

IN THE COURT OF COMMON PLEAS
PHILADELPHIA COUNTY

IN RE:)
) Master File No. 90-0609-C-6
PAOLI RAILROAD YARD)
PCB LITIGATION)

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

IN RE:)
)
PAOLI RAILROAD YARD) Master File No. 86-2229
PCB LITIGATION) Relates to All Actions

DEPOSITION OF GEORGE ROUSH, JR., M.D.
Taken on behalf of Plaintiffs
April 22, 1992

WALLER REPORTING, INC.
515 Olive Street, Suite 1506
St. Louis, Missouri 63101
(314) 621-2571

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DEPOSITION OF GEORGE ROUSH, JR., M.D., produced, sworn and examined on behalf of Plaintiffs, on April 22, 1992, between the hours of eight o'clock in the forenoon and five o'clock in the afternoon of that day, at the office of Brown & James, 705 Olive Street, 11th Floor, St. Louis, Missouri 63101, before TINA M. STUMPF, a Certified Shorthand Reporter and a Notary Public.

A P P E A R A N C E S

The Plaintiffs were represented by Mr. Arnold E. Cohen of the law firm of Klehr, Harrison, Harvey, Branzburg & Ellers, 1401 Walnut Street, Philadelphia, PA 19102 and Mr. Martin J. D'Urso of the law firm of Kohn, Nast & Graf, P.C., 1101 Market Street, Suite 2400, Philadelphia, Pennsylvania 19107.

The Defendant SEPTA/PCC was represented by Mr. Paul J. Giordano of the law firm of Blank, Rome, Comisky & McCauley, Four Penn Center, Philadelphia, Pennsylvania 19103.

The Defendant General Electric was represented by Mr. Eric A. Kuhl of the law firm of Williams & Connolly, 839 Seventeenth Street, N.W., Washington, D.C. 20006.

The Defendant Monsanto and Dr. Roush were represented by Mr. Michael H. Malin, 1650 Market Street, Philadelphia 19103.

The Defendant The Budd Company was represented by Mr. Willard R. Burns of the law firm of Kelly, McLaughlin & Foster, 260 S. Broad Street, 1700 Atlantic Building, Philadelphia, Pennsylvania 19102.

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1 IT IS HEREBY STIPULATED AND AGREED by and between
2 Counsel for the Plaintiffs and Counsel for the Defendants,
3 that this deposition may be taken in shorthand by TINA M.
4 STUMPF, a Certified Shorthand Reporter and Notary Public, and
5 afterwards transcribed into typewriting, and then read and
6 signed by the witness.

7 o-O-o

8 GEORGE ROUSH, JR., M.D.,
9 a witness, being produced, sworn and examined on the part of
10 the Plaintiffs, deposes and says:

11 DIRECT EXAMINATION

12 QUESTIONS BY MR. COHEN:

13 Q. For the record, sir, can we have your full name?

14 A. George Roush, R-O-U-S-H, Jr.

15 Q. And you're a medical doctor, sir?

16 A. Yes.

17 Q. Where do you reside?

18 A. In Ladue.

19 Q. Ladue?

20 A. L-A-D-U-E, Missouri. The address is 10 Babler
21 Lane, B-A-B-L-E-R Lane, 63124.

22 Q. What is your date of birth, sir?

23 A. April 30th, 1921.

24 Q. My name is Arnold Cohen. With me is Martin
25 D'Urso. We are, together, co-counsel for plaintiffs in

WALLER REPORTING, INC.

1 certain actions pending in the United States District Court
2 for the Eastern District of Pennsylvania and in the Court of
3 Common Pleas of -- What is it now?

4 MR. MALIN: Chester County.

5 Q. Chester County, Pennsylvania, your counsel says
6 with a small smile. We're going to be asking you some
7 questions here today. If during the course of this
8 examination at any time you don't hear a question that I ask
9 you, would you be kind enough to indicate that to me?

10 A. I'll try to remember that.

11 Q. All right. If at any time during this
12 examination you don't understand the question that I put to
13 you, would you be kind enough to tell me that?

14 A. Yes.

15 Q. In both instances I'll either repeat or have the
16 reporter repeat or I will restate the question as is
17 necessary, because as for myself I'm going to assume that
18 every question you answer you will have both heard and
19 understood; would that be a fair assumption?

20 A. I think so.

21 Q. Now, doctor, I'm a layman. If I should misstate
22 any technical term or medical term and you recognize that I
23 have misstated or misused the term or even mispronounced the
24 term, would you be kind enough to indicate that to me?

25 A. Yes.

1 Q. I want to be sure that I understand the question
2 I'm asking and that you understand the question I'm asking
3 and that I understand your answer. That way we'll have a
4 nice clean record. You understand, sir, that all of your
5 responses must be made in a verbal fashion?

6 A. Yes.

7 Q. Have you had the occasion to testify before?

8 A. Yes.

9 Q. Can you tell me how many times you've testified
10 in the past in any type of matter whatsoever?

11 A. Including workman's comp?

12 Q. Sure.

13 A. Many workman comp cases.

14 Q. When you say many, is that somewhere between five
15 and 10 or 50 and 100?

16 A. More than 10.

17 Q. Would it be more than 50 times?

18 A. No.

19 Q. So somewhere between 10 and 50 times?

20 A. Yes.

21 Q. And you have testified, what, as the employer's
22 physician or in some other capacity?

23 A. Or as an expert witness.

24 Q. Can you tell me the entities who have had
25 occasion to call you as an expert witness in workers

1 compensation cases?

2 A. Lead poisoning.

3 Q. Without regard to what the alleged substance was,
4 can you tell me the names of the employers who have called
5 you?

6 A. No, I don't remember them.

7 Q. You don't remember?

8 A. No. I think cases rather than people or
9 companies.

10 Q. Okay. Then why don't you tell me, if you can, to
11 the best of your ability, the substances then that were
12 involved in various workers compensation cases where you
13 appeared and testified as an expert witness.

14 A. A number of lead poisoning cases or alleged lead
15 poisoning cases.

16 Q. Any other substance?

17 A. Carbon disulfide. Boranes.

18 Q. Bor --

19 A. B-O-R-A-N-E-S. PCB's. Dioxin. That's -- Many
20 of them were lead.

21 Q. Many of them were lead?

22 A. Yes.

23 Q. Now, other than in workers compensation cases.
24 Have you had occasion to testify?

25 A. On the Boranes and on workman's comp.

1 Q. I'm sorry. You said on the Boranes?

2 A. Boranes. You have it on the list there. That
3 was a non-workman's comp.

4 Q. Any other cases that you can recall where you
5 testified either as a fact or expert witness other than in a
6 workers compensation proceeding?

7 A. And in dioxin.

8 Q. You've testified in civil cases involving dioxin?

9 MR. MALIN: I'll make it easy. He testified in
10 the Sturgeon case involving dioxins.

11 MR. COHEN: Sturgeon?

12 MR. MALIN: What was the full name of that case?

13 MR. COHEN: Kemner?

14 MR. MALIN: Kemner, yes. He testified in the PCB
15 cases for Monsanto. Brewer was one.

16 MR. COHEN: Do you mind if I get the testimony
17 from the witness. What you have to say is not testimony,
18 counsel. If you want to supply me with a list that the
19 witness can sign as being a listing of the cases --

20 MR. MALIN: I was just trying to save time.

21 MR. COHEN: I'm not trying to waste time. I'm
22 trying to get the information.

23 MR. MALIN: Sure.

24 Q. (By Mr. Cohen) So, you testified in Kemner?

25 A. Yes.

1 Q. You were on the stand for 30 days?

2 A. Yes.

3 Q. That was a case involving dioxin?

4 A. Alleged dioxin at least.

5 Q. Alleged dioxin, PCB cases. You testified in PCB
6 cases or just workers compensation claims?

7 A. Workman's -- They were not workman's comp. They
8 were other than workman's comp.

9 Q. Civil cases?

10 A. Yes.

11 Q. When you testified in PCB cases that were civil
12 cases, were you testifying as a fact witness or an expert
13 witness or both?

14 A. Representing Monsanto.

15 Q. So, you were speaking on behalf of Monsanto?

16 A. Yes.

17 Q. Had Monsanto called you to testify and to offer
18 opinions on their behalf?

19 MR. MALIN: I object to the form of the question.
20 If you understand that, doctor, go ahead.

21 A. I don't think I understand the question.

22 Q. Do you understand the difference between an
23 opinion and a fact?

24 A. No.

25 Q. So in the past, you've been called to testify as,

1 what you believe to be, an expert witness and you offered
2 testimony, but you don't know whether what you were offering
3 was a fact or opinion?

4 A. Yes.

5 Q. That's correct?

6 A. Yes.

7 Q. You were employed by Monsanto?

8 A. Yes.

9 Q. When were you last employed by Monsanto?

10 A. '88. 1988. April 30th.

11 Q. And you retired four years ago?

12 A. Yes.

13 Q. I gather your retirement was something that you
14 wanted to do?

15 A. Yes.

16 Q. Are you a shareholder of Monsanto or any Monsanto
17 entity?

18 A. No.

19 Q. Have you ever been a shareholder of Monsanto?

20 A. Yes.

21 Q. And did you divest yourself of shares in that I
22 guess?

23 A. Yes.

24 Q. When was that?

25 A. When I retired.

1 Q. Did you have some sort of employee incentive plan
2 that gave you shares in the company?

3 A. No. I had options to buy stock that have been
4 issued to me in my name.

5 Q. And when you retired you got rid of all that?

6 A. Yes. I still have some that I haven't exercised
7 options yet.

8 Q. Since your retirement, have you testified on
9 behalf of Monsanto?

10 A. On PCB's.

11 Q. When was that?

12 A. I don't know. I don't remember. I have no basis
13 of thinking of that way.

14 Q. You retired four years ago?

15 A. Yes.

16 Q. Did you testify on behalf of Monsanto -- and I'm
17 excluding today because I don't know about your appearance
18 here today -- at all in 1992?

19 A. I don't remember when I testified. I'm sorry.

20 Q. Well, we're three and a half months into 1992.

21 A. I understand.

22 Q. Did you have occasion to appear this year?

23 A. No.

24 Q. How about in 1991?

25 A. I don't recall.

1 Q. You have no recollection of whether you
2 testified?

3 A. I have no basis for it.

4 Q. Do you know the names of the cases --

5 A. No.

6 Q. -- in which you testified regarding PCB's since
7 April 30th, '88?

8 A. No.

9 Q. Do you have a record of what those cases were?

10 A. No.

11 Q. Do you keep files on the cases in which you are
12 asked to testify?

13 A. No.

14 Q. When you were asked to testify, do you then have
15 a file, whether you keep it after you're finished or not?

16 A. I'm not sure what you mean by a file.

17 Q. Does anyone give you information either in
18 documentary form or orally that you reduce to a document that
19 you then retain so that you'll have information about the
20 case in which you're appearing and testifying?

21 A. No.

22 Q. So, you just go in and testify and answer
23 whatever questions are put to you?

24 A. Yes.

25 Q. Has that always been the case when you testified

1 regarding PCB's other than during your employment with
2 Monsanto?

3 A. Yes.

4 Q. So, you've never had any files on any cases?

5 A. No.

6 Q. Now, you're appearing here today. Are you
7 appearing here on behalf of Monsanto?

8 A. Yes. Well, I was being subpoenaed.

9 Q. Are you appearing here as a result of having been
10 served with a subpoena?

11 A. Yes.

12 Q. Do you have a copy of that subpoena?

13 A. No.

14 Q. Who served you with the subpoena?

15 A. I don't know. Somebody came to the door and gave
16 it to me.

17 Q. Did it ask you to bring anything?

18 A. Yes, but I just took it to Monsanto.

19 Q. Who did you take it to at Monsanto?

20 A. Mr. Bistline.

21 Q. Mr. Bistline?

22 A. Yes.

23 Q. He's in their legal department?

24 A. Yes.

25 Q. Do you know his title?

1 A. No.

2 Q. Did Bistline tell you that you had to bring any
3 documents or anything to the deposition?

4 A. No.

5 Q. Did he tell you that you didn't have to bring
6 anything to the deposition?

7 A. No. He showed me a form that said I should bring
8 what information I have.

9 Q. And what did you bring?

10 A. Nothing.

11 Q. Because you didn't have anything?

12 A. I don't have anything.

13 Q. You don't have any documents, materials, any
14 information at all regarding PCB's?

15 A. It's at Monsanto if I do have. I didn't take
16 anything from Monsanto.

17 Q. In other words, you had materials when you were
18 there up to April 30th, '88, or at least access to materials
19 up until April 30th, '88, but since that time, you have
20 nothing?

21 A. That's correct.

22 Q. Mr. Malin said he's your counsel; is that
23 correct?

24 A. Yes.

25 Q. He represents you here today?

1 A. Yes.

2 Q. Who's compensating you for your appearance here
3 today?

4 A. We haven't discussed that.

5 Q. So, you neither discussed that with Mr. Bistline
6 nor Mr. Malin?

7 A. No.

8 Q. What's your usual fee for appearing and
9 testifying on behalf of Monsanto?

10 A. \$1500 a day.

11 Q. And you expect to get paid that for your
12 appearance today?

13 A. We haven't discussed it.

14 Q. Are you paying Mr. Malin anything for
15 representing you here today?

16 A. No.

17 Q. You haven't discussed that either?

18 A. We haven't discussed that.

19 Q. But you don't expect to?

20 A. No.

21 Q. Did Mr. Bistline tell you that they would supply
22 you with counsel?

23 A. Yes.

24 Q. And is that how you engaged Mr. Malin's services?

25 A. I'm not sure. Mr. Bistline introduced me to him.

1 Q. When was that?

2 A. Yesterday.

3 Q. Was that the first time you met Mr. Malin?

4 A. Yes.

5 Q. Had you spoken with him by phone prior to that
6 time?

7 A. No.

8 Q. Did you prepare for this deposition?

9 A. I looked over a book that I've got on toxicology
10 of occupational things. The title is Patty's, P-A-T-T-Y,
11 Textbook.

12 Q. Patty's?

13 A. Yes.

14 Q. Textbook?

15 A. Of Industrial Medicine, Industrial Hygiene.

16 Q. Is that a one volume text?

17 A. It's three volumes.

18 Q. And do you know the date of publication?

19 A. No.

20 Q. Do you know the date of revision or whatever
21 update you were looking at?

22 A. It's the most recent one is all I can answer.

23 Q. Who owns that book?

24 A. I don't know. You mean now?

25 Q. The one you looked at.

1 A. I own it.

2 Q. You own it?

3 A. Yes.

4 Q. Do you have that at home?

5 A. Yes.

6 Q. But you didn't bring it here today?

7 A. Yes -- No.

8 Q. Does it have a section on PCB's?

9 A. Yes.

10 Q. For what purpose did you look at Patty's
11 Textbook?

12 A. Historically, that's what I do when I talk about
13 any chemical in terms of health effects.

14 Q. You reference Patty's Textbook to see what's been
15 reported?

16 A. Yes.

17 Q. How large is the section on PCB's in Patty's
18 Textbook?

19 A. Five, 10 pages.

20 Q. Do you consider it to be a comprehensive review
21 of the subject?

22 A. Reasonably so.

23 Q. Do you have other sources of information
24 regarding the health effects of PCB's other than Patty's
25 textbook?

1 A. I have Zenz Textbook of Occupational Medicine.
2 Q. Zenz?
3 A. Z-E-N-Z.
4 Q. Z-E?
5 A. N-Z.
6 Q. Textbook of occupational medicine?
7 A. Yes, volume 2.
8 Q. That has a section on PCB's?
9 A. Yes.
10 Q. And how large is that section?
11 A. Two pages.
12 Q. Do you consider that a comprehensive review of
13 the subject?
14 A. Reasonably so.
15 Q. Any other source?
16 A. No.
17 Q. Would it be fair to say that prior to April 30th,
18 '88, you had more information regarding the health effects of
19 PCB's available to you than you have now?
20 A. Yes.
21 Q. What did you have available to you prior to April
22 30th, '88?
23 A. On PCB's?
24 Q. Yes.
25 A. I had no reason for looking at them, looking for

1 the information.

2 Q. But you had, I gather, some repository of
3 information available to you at that time?

4 A. Yes.

5 Q. Can you describe that repository for me?

6 A. We have a library.

7 Q. You have a library at Monsanto?

8 A. Yes.

9 Q. Did that library to your knowledge contain the
10 published scientific literature on PCB's?

11 MR. MALIN: I object to the form of the question.
12 He's asking him did it contain all -- Apparently he's asking
13 if it contains all of the published scientific literature.
14 If you can answer that, answer.

15 Q. Just tell me to the best of your ability what you
16 believe this library at Monsanto contained regarding
17 scientific information on PCB's.

18 A. It has a good representation. How complete it
19 is, I can't answer that.

20 Q. And you said earlier you had no reason to look at
21 it; is that right?

22 A. That's right.

23 Q. Was that during your employment you had no reason
24 to look at it or now you have no reason to look at it?

25 A. When I was working I had reason for looking at

1 it.

2 Q. During the course of your employment, you did,
3 from time to time, reference that library but you do not now?

4 A. Yes.

5 Q. Do I take it that you have not gone to that
6 library since April of '88 to look up any information
7 regarding PCB's?

8 A. I looked at the library to see if there was
9 anything that was apparent, but I didn't have any reason for
10 looking at anything. I didn't look at anything.

11 MR. COHEN: Could I have that answer read back,
12 please?

13 (Reporter read back as requested.)

14 MR. MALIN: I think your question was directed to
15 after he left Monsanto. Wasn't it?

16 MR. COHEN: Yes.

17 Q. (By Mr. Cohen) After you left Monsanto, did you
18 have any occasion to go back and look at that library, that
19 reference material on PCB's?

20 A. I did go back and look at the library.

21 Q. How recently?

22 A. Since this deposition came up.

23 Q. What did you look for in particular? What were
24 you looking for?

25 A. Whether I wanted -- Just to see in general what

1 they had in way of reference books.

2 Q. Was there anything there that caught your eye?

3 A. No.

4 Q. See anything new there since you left in April
5 '88?

6 A. I didn't look for something new.

7 Q. When was it that you actually went to the
8 Monsanto reference library to see what was there?

9 A. Monday.

10 Q. Day before yesterday?

11 A. Tuesday.

12 Q. I'm sorry. Monday or Tuesday?

13 A. Tuesday.

14 Q. Yesterday?

15 A. Monday.

16 Q. Day before yesterday?

17 A. Yes.

18 Q. Today is Wednesday.

19 A. That helps.

20 Q. Two days ago?

21 A. Yes.

22 Q. Was that prior to your meeting with Mr. Malin?

23 A. Yes.

24 Q. Did you see if they have for example the report
25 of the Banberry Conference, report 35?

1 A. No, I didn't look. I didn't see it.

2 Q. Do you know if they have any reports of the
3 Banberry Conference?

4 A. I didn't attempt to find out.

5 Q. Do you know what the Banberry Conference is
6 about?

7 A. No.

8 Q. Did you review any other materials other than
9 going into the library on Monday? Did you review any other
10 materials in preparation for this deposition?

