear, historically,**
4 **what trades have been at risk of developing asbestos-**
5 **related disease?**
6 MR. WOLCOTT: Objection to form.
7 A. I'm sorry. You asked, and I said, first of
8 all, the insulators. And I think that is a trade.
9 **Q. (BY MR. BARLOW) I didn't mean to confuse the**
10 **issue more.**
11 **You said that obviously, present day we**
12 **have regulations in place that may take some trades out**
13 **of the zone-free zone.**
14 A. Hopefully we're doing that for everybody,
15 yes.
16 **Q. So what I'm saying, is over time, over the**
17 **past hundred years, which trades have been at risk of**
18 **developing asbestos-related disease?**
19 A. Again, I have to start with the insulators.
20 This would be one group of people. The other are the
21 textile, asbestos textile workers. And this is the
22 studies by Dr. Dreessen as well as the studies by
23 Meriwether, et al, in England.
24 Surprisingly, miners of asbestos have
25 not been to a great extent, not to the same extent that

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1 people in manufacturing, or particularly in the textile
2 industry --
3 **Q. Miners are at risk, but less so?**
4 A. Well, I would think so. But as I say, the
5 studies indicate, particularly among the Canadian
6 miners, that there has not been nearly as much -- there
7 has been disease, but not nearly to the extent of what
8 might have been expected.
9 Again, when you get down to specific
10 trades, it's kind of hard, because you're saying, "What
11 is their job? How much exposure have they had?"
12 There have been alleged exposures of
13 pipefitters, boilermakers, and others, but those have
14 been primarily -- they have not been asbestosis, they
15 have been mesothelioma, and really not much good studies
16 on those. There have been alleged cases of it.
17 **Q. You're aware of alleged cases. In your**
18 **opinion, were pipefitters at an increased risk of**
19 **developing asbestos-related disease?**
20 A. It's hard for me to say that they are
21 because, again, their job does not involve using
22 insulated materials, even being around it a whole lot.
23 So it's going to have to depend on
24 where they were working, what were the conditions they
25 were working under, what was their exposure level.

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1 But as a group, I would not think
2 pipefitters would, because that's just not their type of
3 work.
4 **Q. As a group, are boilermakers at an increased**
5 **risk of developing asbestos disease?**
6 A. I would say they fit in pretty much the same
7 category that the pipefitters do.
8 **Q. They would not be?**
9 A. They would not be, because their exposure
10 time is very, very -- relatively short as to what their
11 primary job is.
12 **Q. As a group, would electricians be at an**
13 **increased risk of developing asbestos disease?**
14 A. I would put them even below the pipefitters
15 and the boilermakers.
16 **Q. So they would not?**
17 A. Would not.
18 **Q. Would drywallers be at an increased risk of**
19 **developing asbestos disease?**
20 A. They might be. Once again, this is going to
21 depend on when they were doing drywall, because, again,
22 it's not a present-day problem.
23 **Q. Would drywallers in the 1950s be at an**
24 **increased risk of developing asbestos disease?**
25 A. Well, it was certainly a dusty operation. I

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1 don't have any information specifically on what the
2 asbestos levels -- respiratory levels were for drywall
3 workers. It's very dusty. I know that.
4 **Q. So you don't have an opinion one way or the**
5 **other?**
6 A. I don't know.
7 **Q. Would laborers be at an increased risk of**
8 **developing asbestos disease?**
9 A. Again, it depends on what the laborer is
10 doing, where they're working. As a group, no.
11 **Q. Have you been given any documents such as**
12 **worker's compensation claims or other types of documents**
13 **which indicate the existence of asbestos-related disease**
14 **in employees of UPR?**
15 A. No.
16 **Q. What about Champlin?**
17 A. No.
18 **Q. Pontiac?**
19 A. No.
20 **Q. Have you interviewed any former employees of**
21 **Pontiac, Champlin, or UPR, in connection with forming**
22 **your opinions in this case?**
23 A. I can't say that I've interviewed him. Mr.
24 Tansey was present when we did the plant tour.
25 **Q. Did you talk to Mr. Tansey?**

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1 A. We talked, but I couldn't say that this was
2 by any stretch of the imagination an interview. Of
3 course, there were comments with regard to what we were
4 seeing and what his experience had been. But very
5 generally.
6 **Q. Can you tell me what Mr. Tansey told you**
7 **about the conditions of the plant when he was there in**
8 **the 1960s and '70s?**
9 A. Well, he was able to point out what still
10 existed and what did not exist or which had been
11 built -- or merged and built, rebuilt, the use of
12 asbestos-containing products -- or rather the nonuse of
13 asbestos-containing products.
14 This was generally because they had to
15 identify where asbestos was.
16 **Q. Was there anything that Mr. Tansey told you**
17 **that you found relevant in forming your opinions in this**
18 **case?**
19 A. Well, I think anything that you learn from
20 the plant tour, from discussions with him, from review
21 of the documents has some influence on the opinion, yes.
22 **Q. What did he tell you that influenced your**
23 **opinion?**
24 A. I don't think there's any one specific thing.
25 I just think generally, as I mentioned earlier, what he

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1 was asked about, what he said, all of that is a part of
2 the knowledge that's gained for forming an opinion.
3 **Q. Was the information he gave you basically**
4 **information about where things were, what was new, what**
5 **the layout of the plant was?**
6 A. I think that's what I said earlier, yes.
7 **Q. Are you an epidemiologist?**
8 A. No.
9 **Q. Do you consider yourself an expert in the**
10 **area of epidemiology?**
11 A. I think I am capable of interpreting
12 epidemiological information, yes.
13 **Q. Do you consider yourself qualified to**
14 **critique epidemiological studies?**
15 A. In trying to evaluate them and interpret
16 them, yes, you have to have some.
17 I do not consider myself an
18 epidemiologist, but I do think that I can read the
19 studies and obtain valid opinions from them.
20 **Q. Do you consider yourself qualified to opine**
21 **on whether or not an epidemiological study was conducted**
22 **correctly?**
23 A. I think I would want to see what study we're
24 talking about before I would say. I might or I might
25 not.

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1 **Q. Do you feel like you are qualified to review**
2 **epidemiological studies for scientific validity?**
3 A. Yes.
4 **Q. Are there any substances besides asbestos**
5 **which you believe cause mesothelioma in humans?**
6 A. There are those, but I don't know what they
7 are.
8 **Q. What do you rely on for your opinion that**
9 **there are other causes of mesothelioma?**
10 A. Well, there was a study done in -- I think it
11 was India or Nepal, one of the countries in that part of
12 the world, where there was, quote, "no asbestos
13 exposure" and there were cases of mesothelioma.
14 There have been other reports, and I
15 can't specifically name them now, where it was
16 considered idiopathic. They had no idea why a person
17 had mesothelioma.
18 And I think that the number of cases,
19 while it's still relatively small, to me indicates that
20 there has to be some other reason for it other than
21 asbestos exposure.
22 **Q. Are there any epidemiological studies which**
23 **show something other than asbestos to cause**
24 **mesothelioma?**
25 A. Well, I indicated the one study where, to the

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1 best of knowledge of the people conducting the study,
2 there was no asbestos exposure, but there were still
3 cases of mesothelioma.
4 And it's very hard to conduct an
5 epidemiological study for what does not exist.
6 **Q. What I'm saying is are you aware of case**
7 **reports that mesothelioma -- are you aware of articles**
8 **linking mesothelioma to Semian virus 40?**
9 A. To what?
10 **Q. Semian virus 40.**
11 A. I don't know what that is.
12 **Q. What about articles relating mesothelioma to**
13 **radiation?**
14 A. I know that that has been discussed, but I
15 don't know of any studies that has really been
16 conclusive that there's a relationship.
17 **Q. You are aware that there are epidemiological**
18 **studies that show asbestos causes mesothelioma?**
19 A. No. I am aware that there are allegations
20 that extremely low concentrations of asbestos will cause
21 mesothelioma, but I am not convinced that it's very
22 sound.
23 I think that the amount of exposure to
24 asbestos, relatively high exposure, has not shown that
25 mesothelioma is caused by these very, very low

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1 concentrations.
2 We just don't have that many cases of
3 mesothelioma as compared to the total number of people
4 who have been working with asbestos.
5 **Q. Do you know how many cases of mesothelioma**
6 **there are each year?**
7 A. No.
8 **Q. Do you have an estimate?**
9 A. You know, it seems that I've seen that
10 figure, but I don't recall. But I know that it's
11 relatively small when you compare all the diseases that
12 exist; say, to cancer, lung cancer.
13 **Q. So I understand your opinion, are you not**
14 **convinced that asbestos causes mesothelioma?**
15 A. I am not convinced that there aren't other
16 causes. There may be a relationship and there probably
17 is a relationship between asbestos and mesothelioma.
18 I do not know what the threshold may be
19 for disease. I don't believe it's as low as alleged.
20 **Q. You are aware that there are epidemiological**
21 **studies showing asbestos will cause mesothelioma?**
22 A. I'm aware that there are some studies -- and,
23 as I recall, those were part of the further studies by
24 Dr. Selikoff -- that the insulation workers did have
25 cases of mesothelioma.

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1 I'm not saying that there's not a
2 relationship. I'm saying that, as far as I know, no one
3 has come up with what is the threshold, how much
4 exposure do you have to have to cause mesothelioma.
5 I don't believe it's the one fiber
6 theory, no.
7 **Q. I'm not asking about threshold. I'm just**
8 **saying whatever the exposure level, you're aware that**
9 **there are epidemiological studies which show asbestos**
10 **can cause at some level of exposure mesothelioma?**
11 A. When you asked it before I said yes, that
12 there was a relationship. I don't know what the
13 threshold is.
14 **Q. Are you aware of any epidemiological studies**
15 **that show some other substance specifically causes**
16 **mesothelioma?**
17 A. You asked that before, and I told you no, I
18 wasn't aware of it.
19 **Q. So you rely on case reports to show that**
20 **there can be other things that cause mesothelioma?**
21 A. That and the fact that most of the people who
22 have been exposed to asbestos do not have mesothelioma.
23 **Q. Is it scientifically valid, in your opinion,**
24 **to rely on case reports in forming an opinion as to**
25 **causation of disease?**

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1 A. Case reports have some basis, but they
2 certainly are not conclusive evidence for the disease as
3 related or not.
4 **Q. What, in your opinion, is a safe level of**
5 **exposure to asbestos?**
6 A. Well, certainly that's a question that I've
7 had to deal with for some time. In 1986, when I signed
8 the asbestos standard that reduced the level to
9 two-tenths of a fiber per cc, there was no question in
10 my mind whatever that that was a level which would
11 protect people from asbestos disease.
12 I frankly think it probably could have
13 been higher than that.
14 **Q. If you think it could have been higher than**
15 **that -- in your opinion, what level would have been a**
16 **safe level of asbestos exposure to sign into law?**
17 A. Well, since the level was established at two
18 fibers per cc, there's been very, very little evidence
19 that there has been additional asbestos disease.
20 Now we have people who are developing
21 asbestosis now, but those exposures may go back 40
22 years. The same way with mesothelioma. They may go
23 back 20 or so years. But as far as, quote, "new cases,"
24 it just doesn't seem to be there.
25 So as I said, I had no question about

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1 signing the two-tenths of a fiber, because I was quite
2 confident it was very protective.
3 **Q. In your opinion, is two fibers per cc a safe**
4 **level of asbestos exposure?**
5 A. I think it probably is. Did I say "two" last
6 time? That standard is two-tenths of a fiber.
7 **Q. Right. Because I think you said --**
8 A. I think two fibers per cc is probably
9 protective.
10 **Q. Do you think five fibers per cc is a safe**
11 **level of asbestos exposure?**
12 A. Well, that sort of gets mixed up in the
13 period when people were exposed to a whole lot more. So
14 that's hard to say.
15 **Q. You don't know whether five is safe or not?**
16 A. No. That would be very difficult to try to
17 separate that from earlier exposures that probably were
18 higher.
19 **Q. If it had been up to you, would you have left**
20 **the standard for asbestos exposure at two fibers per cc?**
21 A. That's a moot question, because the standard
22 had been written, it had been prepared. And I think the
23 responsibility of the Assistant Secretary for OSHA is to
24 protect workers, and there was certainly nothing there
25 that to me said we were not protecting workers.

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1 MR. BARLOW: Object as nonresponsive.
2 **Q. (BY MR. BARLOW) If it had been up to you,**
3 **though, would you have left the standard for exposure to**
4 **asbestos at two fibers per cc?**
5 A. Well, as I say, you're coming in after the
6 fact on something that's hard to say.
7 Would I have expended the time and the
8 effort that went into producing the 1986 standard? If
9 it had been my call, I probably wouldn't have done it.
10 **Q. Did you disagree with the time and expense --**
11 **expending the time and effort that it took to come up**
12 **with the 1986 asbestos standard?**
13 A. Well, again, it's a question really that has
14 no meaning whatsoever because it was there. It was
15 done.
16 And it provided the protection that was
17 needed. That it might have been overprotective didn't
18 enter into the question. That was not a decision that I
19 could make.
20 MR. BARLOW: Object as nonresponsive.
21 **Q. (BY MR. BARLOW) My question, though, is:**
22 **Did you disagree with expending the time and effort that**
23 **it took to promulgate the 1986 OSHA standard on asbestos**
24 **exposure?**
25 A. You asked me earlier, and my answer was, that

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1 if it had been my decision back at the time the revision
2 was started, I probably would not have agreed to it.
3 **Q. Are you aware of cases of asbestos-related**
4 **mesothelioma from exposure in the household?**
5 A. I know that there have been allegations such
6 as that, yes.
7 **Q. Do you believe that asbestos is capable of**
8 **causing mesothelioma in the family members and workers**
9 **who bring it home on their clothes?**
10 A. I find that difficult to accept on a
11 scientific basis, yes.
12 **Q. You disagree with --**
13 A. As I said, I find that -- because we have no
14 idea what the exposures are, either with regard to
15 concentration or the time.
16 From what I have been able to
17 determine, the concentration has to be relatively low
18 and for a very short period of time. And it's certainly
19 not something that's repeated on an eight-hour-a-day
20 basis.
21 So the exposures seem to me to be very,
22 very low. Again, it makes me think that there's
23 something else that is causing mesothelioma.
24 **Q. Is it your opinion, that asbestos will not**
25 **cause mesothelioma among family members of individuals**

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1 **who work around it and bring it home on their clothes?**
2 A. You just asked me that question, and I tried
3 to answer it. I gave you the answer just a minute ago.
4 You essentially asked exactly the same question again.
5 **Q. Can you answer the question?**
6 THE WITNESS: Would you read my answer
7 back, please?
8 (PREVIOUS ANSWER READ)
9 A. Okay. How is your question, different?
10 MR. WOLCOTT: You answered it. You
11 answered it the second time with the reading of that.
12 MR. BARLOW: Do you have an objection?
13 MR. WOLCOTT: Yeah. I object to the
14 form of your questions, the repetition.
15 **Q. (BY MR. BARLOW) So I understand your**
16 **opinion, it's your opinion that mesothelioma among**
17 **members of the household of workers who brought home**
18 **asbestos on their clothes, those mesotheliomas were not**
19 **caused by the asbestos, they were caused by something**
20 **else?**
21 A. It is my opinion that it is very unlikely
22 they were caused by asbestos. Highly unlikely.
23 MR. BARLOW: I think we've been going
24 another hour. Do you want to take a break now?
25 MR. WOLCOTT: Sure. Fine with me.

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1 (RECESS HELD FROM 11:52 A.M. TO 1:06 P.M.)
2 **Q. (BY MR. BARLOW) Mr. Pendergrass, we're back**
3 **from lunch.**
4 A. Yes, sir.
5 **Q. Continuing with the deposition. And of**
6 **course, you understand, you're still under oath?**
7 A. Right.
8 **Q. Do you believe that asbestos can cause colon**
9 **cancer?**
10 A. I don't have any information on that.
11 **Q. You don't have an opinion one way or the**
12 **other?**
13 A. No.
14 **Q. Have you seen any literature that discusses**
15 **the issue of whether or not asbestos can cause colon**
16 **cancer?**
17 A. As I recall, that has been mentioned some,
18 but very little.
19 **Q. Do you have an opinion on whether or not**
20 **asbestos can cause laryngeal cancer?**
21 A. I don't have an opinion on it.
22 **Q. Do you have an opinion as to whether or not**
23 **asbestos can cause lung cancer?**
24 A. I think it can, yes.
25 **Q. Asbestos can cause lung cancer?**

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1 A. Exposure to asbestos can cause lung cancer,
2 yes.
3 **Q. Right; exposure to asbestos. How much**
4 **asbestos exposure does it take before it can contribute**
5 **to lung cancer?**
6 A. I'm going back, thinking primarily of the
7 studies by Dr. Selikoff. In his first studies he found
8 lung cancer, he really did not know what the exposure
9 levels were except that the people were insulation
10 workers and had been at it for a number of years,
11 including the shipbuilding years in New York City.
12 He also found that most cases of lung
13 cancer among the asbestos workers were those who smoked
14 cigarettes. By far -- no question of the synergism
15 between them.
16 He also found, looking at his data
17 later, that there seemed to be a necessity for there to
18 be asbestosis, but there were cases of people with
19 asbestosis who did not have lung cancer, but they did
20 not smoke either.
21 So there's synergism between the
22 combination of exposure to asbestos as well as cigarette
23 smoking. But either can cause it without the other.
24 **Q. Let me go back on what you just said, see if**
25 **we can tease out the individual opinions there.**

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1 **You believe that asbestos alone can**
2 **cause lung cancer?**
3 A. That seems to be the case, yes.
4 **Q. Is it your opinion that before asbestos will**
5 **cause lung cancer, there must be sufficient exposure to**
6 **have caused asbestosis?**
7 A. Not necessarily. It is true in some cases,
8 but there are cases of asbestosis where there is no lung
9 cancer. There are cases of lung cancer where asbestosis
10 has not occurred.
11 Now some of those are associated with
12 cigarette smoking, so it's kind of hard to pull these
13 apart and say yes, yes, yes, no, no, no.
14 **Q. Do you believe that there's a synergistic**
15 **effect in the causation of lung cancer between asbestos**
16 **and smoking?**
17 A. I think there is.
18 **Q. I understand that in many cases where there**
19 **is no asbestosis and there is lung cancer, you believe**
20 **that smoking contributed to that lung cancer; is that**
21 **right?**
22 A. Well, okay. I don't think I would put it
23 exactly like you did.
24 **Q. I'm trying to -- there are cases of**
25 **asbestosis, where lung cancer does not occur?**

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1 A. That's right.
2 **Q. Are there also cases of lung cancer where**
3 **asbestos is a contributing factor, where asbestosis has**
4 **not occurred?**
5 A. Yes. But there's a caveat there too.
6 **Q. What is the caveat?**
7 A. Well, I'm not sure that there's been a good
8 separation in that case between the cigarette smokers
9 and nonsmokers.
10 What was found, was that people who
11 were exposed to asbestos and had asbestosis but did not
12 smoke cigarettes, did not get lung cancer. This was
13 from Selikoff's study.
14 So it's very hard to separate, but I
15 think it is conceivable that if the exposure is high
16 enough over a long enough period of time, that lung
17 cancer can occur without asbestosis.
18 Asbestosis can occur without lung
19 cancer. The two can occur together. And when you throw
20 smoking in, you're not sure exactly where you are,
21 except it's not good.
22 **Q. Let me see if you think this is a fair**
23 **statement: Asbestos can cause lung cancer in the**
24 **absence of enough exposure to have caused asbestosis,**
25 **but it is unclear whether or not smoking is also a**

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1 **contributing factor in those lung cancers?**
2 A. Well, I don't know that you can make that
3 distinction because the lung cancer may get the
4 individual before the asbestosis does.
5 Those gestation periods are not
6 necessarily the same. So I'm not sure that you can make
7 that -- I'm not aware of anything to make that sort of
8 statement.
9 **Q. At this point you don't have a definitive**
10 **opinion one way or the other as to whether or not you**
11 **need enough exposure to asbestos to cause asbestosis**
12 **before you would be at an increased risk of lung cancer?**
13 A. It is conceivable that the asbestosis just
14 hasn't had a chance to develop.
15 **Q. You were shaking your head "yes"?**
16 A. Well, yes, but there are caveats to it.
17 Asbestos exposure at some level over a certain period of
18 time in certain people, can cause lung cancer.
19 **Q. And what I'm trying to find out from you, is**
20 **based on your reading of the scientific literature, what**
21 **is that level?**
22 A. I don't know that anybody has established
23 what that level is. Unfortunately, the people who have
24 been able to study, the exposure levels were not known.
25 And this goes back whether we're

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1 talking about Selikoff's studies or we're talking about
2 Meriwether's studies in the early '30s. They didn't
3 have the concentration. They didn't know what the
4 concentrations were.
5 With Selikoff, he was examining people
6 or examining people's health records and it was somewhat
7 of a surprise, I think, that he found the lung cancer.
8 And in his first report he did not relate this in any
9 way to cigarette smoking.
10 So you've got really three different
11 things here. Asbestos exposure at some level over a
12 certain period of time, I think, can cause lung cancer.
13 Asbestos over a certain length of time can cause
14 asbestosis.
15 When you then put cigarette smoking in,
16 the probability of lung cancer occurring is much greater
17 than it is without the cigarette smoking.
18 **Q. Are you aware of medical literature and**
19 **studies which report lung cancers found among**
20 **asbestos-exposed workers who do not smoke?**
21 A. I don't think the Doll studies separated
22 that. I think Selikoff had people who had lung cancer
23 without smoking.
24 **Q. Do you know whether or not all of those**
25 **people had asbestosis?**

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1 A. All of those people did not have asbestosis.
2 Or at least it wasn't reported that they did.
3 **Q. So do you believe, based on at least that**
4 **study, that lung cancer can occur among asbestos-exposed**
5 **workers who don't smoke who have not yet developed**
6 **asbestosis?**
7 A. I thought I had said that. Yes.
8 **Q. Yes, right?**
9 A. Yes.
10 **Q. But you aren't sure whether or not those**
11 **individuals have enough exposure to have gotten**
12 **asbestosis and just haven't developed it yet?**
13 A. That's right. We don't know that. I don't
14 know which is worse, to have the cancer first or the
15 asbestosis. But neither one of them are good.
16 **Q. Asbestosis is a serious disease?**
17 A. Lung cancer is pretty serious too.
18 **Q. What is the first report in the medical**
19 **literature of an asbestos-related lung cancer?**
20 A. I am going to say, I think it's probably back
21 in the early '30s, the Germans studied it. But I cannot
22 put the name to it. But there's a case study that you
23 mentioned.
24 **Q. When was it generally accepted in the medical**
25 **literature, that asbestos could cause lung cancer?**

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1 A. I think that the Selikoff studies were the
2 ones that was the final thing that said yes, this is
3 probably the case.
4 There were a lot of case studies before
5 that but not of the magnitude that Selikoff did.
6 **Q. Do you believe that the Doll studies**
7 **conclusively established that asbestos could cause lung**
8 **cancer?**
9 A. No.
10 **Q. Why not?**
11 A. Because he did not take into consideration
12 cigarette smoking.
13 **Q. Can you name for me the authors who were**
14 **writing in the 1950s that asbestos is not a contributing**
15 **factor to lung cancer?**
16 A. That wrote it is not a contributing factor?
17 No.
18 **Q. Are you aware of anyone that was writing in**
19 **the 1950s, that asbestos does not contribute to lung**
20 **cancer?**
21 A. I don't recall seeing anything that says it
22 is not a factor.
23 **Q. Well, then, I'm a little confused by your**
24 **testimony that it was not generally accepted until 1964**
25 **when Selikoff came out that asbestos could cause lung**

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1 **cancer.**
2 A. Well, there were a lot of things that caused
3 lung cancer. And what had been presented to the
4 professions was the case studies. And all of this
5 contributes to the accumulation of knowledge and
6 eventually coming to some conclusion.
7 When Selikoff gave his paper in 1964
8 there were serious questions as to whether it was -- how
9 accurate it was, once again, because he had not included
10 smoking.
11 He went back and looked at his data
12 again, found out as much as he could about the smoking
13 habits of the people, and came to not different
14 conclusions but some clarifying facts as to what the
15 situation was.
16 **Q. By 1945, was there anyone disputing in the**
17 **medical literature, published medical literature, that**
18 **asbestos could cause lung cancer?**
19 A. I'm not aware of any study -- any paper that
20 disputed it.
21 **Q. By 1950, was there anybody disputing that**
22 **asbestos could cause lung cancer?**
23 A. You know, I'm not aware of any studies that
24 say asbestos does not cause lung cancer.
25 What we had was a development of data