11 A. No.

12 Q. What did Mr. Malin tell you about the Paoli case?

13 MR. MALIN: I'll object to that question. That's
14 attorney-client.

15 Q. Let's ask it a different way. What do you know
16 about the Paoli case?

17 A. What I was told yesterday.

18 Q. Okay. What do you know about the Paoli case?

19 A. In the Philadelphia area, I have to guess where,
20 there is a trial involving workers exposed to PCB's in
21 railroad as well as inhabitants living in close proximity to
22 where the explosion of PCB's could have occurred. That's, I
23 think, reasonable.

24 Q. Did anybody show you any photographs of the
25 facility?

1 A. No.

2 Q. Anybody show you any drawings or maps of the
3 facility?

4 A. No.

5 Q. Did anybody give you a description of the
6 facility?

7 A. No.

8 Q. Do you know that it's a rail yard?

9 A. I knew that we talked about it being a rail yard.

10 Q. Do you know that it contains a car repair shop, a
11 rail car repair shop?

12 A. I don't remember.

13 Q. Do you know how long PCB's were allegedly used at
14 that railroad yard and car shop?

15 A. No.

16 Q. Do you know when they were last used?

17 A. No.

18 Q. Do you know anything about the levels of
19 contamination that were found outside on the rail yard
20 property but outside the car shop?

21 A. No.

22 Q. Do you know anything about the levels of
23 contamination that were found inside the car shop?

24 A. No.

25 Q. Do you know anything about the levels of

1 contamination, if any, that were found on any of the
2 residential properties surrounding the rail yard?

3 A. No.

4 Q. No one gave you any information about that at
5 all?

6 A. No.

7 Q. Did you ask for it?

8 A. No.

9 Q. Did you have any interest in knowing it?

10 A. No.

11 Q. Were you told anything about anything, any of the
12 ailments or injuries that any of the plaintiffs claim that
13 they have as a result of their exposure to PCB's?

14 MR. MALIN: Same objection. That's
15 Attorney-client. Do you want to ask him a different way?
16 Ask him what he knows.

17 Q. Do you have any information about any of the
18 ailments or injuries the plaintiffs claim they have as a
19 result of the PCB's?

20 A. No.

21 Q. So, you don't know what these people contend
22 happened to them as a result of exposure to PCB's?

23 A. We talked about that they said their health
24 effects were affected by their exposure to PCB's.

25 Q. What information did you have when you went to

1 any of the references, reference sources that you described
2 somewhat earlier regarding any of the health effect claims?

3 A. Nothing.

4 Q. What were you looking for?

5 A. Information that would supplement what I had,
6 these two references I had at home.

7 Q. Do those references discuss adverse health
8 effects from exposure to PCB's?

9 A. Yes.

10 Q. What does Patty's discuss as adverse health
11 effects observed from exposure to PCB's?

12 A. They talk about the syndrome that we call
13 poisoning by PCB's.

14 Q. What is that syndrome?

15 A. Pardon?

16 Q. What is that syndrome?

17 A. It consists of chloracne, plus involvement
18 irritation of the eye, nose, upper respiratory tract, liver
19 involvement, and a peripheral neuropathy.

20 Q. Anything else?

21 A. And I can't tell which one of these books it is,
22 but they talk about an immunologic reaction.

23 Q. Specifically what?

24 A. Some effect on the lymphocytes called T cells.

25 Q. What is the effect on the T cells?

1 A. Some suppression of the levels of T cells.

2 Q. Anything else?

3 A. No, I think that's it.

4 Q. What do they refer to when they talk about liver
5 involvement?

6 A. Enzyme effects.

7 Q. Specifically what enzyme effects?

8 A. SGOT, SGPT.

9 Q. Those are the enzymes; but what happens to them?

10 A. They are elevated and gamma glutamyle pepaidase
11 is the fourth one.

12 Q. Also elevated or suppressed?

13 A. Elevated.

14 Q. What adverse health effects are believed to be
15 caused by elevation of liver enzymes that you know of?

16 A. Nothing.

17 Q. What adverse health effects are related to the T
18 cell suppression that you know of?

19 A. Nothing.

20 Q. Absent PCB exposure, do you know of any adverse
21 health effects that are reported from elevation of liver
22 enzymes?

23 A. Many diseases are associated with the effect on
24 the liver. It's a liver respondent.

25 Q. You want to describe some of those disease for

1 me?

2 A. Hepatitis, alcohol, viral diseases.

3 Q. You're telling me about diseases now that cause
4 elevation of liver enzymes?

5 A. Yes.

6 Q. Okay. So, you were answering my question, what
7 disease or health effects are associated with elevation of
8 liver enzymes; is that right?

9 A. Isn't that the question you asked me?

10 Q. Yes. That's the answer you were giving?

11 A. Yes.

12 Q. And you were describing for me the disease
13 hepatitis and alcohol?

14 A. Alcohol.

15 Q. Anything else?

16 A. Some exposure to chemicals.

17 Q. Other than PCB's?

18 A. Yes.

19 Q. Anything else?

20 A. I think that's it.

21 Q. Do any of these references refer to the results
22 of animal studies?

23 A. I'm sure they do, but I didn't look at them.

24 Q. You didn't look at, what, the reference or the
25 animal studies?

1 A. What you had asked me to look at, what I had
2 looked at. We talked about, what are the agents that affect
3 the liver? That includes mostly infections, but it includes
4 drugs, medical drugs; and so I listed those.

5 Q. Yes. Let me back up. I'll ask you a different
6 question now, sir. I'll ask you whether the reference books
7 you looked at -- You named two; Zenz and Patty's -- whether
8 those reference books refer to animal studies of the effect
9 of the toxic properties of PCB's?

10 A. That wasn't the question I thought you asked me.

11 Q. That's all right. Let's forget about that other
12 question. Let's talk about that question.

13 A. Ask the question again, please.

14 Q. Sure. Do these texts, speaking of Patty's and
15 Zenz now, and anything else that you looked at, discuss the
16 results of animal studies that were directed toward
17 determining the toxic effect of PCB's?

18 A. Yes.

19 Q. And what do they report in animal studies?

20 A. With big doses.

21 Q. That's a qualification.

22 A. Yes. With big doses. There will be an effect on
23 the liver and it produces an obvious effect on the appearance
24 of the liver and this is associated with a relatively large
25 exposure on the order of 50 parts per million, ppm.

1 Q. And what is the obvious effect on the appearance
2 of the liver?

3 A. A nodule response and some fibrosis associated
4 with it.

5 Q. Any other health effects in animals associated
6 with exposure to PCB's?

7 A. I don't recall.

8 Q. Do you recall whether there are any reports in
9 animal data reflecting that PCB's have caused neoplastic
10 changes?

11 A. That's part of it. To me, that's the
12 continuation of the response I was talking about.

13 Q. So when you were talking about --

14 A. This nodule response can be included. Cancer in
15 some of PCB exposure, not all.

16 Q. In some PCB exposure, not all?

17 A. Yes.

18 Q. What organs in animal tests have shown neoplastic
19 changes specifically cancer, from exposure to PCB's?

20 MR. MALIN: I object to the form of the question.
21 If you understand that, doctor, answer.

22 THE WITNESS: Would you ask it again?

23 MR. COHEN: You want to read it back? If it's
24 not understandable, Ill ask you a different question.

25 (Reporter read back as requested.)

1 A. The liver.

2 Q. Any other organ that you know of?

3 A. Not that I recall.

4 Q. How about kidney?

5 A. No.

6 Q. Gastric tube?

7 A. Pardon?

8 Q. Gastric tube.

9 A. No.

10 Q. Brain?

11 A. No.

12 Q. Lung?

13 A. No.

14 Q. Bones?

15 A. No.

16 Q. Skin?

17 A. No.

18 Q. Only the liver that you recall?

19 A. Yes.

20 Q. And are these results reported in Patty's and

21 Zenz to your knowledge?

22 A. I'm not sure it was both of them because I looked

23 at them both. I couldn't tell you what was in one and what

24 was in the other, but it is mentioned in one of them at

25 least; and these --

1 Q. I'm sorry?

2 A. About it causing liver cancer.

3 Q. And as I understand it, these are the only
4 reference materials that you looked at in preparation for
5 this deposition?

6 A. Yes.

7 Q. And the only materials you looked at in
8 preparation for this deposition?

9 A. Yes.

10 Q. Did you look at any testimony from any of the
11 witnesses in this case?

12 A. No.

13 Q. Are you aware of other Monsanto witnesses who
14 have testified in this case?

15 A. It was mentioned yesterday.

16 Q. What was mentioned?

17 A. One man.

18 Q. Who?

19 A. Kaley, is that how you pronounce his name?

20 MR. MALIN: Kaley.

21 Q. Do you know Dr. Kaley?

22 A. I know the name.

23 Q. Have you ever worked with Dr. Kaley?

24 A. No.

25 Q. Do you know if he is a medical doctor?

1 A. No, he is not.

2 Q. You know he is not?

3 A. (Witness nodded).

4 Q. You nodded your head.

5 A. No, he is not.

6 Q. So, your answer is, no, he is not?

7 A. That's right.

8 Q. Do you know what position Dr. Kaley holds with

9 Monsanto?

10 A. No, I do not.

11 Q. Were you told that Dr. Kelly testified?

12 A. Yes.

13 Q. Were you told a Mr. Papageorge testified?

14 A. Yes.

15 Q. Do you know Mr. Papageorge?

16 A. Yes.

17 Q. You worked with Mr. Papageorge?

18 A. I don't know what the definition of worked with

19 him is.

20 Q. Well, you were both working for Monsanto at the

21 same time?

22 A. Yes.

23 Q. But you were not necessarily working in the same

24 department; is that fair to say?

25 A. That's right.

1 Q. How about Dr. Kelly? Did you work with Dr.
2 Kelly?

3 A. I worked for him when I first came to Monsanto.

4 Q. Did you subsequently succeed him?

5 A. Yes.

6 Q. When did you first start with Monsanto?

7 A. 1973.

8 Q. In what capacity, sir?

9 A. Associate director, medical director.

10 Q. And the medical director at that time was Dr.
11 Kelly?

12 A. Yes.

13 Q. I gather 1973 was not when you graduated from
14 medical school; is that fair to say?

15 A. That's correct.

16 Q. So let's start with your graduation from college
17 and tell me about your educational background.

18 A. I went to the University of Wisconsin from 1940
19 to 1943. Then I had an interruption with the service and I
20 came out in '45 and went back to the University of Wisconsin;
21 and in 1947, I went to the Washington University Medical
22 School, 1947, and graduated in 1951.

23 Q. Did you receive a degree from the University of
24 Wisconsin in 1947?

25 A. No.

1 Q. No degree.

2 A. I wrote to them later and said please send me a
3 degree, and they did. I don't recall when that was. It was
4 just some time in the time while I was in medical school that
5 I got that.

6 Q. So you had accumulated sufficient credits to
7 obtain a degree, but you did not actually obtain it while you
8 were still there.

9 A. It was part of that interruption with the service
10 that made a difference.

11 Q. What degree did you receive from Washington
12 University Medical School?

13 A. M.D.

14 Q. And that was in 1951?

15 A. Yes.

16 Q. Did you have further formal education?

17 A. I don't know whether you would call an internship
18 formal, but it really is.

19 Q. Let's talk about your internship then. Where was
20 that?

21 A. Milwaukee County Hospital. That was the
22 Marquette Teaching Hospital.

23 Q. Marquette University?

24 A. Yes.

25 Q. How long was your internship?

1 A. One year.

2 Q. Rotating?

3 A. Yes.

4 Q. You saw all services that year?

5 A. Yes. From there, I went to the University of
6 Pittsburgh, School of Public Health; and I got an MPH in
7 occupational medicine.

8 Q. What year?

9 A. That was in '53. And the next year, I had a
10 fellowship with the National Heart Institute on metabolism of
11 the heart.

12 Q. Metabolism of the heart?

13 A. Yes. Then I went --

14 Q. Where was that service?

15 A. It was at the University of Pittsburgh, School of
16 Public Health.

17 Q. And when did you complete that fellowship?

18 A. One year.

19 Q. 1954?

20 A. Yes. The next year I went to the National Cancer
21 Institute, National Institute of Health; and that was in
22 clinical cancer. I was a clinical associate.

23 Q. And that was 1955?

24 A. Yes.

25 Q. You were there one year?

1 A. Yes.

2 Q. Then what?

3 A. Then I went to the Staten Island Marine Hospital
4 as a resident in medicine; then back to the University of
5 Pittsburgh.

6 Q. You say a resident in medicine. Was that the
7 study of internal medicine?

8 A. Yes.

9 Q. Was that a one year residency?

10 A. Yes.

11 Q. 1956, then, are we up to?

12 A. Yes.

13 Q. And then what?

14 A. Then back to the University of Pittsburgh,
15 Department of Medicine, residency in medicine, internal
16 medicine, one year.

17 Q. So, you had back to back residencies in internal
18 medicine?

19 A. Yes.

20 Q. Two years total; is that right?

21 A. Yes.

22 Q. And then?

23 A. Then I went on the staff of the School of Public
24 Health and Occupational Medicine as assistant professor.

25 Q. In Pittsburgh?

1 A. Yes, and in the department of medicine as
2 instructor.

3 Q. And how long did you stay there?

4 A. I also was medical director of Callery,
5 C-A-L-L-E-R-Y Chemical Company in Pittsburgh.

6 Q. What products did they manufacture?

7 A. The Boranes. Then in 1962, I went to the
8 University of Louisville where I had a fellowship in
9 cardiology.

10 Q. How long was that?

11 A. One year.

12 Q. Next?

13 A. University of Cincinnati, Department of
14 Preventive Medicine.

15 Q. Department of Preventative Medicine?

16 A. Preventive Medicine.

17 Q. Preventive.

18 A. And I was an Associate Professor of Occupational
19 Medicine; 1968, Tulane Medical School, Associate Professor of
20 Medicine and then professor of medicine; and then in 1973, I
21 came to Monsanto.

22 Q. Other than your residencies, did any of these
23 various positions involve the practice of medicine?

24 A. Only within the clinics. And then the Boranes --
25 At the Callery Chemical Company, I was responsible for the

1 health of those workers.

2 Q. Did you render professional service to those
3 workers at Callery as a physician?

4 A. Yes.

5 Q. And what was that? They had some sort of
6 infirmary or some other sort of medical office there?

7 A. I had a clinic.

8 Q. You had a clinic?

9 A. Yes (nodded).

10 Q. Any in-patient facilities?

11 A. No.

12 Q. What sort of injuries or ailments did you treat
13 there at Callery?

14 A. Exposure to the Boranes.

15 Q. What did it cause?

16 A. One of the Boranes was called diborane, produces
17 an acute respiratory response with tightness in the chest of
18 short duration, non-progressive, non-continuing, no increase.
19 Exposure to decaborane produces some change in liver function
20 tests.

21 Q. Any long-term effects from them?

22 A. No.

23 Q. So how did you treat these people?

24 A. Take them off of exposure. When they were
25 exposed to the diborane, we gave them oxygen; and with time,

1 plus oxygen, they were able to go back to work when we said
2 that there was no evidence of any long-term effect.

3 Q. Tell me about the other clinical experience you
4 had practicing medicine.

5 A. I operated in the clinic at the University of
6 Pittsburgh; and with the medical students, we would work up
7 patients and decide what was going to be done and treatment.

8 Q. Was that -- Let's see what period that would have
9 been.

10 A. '57 to '62, I think, something like that.

11 Q. '57. That was your residency in internal
12 medicine or --

13 A. No, that's after.

14 Q. I'm sorry. I apologize. When you were on the
15 staff of the School of Public Health and Occupational
16 Medicine; is that right?

17 A. And instructor of medicine.

18 Q. Right. Department of medicine as an instructor.

19 A. Yes.

20 Q. So you had clinical practical experience at that
21 time?

22 A. Plus I would see any consultations on the wards
23 that they thought I should see.

24 Q. And that was '57 to '62?

25 A. Yes.

1 Q. And that was coincided with your experience at
2 Callery?

3 A. Yes.

4 Q. So during that five year period, 1957 for '62,
5 you had clinical experience both at the University of
6 Pittsburgh and at Callery Chemical?

7 A. Yes.

8 Q. And the clinical experience that you described.

9 A. Yes.

10 Q. Did you ever treat a patient at any time with
11 alleged PCB intoxication?

12 A. No.

13 Q. How about dioxin?

14 A. No.

15 Q. What were your duties as assistant medical
16 director of Monsanto Chemical Company?

17 A. To assist in the clinic on examinations of the
18 employees who worked at the headquarter site.

19 Q. What is headquarters called?

20 A. I think it's called Headquarters of Monsanto.

21 Q. Where's the plant located?

22 A. Here in St. Louis.

23 Q. That's not Queeny or Krummrich or anything like
24 that?

25 A. No.

1 Q. They're all different places.

2 A. Yes.

3 Q. Is there a factory at the headquarter site?

4 A. There was a research facility.

5 Q. Just a research facility?

6 A. Yes.

7 Q. Was that a pilot type plant or just a laboratory?

8 A. Laboratory.

9 Q. So, you were seeing people then who might have
10 had some sort of illness or ailment while working in the
11 laboratory?

12 A. Yes.

13 Q. How many people worked in that laboratory during
14 that time period you were assistant director?

15 A. I can't answer that. I wouldn't even guess.

16 Q. You have no idea?

17 A. No.

18 Q. How big was a clinic?

19 A. What do you mean how big was the clinic?

20 Q. What kind of physical facility was it? Was it a
21 10 bed hospital?

22 A. Not a hospital. It is a place where we see
23 workers either bring in their non-occupational problems to
24 decide whether they can go on to work or whether they should
25 see their doctor, things like that, making decisions for

1 them, and doing examinations on them in a periodic basis.

2 Q. Did you actually render medical treatment to them
3 at that time?

4 A. Only for non-occupational, we did not. For
5 occupational, we would treat them if it was appropriate.

6 Q. So if a fella got burned in the laboratory with a
7 Bunsen burner, he'd come around to see and you'd dress the
8 wounds and take care of it?

9 A. Yes.

10 Q. What type of ailments and illness did you see
11 while you were assistant medical director in the clinic?

12 A. Non-occupational problems.

13 Q. And then you would refer them to their family
14 physician if appropriate?

15 A. Yes.

16 Q. What sort of occupational problems did you see?

17 A. Didn't see any occupational problems besides
18 injuries.

19 Q. Injuries such as I described, a fella burned
20 himself on a Bunsen burner or something like that?

21 A. Yes.

22 Q. How many people worked in the clinic when you
23 were assistant medical director?

24 A. Dr. Kelly and I, and four or five nurses, and a
25 receptionist.

1 Q. Now, did you say that you also did some studies
2 on these employees?

3 A. No.

4 Q. Did you do periodic health exams on them?

5 A. Yes.

6 Q. What were they for?

7 A. To tell them about the state of their health.

8 Q. Just to provide them with routine physical exam?

9 A. Yes.

10 Q. Did you keep records on that?

11 A. Yes.

12 Q. You were not studying them at any time in these
13 periodic health exams to determine if they had any exposure
14 to anything?