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1 that contributed to the conclusion that there was a
2 relationship.
3 **Q. Let me ask you this: Are you aware of a 1949**
4 **JAMA article discussing asbestos as the cause of lung**
5 **cancer?**
6 A. You're talking about the editor's letter?
7 **Q. Uh-huh.**
8 A. Yeah, I'm aware of it.
9 **Q. In 1949 when that came out, I believe you**
10 **said you're not aware of anyone that was disputing that**
11 **asbestos could cause lung cancer?**
12 A. No. He wasn't saying it didn't cause it,
13 either. To the contrary. He was stating that yes,
14 there was a relationship.
15 **Q. Do you draw a distinction in your mind**
16 **between no one disputing -- well, if people were in the**
17 **medical literature publishing that asbestos causes lung**
18 **cancer and no one was disputing it, is that not general**
19 **acceptance in your mind?**
20 A. It is not necessarily acceptance until there
21 is the accumulation of data. In the scientific process,
22 simply because I do something and I say this is what I
23 found, that doesn't make it a fact.
24 It is something that I have found. Now
25 if somebody else comes along and does the same thing and

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1 says I found the same thing, then these begin to build
2 on each other until it's pretty well established that
3 that is a fact.
4 However, if no one else can duplicate
5 my work, then it probably is not going to be considered
6 as fact.
7 So it's a matter of increasing
8 knowledge that allows us to come to a scientific
9 conclusion as best we can. Even that may not be right.
10 **Q. Would you state that by 1964, asbestos was**
11 **conclusively proven to cause lung cancer?**
12 A. Well, I said that Selikoff's paper was one
13 which stirred up a lot of thought. There was some
14 dissension as to whether he had considered everything
15 that he should have considered.
16 But his work was certainly very much
17 definitive as to the relationship between asbestos and
18 lung cancer.
19 **Q. Are you aware of any medical literature ever**
20 **published which said that asbestos did not cause lung**
21 **cancer?**
22 A. You asked me that before, and I told you I
23 was not aware of something that says it is not. Very
24 seldom is that sort of thing published anyway.
25 **Q. How much exposure, based on your review of**

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1 **the medical literature, does it take to cause**
2 **mesothelioma?**
3 A. I have not seen any publication as to what
4 the threshold for mesothelioma is. There has to be one.
5 But as far as I know, it hasn't been published.
6 **Q. You're aware of no published threshold below**
7 **which mesothelioma will not occur?**
8 A. Well, I think that what I said was that I'm
9 not aware that a threshold has been published. We
10 certainly know that there have been many, many
11 exposures, fairly high exposures, to asbestos that did
12 not result in mesothelioma.
13 **Q. Not everyone who is exposed to asbestos**
14 **develops mesothelioma?**
15 A. That's true.
16 **Q. You say that there must be some threshold**
17 **below which -- threshold exposure to asbestos below**
18 **which mesothelioma will not occur. What do you base**
19 **that on?**
20 A. Well, the fact that everybody has been
21 exposed to asbestos, you and I and everybody in this
22 room.
23 Everybody outside has been exposed to
24 asbestos. Low levels? Some of us even more than low
25 levels. So yes, there is a threshold. I don't know

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1 what it is.
2 **Q. Are you aware of idiopathic -- something**
3 **called idiopathic mesothelioma?**
4 A. Yes, that there are cases of idiopathic
5 mesothelioma.
6 **Q. Do you think it is possible that the**
7 **idiopathic mesotheliomas are asbestos related and those**
8 **people simply have a low enough threshold that they can**
9 **develop mesothelioma from background levels?**
10 A. Now this is a merry-go-round. As I said, I
11 don't know what the threshold is. And you're saying do
12 I know what the threshold is.
13 I don't know what it is. Idiopathic,
14 of course, means unknown. Unknown from what? No one
15 has been able to pin it down. But there are situations
16 where there have been cases of mesothelioma, as we
17 talked about this morning, where there was no known
18 exposure to asbestos.
19 So there has to be something else that
20 causes it. What it is, I don't know. I don't know
21 whether it's exposure to some other material. It may be
22 hereditary.
23 It's just something that there's been
24 almost no study done to try to determine it.
25 **Q. I guess the purpose of the merry-go-round is**

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1 this: I believe you said that everyone is exposed to
2 some level of asbestos.
3 A. That's right.
4 Q. There are background levels of asbestos that
5 everyone is exposed to?
6 A. Right.
7 Q. You also said that there must be some
8 threshold limit of exposure to asbestos below which
9 mesothelioma will not occur because there are some
10 people who have no known occupational exposure to
11 asbestos which develop mesothelioma?
12 A. And we have the opposite of that. We have
13 many, many people who have been exposed to high
14 concentrations, relatively high compared to background,
15 who do not develop mesothelioma.
16 We have cases of people with asbestosis
17 who don't develop mesothelioma. We have people with
18 high levels, relatively high levels; we have people with
19 very low levels that don't get it. We've got people
20 somewhere in between that do.
21 Q. My question is this: Your basis for your
22 opinion that there must be a threshold exposure to
23 asbestos under which mesothelioma will not occur is that
24 there are certain people who develop mesothelioma where
25 we can't find any identifiable exposure to asbestos.

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1 But you also say that everybody -- and I assume that
2 would include those people who developed mesothelioma
3 that you're referencing -- has asbestos in their lungs.
4 And my question to you is: Do you
5 believe it's possible that the asbestos that they were
6 exposed to through background levels is causing their
7 mesothelioma?
8 MR. WOLCOTT: Objection to form.
9 A. The study was, to me, quite convincing that
10 they had done everything they could to determine in that
11 particular study that there was no asbestos exposure, no
12 known asbestos exposure, background or anything else.
13 Q. (BY MR. BARLOW) What study are you
14 referencing?
15 A. This is a study that was done -- it was in
16 the Mid East, India, Afghanistan, somewhere in that
17 area. I don't recall right now exactly where. Isolated
18 village.
19 But no known cases of mesothelioma -- I
20 mean there were cases of mesothelioma with no known
21 exposure.
22 I probably misspoke, and you're picking
23 on it, and rightfully so. There are obviously people
24 who have never been exposed to asbestos, I would think,
25 somewhere. Those people, it was believed, were not.

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1 But most of us live in an environment
2 where there is some asbestos in the air. Not very much.
3 Very, very little.
4 Now I don't know what the difference is
5 between very, very little, and the level that will cause
6 mesothelioma, but I know that there has to be a
7 threshold. There has to be something to cause it.
8 Q. In the study that you were referencing that
9 was conducted somewhere in the Mid East, some isolated
10 population, do you know if digestion studies were done
11 of the lungs?
12 A. I don't know.
13 Q. When was the first report of air sampling for
14 asbestos exposures in the literature?
15 A. Of course, Meriwether did some but not much.
16 There were reports of asbestos disease, asbestosis,
17 before there was much done in the way of air studies.
18 I don't recall. Probably somewhere in
19 the early '30s.
20 Q. Do you know how many articles discussing air
21 sampling for asbestos exposures there were in the
22 medical literature by the 1960s?
23 A. No, I don't.
24 Q. Would there have been many articles by the
25 1960s discussing air sampling as a means of determining

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1 asbestos exposure to workers by the 1960s?
2 A. Well, I think about my own files, and I can't
3 separate these as to which are air studies and which are
4 some of the medical studies.
5 But it's probably a stack eight, ten
6 inches high of studies.
7 Q. A number of articles?
8 A. Oh, asbestos has been written on many, many
9 times, yes.
10 Q. When would it have been reasonable for an
11 employer to begin sampling the air for asbestos
12 exposures to its employees if it was manipulating and
13 using asbestos in its workplace?
14 MR. WOLCOTT: Objection to form.
15 A. I'm going to assume when you say
16 "manipulating asbestos," that you mean that they were
17 making something -- either they were mining, processing
18 or manufacturing something with asbestos fibers.
19 Q. (BY MR. BARLOW) We can do it that way first.
20 A. Well, the first best known study was, of
21 course, the Dreessen study in 1938. And that was an
22 asbestos textile industry.
23 But there had been some sampling done
24 before because Dreessen followed practices that had
25 existed for dust sampling, not particularly necessarily

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1 just for asbestos.
2 So I think the people who were
3 manipulating it may well have done some air sampling at
4 some time through the '30s.
5 **Q. Let me see if I'm understanding what you're**
6 **saying. A manufacturer using raw asbestos, if they were**
7 **acting with reasonable care, would have monitored and**
8 **air sampled during the 1930s for asbestos?**
9 A. You didn't put in the "reasonable care." I
10 think that you would probably find that there were some
11 studies being done there, and the Dreessen studies in
12 1938 was the study that said we think that 5 million
13 particles per cubic foot is a protective concentration.
14 And there might not have been a whole
15 lot of air sampling done before that.
16 **Q. What I'm asking, is if a manufacturer of**
17 **asbestos products was utilizing raw asbestos in its**
18 **plants, if it was exercising good practices, would it**
19 **have been air monitoring by, say, 1940?**
20 MR. WOLCOTT: Objection to form.
21 A. Again, we're going to have to say what were
22 the probabilities. We know that there was concern for
23 the concentrations in the shipyard starting in the early
24 '40s and the techniques were there.
25 The suggested concentration was there.

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1 And I think that an employer would have to exercise
2 their own judgment as to whether they needed to air
3 sample their particular operation. I don't know what
4 that would have been.
5 MR. BARLOW: Object as nonresponsive.
6 **Q. (BY MR. BARLOW) In your opinion, would it**
7 **have been a violation of good practices by 1940 for**
8 **someone to not monitor the levels of asbestos in the air**
9 **for their employees if they were utilizing raw asbestos**
10 **in their manufacturing process?**
11 A. Not necessarily.
12 **Q. Under what conditions would it not have been**
13 **a violation of good practices?**
14 A. Well, depending on how much they were using,
15 the circumstances. Actually if we go back to the
16 Meriwether studies which involved the late '20s, early
17 '30s -- and I believe it's 1933 Meriwether published and
18 said we've solved the problem.
19 By use of local dust ventilation we
20 don't need to be concerned about exposure anymore. And
21 that was in the textile industry.
22 **Q. Am I understanding you to say that if by 1940**
23 **a manufacturer of asbestos was utilizing some sorts of**
24 **industrial controls -- excuse me -- engineering**
25 **controls, then it may not have been a violation of good**

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1 **work practice to not monitor the air?**
2 A. It all depends on the individual
3 circumstances. That could very well be the case, that
4 there was really no violation of good practice at all if
5 they did not believe that they had concentrations which
6 were harmful.
7 And if they compared it to what they
8 would have known about textile mills, they might have
9 said: We don't have any problem. This is no concern.
10 And you have to also keep in mind, now
11 that asbestosis, while it was a known disease, was very
12 rare in this country, very rare.
13 **Q. By 1950, would it have been a violation of**
14 **good work practice to not monitor the asbestos exposures**
15 **to employees in an area where pipe insulation was being**
16 **utilized, asbestos pipe insulation?**
17 A. Where in pipe insulation manufacturing? I
18 don't know. You would have to be far more specific than
19 that.
20 **Q. I'm sorry. My question may not have been**
21 **clear. I'm not talking about a manufacturer now. I'm**
22 **switching gears.**
23 **Where pipe insulation was being**
24 **utilized, would it have been -- and by "utilized," I**
25 **mean installed on the pipes -- would it have been a**

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1 **violation of good work practices to not monitor the**
2 **exposures to workers in that area by 1950?**
3 MR. WOLCOTT: Objection to form.
4 A. Okay. It's my turn to make sure that I've
5 got your question. Are you asking in my opinion if it
6 was a violation of good practice to not air sample where
7 insulators were insulating pipe? Is that your question?
8 **Q. (BY MR. BARLOW) Yes.**
9 A. I don't think it was a matter -- now we have
10 a lot of negatives in there. That is not an indication
11 of poor practice, no.
12 **Q. By 1960, would it be a violation of good**
13 **practice to not air monitor where insulation was being**
14 **installed?**
15 A. Again, it would not have been.
16 **Q. By 1970, would it have been a violation of**
17 **good practices to not air monitor where asbestos**
18 **insulation was being installed?**
19 A. Again, now we're talking about pipe
20 insulation or we're talking about aboard ship? Or where
21 are we talking about?
22 I guess I should have asked this
23 question a little bit earlier.
24 Q. Outdoors.
25 A. Okay. Outdoors. No, it was not a violation

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1 of good practice.
2 **Q. Would it have been a violation by 1960 of**
3 **good practice, to not air monitor inside an enclosed**
4 **area where asbestos insulation was being installed?**
5 A. Again, this would depend on what was being
6 done. Was it necessary to do a lot of cutting and
7 molding? And how much ventilation was there? What was
8 the enclosure? It might have called for monitoring, it
9 might not have.
10 **Q. By 1970, would it have been a violation of**
11 **good work practices to not air monitor where asbestos**
12 **insulation was being installed outdoors?**
13 MR. WOLCOTT: Objection to form.
14 A. No, it would not have been a violation of
15 good practice.
16 Do you want to do 1980? 1990? Do you
17 want to do 2000?
18 **Q. (BY MR. BARLOW) We'll do 1980. By 1980, --**
19 A. I don't think it's ever been an indication of
20 poor practice not to monitor installation of asbestos
21 outdoors, even today.
22 **Q. Even today, it would not be a violation of**
23 **good work practices to not air monitor the exposures to**
24 **asbestos from the installation of asbestos pipe covering**
25 **outdoors?**

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1 A. That's correct. It would not be an
2 indication of poor practice.
3 **Q. Explain to me why that would not be a**
4 **violation.**
5 A. Well, there have been samplings done, and
6 they were done primarily back in the '70s to determine
7 compliance with regulation. And the levels are
8 essentially background.
9 **Q. It is your belief that the installation of**
10 **asbestos insulation, pipe insulation, outdoors is**
11 **similar to background levels of asbestos exposure?**
12 A. On the sampling that has been done, that's
13 generally what has been found, somewhere in the order of
14 background.
15 We're talking about a level here, an
16 acceptable level of .1, and these levels are below that.
17 **Q. We've been talking about installation. Do**
18 **you understand installation in your definition to**
19 **include at some times cutting asbestos pipe covering for**
20 **that installation?**
21 A. Uh-huh.
22 **Q. So we're very clear, even today it would not**
23 **be a violation of good work practices to allow someone**
24 **to cut asbestos pipe insulation for installation without**
25 **air monitoring?**

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1 A. Where?
2 **Q. Outdoors.**
3 A. Probably not, no. Because once again, we
4 have to keep in mind that what we're talking about as
5 far as disease-causing concentration is eight hours a
6 day, five days a week, 40 years of exposure. And you
7 just don't get that kind of exposures.
8 **Q. Can you tell me what you rely on to support**
9 **your opinion that it would not be a violation of good**
10 **work practices to allow someone today to cut asbestos**
11 **pipe covering outdoors without air monitoring or**
12 **protection?**
13 A. Well, the fact -- you have to evaluate this.
14 But how often do they have to cut the pipe? How do they
15 cut it -- I'm sorry, the insulation. And how do they
16 cut it? What fraction of their day is that being done?
17 We also have to consider what are the
18 size of the particles that are released when this is
19 done. Cutting creates large particles as far as
20 respirable ones are concerned.
21 So while it may appear to be a fair
22 amount of dust, most of it would not be respirable. And
23 we have to consider what is it that's going to get into
24 the lungs before we can consider a potential health
25 problem.

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1 **Q. Is it your opinion, that if there is visible**
2 **asbestos dust, there is a hazardous situation?**
3 A. No.
4 **Q. Do you believe that if one can see asbestos**
5 **dust, then he is over the threshold limit?**
6 A. Not necessarily.
7 **Q. Under regular lighting, if the asbestos dust**
8 **is visible, is the threshold limit value of 5 million**
9 **particles per cubic foot being violated in that area?**
10 A. Well, we're no longer talking about 5 million
11 particles per cubic foot. That passed many, many years
12 ago.
13 So I don't see the pertinence of the
14 question. It might or might not be. Again, it's going
15 to depend on the size of the particles, it's going to
16 depend on how the light is striking it, whether you can
17 see it or not.
18 So I don't think you can depend on what
19 you see to necessarily say that's what the concentration
20 is going to be.
21 **Q. Is it your opinion that a worker today could**
22 **safely cut asbestos insulation pipe covering as a part**
23 **of their career in insulating pipe in, say, an outdoor**
24 **area like a refinery without increasing their risk of**
25 **developing asbestos disease?**

1 A. Probably, yes. Again, you've got other
2 things that you might want to take in. But probably
3 that would be possible.
4 **Q. So probably today, in your opinion, we could**
5 **still be utilizing asbestos pipe covering outdoors and**
6 **our working men who were installing it would not be at**
7 **any real risk?**
8 A. I think that's true. Of course, it's, again,
9 an exercise in intellectual futility because we don't
10 have it. We don't have asbestos pipe covering anymore.
11 **Q. Sure. What is the basis of your opinion that**
12 **insulators could safely install asbestos pipe covering**
13 **outside?**
14 A. Well, we've gone over this in several
15 different ways. The fact that what sampling was done
16 mostly in order to establish compliance with the federal
17 regulations, that the concentrations are just so low,
18 that they don't present a potential problem.
19 **Q. Can you name for me all of the published**
20 **medical literature which shares your opinion on that**
21 **issue?**
22 A. No, I cannot.
23 **Q. Can you name any piece of published medical**
24 **literature which supports your opinion that asbestos**
25 **pipe covering could be utilized safely today so long as**



1 **it was being installed outside?**
2 A. I don't think there is such a study.
3 **Q. Can you name for me every government agency**
4 **which shares your opinion, that asbestos pipe covering**
5 **could be safely utilized, so long as it was installed**
6 **outdoors?**
7 A. I don't know that there is an agency that
8 would do this. I think that the OSHA standard at the
9 current level of .1 fibers per cc for eight hours a day,
10 five days a week, for a working lifetime wouldn't cause
11 any problem at all.
12 **Q. What air monitoring studies are you referring**
13 **to when you say that you believe asbestos pipe**
14 **insulation could be installed outdoors safely without**
15 **causing levels of asbestos exposure above background?**
16 A. Well, some that I did myself, as well as
17 other people in my department, discussions with other
18 industrial hygienists. And the fact that OSHA just
19 doesn't pay any attention to that.
20 There are regulations and people follow
21 them, but you aren't going to find any cases where OSHA
22 has gone out and cited anybody for it.
23 **Q. Are you of the opinion that if someone was**
24 **having asbestos pipe insulation installed today outdoors**
25 **without utilizing air monitoring or respirators or other**



1 **protection, that OSHA would not cite them?**
2 A. I'm not sure what OSHA might do. But if they
3 did the air sampling, I'm sure that they would not come
4 up with a concentration that would indicate a violation
5 of the standard, which would probably preclude them from
6 issuing a citation.
7 **Q. Are you aware of any published literature**
8 **which says that the installation and cutting of pipe**
9 **insulation that contains asbestos outdoors does not**
10 **violate or does not exceed one fiber per cc?**
11 A. I don't know of any such study, no.
12 **Q. I'm sorry. I messed up that question. I**
13 **should have said .1 fibers per cc.**
14 A. The answer is the same.
15 **Q. Let me ask you: Are you of the opinion that**
16 **asbestos-containing pipe covering is capable of causing**
17 **asbestos-related disease?**
18 MR. WOLCOTT: Objection to form.
19 A. The pipe covering? No.
20 **Q. (BY MR. BARLOW) You think that someone could**
21 **work with asbestos-containing pipe covering for an**
22 **entire career, 40 years, and they're not going to be at**
23 **an increased risk of asbestos-related disease?**
24 A. That's a different question. Which one do
25 you want to ask?



1 **Q. Explain it to me.**
2 A. Well, you said does pipe covering cause
3 disease. No, it can't. Now if you start doing things
4 with it, then it is conceivable.
5 Now the only place you're going to find
6 asbestos insulation these days, of course, is something
7 that's been in place for a long, long time. That's a
8 different matter.
9 It's entirely different than when
10 you're putting it on.
11 **Q. We need to distinguish between asbestos in**
12 **place and installation?**
13 A. Or when you're taking old asbestos off. It's
14 a different situation.
15 **Q. Are you of the opinion, that asbestos**
16 **insulation when it's installed, can potentially cause**
17 **asbestos disease?**
18 A. Are you saying it has been installed, there's
19 been mastic put on --
20 **Q. As it's being installed.**
21 A. -- as it's being installed?
22 Q. Yes.
23 A. I think that's what we've been talking about,
24 isn't it?
25 **Q. Under what circumstances can asbestos**

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1 **insulation cause asbestos-related disease?**
2 A. Now you're saying insulation, so you're not
3 confining it --
4 **Q. Pipe covering.**
5 A. Just pipe covering?
6 **Q. Yeah.**
7 A. And just outside?
8 **Q. No.**
9 A. Anywhere? Well, I think, then, it depends on
10 where it's being done, how much is being done, how
11 confined it is, is there ventilation.
12 There are a whole lot of things that
13 would have to go into consideration.
14 **Q. Is it your opinion that installing asbestos**
15 **insulation pipe covering is only hazardous when it's**
16 **done inside a confined space?**
17 A. Well, let's make sure we understand. None of
18 it is going to happen today, anyway.
19 **Q. Sure. I'm talking about historically.**
20 A. Historically? I'm sure that you could have
21 probably done it under certain circumstances where it
22 might be.
23 But under normal practice, probably
24 not. There was no hazard associated with installing
25 pipe covering outside in the past.

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1 **Q. Right. And that's what I'm trying to figure**
2 **out. I understand that's your opinion.**
3 **What I'm trying to figure out, is under**
4 **what circumstances does installing asbestos pipe**
5 **covering present a hazard to the worker?**
6 A. Well, of course, it's when it exceeds the
7 exposure limits.
8 **Q. What conditions do you need?**
9 A. What conditions? Whatever I would dream up
10 is only that. I suppose that if you were underground in
11 a utility tunnel somewhere, ventilation was very poor, a
12 lot of it was being put in, care was not really being
13 taken as to what they were doing or how they were doing
14 it, I'm sure you could probably exceed the exposure
15 limits.
16 **Q. We've talked a lot today about the Selikoff**
17 **study in 1964; right? That was of insulators, that**
18 **study?**
19 A. That's right.
20 **Q. He found a high rate of asbestos-related**
21 **disease among insulators; correct?**
22 A. Yes.
23 **Q. The insulators in Selikoff's study, where**
24 **were they getting their asbestos disease?**
25 A. Of course, they had been working over a

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1 number of years. Many of them had worked in the
2 shipyards where the concentrations were high because
3 they were in enclosed spaces. We have no idea what the
4 exposure levels were.
5 **Q. Are you of the opinion that had the**
6 **insulators in Selikoff's study never worked inside,**
7 **Selikoff would not have found asbestos-related disease**
8 **among them?**
9 A. I think his results would have been a great
10 deal different if they had been done in Houston as
11 opposed to New York City.
12 **Q. And why do you make the distinction between**
13 **Houston and New York City?**
14 A. Because New York City, everything is
15 enclosed.
16 **Q. And Houston wasn't?**
17 A. Everything is wide open.
18 **Q. So do you believe that if Selikoff had**
19 **conducted his study in Houston where everything was open**
20 **he would not have found an increased rate of asbestos**
21 **disease among insulators?**
22 A. I said I thought his results would have been
23 considerably different than what they were.
24 **Q. How so? Much lower?**
25 A. Exposures would have probably been lower, the

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1 difference between working outside and working inside.
2 **Q. Do you think that refineries should be**
3 **allowed to utilize asbestos-containing pipe covering**
4 **today?**
5 A. I don't really think my opinion makes one
6 whit of difference, because it's not available. And I
7 don't think anybody is going to necessarily go back to
8 using asbestos -- a pipe covering that contains some
9 asbestos.
10 **Q. Hypothetically speaking, do you believe that**
11 **refineries should be allowed to utilize and have**
12 **installed in their plants asbestos pipe covering today?**
13 MR. WOLCOTT: Objection to form.
14 A. I thought that's what you just asked me. To
15 me, I don't see where it really makes any difference
16 what I would say, because it isn't going to happen.
17 And I am not going to suggest that they
18 start making asbestos insulation, because I think there
19 are better materials. And we have them today. So why
20 have asbestos?
21 MR. BARLOW: Object as nonresponsive.
22 Can you read my question back, please?
23 (PREVIOUS QUESTION READ)
24 **Q. (BY MR. BARLOW) Can you answer that?**
25 A. I did.

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1 Q. You don't have any other answer than what
2 you've given me?
3 A. Beg your pardon?
4 MR. WOLCOTT: Objection to form.
5 Q. (BY MR. BARLOW) Assume that they did make
6 asbestos pipe covering today.
7 Do you think that refineries should be
8 allowed to have that asbestos pipe covering installed in
9 their plants?
10 MR. WOLCOTT: Objection to form.
11 A. I think that if there was asbestos-containing
12 insulation that was available today, that it could be
13 used without harming people's health, yes.
14 Q. (BY MR. BARLOW) What precautions would be
15 necessary to take to prevent it from harming people's
16 health today?
17 A. Well, it would depend on where it would end
18 up.
19 Q. In a refinery?
20 A. In a refinery, outside in Texas?
21 Q. Uh-huh.
22 A. Probably not too much. Maybe in certain
23 operations you would want to have some local exhaust
24 ventilation.
25 You might want to have some respiratory

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1 protection, depending on where the operations were being
2 carried out.
3 But I don't think there's any question
4 that it could be handled safely.
5 Q. Do you know whether or not asbestos-
6 containing pipe covering has been banned?
7 A. I don't think it's been banned.
8 Q. Do you know whether or not asbestos-
9 containing spray-on products have been banned?
10 A. Yes.
11 Q. Do you agree with the banning of asbestos-
12 containing spray-on products?
13 A. I don't know whether there has been increased
14 potential for damage to buildings because of not using
15 it, but there are probably other products that are doing
16 that part of it effectively.
17 I don't think it was necessarily
18 necessary, but it's done so it's done.
19 Q. Do you know what the World Health
20 Organization's opinion is on whether or not asbestos-
21 containing products should be allowed for use today?
22 A. No.
23 Q. Do you know what the National Cancer
24 Institute's opinion is on whether or not asbestos-
25 containing products should be allowed for use today?

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1 A. No.
2 Q. Do you have any evidence that at the
3 Pontiac -- I'm going to refer to the refinery as the
4 Pontiac, because it changed over time.
5 But you understand that when I say
6 "Pontiac," I'm talking about when it was Pontiac, when
7 it was Champlin, and --
8 A. Okay. Are we going to confine this to the
9 east plant, the first plant, the small one?
10 Q. The east plant where Mr. Clark worked.
11 A. Okay.
12 Q. Do you have any evidence that the Defendants
13 in this case did not measure the eight-hour time-
14 weighted average airborne concentrations of asbestos to
15 which Mr. Clark was exposed?
16 MR. WOLCOTT: Objection to form.
17 A. Do I have evidence that they did not? I
18 guess I don't have any evidence one way or the other.
19 Q. (BY MR. BARLOW) You don't know whether they
20 monitored or not?
21 A. I don't recall seeing that. I do know that
22 they brought in a consultant, an industrial hygiene
23 consultant, for other things.
24 And he at one time even looked at some
25 materials, as to whether they contained asbestos or not.

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1 And there was no indication that he felt that there was
2 any need to do sampling for asbestos.
3 Q. After 1972, would the plant have been
4 required to sample for asbestos in the air?
5 MR. WOLCOTT: Objection to form.
6 A. The standard states that if there is a belief
7 that the workers are exposed in excess of the standard,
8 that sampling has to be done. So it's a judgment that
9 was left up to the employer.
10 Q. (BY MR. BARLOW) In your opinion, based on
11 what you know about the plant, the Pontiac plant, would
12 it have been a violation of the OSHA standard to have
13 not monitored asbestos in the air after 1972?
14 MR. WOLCOTT: Objection to form.
15 A. It would be my opinion that they were not in
16 violation.
17 Q. (BY MR. BARLOW) What do you base that
18 opinion on?
19 A. Because it says if you believe that you were
20 in excess of the standard, then the monitoring should be
21 done.
22 But otherwise, it was left up to them.
23 And I don't think there was any indication that they
24 were in excess of the standard.
25 Q. Do you know if the Pontiac facility ever

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1 **employed isolation of asbestos as an engineering**
2 **control?**
3 A. When they were having asbestos removed they
4 isolated areas.
5 **Q. When was that?**
6 A. Specific dates, I don't know. But this was
7 in the depositions. When they did this, then they
8 brought in outside contractors who did isolate separate
9 areas.
10 **Q. Do you know when they began isolating**
11 **asbestos for removal?**
12 A. The dates? No, I don't.
13 **Q. Do you know what decade it was?**
14 A. In the early '70s, as I recall.
15 **Q. You believe that they began in the early '70s**
16 **to isolate asbestos when it was removed?**
17 A. When they removed it, yes, as far as I could
18 tell, whenever they removed it, they had outside
19 contractors do it and they were isolated.
20 They isolated the areas. Exact date
21 I'm not sure when they might have removed the first.
22 **Q. If an outdoor refinery in the 1970s was not**
23 **employing isolation as an engineering control during the**
24 **removal of asbestos, would that have been a violation of**
25 **good practices?**

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1 MR. WOLCOTT: Object to the form.
2 A. Not necessarily. Because you could remove
3 with glove, boxes, with wetting down, with a number of
4 techniques that would be available, again depending on
5 how much you were removing.
6 **Q. (BY MR. BARLOW) Would it have been a**
7 **violation of good practices in the 1970s to not utilize**
8 **any engineering controls during the removal of asbestos**
9 **pipe covering?**
10 A. Well, it depends again on how much you're
11 talking about. If you're talking about removing maybe
12 15 or 20 feet, probably not.
13 But again, you have to base this on how
14 much, how long is it going to take, who's going to be
15 exposed, how much.
16 **Q. Do you know if Pontiac laundered its**
17 **employees' work clothes at work?**
18 A. I don't know.
19 **Q. Do you believe that it would have been a**
20 **violation of good work practices to not launder those**
21 **clothes if the employees were working around asbestos?**
22 A. Not necessarily.
23 **Q. Are there any circumstances under which it**
24 **would be a violation of good work practices to not**
25 **launder those clothes if they were working around**

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1 asbestos?
2 A. If they were doing tests, such as removing
3 large amounts of asbestos-containing insulation, then
4 work clothes probably should have been laundered
5 separately.
6 **Q. How much asbestos can you remove without**
7 **utilizing engineering controls before it would be a**
8 **violation of 1970s good work practices?**
9 A. Well, I think you have to take into
10 consideration not only the amount -- are you saying --
11 not talking about regulations but just, say, 1971?
12 Okay. How much of it? How long is it going to take?
13 Is this a job that a person is going to do day after day
14 after day, or is it one he's going to do this week and
15 never again?
16 There are many, many, many different
17 things that have to be taken into consideration.
18 **Q. After 1972, if a refinery, outdoor refinery,**
19 **was having people remove asbestos insulation without**
20 **utilizing engineering controls, would they have been in**
21 **violation of OSHA regulations?**
22 A. Might have been; might not have been.
23 **Q. Can you explain that?**
24 A. Well, again, it would depend on what it was.
25 But how long is it going to take? Is this a job that

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1 people are going to do one after another?
2 If you are a company that does that as
3 a full-time business, then that's a whole lot different
4 than if this is a job that's going to be a part of a day
5 and that's the end, it's never going to be repeated.
6 Again, this is not something that you
7 can say yes or no to. It has to be the circumstances.
8 **Q. What years did you work for OSHA?**
9 A. 1986 to '89.
10 **Q. If you had been an inspector at OSHA in, say,**
11 **1972 to 1978, and you had walked into a plant and saw**
12 **them removing asbestos without respirators or**
13 **engineering controls of any sort, would you have issued**
14 **a violation?**
15 A. Oh, no. Not just on that.
16 **Q. What would you have done?**
17 A. Again, depending on the circumstances, I
18 might have done some air sampling.
19 **Q. And only if they were above the peak exposure**
20 **would you have issued --**
21 A. If they were above the peak exposure, the
22 15-minute limit, that considerably could have been a
23 violation.
24 But if they were even at the threshold
25 of the PEL, the OSHA permissible exposure limit, it

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1 might or might not have been a violation.
2 Again, the compliance officer has to
3 take into consideration everything else that we've been
4 talking about because the OSHA permissible exposure
5 limits are based on eight hours a day, five days a week
6 for a working lifetime.
7 **Q. It seems to me from talking to you about your**
8 **experience with asbestos exposures, that today's**
9 **regulations are much more stringent than what you**
10 **believe to be necessary to keep workers safe.**
11 **Would you agree with that? Is that a**
12 **fair statement?**
13 A. Well, I think that they are very, very
14 protective, yes.
15 **Q. Do you believe that today's standards with**
16 **regard to asbestos are overly protective?**
17 A. Probably are, yes.
18 **Q. To what do you attribute the**
19 **overprotectiveness of today's standards with regard to**
20 **asbestos?**
21 A. Well, based on the fact of what we know of
22 the number of new cases in people who have only worked,
23 say, for the last two decades.
24 We're just not seeing much in the way
25 of new disease other than what could have been brought

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1 about by earlier exposures.
2 We have reduced the concentrations down
3 to extremely low levels. We have a public that is far
4 more aware, employers and employees, as to the diseases
5 that can occur from it.
6 So I just think more care is being
7 taken today than before. How much of this is due to the
8 OSHA regulating? Probably a fair amount.
9 But along with the regulation goes the
10 increased knowledge and practices that we're enjoying
11 today.
12 **Q. You say in the last 20 years, we haven't seen**
13 **any new asbestos disease.**
14 A. I didn't say we haven't seen any. I said
15 it's very little.
16 **Q. Very little new asbestos disease.**
17 A. Most of what we see, of course, goes back 20,
18 30, 40 years.
19 **Q. Do you consider the rate of asbestos disease**
20 **that we see today to be an acceptable rate of disease?**
21 MR. WOLCOTT: Objection to form.
22 A. I don't think any disease is acceptable. I
23 have heart problems. I don't find that acceptable.
24 Am I happy that the doctors can do
25 something about it? You bet.

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1 **Q. (BY MR. BARLOW) Do you know when the first**
2 **article in the scientific literature stated that**
3 **employees should be warned about the risks associated**
4 **with asbestos?**
5 A. No. I know of a publication that said it
6 should not. This was the first edition of the Patty
7 books on Industrial Hygiene & Toxicology.
8 That was a debate for a long, long time
9 as to whether it was wise to tell people of the
10 potential consequences or not.
11 I personally think -- and I don't ever
12 recall having any other thought -- that yes, you should.
13 This was a part of being able to protect people. I
14 think you have to be circumspect in how you do this so
15 that you don't necessarily cause people to have undue
16 concern.
17 You can work with almost anything if
18 you follow the precautions that are necessary to prevent
19 overexposure.
20 As you tell them, you should be able to
21 demonstrate to them how they can protect themselves.
22 **Q. Based on your review of the medical and**
23 **scientific literature, what is the first article you can**
24 **identify which said workers who are working around**
25 **asbestos should be informed of the risks associated with**

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1 it?
2 A. I don't know that it was the first by any
3 means, but I think that the first standard said this.
4 **Q. First standard?**
5 A. First OSHA standard on asbestos.
6 **Q. 1972?**
7 A. But I doubt that that was the first time it
8 had been said.
9 I would strongly suspect that the
10 Public Health Service and NIOSH had both made statements
11 like that long before.
12 **Q. Do you believe that there was anything in the**
13 **medical literature prior to the 1960s saying that**
14 **workers should be advised of the risks of asbestos?**
15 A. I thought that's just what we were saying.
16 I'm not sure what the date was. I really don't know.
17 But I'm sure -- I know that it was
18 stated in the asbestos standard, but I'm sure it had
19 been said before.
20 **Q. You just can't recall?**
21 A. Well, you know, it just wasn't -- the
22 publication, the first Patty publication was 1953. And
23 I don't think it was repeated in the 1958 version.
24 **Q. When you first saw the Patty publication**
25 **which said that workers should not be warned about --**

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1 was it specifically asbestos?
2 A. No. Any matter.
3 Q. When you first saw the Patty publication
4 which said that workers should not be warned about
5 hazards in the workplace, what was your reaction to
6 that?
7 A. At this point I don't know what it was. I
8 couldn't say.
9 Q. You disagree with that today?
10 A. I disagree with it today. And I suspect at
11 the time -- now mind you, when that was published in
12 1953 I had not been in this business very long. Frank
13 Patty had been for a long, long time.
14 I would probably have to think, he's
15 been around a long time. I should perhaps pay some
16 attention to it. But it was not a practice where I
17 worked.
18 Q. Do you believe that an employer should have
19 warned in the 1950s its employees that asbestos was
20 being utilized around them?
21 A. No, not necessarily.
22 Q. Do you believe that an employer in the 1960s
23 should have warned its workers of the hazards of
24 asbestos if asbestos was being used around them?
25 A. Again, I have to say -- and this would be the

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1 case in the '50s as well -- what were the circumstances?
2 Was there an exposure level that could be hazardous?
3 Then yes, they should have been told. If it wasn't,
4 then it's immaterial.
5 Q. I think I know how this is going to end up so
6 maybe I can cut it off. Let's say today asbestos was
7 being used in a refinery, asbestos insulation.
8 Would that refinery be violating good
9 work practices to not inform its employees of the
10 hazards of asbestos?
11 A. Well, we have to -- again, as we said before,
12 it can't happen. But the product itself would have to
13 be labeled, depending on what the concentration of
14 asbestos was, above one percent.
15 So that would in itself be a warning.
16 However, there are also regulations that say that you
17 must tell people.
18 And the hazard communication standard
19 would take care of it, whether it's asbestos or anything
20 else; that workers are entitled to know what they're
21 working with, what the potential hazards are and how
22 they can protect themselves.
23 Q. Do you agree with that today?
24 A. The Hazards Communications Act?
25 Q. Yes.

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1 A. Absolutely.
2 Q. Do you believe in the 1970s workers were
3 entitled to be informed by their employer of the hazards
4 of asbestos being utilized around them?
5 A. Well, let's say how is it being utilized? If
6 we're talking about working in a refinery where there is
7 asbestos insulation installed, already there, no,
8 there's no reason to inform them of anything.
9 Q. Does a worker in a refinery who is having
10 asbestos insulation installed around him, currently
11 installed, in the 1970s, did he have a right to be
12 informed of the hazards of asbestos?
13 A. Again, we're going to have to look at what
14 dates we're talking about.
15 At some point in there, yes, because
16 that is a part of the standard. Was it a hazard to his
17 health? Probably not.
18 Q. So after 1972, is it your opinion an employee
19 would have the right to be informed by his employer of
20 the hazards of asbestos if asbestos pipe insulation was
21 being installed in his work area?
22 A. He was not doing it himself?
23 Q. Right.
24 A. If this was not a part of his job and he was
25 not being excessively exposed, then there's no need to.

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1 It might have been practice that they
2 did just generally because this was a period when there
3 was great change going on with regard to asbestos.
4 In the Pontiac refinery, they even in
5 the early '70s specified nonasbestos insulation.
6 Q. After 1972, if asbestos insulation was being
7 removed in an employee's work area, was the employer
8 under a duty to warn the worker about the hazards of
9 asbestos?
10 A. Depending on the circumstances, he might or
11 might not be. Again, how much? How long is the job
12 going to take? What's the percentage of asbestos there?
13 What is the probability of excessive exposure?
14 Q. So in your opinion, it was possible for an
15 employer to not be violating good work practices in not
16 informing its employees of the hazards of asbestos when
17 asbestos was being removed in their work area?
18 A. If the circumstances were such that the
19 probability was that there was not going to be any
20 excessive exposure, then there was certainly nothing
21 compelling to say, "Hey, we're doing something or
22 other."
23 Q. I take it it's your opinion in this case,
24 that the owners of the Pontiac facility, the Defendants
25 in this case, did not violate any standard of care?

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1 A. After reading the depositions and visiting
2 the plant, it seemed to me that they were probably ahead
3 of their time in some respects with regard to the
4 concern they had for their employees.
5 They had their safety program; they had
6 the nurse there full-time; they had a part-time
7 physician. And this was a very small plant, I think
8 around 300 employees, and certainly not one that
9 experience had been that they should be concerned --
10 they were concerned about fire, explosion, they were
11 concerned about some exposure to things like benzene.
12 So they were trying to do what they
13 could to be a good employer.
14 **Q. Did the nurse that was employed at the**
15 **Pontiac facility do anything to address, in your**
16 **opinion, the potential asbestos hazards associated with**
17 **working at the plant?**
18 A. I don't know what she did.
19 **Q. But to you, the nurse was obviously there for**
20 **some job-related injuries, I suppose?**
21 A. Yes. I would have to make some assumptions
22 there because she was there. She was probably there to
23 take care of anything.
24 Probably took care of some personal
25 minor illnesses. It was not unusual.

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1 **Q. And the part-time physician -- I guess what**
2 **I'm asking, do you have any evidence that the nurse or**
3 **the part-time physician that was employed by Pontiac**
4 **were in any way intended to address asbestos-related**
5 **issues?**
6 A. No. Because frankly, I don't think they had
7 any issues to address. So no, they wouldn't have. I
8 would doubt that they would have.
9 **Q. And that kind of brings me to my next**
10 **question. Is it your opinion that the owners, or**
11 **defendants in this case, the owners of the Pontiac**
12 **facility, did not violate any standard of care because**
13 **in the '50s, '60s and '70s, they simply did not have an**
14 **asbestos problem at their plant?**
15 A. Well, in answer, yes. Part of this, is that
16 when they had jobs that they thought might increase the
17 concentration of asbestos, such as removing old
18 insulation, they brought qualified contractors in to do
19 this under the very best of conditions.
20 So I think in addition, they were
21 trying very hard to be a good employer.
22 **Q. Do you believe that an employee of the**
23 **Pontiac facility who worked there from the 1950s through**
24 **the 1970s was at any increased risk of developing**
25 **asbestos-related disease?**

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1 A. You're saying any employee?
2 **Q. Any employee.**
3 A. Well, from what I have seen, I don't see --
4 oh, their employees? No, I don't think any of their
5 employees were.
6 I don't know about the employees for
7 the people who were removing the asbestos, though I
8 suspect they were being protected too.
9 **Q. What I'm trying to do is get to the crux of**
10 **your opinion. Is the crux of your opinion, that because**
11 **of none of Pontiac's employees were at an increased**
12 **risk, in your opinion, of developing asbestos-related**
13 **disease, they had no duty to warn them about the hazards**
14 **of asbestos?**
15 A. Well, I agree, because I haven't seen
16 anything there, nor have I read anything that would
17 indicate that there was any potential hazard of asbestos
18 disease from conditions in that plant.
19 Now the people may have worked
20 somewhere else. I don't know. That's not a part of my
21 area of having looked at.
22 But as far as the period of time, 1950
23 to the end of 1970s, I think that they had a good
24 workplace. I do not think they were excessively exposed
25 to asbestos.

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1 **Q. What policies did Pontiac have in place in**
2 **the 1950s to ensure that exposures to asbestos were not**
3 **excessive when tear-out of asbestos insulation work was**
4 **done?**
5 A. I don't have much information on the 1950s
6 nor have I heard any indication that there was a whole
7 lot of tear-out done then.
8 That's a fairly recent event to go out
9 and remove large amounts of insulation.
10 **Q. Certainly, asbestos insulation was being**
11 **replaced in the 1950s as it wore out, correct?**
12 MR. WOLCOTT: Objection to form.
13 A. Asbestos insulation usually does not wear
14 out. It's removed because of something else. They have
15 to make a repair for something, and they remove it for
16 that.
17 If I understand, there's insulation in
18 that plant today that was put in in 1930 or '31,
19 whenever it was built.
20 **Q. (BY MR. BARLOW) If they're going to change a**
21 **valve that's insulated, they've got to tear out the**
22 **insulation to get to the valve; is that right?**
23 A. Well, that's interesting. Because at the
24 plant visit I noticed that flanges were not insulated.
25 Dowels were not insulated. And this was probably

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1 because, yes, this is where you're likely to have to
2 make a change.
3 And the amount of heat that you lose on
4 this amount of space is not great; therefore, don't
5 insulate it. We can get to it without removing
6 asbestos -- or without removing insulation.
7 **Q. So in 2001, the valves at the plant weren't**
8 **insulated?**
9 A. Generally, that's right, yes.
10 **Q. Do you know in the 1950s, whether or not**
11 **valves were insulated?**
12 A. Well, the part of the plant that was built in
13 the '30s, the flanges were not insulated. I don't know.
14 Obviously, I don't know what was there in 1950.
15 **Q. If the owners of Pontiac in the 1950s had**
16 **asbestos removed in their plant, and did not take**
17 **precautions such as wear respirators or implement**
18 **engineering controls, would they have been violating a**
19 **standard of care?**
20 MR. WOLCOTT: Objection to form.
21 A. I think they would have been practicing
22 exactly the same thing that almost everybody else was
23 practicing.
24 **Q. (BY MR. BARLOW) Would that have been good**
25 **work practices?**

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1 A. As of the date? Yes.
2 **Q. In the 1960s, would it have been good work**
3 **practices at the Pontiac facility to remove asbestos**
4 **insulation without using respirators or other**
5 **engineering controls?**
6 A. Well, without defining how much, how long,
7 who's doing it, it could well have been perfectly all
8 right. Or maybe you would have made a different
9 recommendation.
10 **Q. Would it have been a violation of good work**
11 **practices to not warn its employees when contractors**
12 **were brought in to remove asbestos insulation in the**
13 **1960s without engineering controls or respirators?**
14 A. No, I don't think that that would have been
15 an issue.
16 **Q. And what do you base that opinion on?**
17 A. Because it was, in many cases, just a routine
18 thing. And it was done. Nobody gave it any thought,
19 because there was no indication, even among industrial
20 hygienists, that that was going to create a problem for
21 anybody.
22 **Q. In the 1960s, it's your opinion there was no**
23 **indication among industrial hygienists that removing**
24 **asbestos insulation without utilizing engineering**
25 **controls or respirators would be a problem?**

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1 A. Again, depending on how much and where and
2 under what type of circumstances, there could very well
3 have been no concern whatever.
4 **Q. You told me earlier, that bystanders are not**
5 **at an increased risk of developing asbestos disease, in**
6 **your opinion?**
7 A. In my opinion.
8 **Q. If you were teaching a course on asbestos,**
9 **would you teach that as part of the curriculum?**
10 A. I would try to emphasize where the exposures
11 would be of concern. I don't think I would say, "Well,
12 when the bookkeeper walks out here to pick up the
13 timecards, we don't have to be concerned about that."
14 You have to say, "All right. Here are
15 the circumstances that we should be concerned about the
16 potential exposure of people to asbestos, when they're
17 doing such and such and such and such."
18 **Q. Do you have children?**
19 A. Sure.
20 **Q. Would you have allowed, say, -- you have a**
21 **son?**
22 A. Right.
23 **Q. I know you have a son. Your son is an**
24 **attorney.**
25 A. I try not to hold that against him.