15 MR. MALIN: We're talking about the period of
16 time when he was associate medical director.

17 MR. COHEN: Yeah, assistant associate director.

18 THE WITNESS: And afterward.

19 Q. I'm just talking about when you were assistant.
20 Were you studying them to determine if they had any adverse
21 health effects from occupational exposure?

22 A. There could be a question about a man saying,
23 "Was I exposed to a chemical or not, and how much? Was it a
24 health effect?" Being exposed to a gas or a vapor, and he
25 got a whiff of it and come over and say that. That's typical

1 of the kind of things we would do.

2 Q. These are folks that were working at the
3 laboratory in the headquarters place?

4 A. Yes.

5 Q. What sort of things did they complain about?

6 A. I just said it usually would be a vapor of some
7 kind that would catch them unaware instead of putting it in
8 the hood like he should.

9 Q. But never anything on an organized basis, you
10 were never directing any sort of a study on them; is that
11 correct?

12 A. No.

13 Q. Did Dr. Kelly to your knowledge direct any such
14 studies?

15 A. I don't know.

16 Q. How long were you assistant or associate medical
17 director at headquarters?

18 A. About a year and a half.

19 Q. Then what happened?

20 A. Then Dr. Kelly retired.

21 Q. That would have been 1974 some time?

22 A. Yes.

23 Q. And you became medical director?

24 A. Yes.

25 Q. How did your duties change?

1 A. I'm now responsible for all the employees of
2 Monsanto at all sites; and I was responsible for those people
3 that had reported to Dr. Kelly, like the industrial hygiene
4 section, the toxicology section, the medical section.

5 Q. Okay. Let's talk about the industrial
6 hygienists. What were your responsibilities with respect to
7 them?

8 A. Their responsibility was to look at all the work
9 sites and to observe the work place exposure and to gather
10 whether they were in some level of safe exposure, so there
11 would not be an adverse health effect.

12 Q. During this time period 1974 to 1988, did
13 Monsanto have established levels of exposure for PCB's?

14 A. Yes.

15 Q. Did they have established levels of exposure that
16 they considered safe for dioxins?

17 A. No.

18 Q. Did they have an established safe level of
19 exposure to furans?

20 A. No.

21 Q. Did they have an established safe level of
22 exposure to benzene?

23 A. Yes.

24 Q. Did they have established safe levels of exposure
25 to chlorinated benzene?

1 A. I don't recall, but if it was in the work place,
2 I'm sure we did.

3 Q. Did they have established safe levels of exposure
4 to tin tetraphenyl?

5 A. I don't know, but I'm sure we did. We had
6 exposure limits set for everything that we could use to
7 evaluate their exposure.

8 Q. Was there a publication that would contain this
9 information that was available to you?

10 A. We used the government standards where they were
11 available.

12 Q. Prior to the time government standards were
13 available, what did you use?

14 A. I wasn't with Monsanto before there were
15 government standards.

16 Q. So, your recollection is, is that as long as
17 you've be with Monsanto, there was established levels for
18 exposure to all of those compounds; and these levels were
19 established by the government and that's what you used?

20 A. That's right, except for things like dioxin and
21 furans.

22 Q. Why is that?

23 A. Because there wasn't ones established.

24 Q. What do you consider the safe level of exposure
25 to dioxins?

1 A. The dioxin issue was no longer a realistic one
2 when I came to Monsanto and --

3 Q. You want to tell me why?

4 A. Well, no studies had been done. When they first
5 did the studies on the effects of dioxin in animals, then we
6 went back to see what the level of exposure of our people
7 was.

8 Q. Okay. When was that first study that you know
9 about?

10 A. I don't recall, something like 1975.

11 Q. Who did the study?

12 A. The study was done by Dow.

13 Q. Dow Chemicals?

14 A. Yes.

15 Q. Dow chemical was a manufacturer of dioxins at the
16 time?

17 A. Yes -- Well, no, they didn't make dioxin on
18 purpose. It was a byproduct.

19 Q. They manufactured products that contained
20 dioxins; is that correct?

21 A. Yes.

22 Q. And you say they did studies on animals. Do you
23 know who the author was of the study?

24 A. I don't recall.

25 Q. Do you know the animals that they used?

1 A. I just recall -- And I'd say rats and mice and
2 I'd probably be right.

3 Q. In other words, that's your assumption today.
4 You're not sure.

5 A. Yes, but that's almost a routine for it.

6 Q. And then as I understand it, your industrial
7 hygienists who would have been working under your direction
8 would have went back and studied the exposure levels that
9 your employees may have had to dioxin?

10 A. We were out of the dioxin business almost at that
11 time.

12 Q. So are you saying that by the time this first
13 study on dioxins came about, some time in '75, Monsanto was
14 basically out of the dioxin business?

15 A. Yes.

16 Q. What business was it in that involved the
17 manufacture or the potential exposure by employees to dioxin?

18 A. Agent Orange.

19 Q. Was that the only product that you know that
20 Monsanto manufactured that would have generated dioxins?

21 A. Yes.

22 Q. And that would have been as a byproduct?

23 A. Yes.

24 MR. MALIN: I object to the form of that
25 question. He's answered. That's all right.

1 Q. When did Monsanto manufacture Agent Orange?

2 A. It started early 50's, 1955, something like that.

3 Q. And where was it manufactured?

4 A. Nitro, West Virginia.

5 Q. And was it at that plant that you went back with
6 your industrial hygienists to determine the levels of
7 exposure?

8 A. We were working on trying to establish a level of
9 exposure, but these are contaminants, they're not something
10 that's easily measured. These are contaminants at a very low
11 level.

12 Q. Would you consider dioxin a very dangerous
13 compound?

14 MR. MALIN: I object to the form of the question.
15 You can answer if you understand it.

16 THE WITNESS: I didn't hear.

17 MR. COHEN: You can answer.

18 MR. MALIN: I object to the form of the question.
19 If you think you understand that question or if you can
20 answer it in a meaningful way --

21 THE WITNESS: Would you ask the question again?

22 Q. (By Mr. Cohen) Do you consider dioxin a dangerous
23 compound?

24 A. I didn't know at that time whether it was
25 dangerous.

1 Q. We're sitting here in 1992. What do you do you
2 know now.

3 MR. MALIN: Object to the form of the question.
4 If you think you can answer that easily, you can answer it.

5 A. Back in 1955, they were studied in some depth,
6 the workers who were making the Agent Orange, and they
7 developed a skin rash; and they were studied in depth in
8 1955, and then they started to -- Because of that, they
9 worked to control exposure, but it was done methodologically
10 rather than scientifically because they didn't know what the
11 material was that was causing the rash.

12 Q. Let me see if I understand your testimony.
13 You're relating to me an incident that occurred in 1955 while
14 Monsanto was manufacturing Agent Orange; is that correct?

15 A. Yes (nodded).

16 Q. You're nodding your head. Is that a yes?

17 A. Yes.

18 Q. These were employees at Nitro, West Virginia?

19 A. Yes.

20 Q. Any other plant?

21 A. Some of the work on finishing up that product was
22 done in Queeny Plant here in St. Louis.

23 Q. Did you study those employees at the Queeny
24 Plant?

25 A. This was before I came to Monsanto.

1 Q. All right. Let me withdraw that question. The
2 employees at the Nitro, West Virginia plant in 1955 began to
3 develop a rash while working on the production of Agent
4 Orange; is that correct?

5 A. Yes.

6 Q. Work on Agent Orange was also done during the
7 same time period at the Queeny Plant?

8 A. Not the same process, but it was a part of the
9 development and production of that material.

10 Q. Were employees exposed to Agent Orange at the
11 Queeny Plant?

12 A. Exposed to Agent Orange?

13 Q. Yes.

14 A. Yes.

15 Q. To your knowledge, did employees at the Queeny
16 Plant also develop the same type of rash that was seen on the
17 employees at the Nitro Plant?

18 A. Not in the same degree.

19 Q. In other words, they had it but not as bad?

20 A. I'm not sure how much they had, but it was not
21 much.

22 Q. Was that skin rash of chloracne type?

23 A. Yes.

24 Q. Was it chloracne?

25 A. Yes -- Well, some of the rashes they had were.

1 There was a rash, what we call chloracne, that took place
2 there, but they had other rashes from exposure to chemicals.

3 Q. Which rash were you interested in, the chloracne
4 type rash?

5 A. This was before me.

6 Q. Which rash was it that caused concern in the
7 50's, the chloracne?

8 A. The chloracne.

9 Q. Chloracne is also a rash that develops from
10 exposure to PCB's; is that right?

11 MR. MALIN: Object to the form of the question.

12 A. It can.

13 MR. MALIN: Answer it if you think you understand
14 it.

15 Q. I'll ask the question again. I think you said,
16 "It can." Was that your answer?

17 A. Exposure to -- When we say exposure to PCB's, are
18 we talking about PCB's or something bigger? It's not the
19 same thing. I talk about dioxin when I'm talking about Agent
20 Orange. It's not the same. The PCB's and the association of
21 chloracne is not the same because we didn't have exposure.
22 We didn't have chloracne with PCB's.

23 Q. Whether or not you had it, would you agree that a
24 reported effect of exposure to PCB's is chloracne?

25 MR. MALIN: I object to the form of the question.

1 What do you mean by reported?

2 Q. In the scientific literature, doctor, would you
3 agree that a reported effect in the scientific literature
4 from PCB's is chloracne?

5 A. I'm not sure that's right.

6 Q. You do not believe that its report that exposure
7 to PCB's causes chloracne?

8 A. Sometimes people exposed to PCB's will have
9 chloracne.

10 Q. And do you believe that's because of the PCB's or
11 something else?

12 A. It's something else.

13 Q. What is that something else?

14 A. I don't know.

15 Q. Do you believe that exposure to Monsanto's
16 dielectric fluids is associated with chloracne?

17 MR. MALIN: I object to that question. You're
18 asking for his opinion. He's hear as a fact witness, not an
19 expert witness. Doctor, I'm going to advise you that you
20 don't have to give opinions unless they're opinions that you
21 held when you were a medical director of Monsanto, but you
22 don't have to give medical opinions unless you're compensated
23 as an expert; and you're not named as an expert in this case.
24 The deposition is not being taken as an expert witness, it is
25 a fact witness deposition. Obviously, you're entitled to do

1 what you wish on the issue.

2 Q. (By Mr. Cohen) Do you have an opinion today, sir,
3 whether exposure to dielectric fluids manufactured by
4 Monsanto could produce chloracne?

5 A. Monsanto doesn't make it.

6 Q. Not now.

7 A. It hasn't --

8 Q. But it did make it?

9 A. It hasn't since --

10 Q. I don't know. '77, somewhere around there?

11 A. Yes.

12 Q. But they did make it?

13 A. Yes.

14 Q. I'm asking you whether you have an opinion today
15 as to whether an exposure to dielectric fluids manufactured
16 by Monsanto during the time they were manufacturing those
17 fluids could produce chloracne?

18 A. I don't think so.

19 Q. When you were medical director of Monsanto or
20 associate medical director, did you have an opinion about
21 that subject?

22 A. That was when I was not associated with it, never
23 saw it, never had any experience with it. During that time,
24 it was not producing -- making chloracne. It was not
25 producing chloracne.

1 Q. So you're saying to me during the time period you
2 were associate medical director or assistant associate
3 medical director of Monsanto, you were not having reports
4 from employees exposed to dielectric fluids manufactured by
5 Monsanto having incident of chloracne?

6 A. That's right.

7 Q. Do you know whether the scientific literature
8 reports chloracne as a potential effect from exposure to
9 dielectric fluids manufactured by Monsanto?

10 MR. MALIN: I object to the form of the question.
11 If you think you can answer the question, doctor, you may
12 attempt to answer.

13 A. Monsanto, when it was producing PCB's, did not
14 have a problem with chloracne.

15 Q. That's not my question, sir.

16 A. People who were handling PCB's other places,
17 people who used them, did have chloracne from time to time.
18 Now, the cause of that chloracne is not clear.

19 Q. Is not clear in your mind; is that right?

20 A. That's right.

21 Q. So, you're saying you're not sure whether it was
22 because of dielectric fluid contained other compounds other
23 than PCB's?

24 A. We knew that there were mixtures and we didn't
25 know what those mixtures were.

1 Q. Is this your own products you're speaking of?

2 A. I think that's true of all products.

3 Q. Well, let's focus on your products for a moment.

4 Are you saying you did not know what the mixtures were?

5 A. That's right.

6 Q. Now, you also blended, assembled, whatever,

7 products for other manufacturers such as G.E. and

8 Westinghouse.

9 A. Yes.

10 Q. They were intended to contain substances other
11 than PCB's; is that right?

12 A. I don't know.

13 Q. Well, do you know the name Inerteen?

14 A. Yes.

15 Q. Do you know what it's made of?

16 A. No.

17 Q. Do you know the product Pyronol?

18 A. Yes, but I don't know what it is.

19 Q. Do you know if it contains chlorobenzenes?

20 A. No.

21 Q. Do you know if it contains tin tetraphenyl?

22 A. No.

23 Q. Do you know if it contains Aroclor?

24 A. Yes.

25 Q. It does contain Aroclor?

1 A. Yes (nodded).

2 Q. Do you know that Monsanto blended and sold
3 products called Pyronol and Inerteen?

4 A. No.

5 Q. They did not?

6 A. When you give me the names, I would say yes, but
7 I wouldn't be able to -- I don't know it well enough to tell
8 you that.

9 Q. So you recognize the fact when I tell you that
10 they sold it, that they did sell it?

11 A. Yes.

12 Q. Were you aware during the time period that
13 Monsanto was blending and selling that product?

14 A. No.

15 Q. Are you aware of the fact that dielectric fluid
16 can in use form furans and dioxins?

17 MR. MALIN: I object to the form of the question.
18 Answer it if you think you understand it.

19 THE WITNESS: Could I hear the question, again,
20 please?

21 (Reporter read back as requested.)

22 MR. MALIN: I object to the form of the question.

23 A. I know that they can produce cloracne and the
24 assumption is that it's something in there that apparently
25 was not there when it was made, so there can be a contaminant

1 there that is not causing the chloracne. It's something
2 that's formulated. The one that they always talk about is
3 overheating that could cause it.

4 Q. What do you know about the presence of
5 chlorinated benzenes on the formation of furans and/or
6 dioxins in dielectric fluid in use?

7 A. I don't know that.

8 Q. So, you don't know anything about that chemical
9 process, whatever it is?

10 A. No.

11 Q. Now, do I understand that you assume that it's
12 something different that's causing the chloracne because
13 Monsanto's experience with its production workers, who were
14 working with PCB's, is that they did not develop chloracne?

15 A. Yes.

16 Q. So it's not based upon scientific literature per
17 se reporting that people developed chloracne, but rather on
18 the empirical data that you had in-house?

19 A. Yes.

20 Q. Let's go back to the situation in 1955. This Dow
21 Chemical study came out in the mid 70's reporting dioxin is a
22 byproduct of Agent Orange and reporting the results of animal
23 studies involving, you believe, rats and mice?

24 A. Yes.

25 Q. As a consequence, someone looked back to see what

1 had happened in the Nitro, West Virginia Plant in 1955 or
2 thereabouts when Agent Orange was being manufactured?

3 A. Yes.

4 Q. And apparently there were reports of employees at
5 Nitro having chloracne?

6 A. Yes.

7 Q. Were there reports of employees at Queeny having
8 chloracne?

9 A. When?

10 Q. In the 70's, when you looked back at the
11 historical manufacture of Agent Orange.

12 A. Are we talking about in the 70's having chloracne
13 or looking back further?

14 Q. Looking back at the historical manufacture of
15 Agent Orange, whenever that was.

16 A. They had a reaction that was called chloracne.

17 Q. Do you indicate to me that you did not believe it
18 was chloracne?

19 A. No, I didn't know what it was. We had an expert
20 witness on chloracne who came there and had seen the first
21 cases and followed up on them.

22 Q. Who was that expert?

23 A. A man from the University of Cincinnati. His
24 name slips my mind.

25 MR. COHEN: Well, can you help me out, Mr. Malin?

1 MR. MALIN: I think Dr. Kelly testified that it
2 was a man named Suskind.

3 Q. (By Mr. Cohen) Does that refresh your
4 recollection?

5 A. Yes.

6 Q. Was he a medical doctor?

7 A. Yes, Dermatologist.

8 Q. Dr. Suskind came down. Was he studying records?

9 A. No, studying people.

10 Q. When was that? What year?

11 A. At that time in 1955.

12 Q. Suskind came down and studied people in the 50's
13 and he diagnosed chloracne.

14 A. Yes.

15 Q. Both at Nitro and Queeny?

16 A. He didn't come to Queeny.

17 Q. Who diagnosed the chloracne at the Queeny Plant?

18 A. There wasn't much in the way of chloracne problem
19 there. It was very small if there was any.

20 Q. Did you tell me a few minutes ago that people had
21 chloracne at Queeny?

22 A. I told you that I have difficulty because it was
23 such a small problem, if it was any, and that you're talking
24 about before my time in terms of bringing it up to the
25 present time; and I can't do it.

1 Q. I'm not trying to argue with you, doctor. I'm
2 trying to found out who made the determination -- however
3 many people it was, one, three, a hundred, how many people, I
4 don't know -- who had chloracne.

5 MR. MALIN: You're asking him to testify to
6 something in which he has no personal knowledge.

7 MR. COHEN: I don't care whether he has personal
8 knowledge, Mr. Malin, but he had records available to him at
9 the time. He knew that Suskind went to Nitro.

10 Q. (By Mr. Cohen) Who went to Queeny?

11 A. I'm not even sure when -- They didn't make Agent
12 Orange. I told you there's a different process at Nitro than
13 there was at Queeny, and so that the hazard of it and the
14 production of it would be quite different in terms of the
15 likelihood of producing chloracne; and so the definition of
16 what they had could have been made by a local doctor rather
17 than having Suskind come to Queeny.

18 Q. I understand, sir. All I'm trying to find out is
19 who did make the determination of the employees at Queeny.
20 Was it a local doctor?

21 MR. MALIN: If you know, doctor.

22 A. I don't know.

23 Q. But someone apparently reported that employees at
24 Queeny, during some time period during the manufacture of
25 Agent Orange, had experienced chloracne; is that right?

1 A. I don't know.

2 Q. You don't know. Okay. What happened in the mid
3 70's when you looked back at the employees at Nitro and
4 perhaps Queeny? Did you do further studies?

5 A. Yes, we had Suskind come back and examine them
6 again.

7 Q. And did Suskind write up his studies?

8 A. Yes.

9 Q. Did he issue a report on what happened?

10 A. Yes.

11 Q. What did he report?

12 A. That there was persisting cloracne lesions in the
13 people who had the exposure back in 1955.

14 Q. And were these people no longer exposed to the
15 Agent Orange?

16 A. That's right.

17 Q. So from an exposure in the past, almost 20 years
18 in the past, they were having persistent chloracne?

19 A. Some of them. Less than 50 percent. There were
20 some of them that had persisting lesions.

21 Q. Did he study any other health effects other than
22 the chloracne?

23 A. Yes.

24 Q. What?

25 A. He had a general examination. He had a

1 neurologist; and I think that's it.