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1 **Q. If your son had come to you in, say, 1975 and**
2 **said, "Dad, I'm working this summer at a refinery, and**
3 **they're going to be installing and removing asbestos**
4 **around me, but I'm going to be working as an operator**
5 **there," would you have allowed him to do that if he**
6 **wasn't going to be provided a respirator?**
7 A. Absolutely.
8 **Q. Say your son was still working not as a**
9 **lawyer today, but was working in plants. If your son**
10 **came to you today and said, "I'm going to be working in**
11 **this refinery, and they're going to be installing and**
12 **removing asbestos around me, and I'm not going to be**
13 **wearing a respirator," would you allow him to do that?**
14 A. Well, first of all, I wouldn't have any say
15 as to whether he would or not. But the questions that I
16 would ask, "Where is this? How much of it is going to
17 be removed? How long is it going to take?"
18 It could be a problem or not. Probably
19 would not be any problem.
20 **Q. If your son came to you today and said, "Dad,**
21 **I've got a great job. I'm quitting the practice of**
22 **law" --**
23 A. He's going to be an insulator?
24 **Q. -- "and I'm going to be working around this**
25 **asbestos that they're making, some new project, and it's**

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1 **a great job, but I'm going to inhale one teaspoon of**
2 **asbestos a month."**
3 **Would you advise him against taking**
4 **that job?**
5 MR. WOLCOTT: Objection to form.
6 A. Based on this information, no. Because
7 frankly, it would not indicate any real exposure,
8 minuscule. You'd probably get that walking around in
9 some areas somewhere.
10 My question, is the judgment of giving
11 up law.
12 **Q. (BY MR. BARLOW) I don't know. The law is**
13 **not such a good job sometimes. Actually, it is.**
14 **When was it first reported in the**
15 **literature, that asbestos-exposed workers should be**
16 **monitored with chest X-rays?**
17 A. Well, the first report of asbestos-related
18 disease was through X-ray, which was about, I think,
19 1899, about 100 years ago.
20 The disease was recognized as an entity
21 in itself about 1925. And those would have all had to
22 have been done by --
23 **Q. Chest X-ray?**
24 A. -- by chest X-ray.
25 **Q. 1899, Nelly Kershaw -- the Nelly Kershaw**

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1 **case?**
2 A. I don't remember the name of it. There was a
3 Dr. Murray.
4 **Q. Uh-huh. I think the patient was Nelly**
5 **Kershaw. That was an X-ray? I thought it was an**
6 **autopsy.**
7 A. It might have been an autopsy. X-rays? I'm
8 not sure exactly when X-rays -- but I know that the
9 disease asbestosis was given the name as a result of
10 studies in 1925. And that was X-rays.
11 **Q. Dr. Cook?**
12 A. Cook. Right. And of course, Meriwether was
13 X-rays. It's been around a long time.
14 **Q. Sure. And my question is slightly different,**
15 **not when X-rays were first utilized to diagnose**
16 **asbestos.**
17 **My question is, when was it first**
18 **stated in the scientific or medical literature that**
19 **chest X-rays should be utilized to monitor workers for**
20 **asbestos disease?**
21 A. Well, I doubt that it was asbestos that it
22 first occurred. It probably was silicosis was the
23 disease that would have been of concern rather than
24 asbestos.
25 I don't know. I don't even know when

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1 it would have been for silicosis. Probably very shortly
2 after 1925, that this was a tool that might contribute
3 more to the knowledge of changes occurring in the lungs.
4 **Q. By what year should a manufacturer of**
5 **asbestos-containing pipe covering have known that**
6 **asbestos could cause asbestosis?**
7 A. That probably goes back to the Lanza
8 publication, Dr. Anthony Lanza. He was with
9 Metropolitan Life Insurance Company.
10 And that paper was an indication that
11 this was a disease that is certainly possible with
12 exposure to asbestos.
13 **Q. Do you know what year that paper came out?**
14 **Do you remember?**
15 A. It was the mid-'30s, I think. Either '35 or
16 '36, somewhere along in there.
17 **Q. So in your opinion, a manufacturer of**
18 **asbestos-containing pipe covering should have known that**
19 **asbestos could cause asbestosis by sometime in the**
20 **mid-1930s?**
21 A. It was certainly a known disease. And I
22 think that somebody using asbestos in the manufacturing
23 process would have had some opportunity to know that,
24 either through their own insurance carrier or somebody
25 else.

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1 **Q. By what time should a manufacturer of**
2 **asbestos-containing insulating cement have known that**
3 **asbestos could cause asbestosis?**
4 A. I'm not even sure that I know when asbestos
5 cement was first started being manufactured. I don't
6 think I can answer your question.
7 **Q. Well, assume that asbestos insulating cement**
8 **has been manufactured since the early 1900s.**
9 A. Well, I would say probably along the same
10 time as the pipe insulation or other users of asbestos
11 as a raw material.
12 **Q. Sometime in the mid-1930s?**
13 A. Probably somewhere in there.
14 **Q. By what time should a manufacturer of**
15 **asbestos-containing refractory products have known that**
16 **asbestos could cause asbestosis?**
17 MR. WOLCOTT: Objection to form.
18 A. Well, I think that the use of asbestos in
19 refractories is considerably less than in the
20 manufacture of, say, fabrics or insulation.
21 I don't know when the use might have
22 been left to warrant.
23 **Q. (BY MR. BARLOW) You don't have an opinion on**
24 **that one way or the other?**
25 A. I don't.

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1 Q. **You do not?**
2 A. I do not, no.
3 Q. **When should a manufacturer of asbestos-**
4 **containing cloth have known that asbestos could cause**
5 **asbestosis?**
6 A. Well, again, when you say "cloth," I guess
7 that's different, because there's always other fibers
8 involved in the making of asbestos fabrics.
9 But this was something that Meriwether
10 was studying in the early '30s. This was the area of
11 the industry that Dreessen was studying in 1938.
12 So somewhere in that order it probably
13 would have been brought to the attention of fabric
14 manufacturers.
15 Q. **Sometime in the 1930s?**
16 A. Sometime in there. We're talking about
17 asbestosis?
18 Q. **Asbestosis. By what year should a**
19 **manufacturer of asbestos-containing pipe covering have**
20 **known that asbestos could cause lung cancer?**
21 A. Oh, I think that would be the Selikoff
22 studies, 1964, '65. Or sometime other than that.
23 Because his studies were really not
24 published until '67. He presented the papers, but it
25 was not a publication.

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1 Q. **So you don't think that a manufacturer of**
2 **asbestos-containing pipe covering should have known that**
3 **asbestos caused lung cancer prior to 1967?**
4 A. They might have. But then, this was not
5 something that the profession was even much -- they knew
6 that there were the case studies, which we've talked
7 about this before.
8 But the Selikoff studies were the ones
9 that really brought this home. And even then there was
10 some reluctance to accept it.
11 Q. **Would your answer for when a manufacturer of**
12 **insulating cement should have known that asbestos caused**
13 **lung cancer be the same? 1967?**
14 A. Lung cancer?
15 Q. **Lung cancer.**
16 A. Probably somewhere in the same order. I
17 would say that would be true for the users of the raw
18 material, yeah. Any of them.
19 Q. **By what year should a manufacturer of**
20 **asbestos-containing refractory products have known that**
21 **asbestos could cause lung cancer?**
22 A. Well, again, that might fall into the same
23 category, depending on how much they were using.
24 Because all refractories don't have asbestos in them or
25 did not have.

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1 So I think it would depend on the
2 amount of material that they were using. It might have
3 been the mid-'60s, or it might have been later than
4 that.
5 Q. **How much later, if not the mid-'60s?**
6 A. I don't know. It's kind of hard to pin down.
7 Certainly by the time you have federal regulations, then
8 it behooves everybody to know what's in the federal
9 regulations.
10 Q. **After 1972, were the owners of the Pontiac**
11 **facility under any obligation to monitor their employees**
12 **for asbestos disease?**
13 MR. WOLCOTT: Objection to form.
14 A. I think that we certainly covered that
15 subject before.
16 Since there was no indication that
17 there was exposure, then certainly there was no reason
18 to monitor them for the disease.
19 Q. **(BY MR. BARLOW) I'm sorry. My question**
20 **wasn't quite clear. By "monitoring," I meant with chest**
21 X-rays.
22 A. Yeah, I understood that. But as we discussed
23 earlier, there was no indication that there was a reason
24 to think that people were going to be exposed to enough
25 asbestos to cause disease, therefore, there was no

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1 obligation to do chest X-rays for that.
2 Q. **Who do you consider to be the most**
3 **authoritative writer on the subject of asbestos-related**
4 **disease?**
5 A. Living or dead?
6 Q. **Either.**
7 A. I guess just from the volume as well as the
8 period that he covered would be Selikoff. I think he
9 began to wander before he died.
10 Q. **Who do you find to be the most authoritative**
11 **current writer on the issue of asbestos disease?**
12 A. I don't know if there is an outstanding one.
13 Q. **Do you consider any of the current writers on**
14 **the issue of asbestos disease to be authoritative?**
15 A. I don't really see much new coming out. It's
16 mostly repeat, confirmation of something else.
17 I don't know of anybody that really
18 stands out as being an authoritative person.
19 Q. **Are you familiar with Victor Roggli?**
20 A. Yeah.
21 Q. **Do you consider Victor Roggli to be an**
22 **authoritative writer on the issue of asbestos disease?**
23 A. Not necessarily.
24 Q. **Do you consider --**
25 A. Let me back up a little bit. I think Hans

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1 Weill is probably the most authoritative.
2 **Q. Hans Weill?**
3 A. Yeah.
4 **Q. You have Hans Weill to be the most**
5 **authoritative current writer on the issue of asbestos**
6 **disease?**
7 A. Well, you can't even say he's current,
8 because he's retired.
9 **Q. What are your criticisms of Dr. Roggli's**
10 **writings?**
11 A. I just don't think that he's necessarily
12 basing what he says on very sound data. He has a lot of
13 opinions.
14 And most of his is on the medical side,
15 which I'm not a physician, so I can't really comment on
16 it.
17 But I think some of his comments,
18 decisions, as far as I'm concerned, are questionable.
19 **Q. Can you give me any specific examples of Dr.**
20 **Roggli's opinions which you find questionable?**
21 A. I can't give you any particular papers. Just
22 the impression is, as I've read them, or that he
23 provides his opinions on cases, that it's pretty shaky.
24 Whether he says so or not, I get the
25 impression he tends toward the one-fiber theory, which I

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1 cannot accept at all.
2 **Q. Are there any writers on the subject of**
3 **asbestos-related disease other than Hans Weill that are**
4 **currently alive that you consider authoritative?**
5 A. Well, you know, when you asked that before,
6 it took a while before I could come up with Hans. About
7 midnight tonight, I might think of somebody else.
8 **Q. None that you can think of offhand?**
9 A. Not right now, no.
10 **Q. Well, just tell me who do you find to be**
11 **authoritative on the subject of asbestos-related**
12 **disease?**
13 MR. WOLCOTT: Objection.
14 **Q. (BY MR. BARLOW) You told me Selikoff and**
15 **Weill.**
16 A. I thought that's what we've been talking
17 about.
18 **Q. Well, you told me two, Selikoff and Weill.**
19 A. That's the only two that I've been able to
20 come up with at this point.
21 **Q. You can't name me any others that you find**
22 **authoritative right now? It's okay.**
23 A. No. Do you want me to call you tonight?
24 MR. WOLCOTT: No.
25 **Q. (BY MR. BARLOW) Do you find Meriwether to be**

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1 **authoritative?**
2 A. Of course, Meriwether goes back to the very
3 early days of this. And he was reporting really at the
4 cusp of all of this. I found that his papers were very
5 interesting.
6 Certainly they lacked something in that
7 he really did not know what the exposure levels were.
8 He didn't try to find out. He made a judgment after
9 three years that the problem had been solved, which, of
10 course, it hadn't been.
11 But he was certainly breaking new
12 ground all along.
13 **Q. He would have been authoritative for his time**
14 **period?**
15 A. When you can't judge it by anything else,
16 yes. By hindsight, yes, you can say, "Here are a lot of
17 problems that he didn't address."
18 **Q. But you wouldn't hold his work today to be**
19 **authoritative, based on what we know today?**
20 A. No. Because -- not that he was wrong. It
21 was just that at his time, that's what he was able to
22 come up with. And it was quite valuable.
23 **Q. Do you consider Dr. Fleischer's work to be**
24 **authoritative?**
25 A. Well, Fleischer's study, of course, was 1946.

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1 And this was one of the first -- I guess really the
2 second study in which concentration -- the exposure
3 concentrations were really looked at.
4 It was under very limited
5 circumstances. He was in the shipyards in New York
6 metropolitan area. I guess they also did some shipyards
7 out on the west coast.
8 So yes, this was valuable information
9 for this type of exposure. And he was also looking at
10 this and getting exposure levels and drawing a
11 conclusion.
12 In fact, he agreed with Dreessen as far
13 as the permissible exposure limits. Or he did not
14 disagree with it, I think is more correct.
15 **Q. Based on what we know today, do you believe**
16 **that Dr. Fleischer and Dr. Drinker's work was**
17 **authoritative?**
18 A. Again, we have to look at when it was being
19 done and what tools did they have to work with.
20 They were doing things that had not
21 been done before, and, again, quite valuable in building
22 up the body of knowledge that eventually leads to where
23 we are today. But many, many people contributed to it.
24 **Q. You think they were good scientists,**
25 **obviously?**

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1 A. I think they were both -- yes, I think they
2 were good scientists. I have no reason to think they
3 weren't.
4 **Q. But we've learned a lot since then?**
5 A. Oh, hopefully.
6 **Q. So obviously, I know you don't mean this as a**
7 **criticism of Dr. Fleischer and Dr. Drinker, but based on**
8 **what we know today, -- let me start that question again.**
9 **I understand that you're not critical**
10 **of Dr. Fleischer and Dr. Drinker. But based on what we**
11 **know today, do you still consider their work to be**
12 **authoritative?**
13 A. Well, you cannot apply today's knowledge to
14 1946. If it were not for that type of work that they
15 did, we would probably not be quite as far as we are
16 today.
17 Would the study be done the same way
18 today? No. Because we have different techniques.
19 **Q. In your opinion, has there been any**
20 **authoritative medical literature published on the issue**
21 **of asbestos-related disease in the last ten years?**
22 A. Last ten years? I can't think of any real
23 break-through information, no.
24 **Q. By "authoritative," I don't mean**
25 **break-through. I'm just saying scientifically valid.**

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1 **So let me ask it with that**
2 **understanding. In the last ten years, has there been --**
3 A. Well, I think some of Hans Weill's work was
4 within the last ten years.
5 **Q. So the record will be clean, let me ask a**
6 **question, and then you can answer it.**
7 **Within the last ten years, has there**
8 **been any scientifically valid authoritative literature**
9 **published on the issue of asbestos-related disease?**
10 A. I think some of Dr. Weill's work has been
11 published in the last ten years. There have probably
12 been -- Roggli has come out with things in the last ten
13 years that are valid.
14 I wasn't totally criticizing him. And
15 I think that -- what's his name? He's out on the west
16 coast. Sandler? He's an epidemiologist physician that
17 has done some good work.
18 This is embarrassing, because I worked
19 with him on a project once. I'm sorry. I can't come up
20 with it right now.
21 **Q. If you think of it --**
22 A. Call you tonight?
23 **Q. Well, before we finish the deposition.**
24 **Who was doing authoritative work in the**
25 **1980s, on the issue of asbestos-related disease?**

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1 A. I think all these people were working in the
2 '80s. I don't think you can mark it off in nice, clean
3 decades at all.
4 **Q. Anyone other than Weill and this other**
5 **individual whose name you can't recall right now on the**
6 **West Coast in the 1980s?**
7 A. Well, again, this is not something that I've
8 really given much thought to, trying to pull it out.
9 I can't think of anybody else right
10 now, but that doesn't mean that there hasn't been good
11 work done.
12 **Q. As we sit here today, the only authoritative**
13 **writer you can name that was published in the 1980s is**
14 **Dr. Weill?**
15 A. I think Roggli was publishing in those years.
16 Selikoff was publishing, still publishing in the '80s.
17 **Q. Selikoff, Weill and some of Roggli's work?**
18 A. Some of his work and this other -- I'm sorry,
19 I just can't come up with it.
20 **Q. Anyone else that you can think of as we sit**
21 **here today?**
22 A. No.
23 **Q. Do you believe in the 1960s, that refineries**
24 **should have been monitoring the medical literature with**
25 **regard to asbestos disease?**

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1 A. Not really. Well, you'd have to say who in
2 the refineries? What refinery?
3 **Q. Safety personnel in the refineries.**
4 A. No. Certainly there were organizations such
5 as Exxon that had medical research teams. But a
6 refinery like Pontiac, they didn't have that sort of
7 capability.
8 They didn't make enough money to pay
9 for it.
10 **Q. Let me ask you this: Are you familiar with**
11 **the API?**
12 A. In a general way.
13 **Q. Have you reviewed any of the documents and**
14 **publications of the API?**
15 A. A few of them. But I can't name them right
16 now.
17 **Q. Do you know when it was knowable through the**
18 **API that asbestos could cause asbestosis?**
19 A. Oh, Lord, no. That would go back probably
20 into the '30s somewhere.
21 **Q. Do you know when it was knowable through the**
22 **API that asbestos could cause lung cancer?**
23 A. Well, you'd have to say -- when was the first
24 case report that they may have come across? I don't
25 know. That could have been some of the German work.

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1 It might not have. I suspect that
2 Doll's work was known to people in the API, which would
3 be in the mid-'50s.
4 **Q. Do you believe that a member of the API**
5 **should have monitored the publications of the API to**
6 **determine potential hazards to its employees?**
7 MR. WOLCOTT: Objection to form.
8 A. I don't think I could even answer that. I
9 don't know. API, of course, published on a lot of
10 different subjects.
11 But if a refinery for whatever reason
12 or a company that had a refinery for whatever reason had
13 no more than what Pontiac had, the number of employees
14 and the care that they were taking, apparently there
15 wasn't anyone there that felt there was any need to do
16 anything else.
17 MR. BARLOW: Object to the
18 responsiveness of the answer.
19 **Q. (BY MR. BARLOW) My question is: Should a**
20 **member of the API have monitored API publications to**
21 **discover potential hazards to their employees?**
22 MR. WOLCOTT: Objection to form.
23 A. Well, that's a different question. I don't
24 think I'm in a position to say what some member of API
25 should have done 30 or 40 years ago. They belonged to

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1 it.
2 They probably had some particular
3 interest that they would have monitored that. But they
4 may have been a member of API without having any of
5 their own people as active participants.
6 So it's very difficult to say who
7 should have done what, when. I don't know how to answer
8 your question.
9 **Q. (BY MR. BARLOW) You don't believe that**
10 **you're in a position to tell us what a refinery should**
11 **or should not have done 30 or 40 years ago?**
12 A. I didn't say that. We were talking about
13 API.
14 **Q. I said, a member of the API.**
15 A. Yeah. That was your question.
16 **Q. It's my understanding that members of the**
17 **API, were refinery companies. Is that not correct?**
18 A. I don't know who all was eligible to be
19 members of API.
20 **Q. Well, do you feel that you're in a**
21 **position -- let me just ask you: Do you feel that**
22 **you're in a position to be able to tell us what a**
23 **refinery should or should not have done 30 or 40 years**
24 **ago?**
25 MR. WOLCOTT: Objection to form.

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1 A. Now are you talking about API, or are you
2 talking about health and safety? I don't understand
3 what you're talking about.
4 **Q. (BY MR. BARLOW) Yeah. With regard to**
5 **safety.**
6 A. What a refinery should have done?
7 Q. Yes.
8 A. They should have taken whatever action was
9 necessary to protect the health and safety of their
10 workers.
11 MR. BARLOW: I need to take a break.
12 (RECESS HELD FROM 3:06 P.M. TO 3:15 P.M.)
13 MR. WOLCOTT: Could you make a note
14 that Mr. Pendergrass has tendered the documents he
15 brought to Plaintiffs' counsel.
16 I just want there to be a record that
17 he brought the documents, and you now have had a chance
18 to look at them.
19 MR. BARLOW: Do you want me to identify
20 what they are?
21 MR. WOLCOTT: Not necessarily. I think
22 it's all stuff you've seen before.
23 MR. BARLOW: This is all deposition
24 testimony?
25 THE WITNESS: (Nodding head

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1 affirmatively.)
2 MR. BARLOW: I'm not going to actually
3 mark this -- I'm going to mark it on the record as
4 Exhibit 2, if that's all right with you.
5 And we'll make a copy and attach that
6 to the record, the "Chronology of Asbestos Regulations
7 in the United States Workplace."
8 MR. WOLCOTT: Are you asking Debra to
9 make -- the court reporter to make a copy of it?
10 MR. BARLOW: We'll make a copy after
11 we're through here, and then attach it. Will that be
12 fine?
13 MR. WOLCOTT: Can the hotel do it?
14 MR. BARLOW: I'm sure they can.
15 MR. WOLCOTT: I just know, that's his
16 original.
17 MR. BARLOW: Right. I don't want you
18 to lose this.
19 THE WITNESS: And they do get lost
20 sometimes.
21 MR. BARLOW: Yes, I understand.
22 MR. WOLCOTT: Yeah. I have no problem
23 with marking the copy as Exhibit 2.
24 MR. BARLOW: We'll work out how to get
25 it actually attached. If they can't make a copy here, I

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1 can send it home with you.
2 And if you'll send Mr. Wolcott a copy,
3 then we can do it that way, and just attach it. Is that
4 all right?
5 MR. WOLCOTT: All right. Sure.
6 (DEPOSITION EXHIBIT NO. 2 MARKED)
7 **Q. (BY MR. BARLOW) Let me ask you, why is it**
8 **that you produced this chapter by Peter A. Nowinski**
9 **today?**
10 A. It's just one of the things that I looked
11 through. It happened to be in a folder, and I just read
12 through it.
13 **Q. This is one of the things that you rely on**
14 **for your opinion?**
15 A. One of the things that I reviewed prior to
16 today for this.
17 **Q. Do you find this chapter entitled "Chronology**
18 **of Asbestos Regulations in the United States Workplace"**
19 **to be authoritative?**
20 A. It's pretty good. There are a few minor
21 things in it that are errors. But I think for a
22 publication, and for what it is, it's very good, yes.
23 **Q. Can you point out to me what in there you**
24 **find to be an error?**
25 A. I think there's a date that was wrong. It

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1 isn't that important.
2 I'm not finding it right now.
3 **Q. You think there's one date in there?**
4 A. I think it's just a date. There was nothing
5 of any great significance.
6 **Q. Well, we can move on. If you think of it,**
7 **let me know. Okay?**
8 A. Okay. Do you want to look at it again?
9 **Q. Yeah, please. Do you know when Texas enacted**
10 **laws governing permissible asbestos exposures in the**
11 **workplace?**
12 A. I think that it was probably 1956 or '55.
13 And this is the date that sticks in mind with regard to
14 asbestos.
15 So they may have had some earlier than
16 that. But I think the mid-'50s, as I recall.
17 **Q. Would any employer following the passage of**
18 **that law have been in violation of the standard of care**
19 **for the industry if they were not in compliance after**
20 **1958?**
21 MR. WOLCOTT: Objection to form.
22 A. As I recall, the only thing that they had was
23 that they actually adopted the ACGIH TLVs. And that was
24 just a number.
25 So I don't know that there was any -- I

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1 don't recall there was any specific requirements other
2 than that these were the acceptable levels for however
3 many materials were on that list at that time.
4 **Q. (BY MR. BARLOW) And an employer in Texas in**
5 **1958 who was not keeping asbestos levels at their**
6 **workplace below 5 million particles per cubic foot based**
7 **on time-weighted average, would they have been violating**
8 **the standard of care?**
9 MR. WOLCOTT: Objection to form.
10 A. Well, I think -- you're saying that they were
11 definitely in excess of whatever they called them in
12 Texas, TLVs?
13 If that were over the time-weighted
14 average that we're talking about, hours per day, then
15 they obviously would have been in excess of the
16 acceptable level for Texas.
17 **Q. (BY MR. BARLOW) Would you expect a Texas**
18 **employer who utilized asbestos in their business or in**
19 **their work, to have kept its levels of asbestos exposure**
20 **below the threshold limit value as it was set in Texas**
21 **in 1958?**
22 MR. WOLCOTT: Objection to form.
23 A. I think you would expect them to. How many
24 did, or how many knew what they were, I don't know.
25 I have no idea what the actual practice

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1 was in Texas. Probably very few in the mid-'50s were
2 even aware that that existed.
3 **Q. (BY MR. BARLOW) Do you think an employer in**
4 **the state of Texas in 1958 would have been under a duty**
5 **to know what the acceptable levels of asbestos exposure**
6 **were in its workplace as stated by state law?**
7 A. I don't know the details of the state law.
8 So I think their duty would have been to protect their
9 workers. And whatever the state law called for, that
10 would have been what they should have been doing.
11 **Q. If a company was not in compliance with the**
12 **state law in 1958, they weren't doing what they should**
13 **have been doing, in your opinion?**
14 MR. WOLCOTT: Objection to form.
15 A. If their employees were not being
16 overexposed, then they were. If they were being
17 overexposed, then obviously that would not be good
18 practice.
19 MR. BARLOW: Objection as
20 nonresponsive.
21 **Q. (BY MR. BARLOW) That wasn't exactly my**
22 **question. My question is, if an employer in the state**
23 **of Texas in 1958 was not keeping its asbestos levels**
24 **within what was laid out by state law, then in your**
25 **opinion, they weren't doing what they were supposed to**

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1 be doing, correct?
2 MR. WOLCOTT: Objection to form.
3 A. And we're talking about eight-hour repeated
4 exposures? Then they were in violation of the stated
5 guideline for Texas. I don't know what the consequences
6 of that is.
7 Q. (BY MR. BARLOW) Well, if you were an
8 executive in 1958 and in charge of a refinery, would you
9 have allowed your workers to be in violation of Texas
10 state law with regard to asbestos exposures?
11 MR. WOLCOTT: Objection to form.
12 A. I don't see how that's -- I certainly have
13 never been in that position. My profession was to and
14 has always been to evaluate areas, conditions, to
15 protect the health of workers.
16 If that had been the case, and I had
17 been the evaluator, then yes, I would have been
18 responsible to advise the manufacturer or the executive.
19 But I can't sit here and say, this is
20 what the executive should have done without knowing any
21 other circumstances.
22 Q. (BY MR. BARLOW) So you can imagine a set of
23 circumstances in which an employer in the state of Texas
24 in 1958 could be in violation of state law, but would be
25 exercising reasonable care with regard to asbestos

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1 exposures in its workplace?
2 MR. WOLCOTT: Objection to form.
3 Q. (BY MR. BARLOW) Is that right?
4 A. No. I think what you have there is probably
5 his actions would have been similar to the vast majority
6 of other employers in the same circumstance.
7 Whether it would have been good
8 practice or not from the industrial hygienist's
9 standpoint, the answer would be no.
10 Q. It's never good practice from an industrial
11 hygienist's standpoint to be in violation of state law?
12 A. No. It is not good practice for the
13 industrial hygienist to have conditions exist which
14 would be harmful to the health of the workers.
15 Q. Do you know when caution labels began
16 appearing on asbestos-containing products which were
17 sold to or used within the Pontiac facility?
18 A. No, I don't.
19 Q. Once caution labels began appearing on
20 products that were used within the Pontiac facility, was
21 Pontiac under any duty to investigate how to use those
22 products safely around their employees?
23 MR. WOLCOTT: Objection to form.
24 A. Once it was there, yes. And I think that the
25 indications are that this was the practice. This is

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1 what they did.
2 In fact, it was what they probably did
3 before that. They certainly were taking, it seems to
4 me, the precautions necessary to protect the worker from
5 excessive exposures.
6 First of all, under normal
7 conditions -- or routine conditions, they didn't have
8 conditions that were in excess.
9 When they were likely to occur they
10 used -- their practice was to use outside contractors
11 and enclosures.
12 Q. (BY MR. BARLOW) I want you to assume for me
13 that as of 1964 there were caution labels on some of the
14 asbestos-containing products which were utilized at the
15 Pontiac facility and that the caution labels said:
16 Caution, contains asbestos, avoid breathing dust.
17 Do you believe at that point, that
18 Pontiac should have utilized a respirator program when
19 those products were being used?
20 A. Not necessarily.
21 Q. Do you believe that Pontiac should have
22 utilized engineering controls when those products were
23 being used?
24 A. Not necessarily.
25 Q. Why do you say "not necessarily"?