2 Q. Did they do liver function studies?

3 A. Yes, as part of the general examination.

4 Q. Did they find any change in liver enzymes?

5 A. All that had cleared up.

6 Q. How about back in the 50's? Did he do liver
7 function studies?

8 A. Yes.

9 Q. Did he find elevation of liver enzymes?

10 A. In some.

11 Q. Did he do any other studies, any serum studies,
12 plasma, body fat, to see if any substance was being stored?

13 A. No.

14 Q. By the mid 70's did he know that the exposure was
15 to dioxins when he came back?

16 A. Yes.

17 Q. Was that as a result of the work that Dow had
18 done?

19 A. I don't know how we'd say what the basis of that
20 knowledge was.

21 Q. But by the mid 70's Monsanto knew that dioxin was
22 a byproduct of the manufacture of Agent Orange?

23 A. Yes.

24 MR. MALIN: I object to the form of the question.
25 It is a contaminant not a byproduct; and that's what he

1 testified to.

2 MR. COHEN: No. His exact word was a byproduct.

3 Q. (By Mr. Cohen) Were they not, doctor? I wrote it
4 down when you said it. A byproduct.

5 MR. MALIN: Just tell us what's correct.

6 Q. (By Mr. Cohen) You tell me, doctor.

7 A. I don't know the difference.

8 Q. Do you believe you used the word byproduct
9 earlier in this deposition?

10 A. I'd have to assume I did.

11 Q. So when you say byproduct, that is equal to, in
12 your mind, contaminant?

13 A. Yes.

14 Q. Were any further studies made of these folks at
15 Nitro?

16 A. The people from Mt. Sinai came.

17 Q. Up in New York?

18 A. Yes.

19 Q. Who were those people?

20 A. I don't recall. It wasn't done for us. It was
21 done for the union.

22 Q. You don't know their names?

23 A. No.

24 Q. If I said some names, would you recognize them?

25 A. Sure.

1 Q. Schechter?

2 A. No, Schechter's not from there.

3 Q. Selikoff?

4 A. It was from Selikoff's department, but it wasn't
5 he.

6 Q. Wolf?

7 A. No.

8 Q. Nicholson?

9 A. No. It was a woman.

10 MR. COHEN: I'll think of it on the plane on the
11 way home, and I'll give you a call.

12 Q. (By Mr. Cohen) What other studies did Monsanto
13 perform on these folks?

14 MR. MALIN: When are we talking about?

15 MR. COHEN: Nitro, West Virginia. Folks exposed
16 to Agent Orange.

17 Q. (By Mr. Cohen) What other studies were done?

18 A. There was, as a part of the Nitro lawsuit, the
19 same population was studied by the West Virginia Medical
20 School Department of Medicine.

21 Q. Who was directing Suskind's work on these folks
22 at Nitro?

23 A. No one was directing, but what he had planned to
24 do he gave us to look at, and we agreed with what he was
25 going to do.

1 Q. Who's we?

2 A. Primarily me.

3 Q. You were the medical director of Monsanto at that
4 time?

5 A. Yes.

6 Q. Suskind came to you, told you what his plans were
7 --

8 A. No. He came and asked -- He said he would like
9 to do an examination to see.

10 Q. Was Suskind working alone on this?

11 A. He brought with him a team from the University of
12 Cincinnati to do the exam.

13 Q. Who's J. A. Zack?

14 A. Who?

15 Q. J. A. Zack.

16 A. She worked for Monsanto.

17 Q. She's an employee of Monsanto?

18 A. Yes, she was.

19 Q. She was?

20 A. Yes.

21 Q. Industrial hygienist?

22 A. No, no.

23 Q. What was her job?

24 A. Epidemiologist.

25 Q. What department did she work in when she was

1 working there?

2 A. Department of medicine.

3 Q. Was that your department?

4 A. Yes.

5 Q. Was she an employee of yours?

6 A. Yes.

7 Q. What's her full name?

8 A. Judy. Judy Zack.

9 Q. Where does she live?

10 A. She doesn't live in St. Louis. She moved away.

11 She was married to a resident in medicine and they went
12 someplace else.

13 Q. How long did she work at Monsanto?

14 A. A short time, three, four, five years.

15 Q. What were the inclusive dates of her employment?

16 A. I don't know.

17 Q. Mid 70's?

18 A. Yes.

19 Q. Is that correct?

20 A. I think so. I don't know.

21 Q. Was it about this time that Suskind came back and
22 talked to you and told you what he wanted to do?

23 A. Yes.

24 Q. Did Ms. Zack work with Dr. Suskind?

25 A. Yes.

1 Q. Didn't they together investigate these employees
2 at Nitro?

3 A. Yes.

4 Q. Did they investigate employees anywhere else?

5 A. No.

6 Q. Ms. Zack was an epidemiologist. Did she have a
7 Ph.D.?

8 A. No.

9 Q. Masters?

10 A. Yes.

11 Q. Do you know from what institution?

12 A. Michigan, I think.

13 Q. What is epidemiology?

14 A. Epidemiology, it is a study of epidemics.

15 Q. And today what do epidemiologists do?

16 A. Yes.

17 Q. What do they do?

18 A. They study epidemics.

19 Q. They study epidemics. What was she studying with
20 Dr. Suskind?

21 A. Whether there was an epidemic effect from the
22 exposure to the dioxin.

23 Q. Epidemic of what?

24 A. An epidemic. Any epidemic.

25 Q. Oh. I'm sorry. An epidemic effect, is that what

1 you said?

2 A. Yes.

3 Q. In other words, a broad population of individuals
4 afflicted with some ailment?

5 A. To see if there was an affliction of some type.

6 Q. And what did they determine?

7 A. That there was a persisting effect on the skin,
8 and that was it.

9 Q. Did they study anything else?

10 A. Oh, they did the complete medical workup as you
11 would any other person; and the specific test was to look at
12 the skin by Dr. Suskind.

13 Q. And Dr. Suskind, he was a medical doctor?

14 A. Dermatologist.

15 Q. Was there report and epidemiological study?

16 A. Yes. An epidemiological study can be either a
17 lifetime study or it can be a vertical study in terms of what
18 affects the population. They're both a part of epidemiology.

19 Q. What was this?

20 A. What was what?

21 Q. This study that Zack and Suskind did.

22 A. It was a vertical study.

23 Q. What was it called?

24 A. What was it called?

25 Q. The study.

1 A. I've forgotten.

2 Q. Was it published?

3 A. Yes.

4 Q. Was it called a cancer risk specific dose
5 estimate for 2,3,7,8-TCDD?

6 A. That was one of the studies, yes.

7 Q. How about the mortality experience of workers
8 exposed to tetrachlorodibenzodioxin in a trichlorophenal
9 process accident?

10 A. Yes.

11 Q. Is that one of the studies?

12 A. Yes.

13 Q. What's trichlorophenal?

14 A. It's one of the substances they used to make
15 Agent Orange.

16 Q. Is that what you were manufacturing at Nitro?

17 A. Yes.

18 Q. Was there an accident?

19 A. Yes.

20 Q. In the 50's?

21 A. Yes.

22 Q. What happened?

23 A. It's like all chemistry in a chemical company is,
24 they have a large reactor as big as this room and the
25 chemicals that are reacting together are put in these large

1 vessels and they have a release valve on top of it someplace
2 and that release valve is, if the pressure builds up in
3 there, so they don't have an explosion, that it releases.
4 That's what took place. There was a release of material
5 inside that reactor and it coated the inside of the building
6 where this reactor was; and they went in afterward and
7 cleaned it up off the walls of the reactors and other places.

8 Q. So it was the workers who did the cleanup work
9 who developed the chloracne?

10 A. Yes.

11 Q. Any other workers develop the chloracne?

12 A. Only those that worked there either for a long
13 period of time or a short period of time. Not all of them
14 developed it.

15 Q. But you're saying that individuals who worked for
16 a short period of time developed chloracne and individuals
17 who worked for a long period of time developed chloracne.

18 A. Yes.

19 Q. As part of this study, were they trying to
20 determine if there was any other ailment caused by the
21 exposure other than the chloracne?

22 A. They were looking to see what the state of their
23 health was at the time they did the examination.

24 Q. Did they make an analysis to determine if there
25 was any cancer as a result of the exposure?

1 A. Yes.

2 Q. What did they report?

3 A. There was no excess of cancer.

4 Q. Was that true?

5 A. There was no excess of cancer?

6 Q. Yes.

7 A. What do you mean is it true?

8 Q. Was it true?

9 A. The studies showed there was no excess of cancer.

10 Q. Do you believe that that is the fact, that there
11 was no excess of cancer?

12 A. On what would I base it?

13 Q. I didn't ask you that. I asked you if you
14 believed it was true.

15 MR. MALIN: He's asking for your opinion again.

16 A. Based on that study, there was said there was no
17 cancer effect.

18 Q. And was that your only source of information, the
19 study itself?

20 A. At that time.

21 Q. Did you subsequently learn that the study was
22 perhaps flawed?

23 A. No.

24 Q. Did you subsequently learn that the study may
25 have been fraudulent?

1 A. No.

2 Q. Has it been reported that the study was
3 fraudulent?

4 A. No, not to my knowledge.

5 Q. Has anyone from the environmental protection
6 agency ever spoken to you about that study?

7 A. No.

8 Q. Has anyone ever told you that the Environmental
9 Protection Agency has issued a memorandum in which they
10 allege that that study was fraudulent?

11 A. I haven't seen it.

12 Q. Did you testify about this study on the Kemner
13 case?

14 A. Yes.

15 Q. Has anyone ever suggested to you that that
16 research was altered?

17 A. That what? The study was altered?

18 Q. Uh-huh (yes).

19 A. No. That Suskind's study was altered?

20 Q. Uh-huh (yes).

21 A. No.

22 Q. What was the nature of the relationship between
23 Suskind and Monsanto Company when this study was performed at
24 Nitro?

25 MR. MALIN: I object to the form of the question.

1 If you can understand that question, you can attempt to
2 answer that.

3 THE WITNESS: Could you ask the question again,
4 please?

5 (Reporter read back as requested.)

6 THE WITNESS: Which study?

7 MR. COHEN: The one that was performed by Suskind
8 and Zack in the mid 70's on the Nitro employees.

9 MR. MALIN: Was it more than one study? Did we
10 establish that?

11 Q. (By Mr. Cohen) All right. Let's get it clear.
12 How many studies did Zack and Suskind together perform?

13 A. They did the lifetime study.

14 Q. And that was what, the mortality experience of
15 workers exposed to tetrachlorodibenzodioxin in a
16 trichlorophenol process accident?

17 A. Yes.

18 Q. Do you know where it was published?

19 A. I think it was in the -- No, I don't.

20 Q. In the Journal of Occupational Medicine?

21 A. Yes.

22 Q. Number 22?

23 A. Yes.

24 Q. In 1980?

25 A. I don't know.

1 Q. Did they do another study?

2 A. Suskind did another study. That was the lifetime
3 -- I mean the vertical study.

4 Q. What was that study called?

5 A. I don't know.

6 Q. Do you know when that was published?

7 A. No. That was A.M.A., though.

8 Q. A.M.A.?

9 A. That was published in the A.M.A.

10 Q. Journal of the American Medical Association?

11 A. Yes.

12 Q. J.A.M.A.?

13 A. Yes.

14 Q. Was that after the 1980 study?

15 A. I don't know.

16 Q. Now, when the mortality study was done, what was
17 the relationship between Monsanto and Dr. Suskind?

18 MR. MALIN: I object to the form of the question.
19 If you think you understand that question, you can attempt to
20 answer it. What do you mean? Do you mean financial
21 relationship? Did he know the chairman of the board?

22 MR. COHEN: I don't know.

23 Q. (By Mr. Cohen) Were you working together? What
24 was it?

25 A. I have a problem with the nature of the

1 relationship.

2 Q. Do you know the relationship? Was there a legal
3 relationship that was established?

4 A. No.

5 Q. Did you enter into a contract with Suskind?

6 MR. MALIN: Do you mean a written contract, oral
7 contract?

8 MR. COHEN: I really don't know and don't care.
9 I just want to know if they had a contract or a relationship.

10 MR. MALIN: Doctor, tell us how you came to hire
11 them and what he was supposed to do. I think that's what
12 he's looking for here.

13 A. The study that Suskind did in looking at the
14 health of the people who were still working at that plant and
15 those who had worked at the plant was done based on the need
16 for information on the long-term health effects of dioxin
17 exposure; and that was done as a result of a conference over
18 in Italy, and he came back and said, "I'd like to do a study
19 on these people." And based on that meeting, we said, "Go
20 ahead." Now, the contract. Was there a contract, as who
21 paid to help to get it done? I'm sure Monsanto paid part of
22 it; and he had some money of his own for research that he
23 could use.

24 Q. Plus you supplied an employee?

25 A. Yes.

1 Q. Ms. Zack?

2 A. To help to do it, yes.

3 Q. Did she do the epidemiological part of the study?

4 A. Yes.

5 Q. Or did they do that together?

6 A. She did the epidemiologic parts.

7 Q. What did Suskind do, the medical exams?

8 A. He went over and talked about who was there in
9 the exposure and helped to define what the people were.

10 Q. How many people were involved?

11 A. I don't know. The people who are part of the --
12 This was a study of people with chloracne; and there was
13 something on an order of a hundred people involved in that
14 study.

15 Q. Does 121 sound right?

16 A. Could well be.

17 Q. And there was analysis to determine whether there
18 was an excess of cancer deaths; is that right?

19 A. Their goal was to determine what had happened and
20 what it was, the mortality experience of that population.
21 That was what they did.

22 Q. And was one of the conclusions dealing with an
23 excess of cancer deaths?

24 A. That would be one of the conclusions. It
25 wouldn't follow always on the mortality studies.

1 Q. And the report was that there was not; is that
2 correct?

3 A. That's right.

4 (A short recess was taken.)

5 Q. To your knowledge, has Ms. Zack ever obtained a
6 Ph.D.?

7 A. I don't know. She left while she was -- while
8 she was talking about it, going on. I knew she was talking
9 about it, but whether she did --

10 Q. Are you aware of the fact that Dr. Zack had done
11 an earlier or predecessor study on the same group of people
12 prior to the time that she worked with Dr. Suskind?

13 MR. MALIN: I object to the form of the question.
14 You mean on the Nitro people?

15 MR. COHEN: Uh-huh (yes). Yes, on the Nitro
16 people.

17 MR. MALIN: You're talking about things I don't
18 know anything about, so I'll withdraw my objection.

19 A. I don't know.

20 Q. You don't know anything about that?

21 A. I don't recall anything.

22 Q. Has it ever been suggested to you that Dr. Zack
23 had omitted five deaths from the exposed group and put them
24 into the category as unexposed?

25 A. No.

1 Q. Let me restate that. Had it ever been alleged to
2 you that she had knowingly omitted five deaths from the group
3 exposed to dioxins?

4 MR. MALIN: Are we talking about the Nitro study
5 then?

6 MR. COHEN: Yes.

7 MR. MALIN: Answer the question if you can.

8 A. The crux of all such discussions would be whether
9 the people in the epidemiology study put them in the right
10 category or not; and the question is, did she have some that
11 she moved from one category to another?

12 Q. Yes.

13 A. And if she did, it was because there was a basis
14 for that interpretation that I took that person from here
15 because they thought we were there, when, in fact, they
16 worked over here. That's a terrible problem in occupational
17 epidemiology in deciding which cohort are you talking about.

18 Q. So you're saying that it's possible that she had
19 some people in the wrong group?

20 A. I think it's true of any epidemiology study.

21 Q. I didn't ask you that. Is it possible she had
22 some people in the wrong group?

23 A. It's possible.

24 Q. Do you know that she had some people in the wrong
25 group?

1 A. No.

2 Q. Was there another incident in 1949 different than
3 the incident in 1955?

4 MR. MALIN: I object to the form of that
5 question. Are we talking about another incident?

6 A. I think we're all talking about the same one.
7 This is -- The 1949/1955 is my problem in saying when that
8 episode took place.

9 Q. So there was one 1949 accident that you're aware
10 of. When you said '55, you were talking about the same
11 thing.

12 A. Right.

13 Q. And that's the incident that we're talking about
14 that involved this -- what was it called here -- this
15 trichlorophenol accident?

16 A. Yes.

17 Q. Do you know that five persons who died were
18 omitted from the group that was considered to be the exposed
19 group in that 1949 accident?

20 A. No, I don't know that.

21 Q. Do you know that four workers who had been
22 exposed were categorized as unexposed?

23 MR. MALIN: I object to the form of the question.
24 I mean you're stating something categorically that's not in
25 evidence information and the doctor wouldn't necessarily know

1 the answer, and he already testified to that. But if you
2 think you can answer the question, go ahead.

3 A. I don't recall any of this.

4 Q. Were you asked the same exact questions in your
5 testimony in the Kemner case?

6 A. Pardon?

7 Q. Were you asked these questions in the Kemner
8 case?

9 A. I was asked so many questions, I can't answer
10 that question.

11 Q. So you're saying you don't know whether you were
12 asked about that?

13 A. No.

14 Q. Were you asked about Zack and Suskind's work when
15 you testified in Kemner?

16 A. Yes.

17 Q. Were you asked whether the classifications made
18 by Dr. Zack were accurate?

19 A. I told you I don't recall that. That's a
20 different thing.

21 MR. MALIN: Wait a minute. He's asking you if
22 you were asked that in the Kemner case, not whether or not
23 you know they were accurate.

24 THE WITNESS: I don't recall that.

25 MR. MALIN: Okay. That's his answer.

1 Q. Is it my understanding of your testimony that the
2 possible classification of individuals for a cohort group in
3 any epidemiological study can lead to the possibility of
4 error in classification?

5 MR. MALIN: Objection. He said occupational
6 epidemiological studies.

7 Q. (By Mr. Cohen) Is that correct, sir? Is that
8 what you said?

9 A. Yes.

10 Q. So you're referring to occupationally exposed
11 individuals?

12 A. Yes.

13 Q. And you are saying that it's possible that any
14 such epidemiological study can contain such errors in
15 classification?

16 A. Yes.

17 Q. Is it your experience that they do contain such
18 errors?

19 A. No.

20 Q. Do you have any experience to tell you whether
21 they do or do not?

22 A. No.

23 Q. On what do you base your testimony that it is
24 possible that that error can occur?

25 A. I know how they are put into cohorts. They get

1 this from as many different sources as possible and that's a
2 general statement. When we talk about that looking at those
3 people with chloracne, that was an easier definition that, in
4 fact, this cohort was, in fact, a group that had chloracne.
5 Now, if they didn't have chloracne, then they wouldn't go
6 into a group with chloracne.

7 Q. Has Monsanto ever, to your knowledge, used the
8 results of the Zack and Suskind study, mortality study?

9 MR. MALIN: I object to the form. Used for what
10 purpose?

11 MR. COHEN: Any purpose.

12 MR. MALIN: If you understand the question, try
13 to answer it, doctor.

14 A. Not that I know of.

15 Q. Has Monsanto ever relied upon that study to show
16 that the only health consequence of exposure to dioxin was
17 chloracne?

18 A. I don't know that.

19 Q. Did you ever, as medical director of Monsanto,
20 rely upon that study?

21 A. Rely on it for what?

22 Q. Anything, advising customers, advising scientists
23 who inquired, anyone.

24 A. No.

25 MR. COHEN: Mark this as an exhibit.

1 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 1.)

2 Q. Have you ever seen this document before?

3 A. No.

4 Q. So, this is the first time you've seen this
5 memorandum?

6 A. Yes.

7 Q. Has anyone ever discussed this document with you
8 before?

9 A. No.

10 Q. Were you unaware of its existence prior to it
11 being shown to you just a few moments ago?

12 A. I was unaware of this document.

13 MR. MALIN: In order to understand, this is a
14 document that we're talking about is Exhibit 1, dated
15 February 23, 1990, from Cate Jenkins to Raymond C. Loehr,
16 Ph.D., which is apparently based upon a plaintiff's brief in
17 the Kemner case. Is that what we're talking about?

18 MR. COHEN: We're talking about a document that
19 is dated February 23rd, 1990, from Cate Jenkins to Raymond C.
20 Loehr. It's been marked Exhibit 1. You can characterize it
21 any way you want to for any purpose you like.

22 Q. (By Mr. Cohen) Now, let me ask you this, doctor,
23 when you retired in April of 1988, was there, to your
24 knowledge, any ongoing investigation, litigation claim of any
25 kind between EPA's Office of Research and Development or any

1 other division of EPA and Monsanto?

2 A. No.

3 Q. You're unaware of any case that was in existence
4 at that time?

5 A. That's right.

6 Q. So where it says in the last paragraph on the
7 last page, "I request that the SAB on its own, or by way of
8 direction to EPA's office of Research and Development obtain
9 the full files from the ongoing case against Monsanto," you
10 have no idea what they're talking about?

11 A. No.

12 Q. Is that correct, you have no idea?

13 A. Yes.

14 Q. Now, is it true, to your knowledge, from records
15 that Dr. Suskind testified on behalf of Monsanto before the
16 Workers Compensation Commission in 1955?

17 MR. MALIN: I object to the form of the question.
18 What Workers Compensation Commission? What state? What?

19 Q. Without regard to what state, are you aware of
20 that, sir?

21 A. No.

22 Q. You're unaware of that.

23 A. (Witness nodded).

24 Q. You've never seen anything to indicate whether or
25 not Dr. Suskind ever testified on Monsanto before a Workers

1 Compensation Commission?

2 A. In 1955, about?

3 Q. We're talking about in 1955.

4 A. No, I do not.

5 Q. Are you aware --

6 MR. MALIN: The doctor has testified that he came
7 to Monsanto in 1973. Is that 18 years?

8 MR. COHEN: Thank you for that. I appreciate
9 that, Mr. Malin. I'm asking him from records.

10 Q. (By Mr. Cohen) From any other source, are you
11 aware of Dr. Suskind having testified on behalf of Monsanto
12 before a Workers Compensation Commission?

13 A. No.

14 Q. Are you aware of whether any of the employees at
15 the Nitro, West Virginia Plant ever made claims for workers
16 compensation benefits as a result of harm they allege
17 occurred from their exposure at that facility?

18 A. No.

19 Q. And I'm referring specifically to the 1949
20 trichlorophenol accident.

21 A. No.

22 Q. You're unaware of any claim before the workers
23 compensation?

24 A. That's right.

25 Q. So where it says in this document on the third

1 page, "In addition, it was alleged that in November of 1955,
2 Dr. Suskind colluded with Monsanto to conceal findings of
3 psychoneuroses in the exposed workers from the Workers
4 Compensation Commission." You have no information to tell
5 you whether or not that's true or not?

6 A. No.

7 Q. And you are unaware of Dr. Suskind ever having
8 offered any testimony, or any reports, any information, to
9 any Workers Compensation Commission?

10 A. That's right.

11 Q. And let's move away from testimony for a moment.
12 Did Dr. Suskind, to your knowledge, from records or otherwise
13 ever offer any reports or affidavits or statements of any
14 kind to any Workers Compensation Commission regarding these
15 employees?

16 A. I'm not sure what the question is, but I know the
17 subject. What was the question?

18 (Reporter read back as requested.)

19 MR. MALIN: I object to the form of the question.
20 That's very confusing. I'm not sure what you're asking. Are
21 you asking, do you know from records whether or not he did
22 it? Well, I think you're asking him, do you know from any
23 records that you have seen while you were at Monsanto,
24 whether Dr. Suskind ever offered any testimony with respect
25 to any of the Nitro workers for any workman's compensation

1 boards? Is that what you're asking?

2 MR. COHEN: No.

3 Q. I'm asking the doctor, from any source of any
4 information whatsoever available to you, whether you were
5 aware that Dr. Suskind offered either testimony, reports,
6 affidavits or statements of any kind before any Workers
7 Compensation Commission regarding the employees at Nitro,
8 West Virginia?

9 A. No.

10 Q. Are you aware of whether there was ever any
11 litigation brought by any of the workers or their survivors
12 against Monsanto or anyone as a result of injuries that they
13 allege occurred at that trichlorophenol explosion?

14 A. No.

15 Q. There has been no such litigation?

16 A. No, I don't know.

17 Q. You don't know whether there has been or not?

18 A. That's right. I have no knowledge about the
19 subject.

20 Q. Now, it states here in this document again, on
21 page 3, "An earlier, predecessor study performed by Dr. Zack
22 was alleged to have deliberately and knowingly omitted 5
23 deaths from the group exposed to dioxins in the 1949
24 accident." And it goes on. Are you aware of any predecessor
25 study performed by Dr. Zack?

1 A. No.

2 Q. Second full paragraph, on that page, starts off,
3 "The Monsanto study performed by Dr. Suskind on workers
4 exposed to dioxins" --

5 A. I'm not with you.

6 Q. On page 3.

7 A. The same page.

8 Q. "The Monsanto study performed by Dr. Suskind on
9 workers exposed to dioxins in the 1949 accident, published in
10 1980 in the Journal of the American Medical Association and
11 the same year, in the Journal of Occupational Medicine with
12 Dr. Zack as co-author" -- and there's a parenthetical phrase
13 -- "was also alleged to be fraudulent." Are you aware of Dr.
14 Suskind having published a study in 1980 in J.A.M.A.
15 regarding that 1949 accident?

16 A. Yes.

17 Q. Are you aware that that is the same study that
18 was also published in the Journal of Occupational Medicine?

19 A. No.

20 Q. It is not, to your knowledge, the same study?

21 A. Not the same study.

22 Q. They are separate studies?

23 A. Yes.

24 Q. Is Dr. Zack a participant in any way in both
25 studies?

1 A. No.

2 Q. She was a participant in one study only; is that
3 correct?

4 A. In the J.O.M. study.

5 Q. And that's the study that we discussed earlier,
6 the mortality experience of workers exposed to
7 tetrachlorodibenzodioxin in a trichlorophenol process
8 accident?

9 A. Yes.

10 Q. What is the study that was published in J.A.M.A.?
11 What was that about?

12 A. That was a medical study. That's the vertical
13 study. That's looking at --

14 Q. That was not an epidemiological study?

15 A. That's a vertical epidemiologic study. That's a
16 study of a population rather than the person. That makes an
17 epidemiological study.

18 Q. And that is the 1980 study?

19 A. Yes.

20 Q. In J.A.M.A.?

21 A. Yes.

22 Q. And that was performed by Dr. Suskind alone?

23 A. And people with him at Cincinnati.

24 Q. Now, in either of these studies, are you aware of
25 any allegations of knowing or unknowing misclassifications of

1 participants?

2 A. No.

3 MR. MALIN: He's answered that question several
4 times already.

5 MR. COHEN: We're trying to get it clear.

6 Q. (By Mr. Cohen) Have you ever had occasion to talk
7 to Dr. Suskind about either of these studies since you
8 testified in the Kemner case?

9 A. No.

10 Q. Have you ever talked to Ms. Zack about either of
11 these studies?

12 A. No.

13 Q. We had started talking about your
14 responsibilities as a medical director. You had said that
15 you had had industrial hygienists working for you and you
16 looked at work sites in order to determine whether the levels
17 of exposure were safe levels. Do you recall that?

18 A. Yes.

19 Q. And you started to tell me about the incident in
20 1955 at Nitro. Did you make any other determinations
21 regarding the exposure of workers at any Monsanto plant for
22 any of the substances that by that time the government had
23 published exposure levels for?

24 MR. MALIN: I object to the form of the question.
25 If you think you understand it, you can try and answer it.

1 Q. You had told me that you had no published levels
2 for dioxins prior to that time. Do you recall that?

3 A. Yes.

4 Q. That's how we got on this whole discussion.

5 A. Yes.

6 Q. Until this Dow report. Did you make
7 determinations at that time in the mid 70's regarding the
8 exposure levels of employees in Monsanto plants to other
9 substances?

10 A. Yes.

11 Q. Where are those results of those analyses?

12 A. In our industrial hygiene section. They keep
13 records of those.

14 Q. And those were the work of the industrial
15 hygienists?

16 A. Yes.

17 Q. When you found levels of exposure beyond what the
18 government had published as so-called safe levels of
19 exposure, what did you do? What was it your responsibility
20 to do?

21 A. Determine whether, in fact, they were elevated;
22 and if they were elevated, either to give them some
23 protective gear or to change the ventilation in the area in
24 order to get it down to a level where it is at a safe level.

25 Q. Who made the determination as to what was the

1 appropriate step to take?

2 A. Well, appropriate step to take about what?

3 Q. What measures you were going to do to bring the
4 exposure levels down.

5 A. That's the responsibility of the plant together
6 with industrial hygiene that, in fact, met the goal.

7 Q. And ultimately was it your determination as to
8 what was to be done or did you just supervise this?

9 A. Just supervised.

10 Q. Other than the industrial hygienists, what other
11 responsibilities did you have as medical director?

12 A. Supervise the toxicology section.

13 Q. And what were their activities?

14 A. To do appropriate studies to insure we knew
15 enough about our chemicals to say that they can be handled
16 safely, as well as what safety device would probably be
17 effective.

18 Q. Handled safely by whom?

19 A. The workers.

20 Q. Your own workers?

21 A. Yes.

22 Q. Was any of the work of the toxicology section
23 directed toward the handling of your products by persons
24 other than workers of Monsanto?

25 MR. MALIN: I object to the form of the question.

1 He's testified what his responsibility was. His
2 responsibility was as medical director to supervise the
3 health of workers at the Monsanto facilities. I don't think
4 he described any other.

5 MR. COHEN: Are you coaching him now, or are you
6 instructing him not to answer?

7 MR. MALIN: I'm describing what he has described
8 as his duties; and you haven't established that he has or
9 would have any such knowledge.

10 MR. COHEN: I don't believe I have to establish
11 anything. This is a discovery deposition. I'm trying to
12 find out what he knows.

13 MR. MALIN: I object to the form of the question.
14 If you can understand the question, answer it.

15 MR. COHEN: I think we probably both forgot the
16 question. Do you want to hear it back?

17 (Reporter read back as requested.)

18 A. The toxicology section had the responsibility to
19 define how a product should be handled safely; in other
20 words, if the product is not toxic, then it can be a
21 relatively non-specific safety procedure, but if in fact it
22 was a more toxic material, they would say something needs to
23 be done in addition to that.

24 Q. When you say how to handle the product safely,
25 are we speaking strictly of Monsanto employees or are we

1 speaking of the world at large?

2 A. Our customers.

3 Q. So this went beyond then trying to protect your
4 own workers?

5 A. Yes.

6 MR. COHEN: What time do you want to break for
7 lunch? Off the record.

8 (A recess was taken for lunch.)

9 Q. When we had broken off, doctor, we were talking
10 about the work of the toxicology section; and I believe you
11 said that they had the responsibility to determine how to
12 handle a product safely. And that was, as I understood it,
13 for your customers; is that right?

14 A. Yes.

15 Q. Now, when you say your customers, do you mean
16 just those people who buy the product, how it should be
17 handled safely, or was it intended to determine its safe
18 handling throughout its useful life and perhaps beyond that,
19 on through salvage?

20 MR. MALIN: If you understand that question,
21 doctor, you may attempt to answer it.

22 A. Their responsibility was to write out how they
23 think it should be handled to be handled safely.

24 Q. What was the duration of their intended scope of
25 instruction?

1 A. That it would appear as a label on the product
2 for use.

3 Q. So would it be fair to say then that their job
4 was to provide appropriate labeling for the product?

5 A. Yes.

6 Q. What was that labeling to inform whoever received
7 the product? What information was it to give them?

8 A. To explain to them what they must do to protect
9 themselves.

10 Q. From the product itself?

11 A. Yes.

12 Q. Now, at the time that you came there in 1973 --

13 A. Yes.

14 Q. -- did you have any responsibility toward the
15 toxicology section?

16 A. Yes.

17 Q. Were they the same responsibilities --

18 A. Between '74, I became responsible for them.

19 Q. So it was after Dr. Kelly left?

20 A. Yes.

21 Q. What did you do at that time to determine that
22 the toxicology section had prepared appropriate labeling for
23 the products?

24 A. I don't understand the question.

25 Q. Did you do anything to determine whether the

1 labeling of the products was appropriate when you took over
2 the role of medical director?

3 A. Indirectly.

4 Q. What do you mean indirectly?

5 A. Dr. Levinskas was responsible for the labeling.

6 Q. And who was Dr. Levinskas?

7 A. He's the head chief toxicologist.

8 Q. Was he in your department?

9 A. Yes.

10 Q. Did you supervise him?

11 A. Yes.

12 Q. Would he have been the individual who was head of
13 the toxicology section?

14 A. Yes.

15 Q. When you took over as medical director, did he
16 report to you on the status of his work?

17 A. Yes.

18 Q. What did he tell you?

19 A. On what?

20 Q. Anything.

21 A. Tell me about the products, if he had any concern
22 for them, whether there should be more studies done on them.

23 Q. Do I take it then that the toxicology section did
24 some sort of work in order to determine whether the labeling
25 was appropriate?

1 A. Yes.

2 Q. What sort of work did they do?

3 A. Do animal studies.

4 Q. Animal studies?

5 A. Yes.

6 Q. Why did they do animal studies? Can you tell me?

7 A. To observe what biologic effects of the chemical
8 are on that species.

9 Q. Yes. Is that it?

10 A. Yes.

11 Q. Now, I gather that your principal concern was not
12 the biological effects on the species that you were testing;
13 is that fair to say?

14 A. That's right.

15 Q. What species were you primarily concerned with?

16 A. With man.

17 Q. Why was it that you did animal studies then?

18 A. It's a way to get information that will provide
19 some understanding of the biologic effects of such chemicals.

20 MR. COHEN: Could I get that last answer again?

21 (Reporter read back as requested.)

22 Q. Biologic effects of those chemicals on any
23 species or on man or on animals?

24 A. Where appropriate.

25 Q. What does that mean?

1 A. If it was for man, then we would establish and
2 write the safe handling procedure for man. If it's a cow
3 exposed to a chemical, then it will be responsible to the
4 farmer to take care of him or whatever.

5 Q. Did you do testing on cows?

6 A. No, but if we did have, we would do that. We
7 would do a study that would be appropriate to the use of that
8 chemical.

9 Q. Did you have any products that you were writing
10 labels for at that time in a toxicology section where the
11 intended user or the individual exposed was a species other
12 than man?

13 A. I don't recall, but it could well be.

14 Q. Was that sort of feeds and that sort of thing?

15 A. Pardon?

16 Q. Feeds, animal feeds?

17 A. Sure.

18 Q. You were manufacturing feeds during that time,
19 were you?

20 A. No.

21 Q. So are we talking hypothetically then?

22 A. All I'm saying is there could be some chemicals
23 in Monsanto that are being used in a farm where an animal
24 could be exposed and we wanted to handle that animal properly
25 if there was an exposure.

1 Q. Can you give me an example?

2 A. I cannot, but all I'm saying is we would do it
3 if, in fact, there was one.

4 Q. During the time that you were there as medical
5 director from '74 to '88, did you have an occasion where you
6 were worried about the exposure of some species other than
7 man on the particular project?

8 A. I don't recall.

9 Q. In a 14 year period, you don't recall whether
10 there was one product where the potential exposure was to a
11 species other than man?

12 A. No, I do not.

13 Q. Do you believe that the results of animal
14 studies, that is the observed biologic effect of the chemical
15 on that species, can be translated into an expected biologic
16 effect on man?

17 A. It's a procedure by which it's done.

18 Q. Well, I don't think I asked you that. I asked
19 you whether you believed that you could translate that
20 biologic effect observed in one species to man?

21 A. Yes.

22 MR. MALIN: I object to the form of the question.
23 Go ahead. Answer the question.

24 MR. COHEN: On what basis do you object? What is
25 it about the form that you object to?

1 MR. MALIN: The question you asked is, do you
2 believe that you can translate an observed effect in an
3 animal to man; and that's too vague in terms of the words
4 translate. It's too vague, too general. For the question to
5 have any meaning, it would have to deal specifically with the
6 kind of tests, dosage, animals used, etc. It's far more
7 complex than that.

8 MR. COHEN: Are you testifying then? Are you
9 testifying now, Mr. Malin?

10 MR. MALIN: That's not testifying.

11 MR. COHEN: All right. In any event, the witness
12 answered the question. Do you have the witness's answer?

13 THE REPORTER: His answer was "Yes."

14 Q. (By Mr. Cohen) Would it be fair to say, doctor,
15 excepting if you will for a moment, the possible odd exposure
16 to an animal such as a farm animal, which you don't even
17 recall if it occurred, excepting that category for a moment,
18 you were doing research in animals to observe biologic
19 effects with the intention of determining potential biologic
20 effects in man.

21 A. Yes.

22 Q. Do you believe that animal studies of PCB's and
23 their byproducts, such as you alluded to earlier -- Strike
24 that. Do you believe that animal studies to observe the
25 biologic effects of PCB's and their byproducts can be used to

1 determine biologic effects of the same compounds in men?

2 MR. MALIN: I object to the form of the question.
3 If you think you understand that question, answer it.

4 A. The animal studies are not done to give a
5 one-on-one interpretation. The studies are done to determine
6 whether there is an inhalation hazard; and if there's an
7 inhalation hazard, how to handle it. It can be you don't get
8 it on your hands because of something, and make sure you
9 don't get it in your mouth, don't breathe it. All of these
10 things can be brought up; and it's not on a one-on-one basis,
11 but to answer those questions, I just cited that's what the
12 test is for.

13 Q. In other words to determine if there's the
14 potential danger from exposure to whole skin, you will not
15 test humans, but test an animal to see if it absorbed through
16 the skin?

17 A. Or produce an effect on the skin.

18 Q. All right. To see if there's an adverse effect
19 on the skin of the animal or if a transdermal route of
20 absorption is possible; is that fair to say?