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1 A. Because they might have been being used,
2 where there was no reason to think that there was an
3 excessive concentration.
4 Q. Do you believe that it's possible to avoid
5 breathing the dust from asbestos-containing pipe
6 covering when it's cut, unless you're using a respirator
7 or engineering controls?
8 A. No. You're going to breathe some.
9 Q. Do you believe that when caution labels began
10 appearing saying to avoid breathing the asbestos dust,
11 that Pontiac should have been testing to find out if
12 they were exceeding safe levels of asbestos exposure?
13 MR. WOLCOTT: Objection to form.
14 A. I think that it's essentially the same
15 question as before. No. It depends on what they were
16 doing. Probably not. But it would depend on what was
17 being done.
18 Q. (BY MR. BARLOW) When Pontiac got the pipe
19 covering, let's say hypothetically, that had the warning
20 on it which said "Avoid Breathing the Dust," assuming
21 they didn't know one way or another what the safe levels
22 of asbestos exposure were, what should they have done?
23 A. Well, I think they would have done exactly
24 what their Safety Manager did, was try to get as much
25 information as he could. But --

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1 Q. When did their Safety Manager begin --
2 MR. WOLCOTT: Objection.
3 Q. (BY MR. BARLOW) Are you through?
4 A. Yeah.
5 Q. I didn't mean to cut you off.
6 A. Okay. Go ahead.
7 Q. When did the Safety Manager, based on what
8 you've reviewed from Pontiac, begin doing research into
9 asbestos hazards?
10 A. I don't think you could say that he did
11 research into anything. I don't think that was his
12 capability or anything else.
13 He was trying to educate himself as
14 much as possible, again based on what I have read from
15 his deposition.
16 But I also think that from that he was
17 a very conscientious individual, and was seeking
18 information where he could get it.
19 Q. Are you referring to Mr. Kucera?
20 A. Yes.
21 Q. Do you know when Mr. Kucera stated that he
22 was first aware that asbestos was a potential hazard?
23 A. It was right about the time that he took the
24 job as the safety engineer, I believe is what he said.
25 Q. I believe from some notes I read, that Mr.

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1 Kucera stated that he first became aware that asbestos
2 was a potential hazard in 1969.
3 Does that sound right to you?
4 A. Yeah. Didn't he take that job in '68?
5 Q. Does that sound right?
6 A. Yeah.
7 Q. Do you know of any efforts made by Pontiac
8 prior to 1969, to determine whether or not asbestos was
9 a potential hazard to its employees?
10 A. No, I don't. We know now that it wasn't or
11 probably wasn't. We don't know possibly because they
12 didn't do anything.
13 But I don't think anyone, certainly in
14 the industrial hygiene profession, would have suggested
15 doing anything at all there with regard to asbestos.
16 Q. Assume for me that in 1964 asbestos-
17 containing products were delivered to Pontiac which said
18 "Caution. Asbestos. Avoid Breathing the Dust."
19 Would it have been good practices to
20 wait five years before doing any investigation into
21 whether or not there was a potential hazard for their
22 employees?
23 A. We don't know that there was a wait of five
24 years. And there's no indication that there was a
25 problem.

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1 MR. BARLOW: Object as nonresponsive.
2 Q. (BY MR. BARLOW) Is it good work practices to
3 wait five years from the time you first have notice of a
4 potential problem until you do further investigation
5 into that problem?
6 MR. WOLCOTT: Objection to form.
7 A. I don't know that that was a fact there. And
8 depending on what information they received, they may or
9 may not have done anything further.
10 Again, we have to say, well, was there
11 or is there any indication that a problem existed?
12 There is not. So there was nothing to do.
13 Q. (BY MR. BARLOW) Is it your opinion that even
14 if Pontiac waited five years before doing any further
15 investigation into the asbestos problem, they weren't
16 negligent, because there simply wasn't a problem to
17 begin with?
18 A. That's correct.
19 Q. Is it your opinion, that no matter how long
20 Pontiac waited to address the asbestos issue, they're
21 not negligent, because they never had a problem to begin
22 with?
23 A. Well, the fact is, that when they began
24 removing large amounts of asbestos, they brought
25 somebody else in to do it.

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1 They brought somebody else in to do
2 their insulation work. So that is not a fact of what
3 happened. I don't see any indication where Pontiac was
4 negligent in protecting their workers. Their workers
5 were protected.
6 Q. It's your opinion, that at all times,
7 Pontiac's employees were protected from the asbestos
8 hazard?
9 A. From what I have read, I have no indication
10 that conditions existed otherwise.
11 Q. When was it knowable by a refinery that
12 asbestos could cause asbestosis?
13 MR. WOLCOTT: Objection to form.
14 A. By any refinery, or a refinery, or the
15 refinery industry?
16 Q. (BY MR. BARLOW) By any refinery.
17 A. I have no idea.
18 Q. When was it knowable by the refining
19 industry, that asbestos could cause asbestosis?
20 A. Again, probably in the mid-'30s, depending on
21 the company. Those companies that had occupational
22 health programs at that time -- there wouldn't be many
23 in the mid-'30s, but certainly after World War II there
24 would have.
25 But there were not many companies that

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1 had occupational health programs prior to World War II.
2 **Q. In your opinion, should sister companies**
3 **within the same corporate structure share industrial**
4 **hygiene information?**
5 MR. WOLCOTT: Objection to form.
6 A. There was certainly an open sharing of
7 information among industrial hygienists, yes.
8 **Q. (BY MR. BARLOW) If a company's sister**
9 **company has information concerning the hazards of**
10 **asbestos, should that company seek to have that**
11 **information so it can use it to protect its own**
12 **employees?**
13 MR. WOLCOTT: Objection to form.
14 A. Go about that one again.
15 MR. BARLOW: Can you read it back to
16 him or do you need me to rephrase it?
17 (PREVIOUS QUESTION READ)
18 MR. WOLCOTT: Objection to form.
19 A. Can you rephrase that? Because I'm really
20 not sure what you're asking,
21 **Q. (BY MR. BARLOW) Sure. If there's several**
22 **subsidiaries of the same parent company, and one of the**
23 **sister companies, one of the subsidiaries, has access to**
24 **information about asbestos hazards, and another one of**
25 **the subsidiaries is utilizing asbestos in their field,**

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1 **should the subsidiaries share that information among**
2 **each other?**
3 MR. WOLCOTT: Objection to form.
4 A. There's an answer to that if you disregard
5 company culture. Yes, and you would expect it, and it
6 probably would happen.
7 However, there are organizations which
8 discourage any exchange of information between different
9 subsidiaries or even different divisions of a company.
10 So in some situations, there is
11 absolutely no sharing of information, regardless of what
12 it is.
13 **Q. (BY MR. BARLOW) Would it ever be responsible**
14 **to not share information about health hazards between**
15 **subsidiaries?**
16 MR. WOLCOTT: Objection to the form.
17 A. I think from my standpoint, health is all
18 important. And I think that is generally true with
19 employers.
20 However, where there is this culture
21 that says you do not exchange information, it probably
22 wouldn't be. I mean, this manager is not going to
23 whisper to this one over here, "You know, I'm not
24 supposed to talk to you, but this is what's happening."
25 That isn't going to occur.

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1 Now I cannot believe that the
2 information wouldn't flow anyway up through the chain
3 and back down.
4 **Q. (BY MR. BARLOW) But from a public health**
5 **standpoint, would it ever be responsible to not share**
6 **health information between subsidiaries?**
7 MR. WOLCOTT: Objection to the form.
8 A. Well, this isn't a matter of public health.
9 This is a matter of employee health. And there's a
10 difference.
11 **Q. (BY MR. BARLOW) From an employee health**
12 **standpoint, would it ever be responsible for companies**
13 **to not share health information among subsidiaries?**
14 MR. WOLCOTT: Objection to form.
15 A. Again, this is so foreign to my own
16 experience and practice, that I can't even conceive of
17 this, that they wouldn't.
18 But it's certainly possible that that
19 information would not be shared.
20 **Q. (BY MR. BARLOW) Would it be responsible?**
21 MR. WOLCOTT: Objection to form.
22 A. I tried to answer that. I can't go any
23 further.
24 **Q. (BY MR. BARLOW) When was it knowable to**
25 **members of the National Safety Council that asbestos**

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1 **could cause asbestosis?**
2 MR. WOLCOTT: Objection to form.
3 A. I don't have any idea.
4 **Q. (BY MR. BARLOW) Have you reviewed any**
5 **documents from the National Safety Council?**
6 A. Regarding this?
7 **Q. Regarding asbestos hazards.**
8 A. No, I don't think so. Because that's not
9 where I would go for information on asbestos.
10 **Q. Do you know when the National Safety Council**
11 **began publishing papers discussing asbestos as the cause**
12 **of asbestosis?**
13 A. No, I don't.
14 **Q. Do you know whether or not Pontiac was a**
15 **member of the National Safety Council?**
16 A. I don't know.
17 **Q. Can you name all of the articles published in**
18 **the 1940s, which discuss asbestos hazards as it relates**
19 **to petro chemical workers?**
20 A. No, I couldn't.
21 **Q. Can you tell me which articles in the 1950s**
22 **were published, which discussed asbestos hazards to**
23 **petro chemical workers?**
24 A. No. Nor 1960s, nor 1970s, nor 1980s, nor
25 1990s, nor now.

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1 **Q. Are you aware of any articles which discuss**
2 **asbestos hazards to petro chemical workers?**
3 A. I'm trying to think. I know there are papers
4 from refineries, but one would say specifically for
5 asbestos -- well, we mentioned one earlier.
6 Dr. Wright's paper, I think, was a
7 Texaco refinery in which they said that there was a
8 cancer case that they attributed to exposure to
9 asbestos.
10 And I'm sure there were others, but I
11 can't name them all for you.
12 **Q. Would a reasonable refining company in the**
13 **1950s have required that asbestos be wetted before it**
14 **was torn out?**
15 A. Probably not.
16 **Q. What about for the 1960s?**
17 A. Depending on how much material, it might have
18 been. And it would go up the calendar.
19 It would probably be more probable as
20 we go up until certainty.
21 **Q. When would it have been a certainty that a**
22 **reasonable refining company would have required the**
23 **wetting of asbestos being torn out?**
24 A. Well, that would have certainly been when the
25 use of contractors was concerned. But the refinery

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1 would not have been the one to tell them.
2 They would have known that themselves.
3 I don't know. It's kind of hard to put a date on that.
4 **Q. You don't know?**
5 A. I don't know what the certainty date is. But
6 if it were today, it would be done, I think, without any
7 question.
8 **Q. In the 1970s, what would you have done to**
9 **protect workers at the Pontiac facility from asbestos**
10 **hazards?**
11 MR. WOLCOTT: Objection to form.
12 A. Probably not anything different than what
13 they were doing. They very quickly in the early '70s
14 decided to use nonasbestos-containing products.
15 They had contractors come in to remove
16 asbestos. They had contractors come in to replace the
17 asbestos. Probably not a great deal different than what
18 they were doing.
19 **Q. (BY MR. BARLOW) In the 1960s, what would you**
20 **have done to protect employees of Pontiac from asbestos?**
21 MR. WOLCOTT: Objection to form.
22 A. Probably no different than they were doing.
23 **Q. (BY MR. BARLOW) Do you find the EPA's**
24 **position on the asbestos hazard authoritative?**
25 A. I think EPA has been very prone to overreact

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1 with regard to asbestos.
2 **Q. Do you find OSHA's positions on asbestos to**
3 **be authoritative?**
4 A. OSHA's position, I think, has been to be
5 highly protective. In other words, to take lower and
6 lower concentrations simply because it's technically
7 able to do it.
8 I mean, the technology exists that
9 allows people to do it, not that OSHA does.
10 **Q. Do you find OSHA's positions on asbestos**
11 **health issues to be authoritative?**
12 A. Well, obviously, they're authoritative,
13 because they are the rule.
14 But as I said, I think that they have
15 taken a very highly restrictive position that probably
16 isn't necessary.
17 **Q. Maybe this will make it easier. Obviously I**
18 **understand OSHA is the authority, so their position is**
19 **authoritative from a legal standpoint.**
20 **From a scientific standpoint, do you**
21 **find OSHA's positions on asbestos health matters to be**
22 **authoritative?**
23 A. From a scientific standpoint, I think that
24 they have gone beyond what is necessary to protect the
25 health of workers.

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1 **Q. Do you find NIOSH's positions with respect to**
2 **asbestos health matters, to be scientifically**
3 **authoritative?**
4 A. I think OSHA's [sic] original statement with
5 regard to asbestos exposure was irresponsible.
6 **Q. You think NIOSH was irresponsible?**
7 A. Yes. Because they said zero exposure.
8 That's not possible.
9 **Q. Are you aware of any evidence that**
10 **manufacturers of asbestos products hid information about**
11 **asbestos hazards from employers?**
12 A. Hid information from them? I don't have any
13 of that evidence, no.
14 **Q. When should manufacturers have begun putting**
15 **warnings on asbestos products?**
16 A. When did they have?
17 **Q. When should they have?**
18 A. I would say probably sometime after the mid
19 '60s.
20 **Q. Can you be any more specific?**
21 A. Well, after the Selikoff publications
22 probably.
23 **Q. '64?**
24 A. Actually, they weren't published until -- I
25 believe it was '67. And they were not -- as we talked

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about earlier, this was not something that appeared in the "Wall Street Journal" or the "New York Times." And many people probably were not reading the proceedings of the New York National Safety -- what was it? New York National Science Association.

**Q. You don't believe there were any references to the asbestos hazards in the general media prior to 1967?**

A. Not a whole lot, no.

**Q. Are you aware of any?**

A. I could not tell you any, no.

**Q. Is there any type of asbestos fiber which is safe?**

A. Any type?

**Q. Uh-huh.**

A. I think the toxicity varies from chrysotile to crocidolite. Of course, safe and unsafe depends on concentration and the dose that a person receives.

This is the concentration times the length of time that the exposure occurs.

**Q. So is the answer no, there is no safe type of asbestos fiber?**

A. Well, of the ones that are commonly used. There's some rather strange asbestos formulations that I don't know a whole lot about.

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But certainly of the commonly used ones, at some level, yes, they can be harmful. At some dose, they can be harmful.

**Q. What does the scientific literature say that the level of asbestos exposure is when asbestos pipe covering is being torn out?**

MR. WOLCOTT: Objection to form.

A. Asbestos pipe covering?

**Q. (BY MR. BARLOW) Uh-huh.**

A. Once again, it's going to depend on where the job is, how much is being torn out.

I don't think there's any one figure that you can come up with. The job has to be evaluated.

**Q. Have you seen any literature which discusses airborne asbestos levels of insulation tear-out in an outdoor setting?**

A. I don't recall. I know there are studies that show what the levels are outside an enclosure, and they show they are background levels. But other than that, I can't recall any other data.

**Q. When would a reasonably careful refinery have implemented a written respiratory program?**

MR. WOLCOTT: Objection to form.

**Q. (BY MR. BARLOW) With regard to asbestos?**

MR. WOLCOTT: Object to the form.

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A. Well, certainly the 1972 standard had respiratory requirements in it. I don't recall it said it had to be a written program, but it laid out what a program was.

And then, of course, the later standards very specifically talk about a written standard.

**Q. (BY MR. BARLOW) Do you know when Pontiac implemented a respiratory program for asbestos in their plant?**

A. I don't know.

**Q. You don't know? Should the Safety Manager at Pontiac in 1972 have known that the OSHA standards applied to refineries?**

MR. WOLCOTT: Objection to form.

A. I don't know why not.

MR. BARLOW: I think that's as far as I can go now.

(DEPOSITION CONCLUDED AT 3:56 P.M.)

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CHANGES AND SIGNATURE

| PAGE | LINE | CHANGE | REASON |
|---|---|---|---|

I, JOHN A. PENDERGRASS, CIH, CSP, PE, have read the foregoing deposition and hereby affix my signature that same is true and correct, except as noted above.

---------- ----------
JOHN A. PENDERGRASS, CIH, CSP, PE

THE STATE OF ---------- )

THE COUNTY OF ---------- )

Before me, ----------, on this day personally appeared JOHN A. PENDERGRASS, CIH, CSP, PE, known to me (or proved to me under oath or through ----------) (description of identity card or other document)) to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that they executed the same for the purposes and consideration therein expressed.

Given under my hand and seal of office, this

---------- day of ----------, 2001.

---
NOTARY PUBLIC IN AND FOR

THE STATE OF ----------



CAUSE NO. 98-317-G

| | | |
|---|---|---|
| WILMA S. CLARK, Individually and as Personal Representative of the Heirs and Estate of HOWARD HAROLD CLARK, Deceased | ) | IN THE DISTRICT COURT |
| vs. | ) | OF NUECES COUNTY, TEXAS |
| UNION PACIFIC RESOURCES COMPANY, et al | ) | 319TH JUDICIAL DISTRICT |

REPORTER'S CERTIFICATION
DEPOSITION OF JOHN A. PENDERGRASS, CIH, CSP, PE
April 20, 2001

I, Debra Amos Isbell, CSR, RDR, CRR, in and for the State of Alabama, hereby certify to the following:

That the witness, JOHN A. PENDERGRASS, CIH, CSP, PE, was duly sworn by the officer and that the transcript of the oral deposition is a true record of the testimony given by the witness;

That the deposition transcript was submitted on the 4th day of May, 2001 to the witness or to the attorney for the witness for examination, signature and return to me by the 24th day of May, 2001 (20 days);

That the amount of time used by each party at the deposition is as follows:

Alex Barlow, Esq. - 05:08
Craig S. Wolcott, Esq. - 00:00

That pursuant to information given to the deposition officer at the time said testimony was taken, the following includes counsel for all parties of



record:

FOR THE PLAINTIFF, WILMA S. CLARK, INDIVIDUALLY AND AS PERSONAL REPRESENTATIVE OF THE HEIRS AND ESTATE OF HOWARD HAROLD CLARK, DECEASED:
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Craig S. Wolcott, Esq.
HAYS, McCONN, RICE & PICKERING
1200 Smith Street
Suite 400, Two Allen Center
Houston, Texas 77002

I further certify that I am neither counsel for, related to, nor employed by any of the parties or attorneys in which this proceeding was taken, and further, that I am not financially or otherwise interested in the outcome of the action.

Further certification requirements pursuant to Rule 203 of TRCP will be certified to after they have occurred.

Certified to by me this 4th day of May, 2001.

---
DEBRA AMOS ISBELL, CSR, RDR, CRR
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FURTHER CERTIFICATION UNDER RULE 203 TRCP

The original deposition was/was not returned to the deposition officer on ----------, 2001;

If returned, the attached Changes and Signature page contains any changes and the reasons therefor;

If returned, the original deposition was delivered to ALEX BARLOW, ESQ., Attorney for the PLAINTIFFS, Custodial Attorney;

That $906.80 is the deposition officer's charges to the PLAINTIFFS, for preparing the original deposition transcript and any copies of exhibits;

That the deposition was delivered in accordance with Rule 203.3, and that a copy of this certificate was served on all parties shown herein and filed with the Clerk.

Certified to by me this ---------- day of

----------, 2001.