21 A. Yes.

22 Q. Would you look for --

23 A. And that's acute effect.

24 Q. Your animal studies were looking for acute
25 effects?

1 A. The ones we have been discussing are acute
2 studies.

3 Q. You didn't do chronic studies?

4 A. We did chronic studies when they were indicated.

5 Q. If you saw an acute effect, were you doing
6 chronic studies?

7 A. No.

8 Q. What would be an indicator for a chronic study,
9 doctor?

10 A. An observation in man; another chemical is quite
11 similar to it; something reported. In other words, there's a
12 whole host of collections, could be, would influence whether
13 we did chronic studies.

14 Q. Did Monsanto ever of its own initiative determine
15 to do chronic animal studies in order to observe chronic
16 long-term adverse effects from exposure to PCB's in animals?

17 A. Yes.

18 Q. Can you give me some examples during your tenure
19 as medical director?

20 A. There was a lifetime study done with PCB's.

21 Q. What species?

22 A. Rats and mice.

23 Q. And again was the goal to determine biologic
24 effects of potential chronic long-term exposure in man?

25 A. If there are any.

1 Q. I don't know what you mean. What do you mean if
2 there are any?

3 A. There may not be any chronic lifetime effects.

4 Q. In other words, you would do chronic long-term
5 studies in animals to see if there are any adverse effects
6 from such exposure?

7 A. But you don't do it on all chemicals, lifetime
8 studies.

9 Q. You did do it on PCB's?

10 A. Yes.

11 Q. When you say you did it on PCB's, were you using
12 Monsanto product?

13 A. That was before me.

14 Q. So the test you're alluding to now occurred prior
15 to your tenure?

16 A. Yes.

17 Q. Was it prior to your employment with Monsanto?

18 A. What was before? Did they do the study before?

19 Q. Yes.

20 A. Yes.

21 Q. So it wasn't just before you became medical
22 director, it was before you even worked there?

23 A. Yes.

24 Q. I know there was only a short time period between
25 the time you joined and became medical director. What were

1 the results of those chronic long-term studies?

2 A. There was cancer in one of the species that was
3 studied of the PCB's.

4 Q. Now, again, was the product that was being used
5 in that study, which I know was before your employment,
6 Monsanto product, that is, an Aroclor?

7 A. Was it -- I'm not sure I got the question out of
8 that. Restate it.

9 Q. Sure. A chronic long-term study was done prior
10 to your employment to determine long-term adverse health
11 effects from exposure to PCB's?

12 A. Right. Yes.

13 Q. I'm trying to determine if the product that was
14 being tested for adverse health effects was a Monsanto
15 product, specifically an Aroclor.

16 A. I'm sure it was.

17 Q. In other words, you don't have the study in front
18 of you but you believe they used Aroclor?

19 A. Yes.

20 Q. Was it production grade or production quality
21 Aroclor?

22 A. Again, as, I'm sure it was.

23 Q. Do you know if it contained the byproducts that
24 we had discussed earlier, like dioxins?

25 MR. MALIN: Objection. He never testified that

1 PCB's contained dioxins.

2 Q. Let me back up then. Do you believe that your
3 production grade Aroclors in this time period when this test
4 was done, whenever it was done prior to your employment,
5 contained anything other than PCB's?

6 A. It's like all chemicals. It's not 100 percent
7 PCB's.

8 Q. What else did it contain, to your knowledge?

9 A. I don't know.

10 Q. Did it contain furans?

11 A. If it did, they wouldn't have known it because
12 they didn't know what furans were back then.

13 Q. I understand that, but I'm asking you, do you
14 believe it contained furans?

15 A. I said before, I don't think that furans were
16 present in this or dioxins were present in these products.

17 Q. You do not believe that the Monsanto product
18 contained furans?

19 A. That's right.

20 Q. Do you know what stereo chemicals are?

21 A. No.

22 Q. Do you know what coplanar PCB's are?

23 A. No.

24 Q. You never heard of that?

25 A. No.

1 Q. It was not a subject that was ever discussed
2 during your tenure of employment?

3 A. No, it was not.

4 Q. Do you know the name James Mieure, M-I-E-U-R-E?

5 A. No.

6 Q. A Dr. James Mieure?

7 MR. MALIN: It's pronounced Mieure.

8 WITNESS: Mieure. I know Mieure.

9 Q. Do you know James Mieure?

10 A. I know Mieure.

11 Q. I'm sorry.

12 A. Yes.

13 Q. He apparently had a business address of 800 North
14 Lindbergh in St. Louis. Do you know that address?

15 A. I know about where it is, yes.

16 Q. Is that where you worked?

17 A. Yes.

18 Q. Is that where your office was?

19 A. Yes.

20 Q. In '74?

21 A. Yes (nodded).

22 Q. Is Mieure a medical doctor?

23 A. No.

24 Q. Ph.D.?

25 A. I'm sure.

1 Q. What department was he in in '74?

2 A. I don't know.

3 Q. Did you have any dealings with him at that time?

4 A. Casually, I'm sure I did.

5 Q. Were you made aware of the fact that apparently
6 some scientists by the name of Roach and Pomerantz in 1974
7 contended that they had found contaminants, dibenzofurans,
8 chlorinated dibenzofurans in certain PCB's?

9 A. No.

10 Q. Are you saying you don't recall that today or you
11 never knew it?

12 A. No. Isn't that the same answer? That's the same
13 answer to me.

14 Q. Back in the early 70's, did you have any dealings
15 with Dr. Kaley?

16 A. No.

17 Q. He did not report to you on his activities?

18 A. No.

19 Q. Do you know when Monsanto first got gas
20 chromatography?

21 A. No.

22 Q. Do you know what gas chromatography is?

23 A. Sort of.

24 Q. Would you agree that gas chromatography is what
25 enabled Monsanto to detect these byproducts or contaminants

1 in their product?

2 A. I'm not a chemist.

3 Q. So, you don't know?

4 A. I have an idea, but I don't know.

5 MR. COHEN: Mark this as Roush Exhibit 2.

6 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 2.)

7 Q. Have you had a chance to look at the document?

8 A. It's a chemistry document, though.

9 Q. Have you ever seen it before?

10 A. No.

11 Q. This is dated December -- Am I looking at the
12 write document? It's dated December 23rd, '74.

13 A. Yes.

14 Q. And it refers to an AOAC meeting presentation
15 from October, '74.

16 A. Whatever that is.

17 Q. Whatever that is. But you see on the first page
18 here of the report itself, it says, "In this paper, we report
19 the finding of chlorinated dibenzofurans in production lots
20 of Aroclor 1254, 1242 and 1016 that were manufactured in
21 1973."

22 A. Do you see that?

23 A. Yes.

24 Q. Did you see the attachments here? They have been
25 stamped with the numbers PRR 4369, 4370, 4371, 4372.

1 A. Yes.

2 Q. They refer to Aroclor products.

3 A. Yes.

4 Q. Would it be fair to say about this time in 1974
5 was when you became aware of the fact that the product
6 contained furans?

7 MR. MALIN: Objection to the form of the
8 question. I don't think he ever testified that he became
9 aware that the product contained furans.

10 MR. COHEN: I'm asking him that.

11 A. No, I didn't know that.

12 Q. Did you ever know that it contained furans?

13 A. No.

14 Q. So through 1988, were you aware of the fact that
15 the product contained furans?

16 A. No.

17 Q. Did you ever see any data subsequent to this in
18 '74 that indicated that the product did not contain furans?

19 A. No.

20 MR. MALIN: Off the record.

21 (Colloquy held off the record.)

22 MR. COHEN: Mark Exhibit 3.

23 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 3.)

24 Q. Have you had a chance to look at the document,
25 sir?

1 A. Yes, but not in depth as I should because it's
2 pretty deep for me.

3 Q. It's a little heavy.

4 A. Yes, it is.

5 Q. You'll agree with me, however, on the first page
6 it is a handwritten memo from the desk of R. E. Keller dated
7 11/11/71, that the document appears to be a typewritten memo
8 with attachments sent to a number of people within the
9 Monsanto organization including Mr. Mieure and, again, it is
10 directed to W. R. Richard, but appears to be, again, from R.
11 E. Keller; is that right?

12 A. Yes.

13 Q. Now, this predates your employment with the firm.
14 I understand that. Were you aware of the existence of this
15 document when you came to the medical department?

16 A. No.

17 Q. Do you see that there are on page 2 of the memo
18 dated October 28th, '71, questions for medical?

19 A. Yes.

20 Q. Would that have been your department, that is, at
21 that time Dr. Kelly's department?

22 A. Yes.

23 Q. Were you aware that these questions were raised
24 in 1971 in the medical department?

25 A. No.

1 Q. Are you aware of any test that was done to
2 determine the toxicity of furans in 1971?

3 A. No, I'm not sure that they would have known how
4 to do it at low levels.

5 Q. Do you know if the medical department either had
6 done or had access to information regarding the toxicity of
7 what are called impurities, chlorinated naphthalenes,
8 anthracene, phenanthrene? Do you know if you had any of that
9 information in that time period?

10 A. No -- I don't recall it if I did.

11 Q. Do you know if the PCB product Aroclor that
12 Monsanto manufactured during that time period contained any
13 of these impurities such as chlorinated naphthalenes?

14 A. Not for sure.

15 Q. At any time prior to your employment in 1973, are
16 you aware of any acute toxicity studies having been done on
17 chlorodibenzofurans?

18 A. No.

19 Q. That's either inside, in-house, or paid for by
20 Monsanto, sponsored by Monsanto, or otherwise?

21 A. Right.

22 Q. You're unaware of any?

23 A. No (nodded).

24 Q. And the answer is no? You shook your head.

25 A. No. Right.

1 Q. See down in the last paragraph, it says "I
2 suggest that the only immediate analytical work would be to
3 firm up furan data for remaining PCB/PCT products with
4 existing methodology." See that sentence?

5 A. Yes.

6 Q. What's PCT?

7 A. I don't know.

8 Q. Would you turn, sir, to the page marked 4245,
9 dated June 13, '72, apparently from J. R. Savage, St. Louis.
10 It is to W. R. Richard. Do you see that page?

11 A. Yes.

12 Q. Do you see that symbol T3A --

13 A. Yes.

14 Q. -- under the name?

15 A. Yes.

16 Q. What's that mean?

17 A. That's his location.

18 Q. And would B2SL likewise be a location?

19 A. Yes.

20 Q. Now, it says, "Cumming Paton has asked that we
21 develop a history on chlorodibenzofuran content of our PCB
22 products. The plant has no methods for this analysis. If we
23 just need to screen a few current batches, this is perhaps
24 better done in Research, but if we want to develop a
25 continuing history, of say every fifth batch as we did with

1 Dioxins and Penta, we should have a method developed," etc.,
2 etc. Were you aware as to whether or not there was a
3 continuing program to test product for Dioxins and Penta,
4 whatever that is?

5 A. No.

6 Q. Do you know what products they're talking about
7 they would have been testing for Dioxins and Penta?

8 A. I have to guess. I'd say they're talking about
9 PCB's.

10 Q. The memo refers to PCB's in the same paragraph.

11 A. Yes.

12 Q. As director of the medical department at Monsanto
13 Company, wouldn't you have had access to information
14 regarding the content of the product?

15 A. Not necessarily. They could give it and we could
16 talk about PCB's and we would test PCB's and we would include
17 that as a contaminant of it.

18 Q. You're assuming that the testing of PCB's was on
19 production grade material; is that right?

20 A. Yes.

21 Q. In other words, I'm distinguishing from
22 laboratory grade that could be made to a higher degree of
23 refinement.

24 A. Yes.

25 Q. So, you think that whatever the tests would show

1 it would include whatever was in there?

2 A. Yes.

3 Q. And again, I asked you earlier, you have no
4 information as to what effect there is on having the
5 chlorinated benzenes in there with respect to the formation
6 of dioxins and furans?

7 A. No.

8 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 4.)

9 Q. Have you ever seen this memo before?

10 A. No.

11 Q. You see it refers to apparently a memo or some
12 communication between the same two individuals. HSB, I
13 assume, is H. S. Bergen. Do you know who that is?

14 A. I know the name, but I don't know him.

15 Q. WRR is W. R. Richard. Do you know who that was?

16 A. Yes.

17 Q. Copies were sent again to Mieure and Munch.
18 Munch, did he work for you?

19 A. No.

20 Q. The memo does however refer to Dr. Levinskas?

21 A. Yes, it does.

22 Q. In May '75, he worked for you?

23 A. Yes.

24 Q. He was head of toxicology?

25 A. Yes.

1 Q. Again a report of the presence of dibenzofurans
2 in Monsanto product; is that correct?

3 A. Yes.

4 Q. You were not aware of this at that time?

5 A. I don't recall it at least.

6 Q. Do you see in the fourth paragraph there's a
7 reference to a case against Dow, "The case was never brought
8 to trial vs. Dow because of lack of evidence."

9 A. Yes.

10 Q. Do you know what they're talking about?

11 A. I can only surmise what it is.

12 Q. Which is?

13 A. The tetrachlorodibenzodioxin --

14 Q. Right.

15 A. -- was a subject of interest to Dow. Dow was
16 working on dioxin and the fact that they had difficulty in
17 analyzing some form, there's a reason that Dow was never
18 brought in.

19 Q. Do you know anything about a lawsuit against Dow
20 in that time period regarding dioxin?

21 A. I don't think there would be a lawsuit. I think
22 they're talking about what regulations they would be pushing
23 on them.

24 Q. You see the sentence, "The case was never brought
25 to trial vs. Dow because of lack of evidence."

1 A. Yes.

2 Q. You don't think that refers to a lawsuit?

3 A. That one sentence isn't very much for me.

4 MR. MALIN: Doctor, please don't speculate.

5 Either you know or you don't.

6 Q. Let's go to the next sentence. First sentence,
7 of the next paragraph. "In our case the argument is about
8 chlorinated dibenzofurans." Do you know anything about a
9 lawsuit against Monsanto in May of '75 regarding chlorinated
10 dibenzofurans?

11 A. No.

12 Q. And you have no recollection of Dr. Levinskas
13 discussing this situation with you?

14 A. No.

15 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 5.)

16 Q. Have you had a chance to look at the memo,
17 doctor?

18 A. Yes.

19 Q. Now, this apparently is a memo that was sent to,
20 it looks like Mr. Papageorge, although his name appears to
21 have been crossed out, from David Wood. Did you know Mr.
22 Wood?

23 A. Yes.

24 Q. And apparently a copy of this document went to
25 you?

1 A. Yes.

2 Q. Your address was A2SA?

3 A. Yes.

4 Q. Do you recall this situation with Dr. Allen
5 calling about furans and dioxins?

6 A. No.

7 Q. You don't recall?

8 A. No.

9 Q. Does looking at the memo refresh your
10 recollection at all about this event?

11 A. No.

12 Q. Does this memo refresh your recollection that you
13 were aware that furans were being reported as being found in
14 Aroclors?

15 A. No, I do not recall it.

16 Q. You see where it refers to a Risebrough paper?

17 A. Yes.

18 Q. Do you know that paper?

19 A. No, I do not.

20 Q. Have you ever read it?

21 A. No.

22 Q. Do you know what the subject matter is?

23 A. No.

24 Q. Between the time of this memo in August of '75
25 and the time you retired in April of '88, did you ever

1 receive information that indicated that furans were present
2 in Aroclor products, in Monsanto products?

3 A. I don't recall.

4 Q. Did you ever discuss with Dr. Levinskas what you
5 should do about warning labels for PCB's as a result of the
6 reported presence of furans?

7 A. I don't recall.

8 Q. You were aware during that time period, however,
9 that furans can be formed in certain operations that involve
10 dielectric fluids?

11 A. Yes.

12 Q. Now, you knew throughout this time period in '74
13 to '88 that there was an awful lot of dielectric fluids that
14 Monsanto manufactured and sold; didn't you?

15 A. Yes.

16 Q. And you knew certainly as of some time in '77
17 that there was a general market trend to get those dielectric
18 fluids containing PCB's out of transformers; didn't you?

19 A. I knew that they were to stop putting them in,
20 but I don't think they were told to take them out.

21 Q. Well, were you aware at any time prior to April
22 30, 1988, that industry was generally trying to get the
23 dielectric fluids containing PCB's out of the transformers?

24 A. I didn't know how broad it was.

25 Q. But you did know that there were efforts to take

1 dielectric fluids containing PCB's out of transformers?

2 A. Yes.

3 Q. Were you aware of what's called frequently cross
4 contamination, where mineral oil transformers were
5 contaminated with dielectric fluids containing PCB's?

6 A. Yes.

7 Q. Were you aware that there was industry developing
8 ways to remove those PCB's from those mineral oil
9 transformers?

10 A. No.

11 Q. Were you aware that there were substitute
12 dielectric fluids coming to market during that time period to
13 replace the dielectric fluids containing PCB's?

14 A. Yes.

15 Q. What did you know or believe was happening to the
16 dielectric fluid containing PCB's?

17 MR. MALIN: I object to the form of the question.
18 If you can understand it, answer it.

19 Q. Did you understand it, doctor?

20 A. Would you say it again?

21 Q. I'm trying to understand, doctor, sometime in the
22 late 70's people started taking dielectric fluid containing
23 PCB's out of transformers; is that right?

24 MR. MALIN: I object to the form of that
25 question.

1 Q. You already answered that, didn't you, doctor?

2 A. Yes.

3 Q. You know that's true; don't you?

4 A. Yes.

5 Q. What did you know or believe was happening to
6 that PCB fluid?

7 MR. MALIN: You mean the PCB fluid that was being
8 taken out of transformers?

9 MR. COHEN: Yeah.

10 MR. MALIN: Answer the question if you think you
11 understand it, doctor.

12 A. I understand the question, but I don't know. I
13 wasn't a part of that.

14 Q. So you don't know what was happening to it?

15 A. No.

16 Q. But you knew at least as of the late 70's it was
17 coming out of transformers in the field?

18 A. I didn't know how broad it was. I knew they were
19 talking about it.

20 Q. When did you know that under certain operating
21 conditions dielectric fluids in transformers could develop
22 furans and dioxins? When did you have that information?

23 A. I don't know.

24 Q. Did you have it by the late 70's?

25 A. I don't know.

1 Q. Well, I believe there's a report by Hudsinger.
2 Is that his name? Are you familiar with that paper?

3 A. No.

4 Q. Have you ever seen any of the studies of the
5 Binghamton fire, the Binghamton office building fire?

6 A. I knew about the fire and I've seen discussions
7 of it, but not in any depth.

8 Q. That goes back into the 70's, doesn't it, doctor?

9 A. I'm sure it does.

10 Q. And furans and dioxins were all detected in the
11 suit from the transformer fire; isn't that right?

12 A. Furans were. I don't know whether dioxins were.

13 Q. So at least some time during that time period in
14 the late 70's to early 80's you were aware that furans were
15 being formed under certain conditions in dielectric fluids in
16 the field?

17 A. I wasn't sure that it wasn't by leaks and some
18 other exposure but not in the transformer itself.

19 Q. You were unaware that the fluid could form furans
20 in the fluid itself still in the transformer?

21 A. That's right.

22 Q. Doctor, let me show you an article from
23 Environmental Health Perspective Volume 60. I can't read the
24 date. It looks like 1980 something. It's an article by
25 Hudsinger, Chaldry, Chittam, and Johnston, a Formation of

1 Polychlorinated Dibenzofurans and Dioxins During Combustion,
2 Electrical Equipment Fires and PCB Insineration. Have you
3 ever seen this before?