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| 1979-1986 | Developed and Managed Industrial Hygiene Profit Centers |
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AMERICAN INDUSTRIAL HYGIENE ASSOCIATION

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| Member | 1955 - present |
| Board of Directors | 1967 - 1970 |
| Vice President | 1972 |
| President Elect | 1973 |
| President | 1974 |
| Chairman | |
| Institute for Continuing Education | 1976 - 1979 |
| Management Committee | 1979 - 1982 |
| Occupational Health Standards | 1982 - 1985 |

BOARD OF CERTIFIED SAFETY PROFESSIONALS
Director 1974 - 1977

AMERICAN BOARD OF INDUSTRIAL HYGIENE
Director 1981 - 1987

AMERICAN ACADEMY OF INDUSTRIAL HYGIENE
Diplomate 1963 - present
Councilor 1985 - 1987

OCCUPATIONAL HEALTH INSTITUTE
Director 1976 - 1982
Chairman 1982 - 1983

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Director 1971 -1976
Chairman 1976 -1977

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Trustee 1996 - present
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President 1999 - present

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AMERICAN INDUSTRIAL HYGIENE ASSOCIATION 1955 - present
HEALTH PHYSICS SOCIETY 1966 - 1986
AMERICAN SOCIETY OF SAFETY ENGINEERS 1985 - present
AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS 1986 - 1997
ADMINISTRATIVE CONFERENCE OF THE UNITED STATES 1987 -1989
WHITE HOUSE PUBLIC COMMITTEE FOR LIFE SCIENCES 1987- 1989
U.S. CHAMBER OF COMMERCE LABOR RELATIONS COMMITTEE 1994 - 2000

## CERTIFICATIONS AND LICENSES

| | |
|---|---|
| American Board of Industrial Hygiene #517 | 06/28/1963 |
| Board of Certified Safety Professionals #414 | 12/14/1970 |
| Professional Engineer, California #2757 | 01/17/1978 |

## PUBLICATIONS IN

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION JOURNAL
AMERICAN PUBLIC HEALTH ASSOCIATION JOURNAL
JOURNAL OCCUPATIONAL HEALTH AND SAFETY
INTERNATIONAL ENCYCLOPEDIA OF OCCUPATIONAL HEALTH & SAFETY
SAMPLING AND ANALYSIS OF TOXIC ORGANICS IN THE ATMOSPHERE
ASTM 721 CHAPTER AUTHOR
LABOR LAW JOURNAL
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INDUSTRIAL HYGIENE MANAGEMENT - CHAPTER CO-AUTHOR
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## AWARDS

AIHA DONALD E. CUMMINGS MEMORIAL AWARD 1990
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## SPECIAL PROJECTS

United States Information Agency Occupational Health and Safety lecture tours:

1990 Brazil and Argentina
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PLAINTIFF'S EXHIBIT
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# 5

# Chronology of Asbestos Regulation in United States Workplaces

## STANDARDS

The term "regulation" implies an authoritative rule with force of law issued, policed, and enforced by government. In this sense, the history of federal regulation of asbestos in workplaces in the United States is relatively brief. For practical purposes, there was none until the Occupational Safety and Health Act became effective on August 27, 1971.[1]

The word "standard" connotes a uniform rule set up by established usage which is widely recognized as acceptable, in this context, to avoid injurious exposure to airborne asbestos dust. This term comes closer to describing pre-1971 efforts in the United States to control exposure to asbestos in workplaces. The term is used here to relate the history of such efforts, notwithstanding that history itself often contradicts familiar connotation of the word "standard," i.e., uniformity, established, usage, wide recognition, and acceptable.

In addition to the recognition of a particular risk sought to be avoided, the development of a standard also presupposes the existence of some acceptable information about the perceived cause of the risk and where and among what groups it is likely to appear. Major scientific and medical reports that influenced the development of asbestos standards in this manner are also identified. As will be seen, uncertainties and confusion in this area delayed and sometimes even retarded development of effective standards in the United States. Medical research into the etiology of asbestos disease—a prerequisite to effective standards—is still incomplete, confounded by the long latency periods involved and the fact that medical research did not begin in earnest until the present epidemic was already at the doorstep.

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Standards are also a reflection of changing social concern, values, and priorities often methodically articulated step by step in court decisions. Today, the courts have squarely placed responsibility for conducting the safety research necessary for effective standards upon those who market and profit by the distribution of utilitarian but potentially dangerous products. Although the rule has been applied retroactively to suppliers of asbestos products, it had no effective role in development of asbestos standards as opposed to removal of the offending products from the workplace.

If asbestos is the example, standards are regrettably no longer an acceptable substitute for regulation and the financial and philosophical commitment required to police and enforce them. Safety in the workplace cannot be left to inevitably overly optimistic risk assessment, conflicting financial considerations, assumptions that reliable medical and scientific information will be available when needed, or assumptions that government's imprimatur is a guarantee of safety.

It is important to point out, however, what standards and regulations are *not* and cannot be. Whether standards represent the customary methods of conduct or government-approved conduct, compliance does not guarantee safety or is it a conclusive standard by which reasonableness is ultimately gauged in litigation. An early case in point was decided by the Supreme Court of Pennsylvania in 1945.[80] The case arose out of the death of a 33-year-old mother of two children who died from inhalation of carbon tetrachloride fumes after using a cleaning product marketed as "Safety-Klean." The product label contained the word "Caution" and the admonition "Do not inhale fumes. Use only in well ventilated place." Other manufacturers of carbon tetrachloride used a similar label, which was approved by the surgeon general of the United States. Notwithstanding, the court held that the conspicuous display on the container of the words "Safety-Klean" would naturally lull users into a false sense of security, that this might reasonably have been foreseen by the defendant, and hence that it was liable for the woman's death.

Another apt example is represented by the case of a plaintiff who worked for 21 years in the employ of a manufacturer of building materials containing cement, asbestos, and silica.[81] His employer required all employees to wear protective respirators and filters. Before dying of asbestosis, the employee brought suit against the supplier of the respirators and filter apparatus used in the plant, which had the approval of the United States Bureau of Mines. The defendant, which designed and manufactured the respirator apparatus, defended itself on the ground that the apparatus passed all tests for various dusts conducted by the Bureau of Mines and met all standards outlined by industry publications. Since it was in compliance with the "state-of-the-art" and government standards, argued the manufacturer, it could not be liable for the plaintiff's death. Actually, the testing standards formulated by the Bureau of Mines did not involve asbestos particles and, according to the court, the jury properly concluded that the customary practices and standards of the entire respirator and filter industry were defective for failure to test with asbestos particles.

Asbestosis was the first occupational risk eventually subject to imposition of standards in the workplace. Indeed, as will be seen, the carcinogenic potential of asbestos was not regulated until the last decade and is still incomplete.

## EARLY YEARS (PRE-WORLD WAR II)

The identification of asbestosis as an occupational disease is attributed to H. M. Murray in 1906.[71] Murray reported a case of pulmonary fibrosis in a male asbestos worker in Britain. Murray first saw the worker in 1899 when the worker was 33 years of age and already had suffered 14 years of asbestos exposure, for the most part, as a card room hand. Murray's patient reported that he was the only survivor among 10 others working in the card room when he began. The others died at about 30 years of age. Obviously, the work environment must have been deplorable—probably much worse than those described in some detail below in an Indiana plant during the 1930s.[66]

W. E. Cooke published the second report of a case of asbestosis in 1924.[32] Cooke's was the first case generally reported to the medical press. Cooke confirmed a case of asbestosis in a 33-year-old female with an 18-year history of asbestos exposure, which was "intermittent" during the last 5 years "owing to periods of ill health."

### 1918: Investigation Urgently Needed

The first report in the United States of any historical significance was in 1918, when the Labor Department published a report by Frederick L. Hoffman, then vice president of Prudential Life Insurance Company of New York.[39] Hoffman reported that asbestos mining and processing "unquestionably involved a considerable dust hazard." Since American and Canadian life insurance companies routinely declined to insure asbestos workers, there was an absence of mortality experience data and reporting on hygienic aspects of the industry. Hoffman thought this "regrettable" and reported in 1918 that an extensive investigation of the health aspects of asbestos manufacture was urgently needed.

### Labor Department Guide

About the same year as Hoffman's report, the United States Bureau of Labor Standards published the first edition of a guide to occupational hazards and diagnostic signs. Copies of both the first edition (published about 1918) and the second edition of the guide, published in 1922,[76] are unavailable. The second edition was apparently republished, however, in 1922, in the *United States Naval Medical Bulletin*, where it is attributed to Lewis I. Dublin, Ph.D., statistician, Metropolitan Life Insurance Company, and Phillip Leiboff.[103] The guide identified "asbestos workers" as an occupation that "offered" exposure to asbestos, "which definitely produces a lung fibrosis under *existing* industrial conditions." The guide set forth diagnostic signs and recommended safe work practices, i.e., *standards*, including wetting, exhaust systems, confinement, and air-fed helmets.

### 1931: U.K. Regulations

In 1930, Merewether estimated the population at risk of asbestosis in the United Kingdom to be 2200, consisting entirely of persons handling predominantly asbestos.[69] Processes involving fabrication of articles made from asbestos

cloth, on the other hand, were thought not to create a risk because exposure to asbestos dust in such processes was, by comparison, "negligible."

Responsive to Merewether's report, the United Kingdom enacted the Asbestos Industry Regulations of 1931, pursuant to the Factory and Workshop Act of 1901.[38] The regulations became effective March 1, 1932. By contrast, the authority in the United States to promulgate government regulations was withheld until nearly 40 years later.[11] Even then, there was resistance, as described below.[10]

The regulations applied to factories and workshops involved in manufacturing asbestos textiles and insulation slabs or sections; making or repairing insulating mattresses; breaking, crushing, disintegrating, opening, and grinding asbestos; mixing or sieving asbestos and all incidental processes; sawing, grinding, turning, abrading, and polishing dry articles composed of asbestos; and cleaning any chamber, fixture, or appliance for the collection of asbestos dust produced in any such process.

Merewether's cohort included 363 of the longest exposed workers, of whom 95 were determined to have fibrosis; 21 others were classified as prefibrotic due to asbestos exposure. Merewether believed that only workers exposed to very high concentrations for very long periods of time were at risk.[46] Accordingly, the Asbestos Industry Regulations of 1931 specifically exempted factories or workshops where the regulated processes were carried on only occasionally and no person was employed therein for more than 8 hours in any week.[39]

For sake of comparisons, the exempted "dose" can be quantified (without adjustment for clearance). Assuming dust concentrations in the regulated process were 5 million particles per cubic foot (the equivalent of about 175,000 particles per liter) and that 4 to 7 liters of air are inhaled per minute by the normal adult *(at rest)*,[34] the total exempted, i.e., *safe*, "dose" over a working life (8 hours per day, 40 hours per week for 30 years) was about 4.5 trillion particles. A shipyard tradesman working about 10 percent of the time alongside insulators installing products containing about 15 percent asbestos[47] would inhale only about 7 billion particles or less than 1 percent of the "safe" dose.

The 1931 regulations imposed upon employers responsibility to provide exhaust ventilation at the source to prevent the escape of asbestos dust into the ambient air, segregation of particularly dusty processes, and good housekeeping. Use of "a breathing apparatus" in certain operations and suitable overalls and head coverings for persons employed "in the cleaning of dust settling and filtering chambers" were also required. The regulations prohibited employing children in certain processes and required that records of required periodic inspections and tests of ventilation equipment be maintained.

The regulations not only compelled compliance from industry, but *employees* were explicitly required to wear prescribed overalls and head coverings and to wear and make proper use of the breathing apparatus provided.

In large part, the British regulations simply paralleled the standards already urged by the United States Department of Labor. In 1933, the Bureau of Labor Standards published the third edition of its guidebook.[77] The guide set forth diagnostic signs and recommended precautions, including wetting, exhaust systems, confinement, and air-fed helmets. The Department of Labor's report expressed indebtedness to Dr. Anthony Lanza, then assistant medical director,

Metropolitan Life Insurance Company, for reviewing the entire manuscript. Lanza was at the time engaged in dust studies of his own.[65]

### 1934: "Asbestosis a Thing of the Past"

A year later, in 1934, Wood and Gloyne published in England a report reflecting the degree of false confidence that accompanied the new regulations.[112] Reporting on 100 cases reviewed, the authors observed that "the picture of pulmonary asbestosis is that of a pneumoconiosis occurring in a factory in which *few precautions* had been taken to protect the workers from a danger, the gravity of which was not realized. Happily these conditions are now a thing of the past and elaborate precautions have been taken to protect the workers. There is thus good reason to believe that the disease is now under control, [although, because of the latency period] it seems probable that workers exposed to the dust under the old conditions will continue to present themselves for examination for some time to come."

Amid such optimism, there was a harbinger of things to come. One of the 100 cases reviewed by Wood and Gloyne involved a middle-aged boiler/riveter who had served his apprenticeship as a youth in a shop where asbestos was used for *lagging pipes*. The same year, Elman, in a discussion of the difference of opinion on whether tuberculosis was a serious superadded risk to asbestotic patients, mentioned finding tubercle bacilli and *early-state asbestosis* in a patient "exposed to asbestos dust for ten years; but the work, which consisted in coating lead pipes, did not entail exposure to high dust concentrations."

### 1935: American Industry Exhorted to Sponsor Studies

The next year, 1935, the Public Health Service published Dr. Anthony Lanza's report of an investigation of dust conditions in asbestos mines and primary-products manufacturing plants during the period 1929–31.[65] One hundred and twenty-six workers with 3 or more years' exposure had been selected at random for physical examination and x-ray. Sixty-three were diagnosed as first-degree asbestosis, and 4 were diagnosed as second-degree asbestosis. Lanza concluded that prolonged exposure to asbestos dust causes pulmonary fibrosis but that "dust standards are impracticable as yet." Lanza recommended that "the industry seriously face the problem of dust control in asbestos plants" and "sponsor studies."

Pertinent research at the Saranac Laboratory was initiated in November 1936, when 9 primary-products manufacturers agreed to underwrite experiments with asbestos dust[66] to be conducted by Dr. Leroy U. Gardner, director of Saranac Laboratory from 1936 until his death in 1946, when he was succeeded by Arthur Vorwald, who resigned in July 1953.[107]

### Walsh-Healey

The same year Lanza exhorted the industry,[65] the Walsh-Healey Public Contracts Act was enacted.[109] The act required that contracts entered into by any agency of the United States government for the manufacture or furnishing of

materials, supplies, articles, or equipment in an amount exceeding $10,000 contain, among other provisions, the stipulation (i.e., contractually binding promise) that "no part of such contract may be performed nor will any of the materials, supplies, articles, or equipment to be manufactured or furnished under said contract be *manufactured or fabricated* in any plants, factories, buildings, or surroundings or under working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees engaged in the performance of said contract."

Ostensibly, the federal government had exercised the financial leverage of its vast procurement programs by fiat to require its contractors and subcontractors to provide decent working conditions. The Congress's faith in the simple power of a clear expression of its intent was misplaced.

Walsh-Healey became effective on June 30, 1936. It suffered deficiencies in three areas: effective penalties, standards, and surveillance. The efficacy of Walsh-Healey, therefore, was dependent upon the willingness to impose the prescribed sanctions, the effectiveness of state regulation, and the surveillance mechanisms. Any of the three factors would have sufficed to make Walsh-Healey ineffective; as it was, these three factors combined to make Walsh-Healey hardly worth mention in a history of federal regulation.

Walsh-Healey provided that compliance with the safety, sanitary, and factory inspection laws of the state in which the work was to be performed was *prima facie* evidence of compliance.

The only penalty for Walsh-Healey violations was to blackball the offending government contractor. Ironically, the sole Walsh-Healey sanction was unthinkable to exercise at the most crucial moment, during the large-scale naval construction beginning in 1939 and resulting in what has been estimated to be half the exposures to asbestos currently in litigation.

The efforts of the federal government in administering Walsh-Healey were diluted not by the competence or dedication of those involved but by the lack of money and staff to carry out the program. As a result, companies with federal contracts often had worse safety records than others.[41]

It is beyond the scope of this chapter to explore all of the applicable state laws at the time Walsh-Healey was enacted. For sake of example, however, the law of Indiana, one of the "self-policing" jurisdictions under Walsh-Healey, is instructive.

The Factory Act of Indiana of 1933 required that exhaust fans of sufficient power be provided to carry off dust from emery wheels, grindstones, and dust-creating machinery in establishments where used. The act further provided that "there shall be sufficient means of ventilation provided in each workroom of every manufacturing or mercantile establishment." The Indiana law required employers to provide respiratory protection from men required to work in any enclosed room where "there may be accumulations of dangerous, noxious or deliterious gases" but the act contained no comparable provision for *dust*.[86]

### Factory Conditions in 1930s

An example of the conditions that prevailed in Indiana during this period are documented in the report of a judicial decision.[86] The plaintiff had been regularly employed by the defendant from 1930 to 1937. The room in which he worked was

60 feet by 40 feet and was used, among other things, as a storage room for bales of asbestos. The asbestos material was stacked to the ceiling and in front of the windows, which were kept closed so that the asbestos material would keep dry and therefore "work better." A small space left between the stacks of asbestos was reserved for two machines used to cut and pulverize asbestos material, an operation that caused "an enormous amount of dust." The plaintiff worked at this job 8 hours each day for 8 years.

The dust was so thick at times that from a distance of 20 feet, one could not recognize who was operating the machine. The plaintiff, at the end of a day's work, was almost beyond recognition, covered with shreds that hung on him like whiskers, so that he looked like a "polar bear."

Respirators were provided to the plaintiff. The evidence at trial was contradictory as to whether he wore them. Some co-employees testified that the plaintiff wore the masks all the time; others testified that they had seen him when he was not wearing the mask. In any event, the instruction card accompanying one of the respirators provided to the plaintiff said that it would *not* keep out the fine asbestos particles. Another form of mask provided by the defendant did not fit the plaintiff's face and left large spaces for dust to enter.

Two very important events occurred in the year following the plaintiff's departure from this plant, permanently disabled with asbestosis.

### 1938: ACGIH Formed

In 1938, a new organization was formed in Washington, D.C. Its purpose was to promote industrial hygiene and sanitation, coordinate such activities of official federal, state, local, and territorial organizations, encourage the interchange of experience, and collect and make accessible pertinent information.[31] Chartered in June 1983 as the National Conference of Government Industrial Hygienists, the organization has since 1946 become well known as the American Conference of Government Industrial Hygienists (ACGIH).[30]

On the program of the ACGIH's first meeting was a demonstration of field studies of the asbestos textile industry. Recent developments in apparatus for measuring atmospheric dust were demonstrated, and there was a discussion of the pathology of pneumoconiosis and experimental dust studies.[3]

### 1938: Dreessen's "Tentative" Textile Plant Standard

Also in 1938, W. C. Dreessen published an important study of asbestosis in the asbestos textile industry.[35] The Public Health Service had been requested to assist the North Carolina State Board of Health in carrying out engineering and medical studies of health hazards in the asbestos textile industry, which then employed about 6000 people in 60 plants. Unfortunately, just prior to the survey, the plants discharged 150 workers suspected of having asbestosis.

The investigators concluded that "because clean-cut cases of asbestosis were found in dust concentrations exceeding 5 million particles per cubic foot," 5 million particles per cubic foot "may be regarded tentatively as the threshold value for asbestos dust exposure until better data becomes available."

Dust counts were made by the impinger method, and a chemical analysis of

dust samples was undertaken to identify the sample content: greater than 8 percent Canadian crysotile asbestos.

In 1940, then-retired Assistant Surgeon General Dreessen presented a pape entitled "Pneumoconiosis Due to Certain Silicants" to the third annual meeting o the ACGIH.[4] Dreessen reported that in 1938 the United States Public Healt Service published the results of a study of asbestosis among 571 asbestos textil workers. "The true incidence of the disease could not be determined because o an excessive labor turnover antedating the study," Dreessen reported, perhaps charitably. On the basis of detailed analysis of engineering and medical findings, Dreessen reported his conclusion that 5 million particles per cubic foot could be regarded tentatively as a *threshold value* for asbestos dust exposure. Cases of asbestosis were found in dust concentrations exceeding that level, but no clean-cut cases were found in lower concentrations.

### 1941: New Labor Department Guidance

In 1941, the Department of Labor completely revised its 1933 guidebook.[78] Contributions from the Metropolitan Life Insurance Company and others were acknowledged. This publication recites that "asbestosis may cause disability, and a few fatal cases have been recorded, but in the cases showing marked disability, other organic disease is usually also present." Nonetheless, ventilation was added to the list of recommended controls. The list of occupations thought to offer harmful exposure included carders, crushers, miners, spinners and weavers, and "asbestos-products workers." It is unclear but doubtful that insulators were within the intended meaning of the term "asbestos-products workers." More likely, the term referred to workers in primary-products manufacturing plants since, for example, the list of potentially endangered workers included "brake-lining makers" but not mechanics, i.e., brake-lining installers.

## WORLD WAR II

### U.S. Shipyards, 1939–45

World War II began in Europe on September 1, 1939, when Germany invaded Poland. On September 8, 1939, the president of the United States proclaimed a state of national emergency. The toll of enemy submarine activity against United States shipping between 1939 and 1943 was 19.4 million tons sunk;[93] losses in 1942 exceeded new construction. The need to build vessels faster than they were being sunk and to meet commitments under Lend Lease resulted in enormous new construction,[95] as shown in Table 5-1. A grand total of 124,850 vessels, including 1207 combatant vessels, were delivered during the period 1940–45.[96]

Because of the government's efforts to increase ship construction during World War II, the number of shipyard workers increased tenfold, from 177,300 in July 1940 to a peak of 1.89 million in July 1944.[93] This is indicated on Table 5-2. Because of the rapid turnover in shipyard employment, it is estimated that 4.5 million workers were employed in shipyards during World War II.[92]

**Table 5-1**
All Vessel Deliveries July 1, 1940–June 30, 1945

| | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|---|
| Navy | 196 | 1,654 | 11,257 | 31,076 | 45,125 | 15,149 |
| Maritime | 33 | 105 | 760 | 1,949 | 1,786 | 697 |
| Army | | 382 | 1,722 | 6,784 | 4,825 | 535 |
| Coast Guard | | | 65 | 140 | 39 | 4 |
| Office of Defense Transportation | | | | 407 | 140 | 547 |
| Lend Lease | | | 131 | 340 | 5 | 476 |

Data from Shipbuilding Policies of the War Production Board, January 1942 and November 1945, Historical Reports on War Administration, Special Study No 26, April 15, 1947, p 200.

## 1941: No Asbestosis in Shipyards

In 1941, the Navy identified asbestosis as a potential occupational disease hazard among workers engaged in the manufacture of asbestos insulating covers for flanges, valves, and high-temperature steam turbines.[21] A medical survey of workers in the pipe insulating shop at the New York Navy Yard, however, with maximum exposure of 17 years, found no cases of asbestosis. Similar findings were reported from two other yards.

**Table 5-2**
Employment in U.S. Shipyards July 1940–June 1945

| | Total | U.S. Navy Yards | Private Yards |
|---|---|---|---|
| July 1940 | 177,300 | 74,800 | 102,500 |
| January 1941 | 255,500 | 107,800 | 147,700 |
| July 1941 | 380,000 | 146,100 | 233,900 |
| January 1942 | 588,700 | 192,700 | 396,000 |
| July 1942 | 1,038,600 | 246,000 | 792,600 |
| January 1943 | 1,478,900 | 294,600 | 1,184,300 |
| July 1943 | 1,720,500 | 333,100 | 1,387,400 |
| January 1944 | 1,682,600 | 326,000 | 1,356,600 |
| July 1944 | 1,887,400 | 326,200 | 1,561,200 |
| January 1945 | 1,446,929 | 326,538 | 1,120,391 |
| June 1945 | 1,139,822 | 315,735 | 824,087 |

Data from Saipbuilding Policies of the War Production Board, Janaury 1942 and November 1945, Historical Reports on War Administration, Special Study No 26, April 15, 1947 p 159.

## 1942: First Walsh-Healey Standards

On March 2, 1942, Walsh-Healey promulgated its first standards, "Bas Safety and Health Requirements for Establishments Subject to Walsh-Heal Public Contracts Act."[15] These represent the federal government's first offic promulgation of dust standards.

Adequate ventilation was to be provided in all workrooms, buildings a places of employment. Special precautions were admonished to be taken workplaces where toxic or other explosive gases, dusts, or highly volat materials were used. Harmful atmospheric contaminants such as dusts, vapor gases, fumes, sprays, or mists, created or disseminated in workrooms, quantities injurious to workers, were required to be reduced or otherw controlled at the point of origin by local exhaust, to prevent harmful materia from passing through the breathing zone of the workers. Where this wa impracticable, the operation or process producing the harmful contaminant wa required to be enclosed or isolated to prevent contamination of the workroom. I addition, the operator or others required to enter the enclosed or isolated are were to be provided with and required to wear suitable United States Bureau Mines—approved respirators or masks when exposed to the harmful contaminant

## Navy Shipyard Health Program: 1943–45

In July 1942 the Navy Department, in cooperation with the Maritim Commission, agreed to sponsor a joint project in which the shipbuilding industr would be surveyed to assess accident prevention and control of industri diseases. Dr. Philip H. Drinker, professor of Industrial Hygiene, School of Publ Health, Harvard University, was secured on a consulting basis to make the healt survey of shipyards.[64]

Philip Drinker spent 42 years at the Harvard Medical School in the School o Public Health. He was the inventor of the "iron lung" in 1929 and became a worl authority on industrial dust.[19] His prior work had been with mining and manufac turing firms, and he had never before had anything to do with shipyards.[81]

According to his biography, *Family Portrait*, by his sister, Katherine Drinke Bowen, in the course of his work he encountered miners who did not like to wea masks and did not like wet drilling procedures that eliminated dust. Drinker ha to convince the men, and the labor leaders, that he did not want to shut dow mines and factories or see workers forfeit their bonuses when hazardous job were made less hazardous. Factory owners too were suspicious, fearful of being forced to spend money for improvements but, on the other hand, fearing lawsuits brought by injured workers.

To assist Dr. Drinker, the United States Navy Department made available the services of two physicians from the Navy Medical Corps and four engineers from the Naval Reserve. The two Navy physicians loaned to Dr. Drinker were from the Norfolk and Philadelphia naval shipyards. Once the program was under way, one physician was stationed on the East Coast and the other on the West Coast According to Drinker, there were too few doctors "for reasons that you are al familiar with and reasons which perhaps are not within our control." (i.e., the war).[81]

The four ensigns were graduate engineers and chemists who had specialized

in industrial hygiene and ventilation. One had been a sanitary engineer for the state of Illinois for 5 years, another had been in practical air-conditioning work, a third had been an industrial hygiene engineer for the Commonwealth of Massachusetts for 3 months, and the other had been a chemist in special work in the Department of Agriculture.[61]

The initial survey included 20 shipyards.[37] The visits varied from 1 to 3 days. In some shipyards surveyed, it was found that there were as many accidents reported in a month as there were employees in the shipyard.[64] It became evident, as a result of the surveys, that there was a decided lack of knowledge on how to prevent accidents in the shipbuilding industry. Problems came up that Drinker could not answer; he said at a meeting in New York in November 1942, "We are under no [illusions] that we have got all the answers. We know we have not."[61]

There were no standards for comparison. The mushroom growth of the industry and the constant demand for increased production apparently blinded some shipyard executives to the fact that by not controlling their accidents, they were actually hampering their production rate. It was determined that "minimum requirements for safety and industrial health in contract shipyards" should be established. The health and safety consultants drafted such standards by November 1942.[64]

## Minimum Requirements

On December 6 and 7, 1942, representatives of 90 percent of the shipbuilding industry attended a conference in Chicago to discuss the requirements and suggestions for change, correction, and elimination of the conditions reported by Drinker.[64] The proposed minimum requirements were approved by the Navy Department on January 20, 1943, and by the Maritime Commission on February 9, 1943. Before being signed by Frank Knox, secretary of the Navy, and E. D. Land, chairman of the Maritime Commission, an introduction was added stating that "each contractor is hereby given notice that the Navy Department and the Maritime Commission will expect full and complete compliance with the minimum standards."[64,70]

The "Minimum Requirements for Safety and Industrial Health" identified "any job in which asbestos dust is breathed" as a source of risk to asbestosis, e.g., handling, sawing, cutting, molding, welding rod salvage. The Minimum Requirements recommended segregation of dusty work, special ventilation, use of respirators, and periodic medical examinations.[70]

Administration of the requirements was delegated to the regional health consultants of the Maritime Commission in Washington, Philadelphia, Chicago, New Orleans, and Oakland, but they were given no authority "to compel either Navy or Maritime contractors to comply with any of the provisions of the minimum requirements."[64]

In March 1943 Drinker wrote that the health and safety problems confronting him were "comparatively simple" but that the overwhelming percentage of "green" employees made his job more difficult. Further, he said, "the pressure to turn out ships is great—it should be, for the need is urgent—and often we must condone practices that we would not accept in peacetime."[36]

On March 4, 1943, the Navy Department issued a directive to its contracting

officers requiring them to secure compliance with the minimum requirements whenever submission of recommendations by the safety and health consultants did not prove effective.[64]

On August 30, 1945, the program was terminated by H. L. Vickery, commissioner of the Maritime Commission.[104]

Still, however, there was no specific measure or "standard" to determine what constituted "harmful" dust concentrations outside the asbestos textile industry.

## Textile Plant Data Inapplicable to Shipyards

In 1946, Fleischer et al. reported that there was no established figure for permissible or safe dustiness in pipe-covering operations, saying that the asbestos textile industry data was not applicable.[52]

The 1946 Fleischer-Drinker report was based upon chest x-rays of pipe coverers at four shipyards and surveys of working conditions there during the war.[52] This work included some of the best dust counts done during the period.[80]

Dreessen's engineering and medical studies in an asbestos textile plant reported in 1938, included chemical analyses of settled dust samples demonstrating that the total asbestos content was more than 80 percent. Dreessen also undertook to determine the length of inhaled asbestos fibers that reached the lungs and determined that only particles longer than 10 μm reached the alveoli. Fleischer and Drinker recognized that these data were not applicable to asbestos pipe covering, which involved intermittent cutting of finished products containing as little as 15 percent asbestos.

## Total Dust versus Asbestos Fiber Controversy

Drinker's team measured the total dust particles, but it also looked at the actual number of asbestos fibers contained in the samples. The "general room" dust counts in the pipe-covering shop of two private shipyards were reported, for example, as provided in Table 5-3.

**Table 5-3**
Dust Counts (million particles per cubic foot)

| | Total Dust | | Asbestos Dust | |
|---|---|---|---|---|
| Operation | Range | Average | Range | Average |
| General room | | | | |
| Shipyard C* | 9.0–21.6 | 14.2 | 0.34–1.7 | 0.8 |
| Shipyard D† | 3.9–10.9 | 6.0 | 0.0–0.05 | 0.02 |

Data from Fleischer WE, et al: A health survey of pipe covering operations in constructing naval vessels. Ind Hyg Toxicol 28:9–16, 1946. (Shipyard B was the US Navy Yard Brooklyn, NY; Shipyard A was the US Navy Yard, Boston.)
*New York Shipbuilding Corp., Camden, NJ.
†Bethlehem Steel Co Fore River Yard, Quincy, MA.

Fleischer and Drinker assumed that asbestosis results from breathing asbestos fibers of relatively long length, such as 15 to 75 μm. Based on an investigation published by Lanza in 1935,[63] they assumed that "chopped-up" asbestos fibers of 1 or 2 μm were inert (in fact, they may actually be cleared more readily than long fibers[33]). Therefore, they concerned themselves with the presence in air of asbestos fibers (defined as particles with a length-to-width ratio of three or greater[33]), which could be seen as such under low power of an ordinary microscope.[52]

Fleischer and Drinker's asbestos fiber counts can be converted to contemporary measurements. A concentration of 6 million particles total dust per cubic foot was found to be equivalent to 0.2 million fibers greater than 15 microns per cubic foot (Table 5-3). There are 28,300 cubic centimeters in one cubic foot and 0.2 million fibers is 20,000 fibers; 20,000 fibers per 28,300 cubic centimeters is 0.7 fibers greater than 15 microns per cubic centimeter.

Such results, compared to the data reported by Dreessen (that asbestos dust concentrations below 5 million particles per cubic foot were safe),[35] were reassuring but deceiving in two respects. First, no firm conclusions are justified today concerning whether or not, as Fleischer and Drinker assumed, fibrogenicity (or, for that matter, tumorigenicity) becomes negligible below 15, 10, 5, or even 1 μm. In fact, it has been suggested that the medium-length fibers that are apt to be deposited in the respiratory passages above the alveoli may contribute most to carcinoma.[94]

Even if their assumptions about fiber length had been correct, modern electron microscopy has revealed that most airborne asbestos fibers are very small in diameter—hundredths to tenths of a micron, even when many microns long—and could not have been collected by Fleischer's instruments or, if they were, would not have been visible by the microscopic techniques available to him.[94,14]

### 1945: Shipyard Pipe Covering Not Dangerous

In any event, finding only 3 cases of asbestosis among 1074 pipe coverers in shipyards, Fleischer and Drinker concluded that pipe covering was *not* a dangerous occupation.[33]

### Unpublished Data from Saranac

In fact, investigators at Saranac Laboratory in New York, doing research for the asbestos industry,[63] had also reported to their sponsors in 1943, based upon animal experiments, that short fibers, i.e., under 3 microns, were practically inert and that the longer fibers, i.e., 20–50 microns, cause fibrosis. The Saranac scientists cautioned that, on account of this, standard impinger dust counts were deceptive because the impinger method detected largely inert granular particles and not the etiologically significant longer fibers. Accordingly, Saranac recommended use of an electrostatic precipitator. In addition, Saranac advised that the "tentative" and frequently quoted standard of 5 million particles per cubic foot (mppcf) was likewise unreliable because it was based upon sampling done with a standard impinger.[53]

### Further Dust Studies Recommended

In 1947, the Industrial Hygiene Foundation of America furnished to the Asbestos Textile Institute (ATI) a report of a preliminary dust investigation of the asbestosis problem in textile plants of members of the ATI.[38] The investigators cautioned that the United States Public Health Service (USPHS) studies in North Carolina plants[33] did not permit complete assurance that 5 mppcf was actually safe. Eighty to 95 percent of the total dust seen in dust counting consisted of nonfibrous particles. In effect, the correlation studies of the USPHS had only related incidents of asbestosis to the number of nonfibrous particles of a size ranging from 1 to 5 or 10 μm in length. Since it was possible that the fibers of other shape or size were the causative factor involved, the Industrial Hygiene Foundation recommended further dust studies.

### 5 mppcf "Asbestos" Was Applied Standard

It has been stated that the standard extant during this period was 5 million particles per cubic foot total dust (background dust and asbestos dust), not 5 million particles per cubic foot asbestos dust.[69] Likewise, it is contended that excursions above this level are *prima facie* evidence of neglect in the shipyards.

The first ignores practicality. About 9 months before Pearl Harbor, Admiral McIntyre of the Medical Group of the Navy, had asked Harvard and Columbia if they would provide short training courses for health work to a selected group of doctors and engineers and chemists. Both universities agreed. Drinker taught courses of 3 months' duration.[81] The men who went through his course applied his methods in the shipyards; through such widespread and uniform use, they were the standard.

The second concept is belied by the ACGIH's own principles and intent and by the records of the state agencies that adopted the ACGIH recommendations.

In 1946, at the eighth annual meeting of the ACGIH in Chicago, the ACGIH adopted a report of the Committee on Threshold Limits setting forth allowable concentrations of air contaminants. The list included a standard of 5 million particles per cubic foot of air, standard light field count, for asbestos.[2] All of the values adopted were compiled from lists published by the American Standards Association and by Warren Cooke in *Industrial Medicine*, volume 14 (1945). Many of the values had already been in general use by members of the conference for several years.[2]

### Goal of Threshold Limit Values (TLVs) and Maximum Allowable Concentrations (MACs)

Dr. W. G. Frederick, an assistant chemical engineer from Detroit and chairman of the Committee on Threshold Limits, which included Drinker of Harvard University, explained the "considerable difficulty" of fixing satisfactory values for maximum allowable concentrations (MAC) of chemicals in respirable atmospheres.[2] In part, the difficulty was attributable to lack of a uniform definition of the maximum allowable concentration concept.

One concept was that the MAC value should represent, as accurately as possible, that concentration to which a worker could be exposed for a given

period of time and still escape physiologic or organic injury and occupational disease. A second concept was that the MAC should represent some fraction of that concentration that would injure the worker in order to allow a margin of safety in the design of protective equipment and guard against possible synergistic effects in the case of multiple exposures. A third concept was that the MAC should perform the function of the former concepts and, in addition, provide a work environment free of objectionable but noninjurious concentrations of smokes, dust, irritants, and odors.

There was no meeting of the minds as to which, if any, of these goals the 5 million particles per cubic foot standard for asbestos was thought to achieve.

## POST-WORLD WAR II

### State Practices

On November 7, 1946, J. J. Bloomfield, assistant chief, Industrial Hygiene Division, United States Public Health Service, presented to the Industrial Hygiene Foundation of America a paper entitled "Codes for the Prevention and Control of Occupational Diseases."[17] At that time, only 35 states promulgated rules and regulations. In 17 of the states, published MAC values had legal status, whereas in the other 18, they were merely suggested guides. Seventeen states had an MAC for asbestos reported by Bloomfield, as provided in Table 5-4.[17]

In 1948, the states were polled for information relating to laws and regulations for the control of dust in industry.[100] Of 43 responding states and territories, 11 had no "regulation" (Arizona, Arkansas, Indiana, Kansas, Maine, Maryland, Mississippi, New York, North Dakota, South Dakota, and Vermont). Eight had a specific TLV for asbestos of 5 million particles per cubic foot (Arkansas, Massachusetts, New Hampshire, New Jersey, Ohio, Oregon, Wisconsin, and Hawaii). The 23 remaining respondents all adopted or used the ACGIH standard.

Johnstone's 1948 text, *Occupational Medicine and Industrial Health*, stated that the allowable concentration of asbestos dust was 10 mppcf, twice the ACGIH standard, although an appendix adapted from the Division of Industrial Safety in

**Table 5-4**
Maximum Allowable Concentration (MAC) Values for Asbestos for which Good Agreement Exists

| Toxic dusts and fumes M g/M† | | | |
|---|---|---|---|
| Number agreeing | Number disagreeing | Percent agreeing | MAC (ppm)* |
| 17 | 0 | 100 | 5‡ |

Data from Bloomfield JJ: Codes for the Prevention and Control of Occupational Diseases, in Transactions of the Eleventh Annual Meeting of Industrial Hygiene Foundation of America, November 7, 1946, pp 71–79.
*Parts of substance per million parts of air by volume.
†Milligrams of substance per cubic meter of air.
‡Millions of particles of substance per cubic foot of air.

the state of California (with few exceptions, identical to those used by other states) stated that the "suggested MAC" for total dust was 50 million particles per cubic foot but for asbestos dust was 5 million particles per cubic foot.[96]

The apparent contradiction exposes Johnstone to criticism. It is relatively clear, however, that he did not err. The MAC of 5 million particles was for asbestos 0.5 to 10.0 μm in length. The 10 million particles standard was reported as "allowable" for particles between 0.5 and 5.0 μm.

In February 1959, the medical director of Johns-Manville Corporation, Kenneth W. Smith, wrote to the Detroit-Edison Company responding to a request for "information on the possible health hazards associated with some of our [Johns-Manville's] products."[97] Referring to one of Johns-Manville's products, Thermobestos®, Smith told his customer that the product contained only about 10 percent asbestos fiber. Assuming that the airborne dust would approximate the same proportion, Smith advised that applying the ACGIH's 5 million particle per cubic foot standard would permit dust levels of 50 million particles per cubic foot without "an excessive amount of asbestos fiber."

The standard was thus intended only to represent conditions under which it was believed that nearly all workers might be repeatedly exposed to asbestos dust day after day without adverse effect. The textile factory standard simply did not apply to product users, such as transient shipyard insulators intermittently cutting products containing as little as 10 to 15 percent asbestos. Such standards were expressed in terms of a time-weighted average concentration. It was anticipated that the standards might be exceeded for short periods without injury to health.[98]

## ACGIH Condemns "Improper Use" of TLVs

The ACGIH itself, as late as 1958, adopted a resolution condemning laws equating concentrations above the recommended TLV as *prima facie* evidence of a serious health hazard. In effect, the ACGIH itself repudiated the notion that its own threshold limit values could be used as "standards":

> The American Conference of Governmental Industrial Hygienists condemns the improper and dangerous misuse of the threshold limit or MAC list or a similar list by incorporation in any code, law, rule or regulation as a sole criteria of a health hazard.

## Emerging Cancer Concern

During the war years, an association with occupational cancer emerged. In 1942, W. C. Hueper concluded, in the earliest text devoted to occupational cancer, that "an evaluation of the evidence presented reveals certain features connected with these cases [reports in the world literature on asbestosis and cancer] which are suggestive of an occupational cancer."[60] The next year, however, Wampler's text, *Principles and Practices of Industrial Medicine*,[110] described asbestosis as a consequence of asbestos dust exposure but made no mention of cancer.

In 1947, the chief inspector of factories in Britain reported 235 deaths during the 23-year period from 1924 to 1946 in which asbestosis had been proved at autopsy. Cancer of the lungs or pleura was found in 31 (13.2 percent) of the 235 cases. Those cases of "asbestosis developing cancer of the lung" showed a mean

exposure of 16.5 years.[11] Teleky's text in 1948, *Factory and Mine Hygiene*,[102] discussed asbestosis in detail but made no mention of a relationship to cancer. New texts on occupational disease published by Johnstone in 1948[63] and by Sax in 1951[87] likewise described asbestosis but made no mention of cancer in association with it.

### Maritime Safety Act

In 1958, the Longshoremen and Harbor Workers' Compensation Act was amended to require employers to "install, furnish, maintain and use such devices and safeguards . . . as the Secretary [of Labor] may determine by regulation."[83] In 1960, this authority was exercised by promulgating safety and health regulations for ship repairing and shipbuilding.[42] The regulations adopted the threshold limit values of the ACGIH effective March 21, 1960, i.e., 5 million particles per cubic foot for asbestos dust. The same year, the government safety and health standards for federal supply contracts were amended to adopt the ACGIH threshold limit values.

### Asbestosis and Cancer

Three significant new developments had by then occurred. In 1955, Richard Doll published in England his report, "Mortality from Lung Cancer in Asbestos Workers."[34] Doll had collected autopsy records on 105 persons employed at a large asbestos works since 1935. Lung cancer was found in 18 instances, 15 times in association with asbestosis. All of the subjects in whom both conditions were found had started employment before 1923 and had worked in the industry at least 9 years before the 1931 Asbestos Industry Regulations had become effective. One hundred and thirteen men who had worked for at least 20 years in places where they were liable to be exposed to asbestos dust were followed up and the mortality among them was compared with the rates for all England and Wales. Thirty-nine deaths occurred, whereas only 15.4 were expected. The excess was entirely due to deaths from lung cancer (11, as opposed to 0.9 expected) and from other respiratory and cardiovascular disease (22, as opposed to 7.6 expected). All of the cases of lung cancer were associated with the presence of asbestosis. Here was convincing evidence of a causal association between lung cancer and asbestosis or, put another way, a causal association between lung cancer and exposures that cause asbestosis, i.e., the type of exposures that occurred in primary-products manufacturing plants and textile plants before 1931.

In 1943, Leroy U. Gardner, director of the Saranac Laboratory, New York, advised Vandiver Brown, Johns-Manville Corporation, that there were on record 10 cases of lung cancer in asbestos workers.[53] Gardner told Manville that the evidence was suggestive but not conclusive that asbestosis may precipitate the development of cancer in susceptible individuals. Not until 1960 was there a suggestion of a direct causal relationship between asbestos exposure and cancer, vis-a-vis asbestosis and cancer. The significance is of major importance. Contemporary thought was that cancer followed asbestosis, not exposure to asbestos, and, in turn, because of increased awareness and controls, that asbestosis was under control.

Furthermore, since asbestosis was still associated only with prolonged, heavy exposure to asbestos,[33] there was little reason to believe that insulators might be at risk (whereas later it would be shown that the prevalence of tumors is actually higher in persons working with finished products, such as insulators, than in miners and millers).[33]

### Cigarette Smoking

By 1957 a scientific study group established by the National Institutes of Health agreed that a causal relationship between cigarette smoking and lung cancer existed.[90] This development obfuscated prior suggestions of a causal relationship between asbestos exposure, asbestosis, and lung cancer because prior studies had not taken into account the smoking history of the subjects. Even as late as 1968,[91] Selikoff found that of 87 asbestos workers who never smoked cigarettes regularly, none died of lung cancer. Being based upon the experience of only 87 workers, Selikoff disclaimed that his finding proved that exposure to asbestos dust had no influence on the risk of lung cancer among nonsmokers. Just as certainly, however, the data did not suggest that workers thought not to be at risk of asbestosis were in drastic need of stricter standards.

Finally, in 1960, Wagner reported in the *British Journal of Industrial Medicine* 33 histologically proven cases of mesothelioma.[108] Only in 8 of the 33 cases was evidence of asbestosis demonstrated. One of the 8 was exposed to asbestos while lagging steampipes. Two of the remaining 25 patients were engaged in lagging locomotive boilers. Eight case histories illustrating the different types of exposure to asbestos dust included a white female 56 years of age "who could only have had a short exposure to asbestos as a child and probably a further slight exposure as a young woman" when, from 1916 to 1922, she worked as a clerk in an asbestos warehouse. Another case involved a white male 32 years of age who spent his childhood in the vicinity of asbestos fields. His only subsequent contact with asbestos was the auditing of the books of an amosite mine. (An addendum to the article reported an additional 14 cases. Of the total of 47 cases, a possible exposure to crocidolite had been established in 45 cases.)

### ACGIH Limits TLVs to Asbestosis

In 1962, the ACGIH made clear that its present threshold limit value related only to the prevention of asbestosis and attributed the standard of Dreessen's study in three crysotile asbestos textile plants.[1]

### 1963: Judicial Pressures Begin

In January 1963 the Supreme Court of California decided the *Greenman* case, which expanded the concept of strict liability in tort to any article placed on the market by a manufacturer which proves to have a defect that causes injury to a human being.[35] The case involved a combination power tool that could be used as a saw, drill, and wood lathe, but the court's rationale for imposing strict liability on product manufacturers describes asbestos products as well: "It should not be controlling whether plaintiff selected the machine . . . because of the machine's own appearance of excellence that belied the defect lurking beneath the surface."

The purpose of the new rule was to insure that the costs of injury resulting from defective products are borne by the manufacturers that put such products on the market rather than by the injured persons who are powerless to protect themselves. The financial liability imposed by this rule was intended to provide the financial incentives to make industry responsible for adequate standards. The *Greenman* rule found acceptance in other jurisdictions.

### Product Labeling

Ostensibly, at least one manufacturer began placing a warning label on the packages of its products in 1964 and others began in 1966. These "warnings" read as follows:

This product contains asbestos fiber.
Inhalation of asbestos in
excessive quantities over long
periods of time may be harmful.
If dust is created when
this product is handled,
avoid breathing the dust.
If adequate ventilation
control is not possible,
wear respirators approved
by the U.S. Bureau of Mines
for pneumoconiosis-producing dust.

One court has found the admonition that a worker should "avoid breathing the dust" to be black humor and found the warning legally inadequate in other respects, i.e., failure to convey the gravity of risk and failure to convey effective precautions against it.[18]

To avoid liability, sellers may give directions for the safe use of their products and warnings against foreseeable misuses. Products bearing such warnings and instructions, which, if followed, make the products safe, are not defective. With respect to asbestos, this burden was put on manufacturers too late.

Ten years after the *Greenman* decision, strict liability law was applied to asbestos manufacturers in the *Borel* case.[18] The plaintiff was employed as an insulation worker from 1936 until 1969, when he was diagnosed as having pulmonary asbestosis and sued all manufacturers of products he had installed alleging that their products were unreasonably dangerous because they failed to give adequate warnings of the known or knowable dangers involved. The defendants argued unsuccessfully that the dangers of asbestos to insulators were not foreseeable until about 1968. The court held them liable explaining that foreseeability must be measured in light of the manufacturer's status as an expert and its duty to test its product. The evidence established that none of the defendants ever tested its products to determine its effect on insulation workers nor did any of the defendants ever attempt to determine whether the exposure of insulation workers or others to asbestos dust exceeded the ACGIH's recommended threshold limit values or, indeed, whether those standards were accurate or reliable.

Almost 10 years later, the asbestos manufacturers made the same arguments in a New Jersey court contending that the dangers about which they were accused of failing to warn were undiscovered at the time the product was marketed and *undiscoverable* given the state of scientific knowledge at that time. The Supreme Court of New Jersey squarely decided that the medical community's presumed unawareness of the dangers of asbestos was not a defense to the plaintiff's claim.[14]

Holding a manufacturer to the status of an expert, the court explained, is merely a legal fiction employed to supply *scienter* (guilty knowledge), traditionally a necessary element of tort law. Imputed blame cannot be overcome by "state-of-the-art" evidence that defendants did not know or that they could not have known of the product's dangers. According to the court, it was not unreasonable, as defendants contended, to impose a duty on them to warn of the unknowable. The rule achieves two important and rational goals: it places financial consequences upon the person in the best position to make the cost-benefit analysis between accident costs and accident-avoidance costs and to act on that decision once it is made, and it creates an incentive for manufacturers to perform their important role in product safety research and to invest more actively in such research.[14] One court has said that government safety standards and criminal law have failed to provide adequate consumer protection against the manufacture and distribution of defective products and that punitive damages thus remain the most effective remedy.[56]

## Ceilings and Excursions

The year 1964 brought an explosion of significant developments. First, the question of exposure "excursions" about a recommended standard was addressed by the ACGIH in Philadelphia on April 25 to 28.[6] The threshold limit values for industrial air promulgated by the ACGIH were based upon the premise that, although all chemical substances are toxic at some concentration experienced for a period of time, a specific concentration exists for all substances from which no injurious effect will result no matter how long the exposure. Until 1963 the ACGIH's threshold limit values were defined as time-weighted concentrations averaged over the course of the workday operations. Then, the American Standards Association translated the guides as "maximum acceptable concentrations" or, in other words, "ceilings," below which all concentrations should fluctuate. Responding, the ACGIH considered two options: to adopt a "ceiling" concept for its guidelines or suitably lower the guidelines while retaining the time-weighted average (TWA) concept.