4 A. No, and I can't tell you anything about this.

5 Q. You have no recollection of having seen it
6 before?

7 A. No.

8 MR. MALIN: Mr. Cohen, I think you may be under
9 the impression that Dr. Roush worked for Dr. Kaley as an
10 analytical chemist as opposed to being a medical doctor. I
11 think he told you what the medical director does.

12 Q. Do you believe or did you believe while you were
13 a medical director of Monsanto Chemical Company that
14 dibenzofurans were a toxic substance?

15 A. Yes.

16 Q. Did you believe that they could cause adverse
17 health effects in man?

18 A. Depends on --

19 MR. MALIN: I object to the form of the question,
20 unless you're talking about dose.

21 A. Depends upon dose.

22 Q. Do you believe that at some dose, that could form
23 and cause adverse health effects in man?

24 A. I don't think there was an experiment done to
25 talk about that, but it has to do with how much of a dose

1 could be out there.

2 Q. You're familiar with the Yusho and Yucheng
3 incidents?

4 A. Yes.

5 Q. They involve, I think it is now believed, furans?

6 A. Yes.

7 Q. People developed very significant adverse health
8 effect from ingesting rice oil containing --

9 A. I sure did.

10 Q. -- dielectric fluids that contained, amongst
11 other things, furans. You're familiar with those studies?

12 A. Yes.

13 Q. When were you familiar with those studies?

14 A. '75.

15 Q. Between 1975 and 1988 what, if any, instructions
16 did you give to Dr. Levinskas in the toxicology department to
17 inform customers and others of the dangers of furans?

18 A. If we did anything, it would be to put it on the
19 label of something.

20 Q. You said, if we did anything. Did you do
21 anything?

22 A. I would have to talk to Levinskas to see what was
23 done.

24 Q. You have no recollection of what you instructed
25 Levinskas to do?

1 A. That's right. I do not.

2 Q. You were Levinskas's boss?

3 A. Yes.

4 Q. Do you know, as you sit here today, whether you
5 ever put warnings, on the labels of PCB containers going out,
6 of the dangers of furans?

7 A. You'll have to go back. We're still talking
8 about dose. The question is how much of this was present.

9 Q. I'm asking you, doctor, if you ever did anything
10 to change those labels?

11 MR. MALIN: He's answering your question.

12 MR. COHEN: Mr. Malin, can I please have the
13 witness's testimony?

14 MR. MALIN: Tell him to give you an answer and
15 explain his answer.

16 Q. Sure. Explain your answer, please, feel free,
17 but tell me the answer.

18 A. It was a contaminant of PCB's and the
19 concentration was very low; and the people who had been
20 exposed to PCB's in Yusho were exposed to concentrations that
21 were in the thousands of ppm; and they're the ones who got
22 the chloracne. And when we come back from that, we're
23 talking about chloracne being related, there's no evidence
24 that there was chloracne associated with PCB's unless it was
25 in part of a fire or an explosion.

1 Q. What, if anything, to your knowledge did the
2 medical department of Monsanto Company do between 1974 and
3 1988 to warn people in the field that were taking dielectric
4 fluid out of transformers that that fluid could be
5 contaminated with furans or dioxins?

6 MR. MALIN: He hasn't testified that he believed
7 it could be contaminated with benzofurans or dioxins.

8 MR. COHEN: I didn't ask him that. I asked him
9 what he did.

10 MR. MALIN: Well, you premised it on its being
11 contaminated or possibly being contaminated. He never
12 testified to that.

13 MR. D'URSO: He just said furans were present in
14 PCB products and --

15 MR. COHEN: You also said under certain
16 circumstances in the field.

17 MR. MALIN: In the field, not necessarily in the
18 transformer as a result of operations in the transformer.

19 MR. COHEN: I'm still asking him what he did.

20 Q. (By Mr. Cohen) What did you do? If the answer is
21 nothing, tell me nothing.

22 A. It's nothing.

23 Q. Thank you. Is it your contention that people in
24 Yusho and Yucheng only developed chloracne?

25 A. No.

1 Q. What other ailments did they develop allegedly as
2 a result of their exposure to this dielectric fluid?

3 A. There was an irritation of upper respiratory
4 tract, of the eyes, nose. There were liver effects. There
5 were enzyme effects in the liver; and there was a sensory
6 neuropathy.

7 Q. Anyone develop cancer?

8 A. There were several who developed cancer.

9 Q. Anyone develop birth defects?

10 A. Yes, but it wasn't a true -- It was a birth
11 defect, but it went away with time, which makes it different.

12 Q. Which was -- What was the birth defect that went
13 away with time?

14 A. The pigmentation went away, and the eye effects.

15 Q. It was Cola Baby Syndrome?

16 A. I don't remember that.

17 Q. You don't remember that phrase?

18 A. No, but they -- Most of these things disappeared
19 on the babies born with this defect, so it was not a
20 permanent effect.

21 Q. Were the cancers that developed associated with
22 exposure to the dielectric fluids?

23 A. There's no indication that they were. There was
24 only a couple of them.

25 Q. Were any of the cancers that developed neoplastic

1 -- I'm sorry -- a metastatic disease?

2 A. I don't think that there's any evidence about
3 spread, but cancers do spread. That's a characteristic of
4 them.

5 Q. Now, in the lesions that you referred to earlier
6 as developing in animal studies from exposure to PCB's --

7 A. Yes.

8 Q. -- were they metastatic lesions?

9 A. No.

10 Q. They were non-metastatic?

11 A. That's right.

12 Q. Were any of the animals allowed to live long
13 enough after the neoplasms developed to develop metastasis?

14 A. I don't recall that.

15 Q. So, you don't remember whether the sacrifices of
16 the animals occurred prior to the time that any metastasis
17 would have been detected?

18 A. The studies by Colandra would have done that.

19 Q. Colandra was with IBT?

20 A. Yes.

21 Q. Were you at Monsanto when the investigation of
22 IBT took place?

23 A. Yes.

24 Q. And were you there when Keplinger was prosecuted?

25 A. I was there when that lawsuit took place. I was

1 not privy to what took place at that time.

2 Q. When you say the lawsuit, he was prosecuted
3 criminally; wasn't he?

4 A. I don't know.

5 Q. You were not aware that he was convicted of
6 altering or faking animal studies?

7 A. I don't know.

8 Q. You're aware that whatever the charges were, they
9 arose out of studies that were being done for Monsanto?

10 A. No.

11 Q. You're not aware of that?

12 A. No.

13 MR. MALIN: If you're aware of that, we'd like to
14 know about it.

15 MR. COHEN: Well, they weren't PCB's. I'll agree
16 with that.

17 Q. (By Mr. Cohen) Did you ever order any studies
18 done to determine any adverse health effects that would
19 result from the combination of chemicals that was used in the
20 product Pyronol or Inerteen?

21 A. No.

22 Q. You were aware however that you were
23 manufacturing and selling a product called Pyronol?

24 A. Yes.

25 Q. And another product called Inerteen?

1 A. Yes.

2 Q. Do you know the ingredients of those products?

3 A. No.

4 MR. MALIN: The question has been asked and
5 answered. He said before he didn't know the ingredient.

6 MR. COHEN: I was trying to refresh his
7 recollection.

8 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 6.)

9 A. I don't understand it.

10 Q. You don't understand the document?

11 A. No.

12 MR. COHEN: What have we marked it as, as 6?

13 THE WITNESS: Six.

14 Q. You do see that there are a number of compounds
15 contained in these various product numbers for Pyronol, and
16 apparently it varied year by year. Do you see that, sir?

17 A. I see something. Yes.

18 Q. Do I understand that you never ordered any tests
19 done on the combination of Aroclors and chlorinated benzenes?

20 A. I don't recall.

21 Q. Do you know what the scientific literature is
22 with respect to the toxic properties of chlorinated benzenes?

23 A. No.

24 Q. Do you know if they're toxic?

25 MR. MALIN: At what dose?

1 A. I don't know.

2 MR. COHEN: At any dose.

3 MR. MALIN: Everything is toxic at a dose.

4 MR. COHEN: Only if you gag on it.

5 Q. (By Mr. Cohen) Do you know if chlorinated
6 benzenes are more or less, at the same dose, more or less
7 toxic than chlorinated biphenyls?

8 A. I don't know.

9 Q. Do you know if chlorinated benzenes are more or
10 less toxic at the same dose than benzene?

11 A. No, I do not know.

12 Q. Do you know anything about the toxicity of tin
13 tetraphenyl?

14 A. No, I do not.

15 Q. Do you know anything about epoxide
16 dicyclo-diepoxy carboxylate?

17 A. No.

18 Q. Do you know anything about
19 3,4-Epoxycyclohexylmethyl-3,4 epoxycyclohexane carboxylate?

20 A. No, I do not.

21 Q. Are you aware of any literature indicating that
22 certain epoxide compounds, known Epoxide 201 was a known
23 carcinogen?

24 A. No.

25 Q. Do you know whether your product, that's product

1 manufactured by Monsanto Chemical, contained at any time
2 Epoxide 201?

3 A. No, I do not.

4 Q. Would it be fair to say you never directed Dr.
5 Levinskas or anyone to issue any warnings to customers or
6 anyone regarding Epoxide 201?

7 A. No, I do not.

8 Q. How about tin tetraphenyl?

9 A. No.

10 Q. How about chlorinated benzenes?

11 A. I don't recall.

12 Q. How about benzene?

13 A. We do for benzene.

14 Q. But not part of PCB products; is that right?

15 A. If it were benzene itself, it would have been.

16 Q. I'm talking about PCB's now. Did your warnings
17 for PCB's contain any warnings about the toxic effects or
18 toxic interaction between PCB's and benzene?

19 MR. MALIN: I object to the form of the question.
20 He hasn't testified there is any toxic interaction.

21 A. I don't think there was benzene as such in
22 Aroclor.

23 Q. Have you ever heard it claimed that PCB's may
24 have a promotional effect on the carcinogenicity of other
25 compounds?

1 A. I've heard it said, yes.

2 Q. Do you believe it?

3 A. I don't know. The whole idea about promoters is
4 not well understood. It's still in the stage of thinking and
5 trying to understand.

6 Q. Do you believe that benzene is a carcinogenic
7 agent in humans?

8 A. Yes.

9 Q. You'll agree with me that benzene is a fairly
10 common industrial compound?

11 A. Yes.

12 Q. You'll agree with me that people who work in
13 industry can have exposure to benzene on an ongoing basis?

14 A. But their exposure should be protected.

15 Q. But they can have exposure, you'll agree with
16 that?

17 A. But at low levels.

18 Q. Benzene is a common ingredient in motor fuels?

19 A. Yes; and not all, but in some it is.

20 Q. Do you believe that long-term chronic exposure to
21 benzene can cause leukemia?

22 A. The circumstances under which it produces
23 leukemia is not well understood. If you keep it down below
24 one ppm, that is largely protective. To say absolute is a
25 very difficult subject.

1 Q. You say below one ppm, you mean on a -- what do
2 they call it -- TEL?

3 A. No. TLV.

4 Q. TLV, right. Is that what we're referring to?

5 A. Yes.

6 Q. One ppm TLV. TLV is -- What is TLV time?

7 MR. MALIN: Threshold limit --

8 A. Threshold limit value.

9 Q. Threshold limit value. A government term.

10 A. And an industry term. ACGIH does that. American
11 Conference of Governmental Industrial Hygienists by and large
12 do the rating of TLV's.

13 Q. You're not an epidemiologist; is that right?

14 A. No.

15 Q. You've never designed an epidemiological study;
16 have you?

17 A. No.

18 Q. Is that the work of your toxicology department?

19 A. When Zack came, then we had an epidemiology
20 section.

21 Q. And when did she come there again?

22 A. Early 70's.

23 Q. And when did she leave?

24 A. I don't know. 75, '76, something like that.

25 Q. Was she your epidemiology section?

1 A. For a while.

2 Q. When she left, did you have others?

3 A. Yes.

4 Q. Their names?

5 A. Bill Gaffey.

6 Q. Gaffey?

7 A. G-A-F-F-E-Y.

8 Q. Anyone else?

9 A. He had a couple of people with Master's degrees
10 working for him.

11 Q. Was he a Ph.D.?

12 A. Yes.

13 Q. By the way, have you ever published anything?

14 A. A couple of things.

15 Q. Do you have a CV?

16 A. Yes.

17 Q. Is it available?

18 A. Yes.

19 Q. Could you supply it to counsel?

20 A. Sure.

21 MR. COHEN: Would you be kind enough to supply
22 the witness's CV?

23 MR. MALIN: Sure.

24 Q. (By Mr. Cohen) Is there any resource that you
25 could go to enable us to find out the names of the court

1 terms and numbers of cases in which you testified?

2 A. I can work out and come up a lot closer than we
3 have thus far.

4 Q. So in other words, if you had enough time and
5 gave it enough thought, you could probably think of most of
6 them?

7 A. I hope so.

8 Q. You know the phrase low dose extrapolation?

9 A. Yes.

10 Q. What does it mean?

11 A. That largely refers to a risk assessment
12 procedure for evaluating a carcinogen.

13 Q. Is that something that you do from animal
14 studies?

15 A. Yes.

16 Q. You make risk assessments to the population at
17 large?

18 A. And what you do is you take a place where you see
19 an effect and go back to zero.

20 Q. Other than low dose extrapolation and risk
21 assessment activities, do you think that animal studies can
22 be used in order to determine a biologic effect in man?

23 MR. MALIN: This question has been asked and
24 answered. And if you want to try to answer it again, doctor,
25 go ahead?

1 THE WITNESS: Would you say that again for me?

2 MR. COHEN: Would you like to take a break?

3 THE WITNESS: Yes.

4 (A short recess was taken.)

5 MR. COHEN: Go ahead and read back the last
6 question.

7 (Reporter read back as requested.)

8 A. No, not directly at least.

9 Q. What do you mean by that, doctor?

10 A. There's a study in man -- an animal, and then you
11 look at a population and you may see an association or you
12 may not. Now, that can be metabolically or pharmacologic
13 handling of it or it can be the metabolic activity of the
14 animal and its response to that chemical.

15 Q. How about if the particular substance causes the
16 same metabolites in both animals in tests and in man?

17 MR. MALIN: I object to the form of that
18 question.

19 Q. Do you understand the question, doctor?

20 A. Ask it again, please.

21 (Reporter read back as requested.)

22 MR. MALIN: I don't know if I understand the
23 question. Is this question, will the biological effect be
24 the same in animals as in man if the substance being tested
25 produces the same metabolites in man as it produces in

1 animals?

2 MR. COHEN: That's a good question.

3 MR. MALIN: Or will it produce the same effect in
4 both?

5 MR. COHEN: Yes. That's a good question.

6 MR. MALIN: Is that the question?

7 MR. COHEN: That's a good question.

8 MR. MALIN: Do you understand the question?

9 THE WITNESS: Yes. It is a very complicated
10 question. The understanding of man from animal is most
11 difficult; and there are very few examples where the studies
12 in animal have been seen in man, but as you do more and more
13 things to make it the same metabolic activity, which is quite
14 hard to do and do it with different doses and make it
15 different, and then have the same lesion appear would be
16 quite unusual. To say it could happen or not, I think it can
17 -- could happen.

18 Q. How about if the substance attacks the same
19 target organ in both animals and in man?

20 A. At the same dose?

21 Q. Well, I can't say at the same dose, doctor. I
22 don't know that you have humans getting the same dose. It
23 may be a different dose but attacks the same organ.

24 A. Practically all studies are done at doses that
25 are multiples of what man is exposed; and they do that to try

1 to take into account the fact that we don't have many animals
2 exposed. But the fact is, we do the studies to see what we
3 think may happen in man, but the interpretation of it is most
4 complicated.

5 Q. But you would agree not impossible?

6 A. Yes.

7 Q. Are you aware of any government documents that
8 indicate with respect to PCB's that there is a high degree of
9 concordance between animal studies and epidemiologic studies
10 in man?

11 A. No. I think that's not correct.

12 Q. So, you disagree with that?

13 A. Pardon?

14 Q. You disagree with that?

15 A. I disagree with that.

16 Q. You're not aware of any such government documents
17 that say that?

18 A. I know there's lots of written reports that talk
19 about that, and that there's no association.

20 Q. Have you ever had a chance to talk to Dr. Kelly
21 about this particular subject, that is, the translatability,
22 if you will, of the effects in animal studies to man?

23 A. No.

24 Q. Would you agree or disagree that in animal
25 studies and in epidemiological studies, PCB's -- whatever

1 PCB's means whether it includes those contaminants or not --

2 A. Yes.

3 Q. -- have attacked the same target organ?

4 MR. MALIN: I object to the form of that
5 question. If you think you understand that -- I don't think
6 he testified that he knows that PCB's have attacked any
7 target organ in man at the levels in animals.

8 A. We have an effect with big doses. We do get an
9 effect on the liver and they're enzymatic responses primarily
10 and in the animal, but the dose is so different. They
11 haven't done at the same dose level in the animal as we've
12 done on man.

13 Q. What dose levels are you assuming in man?

14 MR. MALIN: I object to the form of the question.
15 For what purpose?

16 MR. COHEN: He's talking about dose levels in
17 man. I'm asking him what he's referring to?

18 MR. MALIN: Dose levels to do what? For what
19 effect?

20 MR. COHEN: Mr. Malin, please. I'm asking him.

21 MR. MALIN: I object to the form of that question
22 on the grounds that it's unclear. If you think you
23 understand that, doctor, go ahead.

24 MR. COHEN: I'm asking the witness what he's
25 referring to when he says dose levels in man.

1 Q. (By Mr. Cohen) What are you referring to, sir?

2 A. Either the levels of exposure in Yusho; and
3 coming back to occupational exposure, occupational exposure
4 is in milligrams.

5 Q. Milligrams what?

6 A. Per day.

7 Q. For how many days?

8 A. In the animal?

9 Q. No, no. Occupational exposures.

10 A. In occupational exposure?

11 Q. What's the longest occupational exposure you're
12 aware of at milligram per day level?

13 A. I'd have to have the epidemiologic studies to see
14 what those were.

15 Q. So it varies from study to study, depending on
16 how long they were studying the individuals --

17 A. And the dose.

18 Q. -- and how long the individuals were employed?
19 In fact, there was no particular dose you can refer me to in
20 any study for man; is that right?

21 A. All I can tell you is that man has been exposed
22 in the work place at least a milligram per day; and there's
23 no evidence that they get liver cancers from that.

24 Q. You have no information about the exposure at
25 Paoli; is that right?

1 A. No.

2 Q. Would you agree that it is possible that human
3 beings in the work place ingest PCB's?

4 MR. MALIN: I object to the form of the question.
5 It is possible. Anything is possible. Anything is possible.
6 The distance of the Norse gods is possible. The question is
7 too vague.

8 MR. COHEN: We have your objection. I'm not
9 asking you about the Norse gods. I'm asking you about
10 ingesting PCB's.

11 THE WITNESS: Please?

12 (Reporter read back as requested.)