The ACGIH believed that the TWA concept had, practically, much to recommend it, but at the same time it possessed a defect for certain fast-acting substances. The ACGIH took what it felt was the best of both concepts. Certain TLVs would be assigned a "C" suffix indicating that the TLV represented a ceiling. The basis for assigning or not assigning a ceiling value rested on whether excursions of concentrations of periods up to 15 minutes might result in intolerable irritations, chronic or irreversible tissue change, or narcosis of a sufficient degree to increase accident proneness, impair self rescue, or materially reduce work efficiency. By this time, no quantitative statements had been given by ACGIH on the magnitude of permissible excursions other than the suggestion that

excursions above the recommended limits should be compensated by an equivalent excursion below the limit.

### 1964: Asbestosis Found in Shipyards

Also in 1964, William T. Marr, an industrial hygienist at the Long Beach Naval Shipyard in California, published an important article.[67] Eighteen years after the Fleisher-Drinker report, Marr found that "shipboard pipecovering and insulating during overhaul and repair is a hazardous trade." Five employees at the insulation shop at the Long Beach Naval Shipyard, averaging 15 years' exposure, were receiving disability compensation due to asbestosis. One employee, after 10 years' employment as a pipe coverer and insulator, had died in 1962. Employees in the insulation trade used fiberglass, magnesia, and diatomaceous earth, and other substances that Marr said complicated air sampling. These employees spent about 80 percent of their time working aboard ship installing block and pipe-section products containing 10 to 15 percent amosite asbestosis and only about 8 percent of their time working aboard ship removing asbestos-containing products. Exposure concentrations to particles 5 to 10 microns in length ranged from 0.1 to 2.0 million particles per cubic foot. Although Marr noted that insulation materials and work methods had remained essentially the same since the Fleisher-Drinker study, his report noted that *removal* of insulation during overhaul and repair started after the war and that, by the time Marr finished his investigation and published his report, many shipyard employees had over 20 years' experience in the insulation trade in contrast to the 1945 study, when only 51 of the 1074 employees had over 10 years' experience. Marr's report noted further that there were no established figures for a maximum allowable concentrations of asbestos fibers in pipe-covering operations or for potentially massive exposures of short duration.

### Biologic Effects of Asbestos

Also in October 1964, Irving Selikoff presented his first major paper at a conference entitled "Biological Effects of Asbestos" in New York. The paper was published the next year.[93] Because of the growth of asbestos utilization, Selikoff found it inadequate to speak of "asbestos workers" vis-a-vis asbestos textile workers, asbestos insulation workers, and such. He noted that the different occupations vary widely in important respects: in intimacy, intensity, and duration of exposure; in variety and grade of asbestos used; in working conditions; and in concomitant exposures to other dusts or inhalants. The asbestos exposure to which insulation workers are subjected is limited and intermittent. Some of the materials used contain no asbestos. Of the asbestos-containing products widely used by insulators, magnesia-block insulation was the most important and usually contained approximately 15 percent asbestos. Asbestos cement generally had 15 to 20 percent or less of asbestos. Nevertheless, an investigation involving 1522 asbestos insulation workers was undertaken. The study included all members of the insulation workers' union in the New York–New Jersey metropolitan area from 1942 to 1962. Among 392 insulators examined, more than 20 years from onset of exposure, medical evidence of

asbestosis was found in 339. More startling perhaps, lung cancer was found at least seven times as often as expected and cancer of the gastrointestinal tract was found three times more often than expected.

### USPHS Undertakes Long-Term Study

At the International Conference on Asbestosis in Caen, France, May 28–31, 1964, the United States Public Health Service presented a paper describing a new, comprehensive study of the asbestos-products manufacturing industry in the United States. The study was expected to require 20 to 30 years to complete.[79]

### UK Undertakes More Stringent Regulation

In the United Kingdom, realization that the Asbestos Regulations promulgated in 1931 were not entirely effective occurred in 1965. Figures were then published by the Ministry of Pensions and National Insurance showing that although there had been an overall *decrease* in the number of new cases of most types of pneumoconiosis, the trend for asbestosis was still upward.[80] Shown in Table 5-5 are the number of diagnosed asbestosis cases during the years 1960 to 1964. As a result, the Ministry of Labour engaged itself in formulating new regulations that would be more stringent and, for the first time, would include pipe laggers and dockers, both of whom were excluded in 1931.

### Dreessen "Standard" Labeled "Arbitrary"

In 1967 the "maximum dust level" of 5 million particles per cubic foot was still adhered to by the UK factory inspectorate. Ironically, though regulation of asbestos exposure in the UK preceded regulation in the United States by decades the standard was characterized in 1967 as one "proposed by an engineer [Dreessen] in 1938 as an interim guide. This figure was an arbitrary choice, and had no experimental foundation."

In a report of the International Conference on the Biological Effects of

**Table 5-5**
Diagnosed Cases of Asbestosis, 1960–64

| Year | Number of Cases |
|---|---|
| 1960 | 29 |
| 1961 | 43 |
| 1962 | 52 |
| 1963 | 67 |
| 1964 | 83 |

Data from Sayers IC: Asbestos as a Health Hazard in the United Kingdom. Unpublished report to Union Carbide U.K., 1967.

Asbestos in 1964, W. Taylor of the Department of Social Medicine, Queen's College, Dundee, said: "The M.A.C. (Maximum Allowable Concentration) of 5 million particles per cubic foot is not now acceptable. Industry should aim at 1 million particles, and accept this figure with reservations until our knowledge in this field is extended."

## Cigarette Labeling

In 1965, the Federal Cigarette Labeling and Advertising Act was enacted effective January 1966. The following warning was required in all advertising and on every package of cigarettes: "Caution: Cigarette Smoking May Be Hazardous to Your Health."

## 1968: ACGIH Proposed Lowering TLV

No direct response to the "information explosion" of 1964 in the standard-setting field was forthcoming, however, until 1968. At its meeting on April 2 and 3, 1968, the ACGIH TLV committee recommended changing the TLV for asbestos (all forms) to 12 fibers per milliliter greater than 5 μm in length, or 2 million particles per cubic foot.[7] Upon adoption by the ACGIH, however, the recommended change appeared only as a "notice of intended change."[7]

Pursuant to extant ACGIH procedures, such a step was initiated to inform industry of the intended action of the TLV Committee prior to taking any final action on threshold limit changes. Each year, following the development of the annual list and its acceptance by the ACGIH at its annual meeting, all new additions and revisions of former values were placed on a tentative list where they remained for at least two years before being placed among the recommended values.

This action was taken because the Conference on the Biological Effects of Asbestos in 1965 called attention to a probability that the 5 million particles per cubic foot limit recommended by Dreessen was inadequate to give complete, working-lifetime protection against all forms of asbestos and attention to the rising worldwide rate of increase in lung cancer among asbestos workers. Critical exposures to asbestos were recognized then to extend far beyond those of miners and millers of asbestos or textile weavers and to include carpenters (sawing asbestos board), insulators, pipe laggers, dockers handling asbestos cargo, brake-lining workers, rubber compounders, and others.[7]

## Ceiling Established

Five million particles per cubic foot was made a ceiling value below which all concentrations should fluctuate. This was regarded by the ACGIH as the equivalent of a time-weighted value of slightly less than 2 million particles per cubic foot or 12 fibers per milliliter greater than 5 μm. This new limit was intended by the ACGIH "to reduce to an insignificant risk, the occurrence of asbestos disease among those exposed for 30 years to all forms of asbestos."[7]

### 1968: Shipyard Bystander Risk Identified

Two new important reports appeared in the literature in 1968. Peter Harries reported on his study of four shipyards in Britain, which togeth employed about 50,000 workers.[57] Less than 450 of the workers were classified "asbestos workers." Because of the nature of their work, only 50 of these we subject to the Asbestos Industry Regulations of 1931. All were involved in refitti and repairing ships rather than shipbuilding. The difference is important becau the removal of lagging material gives rise to more dust than its applicatio Furthermore, because of the requirements of modern shipbuilding for mo efficient insulation material since 1950, there had been a great increase in th amount of asbestos exposure over the past 17 years. Harries's investigatic showed that the problem was not limited only to men continuously working wi asbestos. Asbestosis was found among boilermakers, electrical fitters, engir fitters, engineers, iron caulkers, joiners, plumbers, riveters, shiprights, sh blasters, stokers, and welders. Mesothelioma was also found among these trade Dust counts were as high as 636 million particles per cubic foot (during bagging c asbestos debris) and 173 million particles per cubic foot (during removal c amosite asbestos sections from a boiler room).

### Asbestos–Cigarette Smoke Synergism Identified

Also in 1968, Selikoff published his paper "Asbestos Exposure, Smoking an Neoplasia."[91] Selikoff found that asbestos workers who smoke have about 9 times the risk of dying of bronchogenic carcinoma as men who neither work with asbestos nor smoke cigarettes. Of 87 asbestos workers who never smoke cigarettes regularly, none died of lung cancer. Selikoff qualified this finding. Being based upon the experience of only 87 men, he said that it did not prove tha exposure to asbestos dust had no influence on the risk of lung cancer. It did suggest to Selikoff, however, that exposure to asbestos dust does not lead to an extremely high risk of lung cancer among nonsmokers.

Surveys of the smoking habits of insulators, factory workers, and miners and millers have consistently shown that bronchogenic carcinoma is uncommon in those who do not smoke.[33]

### 1968: UK Adopts New Standards

In 1968, the Committee on Hygiene Standards of the British Occupational Hygiene Society published new standards for crysotile asbestos dust.[20] The standards were, in the opinion of the committee, the best that could be drawn from existing data, which were recognized to be scanty and based on *factory* experience of continuous exposure during working hours, which, during the period 1933–50 were substantially greater than 40 per week. The goal of the proposed standards was to reduce the risk of contracting asbestosis to 1 percent of those who had a lifetime's exposure to the dust. It was thought that this goal could be achieved by limiting cumulative exposure to 100 fiber years per cubic centimeter. That is, for example, a concentration of 2 fibers greater than 5 μm per cubic centimeter for 50 years, 4 fibers per cubic centimeter for 25 years, or 10 fibers per cubic centimeter for 10 years.

Effective May 14, 1970, the asbestos regulations of 1969 were adopted and the 1931 regulations were revoked. The regulations applied to every process involving asbestos or any article composed wholly or partly of asbestos *except* "a process in connection with which *asbestos dust* (defined as "dust consisting of or containing asbestos to such extent as is liable to cause danger to the health of employed persons") cannot be given off." The regulations required exhaust ventilation sufficient to prevent the entry into the air of any workplace of asbestos dust (as defined) or, where impracticable, approved respiratory protective equipment and protective clothing.[13] "Dangerous dust levels" were identified by His Majesty's Inspectors of Factories in an associated document.[101]

For chrysotile and amosite the standard was 2 fibers (defined as particles between 5 and 100 microns in length and having a length-to-width ratio of at least 3:1, observed by light microscopy at 500× magnification) with 10-minute excursions permitted up to 12 fibers per cubic centimeter. For crocidolite, the standard was 0.2 fibers per cubic centimeter "because the concentration of this mineral that is believed to be liable to be dangerous to health is very small indeed."

### 1969: Walsh-Healey Amended

On May 20, 1969, the Walsh-Healey regulations were amended to lower the standard for asbestos to 12 fibers per milliliter greater than 5 μm in length or 2 million particles per cubic foot.[43] Two days later, the Navy Department issued an instruction to establish "as a basic reference the threshold limit values of airborne contaminants adopted by the American Conference of Governmental Industrial Hygienists."[22]

The Clean Air Act of 1970[84] authorized the Environmental Protection Agency (EPA) to establish national emissions standards for hazardous air pollutants (NESHAPS), defined as air pollutants that may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness.[106] By April 1, 1971, the EPA was required to publish a list including hazardous air pollutants for which it intended to establish such a standard.[106] Asbestos was among the three substances named on the first list.[23] Despite efforts to have it removed, asbestos was retained on the list.[24]

### 1970: ACGIH Recommends Still Lower Standard

In 1970, the ACGIH recommended lowering the standard further to 5 fibers per milliliter greater than 5 microns in length. This time, however, the ACGIH stipulated a specific ceiling of 10 fibers per milliliter of stipulated duration and frequency as measured by specific procedures.[3]

Before 1970, excursions had been both permissible and inherent in the TLV concept (with the exception of 30 substances bearing "ceiling" values). This was so, the ACGIH explained in 1971, because all other TLVs had a built-in safety factor or zone of "no effect." The magnitude of the permitted excursions above the TLV, in cases where it was not stated explicitly, could be determined using a rule of thumb supplied by the ACGIH. For TLVs up to 1 part per million, excursions might safely exceed the TLV by a factor of 3. For TLVs up to 10 parts per million, the excursion factor was 2; between 10 and 100 parts per million, the

excursion factor was 1.5; and for TLVs from 100 to 1,000 parts per million, th excursion factor was 1.29.[9]

## OSHA AND SUBSEQUENT REGULATIONS

### 1971: OSHA Enacted

Effective April 13, 1971, the Williams-Steiger Occupational Safety and Health Act of 1970 was enacted.[85] The federal government moved into a broad area of responsibility for the first time on a national scale on a "worst-first" basis.[96]

The act's major tool was to be establishment and enforcement of standards with the force of law. The act itself, however, recognized that setting and enforcing standards would not by itself solve the country's occupational health and safety problems and that it would take a great many trained personnel to launch an effective attack.[38] Effective August 27, 1971, regulations were enacted requiring avoidance of concentrations above those specified in the threshold limit values of airborne contaminants for 1970 by the ACGIH or use of protective equipment.[44] The initial use of existing standards was intended to get the program off to a running start.[96]

Both federal and state safety and health inspectors were in short supply, however. There were only 1600 state safety inspectors and fewer than 100 federal inspectors.[38] There was an immediate need for about 1000 industrial hygienists, 3100 physicians, 16,000 nurses, and 8,000 scientists to protect the workforce,[54] including 3.5 million American workers being exposed to asbestos in their jobs[38] and approximately 390,000 occurrences of occupational disease each year.[54]

Later in the year, OSHA determined that this standard (12 fibers per milliliter greater than 5 microns in length or 2 million particles per cubic foot of air) constituted a *grave danger* to employees exposed to this 8-hour time-weighted average concentration.[45] Effective December 7, 1971, OSHA regulations were amended to provide that the 8-hour time-weighted average airborne concentrations of asbestos dust to which employees could be exposed should not exceed 5 fibers per milliliter greater than 5 microns in length. Concentrations above 5 fibers per milliliter, but not to exceed 10 fibers per milliliter, were permitted up to a total of 15 minutes in an hour for up to 5 hours in an 8-hour day.

### Asbestos Emergency Standard

An emergency standard was published May 29, 1971, and became effective on December 7, 1971. In the interim, on November 4, 1971, a petition for an emergency standard to control concentrations of asbestos dust was submitted to the secretary of labor by the Industrial Union Department of the AFL-CIO.[48]

### Navy Action

Even before July 1971, when President Richard Nixon signed an executive order[9] applying OSHA to federal agencies, the Navy had adopted the new, lower standard. On February 9, 1971, an instruction was issued to all naval shipyards

2-fiber standard and a 5-fiber standard." The regulations acknowledge that the record revealed that many work operations would meet varying degrees of difficulty in complying with the 5-fiber standard and that in some plants, extensive redesign and relocation of equipment might be needed. The delay in implementing the 2-fiber standard was intended to provide all employers "a reasonable time to comply." Both NIOSH and the Advisory Committee on Asbestos Dust had recommended labels for asbestos products or other containers. These recommendations became very controversial in the course of the proceedings. Employers, in general, strongly contended that words such as "danger" and "cancer" were unwarrantedly alarming. These contentions were found to have merit and the adopted standard eliminated them. The new standards required "caution" labels on asbestos-containing products except "where asbestos fibers had been modified by a bonding agent, coating, binder or other material so that in any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed . . . will be released." The labels were required to state only:

CAUTION
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

## New Evidence

New evidence was acquired about this time. Data from the United Kingdom obtained in 1966, indicated that little clinical disease, including x-ray evidence of asbestosis, had occurred among workers first employed at some time after 1933, when improvements in work practices purportedly had been achieved. New x-rays were taken in 1970, however, and the results were evaluated in 1972 showing that many workers still had abnormalities.[48]

On April 6, 1973, the EPA promulgated its national emission standard for asbestos.[72] The regulations applied to the renovation and demolition of structures containing asbestos and to spraying of asbestos materials. The regulation specified procedures for removal of friable, sprayed asbestos fireproofing and insulation materials, including container labeling, required EPA notification whenever such removal was to take place, and essentially prohibited spray application of asbestos fireproofing and insulation (but not decorative) materials. No fiber levels were specified by the regulations, but they required that there be no visible emissions exterior to the structure.[72]

Neither the EPA nor OSHA regulations showed asbestos use in manufacturing during 1973, however.[25]

## OSHA Regulation Challenged

A petition challenging the timetable established by the 1972 standard was filed with the United States Court of Appeals for the District of Columbia by the Industrial Union Department of the AFL-CIO.[41] As a result of that proceeding, in 1974 the court directed the secretary of labor to reconsider the effective date (July

1, 1976) for the 2-fiber standard and determine whether such date might be accelerated for all or some of the industries affected.[61]

## 1975: New Proposed Rules

Responsive to the court's mandate, on October 9, 1975, the Department of Labor published new proposed rules.[48] The proposed standard excluded the construction industry, for which a separate revision of the standard was contemplated. The new, proposed standard, applicable to all other employments covered by the act, would have lowered the permissible exposure to 0.5 asbestos fibers per cubic centimeter and reduced the permissible ceiling for excursions to 5 fibers per cubic centimeter for periods not exceeding 15 minutes. The proposal also required "danger" labels on all raw material, waste and products containing asbestos fibers, or on their container, stating:

DANGER
Cancer Hazard
Contains Asbestos Fibers
Avoid Creating Dust

Development of the proposal was premised upon "recent medical and scientific evidence of increased health hazards associated with occupational exposure to asbestos and the experience gained by OSHA through three years of enforcement and administration of the current asbestos standard."

The asbestos industry applied for and received an extension of the closing time for receipt of comments and raised strong objections to the proposed regulations.[26]

On December 2, 1975, OSHA requested NIOSH to re-evaluate the information available.[73] In response, in December 1976, NIOSH published its "Revised Recommended Asbestos Standard." NIOSH found that available studies provide "conclusive evidence" that exposure to asbestos fibers causes cancer and asbestosis in man. In view of that, NIOSH recommended that the standards should be set at the "lowest level detectable by available analytical techniques." Since phase-contrast microscopy was found to be the only generally available and practical analytical technique, that level was fixed at 0.1 fibers per cubic centimeter. That standard was intended to protect against the noncarcinogenic effects of asbestos and materially reduce the risk of asbestos-induced cancer.

Pursuant to the standard adopted on June 7, 1972, effective July 1, 1976, the 8-hour time-weighted average airborne concentration of asbestos dust to which any employee covered by OSHA might be exposed was lowered to 2 fibers longer than 5 μm per cubic centimeter of air.[47]

On October 11, 1976, the president signed the Toxic Substances Control Act (TOSCA).[103] In 1976, the Consumer Product Safety Commission (CPSC) banned all consumer patching compounds and artificial emberizing materials containing respirable freeform asbestos effective January 16, 1978, and December 15, 1977, respectively.[28]

Asbestos consumption in 1976 was 82 percent of the all-time high in 1973, but the decrease was probably largely due to recession-related factors. The manufacturers' cost of compliance with OSHA and EPA regulations was being absorbed

by consumers.[27] Canadian Johns-Manville announced a $77 million 5-year capital-investment program to improve its Jeffrey mine at Asbestos, Quebec, which produced 45 percent of Canada's asbestos and 15 percent of the world's production.[27]

In 1977, there was a sudden divergence in the rates of asbestos consumption and construction activity attributable to lessened demand brought on by recognition of the environmental problems associated with asbestos.[28]

In 1978, the ACGIH adopted the 2-fiber standard for chrysotile but recommended lowering the standard to 0.5 fibers for amosite and to 0.2 fibers for crocidolite.[10]

On April 26, 1978, the secretary of Health, Education and Welfare announced an asbestos-notification program consisting of an advisory letter to 400,000 physicians and a public information campaign aimed at workers and others exposed to asbestos.[29] In 1978, the EPA ban on spraying asbestos-containing materials was broadened to include decorative applications,[39] and in 1979 EPA NESHAPS, National Emission Standards for Hazardous Air Pollutants, rules were broadened to include building renovation.[49]

On July 2, 1980, the Supreme Court invalidated OSHA's benzene standard, rejecting the agency's position that there is no safe level of exposure to a carcinogen and that the burden was on industry to show that there is a safe level of exposure.[62] Since OSHA's 1975 asbestos proposal was similarly founded on a policy to set permissible exposure levels (PELs) for carcinogens as low as technologically and economically feasible, it was moot.

On May 27, 1982, under TOSCA, the EPA published a final rule requiring the identification of friable asbestos-containing materials in schools and the notification of those exposed effective June 28, 1982.[50]

### 1983: New Emergency Temporary Standard

The OSHA Act allows, after public notice, an opportunity for comment by interested persons, to promulgate rules and standards for Occupational Safety and Health. The act also allows the secretary to bypass these normal procedures in favor of promulgating an emergency temporary standard (ETS) to take effect immediately upon publication in the Federal Register if the secretary determines that "employees are exposed to grave danger from exposure to substances or agents determined to be toxic or physically harmful or from new hazards" and also determines "that such emergency standard is necessary to protect employees from such danger."

On November 4, 1983, acting pursuant to its ETS enabling statute, OSHA published an ETS lowering the time-weighted average permissible exposure level for ambient asbestos fibers from 2.0 fibers per cubic centimeter that are 5 μm or more in length to 0.5 fibers per cubic centimeter.[51]

### ETS Successfully Challenged

On November 17, 1983, the Asbestos Information Association (AIA), an organization of American and Canadian manufacturers of asbestos products, petitioned the Fifth Circuit Court of Appeals for an emergency stay pending

judicial review of OSHA's action. The AIA argued that its members would suffer irreparable harm if the stay was not granted. The Fifth Circuit granted the stay and held a full hearing on the merits.[12]

The standard under which the Fifth Circuit reviewed OSHA's new PEL was whether the agency's action was "supported by substantial evidence in the record considered as a whole."

Immediately after its November publication, OSHA commenced regular notice and comment rule making to decide whether to impose a new permanent PEL for asbestos. The statute requires that the secretary promulgate a permanent standard no later than 6 months after publication of the ETS. Thus the Court of Appeals limited its review to an assessment of the harm likely to accrue, or the grave danger that the ETS might alleviate, during only a hypothetical 6-month life of an ETS, even though OSHA partially justified its decision to issue an ETS on the fact that notice and comment rule making often take several years to complete. OSHA claimed that by permanently lowering the extant 2.0 fibers per cubic centimeter PEL to 0.5 fibers per cubic centimeter, it would save 64 lives per 1000 workers over a working life of 45 years. Over 6 months, 80 lives out of an estimated worker population of 375,399 would be saved according to OSHA. Thus the secretary of labor determined that 80 lives were at risk of grave danger. Although not prepared to say that OSHA was wrong, the court found that the record considered as a whole did not substantially support OSHA's conclusion that the ETS was necessary to alleviate a grave risk of worker deaths during its 6-month term and determined that the ETS was invalid. In reaching its result, the court disavowed any suggestion that deaths must occur before health and safety standard may be adopted and reiterated that the gravity of danger is a policy decision committed to OSHA, not to the courts.

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