13 A. Yes. Primarily it comes from them using --
14 wiping it off from their hands and putting it in their mouth.

15 Q. You would agree that individuals that have PCB's
16 on their hands may then go ahead and either smoke a
17 cigarette, for example, and inhale the fumes and perhaps even
18 consume products of the PCB's, or perhaps may eat their lunch
19 and actually consume the PCB's then?

20 A. Yes.

21 Q. May wipe their face and consume the PCB's from
22 their hands?

23 A. Yes, but they shouldn't be doing that.

24 Q. I understand that. That the PCB's may be on the
25 skin on their face and they may sweat and swallow the sweat?

1 A. Yes.

2 Q. In fact, these are all rather recognized modes of
3 ingestion of PCB's in the work place; would you agree?

4 A. Yes, that's the source of the level that they've
5 got.

6 Q. Then, of course, they may have dermal absorption
7 besides ingestion; is that right?

8 A. What kind of?

9 Q. Dermal, from their skin, actually going through
10 the skin.

11 A. Dermal. I thought you were saying thermal.

12 Q. No, sir. I'm sorry. We have the window open a
13 little bit and that may affect. I'll try to speak up.
14 Dermal absorption through the skin.

15 A. Yes.

16 Q. That's another means of absorption of PCB's in
17 the work place?

18 A. Yes.

19 Q. It's recognized; isn't it?

20 A. Yes.

21 Q. And, in fact, there is some level of inhalation
22 absorption from fumes and airborne particles on dust and the
23 like. That's also recognized; would you agree?

24 A. Yes.

25 Q. So all of these are methods of absorbing PCB's in

1 the work place?

2 A. But they all can be protected from all of those.

3 Q. I understand that, but what I'm saying is that
4 these are all recognized methods of absorption.

5 A. Of exposure.

6 Q. Of exposure. Are you aware if in the studies
7 that you have seen on work place exposure, an effort was made
8 to quantify on a daily basis the level of absorption through
9 these various routes of exposure?

10 A. No, but I've seen the blood levels reported for
11 such workers.

12 Q. Do you think that blood levels are a good measure
13 of absorption?

14 A. Yes.

15 Q. You would agree with me that if the person had an
16 acute short-term exposure that shortly after that acute
17 exposure, they may show a high blood level of PCB's?

18 A. I'm not sure how soon, but it will reflect it.

19 Q. Would you agree that after a long period of time
20 they may show a low blood level of PCB from one acute
21 exposure?

22 A. I think that it will follow after, with no
23 further exposure.

24 Q. And what causes it to fall from the blood level?
25 Why does the blood level go down?

1 A. We know that it appears in the urine and feces.

2 Q. Are you saying it's excreted?

3 A. Yes.

4 Q. Anything else cause the blood level to drop?

5 A. It can be metabolized, but metabolism isn't well
6 understood.

7 Q. Do you think it's going to be transported and
8 stored in any of the other cells in the body other than the
9 blood?

10 A. In the fatty tissues primarily.

11 Q. So would you agree after an acute exposure, some
12 of the PCB's will be excreted, some maybe metabolized and
13 some will be stored in fatty tissues?

14 A. And it's all in equilibrium.

15 Q. So that you believe that the blood level after
16 the storage process will then again reflect the entire body
17 level?

18 A. Yes. Not instantaneously, but it will reflect
19 it.

20 Q. How about with chronic long-term exposures?

21 A. The same will be true in terms of the equilibrium
22 may be changed and he may put something into another depot.

23 Q. Like fat cells?

24 A. Another fat depot because they're not all equally
25 available.

1 Q. So, you may fill up the fat cells in the liver
2 and then fill up the fat cells in another organ and fill them
3 up in another organ, etc.; is that correct?

4 A. Yes.

5 Q. And you still believe that the level in the blood
6 will be reflective in equilibrium that the body burns?

7 A. If you give it time.

8 Q. How much time?

9 A. I don't know. It depends on what the level is
10 compared to where it's going to.

11 Q. What's the difference between testing serum and
12 plasma?

13 A. I don't know. Serum has more relative fat than
14 does --

15 Q. Serum what?

16 A. The serum has more fat in it than does the --

17 Q. Plasma?

18 A. Yes (nodded).

19 Q. Would it then be likely to report a higher level
20 or a lower level?

21 A. I don't know, but I would say it would reflect a
22 higher level.

23 Q. Do you think there's any disagreement in the
24 scientific and/or medical community about the utility of
25 animal data for determining an ailment or illness in an

1 individual human being?

2 MR. MALIN: I object to the form of that
3 question. If you think you understand it, doctor, you may
4 attempt to answer it. I think it also has been asked and
5 answered several times.

6 MR. COHEN: No, I think this is different.

7 THE WITNESS: Ask it for me again, please.

8 (Reporter read back as requested.)

9 A. There is no question about the value of doing
10 animal studies, both given an estimation how it is
11 metabolized, how it's handled, and then you do it within man
12 to see if it handles the same. But the obvious one if I got
13 something very irritating or toxic and I give it to the
14 animal and it drops dead, I've learned a great deal in terms
15 of what the implication of that is, so that's the acute or
16 the easy one. That more difficult one is the long life time
17 because there the differences become more apparent and it's
18 difficult. Nevertheless, we do animal studies lifetime to
19 understand what is a possible effect rather than saying we
20 know what the effect is.

21 Q. Other than animal studies, if you as a medical
22 doctor are evaluating an individual who has an ailment and
23 you know has been exposed to a particular substance, what
24 other information would you want to have?

25 A. Do I understand that at all, his problem? Is

1 this the first time I've ever seen it?

2 Q. Right.

3 A. First time I've ever seen it?

4 Q. First time you've ever seen this person.

5 A. Have I seen the chemical before and its action in
6 man?

7 Q. Are you asking me?

8 A. I want to know if that's another --

9 Q. I'm trying to understand. Let me ask you this.
10 In making a diagnosis about a particular individual, would
11 you be interested in looking at the scientific literature of
12 the effects on man or animals of similar compounds, related
13 compounds?

14 A. If I didn't have it on that chemical, I'd welcome
15 any material that I could use.

16 Q. With respect to PCB's, what similar or related
17 compounds would you look at?

18 A. I'm not enough of a chemist, but I would look and
19 see some closely related chemical that I may know something
20 about.

21 Q. Would you have any interest in looking at
22 polybrominated biphenyls?

23 A. Yes.

24 Q. How about chlorinated naphthalenes?

25 A. Yes, but I'm not sure that it would be the same

1 as this, as PCB's.

2 Q. How about dioxins?

3 A. No.

4 Q. Furans?

5 A. No.

6 Q. Chlorinated benzenes?

7 A. I don't know that.

8 Q. How about other chlorinated hydrocarbons?

9 A. But there's a big range on chlorinated
10 hydrocarbons that you can't take -- You have to look over the
11 whole gamut before you decide.

12 Q. Would it be fair to say that you would look at
13 all of these other possibilities with which you were familiar
14 in order to see what they're known to cause in making a
15 diagnosis in this person?

16 A. Yes.

17 MR. COHEN: You want to mark this, please.

18 (Reporter marked Plaintiff's Deposition Exhibit (Roush) 7.)

19 Q. Did you ever see this document before?

20 A. It's got my name on it.

21 Q. You notice that down at the bottom there are two
22 series of numbers, SCM77226 and PRR43367?

23 A. Yes.

24 Q. Notice that the next page is numbered SCM77227
25 and PRR 43368, and the next page is again numbered in

1 sequential order?

2 A. Yes.

3 Q. Now, do you also notice that the first page ends
4 in the middle of a sentence, and it doesn't start again on
5 the second page?

6 A. Yes.

7 Q. Do you think that was the condition of the
8 document when you got it back in 1975?

9 A. I don't recall.

10 Q. Do you recall receiving this document?

11 A. No.

12 Q. Do you recall having a meeting to discuss the
13 results of a rat feeding study completed by Dr. Kimbrough?

14 A. I know we talked about her study, but I'm not
15 sure I did it in the presence of all these.

16 Q. P. L. Wright, is that Paul Wright?

17 A. Paul Wright. Yes.

18 Q. Is he the chap who worked first for Monsanto and
19 then for Industrial Bio-Test and then came back to Monsanto
20 again?

21 A. Yes.

22 Q. He had worked for Monsanto prior to the time
23 Monsanto gave research work to Industrial Bio-Test?

24 A. That was before my time.

25 Q. When he was here, at this time in '75, was this

1 after he returned from Industrial Bio-Test?

2 A. Yes.

3 Q. Was he supervising any of the work at Industrial
4 Bio-Test for Monsanto while he was there?

5 A. I don't know.

6 Q. Did you ever review any of the work done by
7 Industrial Bio-Test to see if he had supervised that work or
8 participated in any way in that work while he was there?

9 A. Levinskas was the one who was supervising the
10 Bio-Test studies.

11 Q. Where is Levinskas now?

12 A. He's retired.

13 Q. Do you ever see him?

14 A. Yes.

15 Q. Do you know where he lives?

16 A. Close to Monsanto.

17 Q. Do you have an address for him?

18 A. I don't have his address. We can get it.

19 Q. Is he in the white pages?

20 A. I'm sure it is.

21 Q. What's his first name, George?

22 A. George.

23 Q. And does he live in the City of St. Louis?

24 A. No, he lives in Creve Coeur. It's a suburb of
25 St. Louis.

1 Q. What's it called?

2 A. Creve Coeur. Broken Heart.

3 Q. How old a man is -- Is it Dr. Levinskas?

4 A. Yes.

5 Q. Medical doctor?

6 A. No. Ph.D.

7 Q. Ph.D.?

8 A. Yes (nodded).

9 Q. How old is he?

10 A. He just retired a short time ago.

11 Q. Is he about 65?

12 A. 67, I think.

13 Q. Do you remember that cancerous cells were
14 observed in a certain number of Dr. Kimbrough's laboratory
15 animals?

16 A. Yes.

17 Q. You see the page that's marked as page two?

18 A. Yes.

19 Q. According to this document, you had a number of
20 responsibilities here.

21 A. Yes, I did.

22 Q. Item 1 is, "Publish the results of the Monsanto
23 studies conducted by Industrial Bio-Test Laboratories." What
24 was the purpose in doing that; do you know?

25 A. To get the information out of the data that had

1 been gathered by Calandra.

2 Q. He's the chap at Industrial Bio-Test; right?

3 A. Right.

4 Q. Was. As of 1975, how old were those studies; do
5 you know?

6 A. A couple of years.

7 Q. Had you ever published them before?

8 A. No, they were Bio-Test studies. They were the
9 ones who had to publish it.

10 Q. Had they published it before?

11 A. They had published other things, but they didn't
12 publish this.

13 Q. So they had not prior to 1975 published their
14 studies?

15 A. This study.

16 Q. That's right. This study referred to on page 1,
17 similar studies; is that right? Similar to Dr. Kimbrough's
18 studies?

19 A. Yes.

20 Q. So they had not previously published it and now
21 you wanted it published; is that right?

22 A. That's right.

23 Q. Was that in an attempt to counter the results of
24 Dr. Kimbrough's study?

25 A. It was to get the information out to the public.

1 Q. Item 2, "Obtain services of cancer specialists to
2 review both studies and interpret significance to current PCB
3 applications." Did you do that?

4 A. Yes.

5 Q. Who did you get?

6 A. Dr. Pour, P-O-U-R, from the University of
7 Nebraska.

8 Q. And did he do a study?

9 A. No. No, he wasn't supposed to. He was supposed
10 to interpret these studies.

11 Q. Were the results that he -- Were his results ever
12 compiled in a document?

13 A. Yes.

14 Q. Where is that document?

15 A. They were given to the Washington scene. They
16 were given to FDA.

17 Q. EPA?

18 A. EPA.

19 Q. What were Dr. Pour's results?

20 A. That there was cancer found, but they weren't the
21 same, exactly the same as those of Kimbrough.

22 Q. Now, whose study was he interpreting,
23 Kimbrough's?

24 A. IBT's as well as Kimbrough's. Both.

25 Q. Now, do I understand that the IBT interpretation

1 was that cancer was not found?

2 A. No, no. They found cancer.

3 Q. So in other words, both the IBT study as
4 interpreted by IBT and as interpreted by Dr. Pour showed
5 cancer in animals fed?

6 A. One species.

7 Q. Sherman rats?

8 A. I don't know which rat it was.

9 Q. The species of rats developed cancer?

10 A. Yes.

11 Q. And then Dr. Kimbrough, in her studies, found in
12 a species of rats cancer, but a different lesion?

13 A. She had found cancer in the same species. I
14 don't recall what more than that in way of an interpretation.

15 Q. Where are those results of Pour's work now; do
16 you know?

17 A. No, I don't, but they were given -- We took them
18 to the Cancer Institute as well and talked to different
19 agencies.

20 Q. Were any of those lesions metastatic?

21 A. No.

22 Q. Were any of the animals allowed to survive long
23 enough to see if the disease would metastasize?

24 A. I can't answer it without qualification.

25 Q. Tell me your qualifications.

1 A. I think it was long enough to do that.

2 Q. You think the animals were allowed to live long
3 enough to have allowed the disease to metastasize if it was
4 going to metastasize?

5 A. Yes, and that's kind of the way the liver acts.
6 That's the way the liver acts.

7 Q. What?

8 A. It doesn't metastasize very much.

9 Q. It does not metastasize very much?

10 A. Right.

11 Q. And is that in any kind of cancer to your
12 knowledge?

13 A. Liver cancer.

14 Q. Does not metastasize very much.

15 A. Yes (nodded).

16 Q. And that's in man and animals?

17 A. I can't answer that in all animal species. I
18 don't know.

19 Q. In man, though?

20 A. That's right. And it was also true in the 1260
21 study.

22 Q. And how about the study done by IBT, was that a
23 1260 study?

24 A. That was all species. There were other Aroclors
25 besides 1260.

1 Q. So IBT tested other Aroclors besides 1260 to see
2 if it would develop cancer. Did all of the Aroclors that
3 they tested produce cancer?

4 A. No.

5 Q. Which Aroclors did?

6 A. 1260.

7 Q. How about 1254?

8 A. I don't think so.

9 Q. Was it tested?

10 A. I can't answer that.

11 Q. How about 1248?

12 A. I can't tell you which ones were tested.

13 Q. So, you don't recall?

14 A. No.

15 Q. But the 1260 did produce cancer?

16 A. Yes.

17 Q. And it was the same species of rat as used by Dr.
18 Kimbrough?

19 A. I can't answer that.

20 Q. You don't know, but you do know that the lesions
21 were different?

22 A. No, I didn't say that.

23 Q. I'm sorry. I thought you did.

24 A. No (nodded).

25 Q. Same lesions as found in Dr. Kimbrough's study?

1 A. I think so.

2 Q. What was the difference then in the results
3 between Kimbrough's study and IBT's study?

4 A. I don't know, but there were differences.

5 Q. Was it the difference in frequency percentage?

6 A. I can't answer the question.

7 Q. But you do know that Pour's work was reduced to
8 writing and apparently --

9 A. And transmitted.

10 Q. -- to the National Cancer Institute?

11 A. To agencies, right.

12 Q. How about EPA?

13 A. EPA.

14 Q. Where's the National Cancer Institute located?

15 A. National Institute of Health?

16 Q. No, no. National Cancer Institute.

17 A. That's part of the National Institute of Health.
18 It's all in Bethesda.

19 Q. Item 3, "Obtain National Cancer Institute
20 interpretation." You were supposed to do that?

21 A. Did that.

22 Q. Did you?

23 A. Didn't get a reply that was helpful.

24 Q. What was their reply?

25 A. I don't recall.

1 Q. When you say not helpful, not helpful to whom,
2 Monsanto?

3 A. Didn't give us any interpretation of the two
4 studies.

5 Q. Do you believe that the results obtained by Dr.
6 Kimbrough in that study and by IBT in their study are good
7 results?

8 A. Yes.

9 Q. So you believe that in the dosage that was
10 utilized in those studies of Aroclor 1260, that Aroclor 1260
11 will cause cancer of the liver in that strain of rats?

12 A. Yes; and the dose that was used was in the order
13 of 50 ppm.

14 Q. In both your study and in Kimbrough's study?

15 A. Yes.

16 Q. Did you and Mr. Pappageorge and someone by the
17 name of Easley discuss these tests with NIOSH, OSHA, EPA, and
18 FDA?

19 A. That's what I just said.

20 Q. I'm sorry. I was referring to the National
21 Cancer Institute interpretation.

22 A. Yes.

23 Q. So you did both?

24 A. Yes.

25 Q. You talked to National Cancer Institute, and you

1 talked to NIOSH, OSHA, etc.?

2 A. Right.

3 Q. How about number 5, did you discuss these tests
4 with your key customers?

5 A. I didn't.

6 Q. You did not?

7 A. No.

8 Q. It was designated as your task, but you didn't do
9 it?

10 A. That's right.

11 Q. Who did do it?

12 A. I don't know, but I would suspect it was
13 Papageorge or Gossage.

14 Q. T. L. Gossage, who's that?

15 A. One of the people with business.

16 Q. Not in Papageorge's department?

17 A. No.

18 Q. Who were the key customers? Do you know who they
19 were referring to?

20 A. No.

21 Q. Would they have been the G.E.'s and
22 Westinghouses?

23 A. I'm sure it was.

24 Q. Is it your belief that some time in 1975 G.E. and
25 Westinghouse was advised of the results of both Dr.

1 Kimbrough's studies and the IBT studies?

2 A. Yes.

3 Q. Next was 6, "Complete WGK" -- That's the
4 Krummrich plant?

5 A. Yes.

6 Q. "Employee exposure study." Did you do that?

7 A. Yes.

8 Q. Who worked on that?

9 A. That's Johansen.

10 Q. Johansen?

11 A. Yes, before Zack joined us.

12 Q. And who was Johansen?

13 A. A toxicologist.

14 Q. Not an epidemiologist?

15 A. No.

16 Q. Johansen, is that a man or woman?

17 A. Man, Fred Johansen.

18 Q. Was it an epidemiological study that he was
19 doing?

20 A. Yes.

21 Q. Had he had experience doing epidemiological
22 studies?

23 A. No.

24 Q. Did you look over his work?

25 A. Yes.

1 Q. Were you satisfied with his work?

2 A. We had difficulty interpreting.

3 Q. In other words, you didn't know what the results
4 meant?

5 A. We did some work and I've forgotten what it was
6 with them.

7 Q. What did the results show?

8 A. I don't recall.

9 Q. Where is that test?

10 A. I don't know.

11 Q. Where's the raw data?

12 MR. MALIN: Do you know the answer to his
13 question, where's the raw data?

14 A. I don't know.

15 MR. MALIN: The answer is no. He doesn't know.

16 Q. Do you think any of those classification errors
17 that we discussed earlier this morning in connection with Dr.
18 Zack's work on the Nitro, West Virginia plant occurred in
19 Johansen's studies of Krummrich?

20 MR. MALIN: Objection to the form. He didn't
21 admit that there was ever -- there were any such
22 classification errors or that there were any at all.

23 MR. COHEN: I didn't say that he did. I said
24 that we discussed in connection with. I was giving that to
25 him as a reference. Would you like me to rephrase that,

1 doctor?

2 A. Could you now? Yes, please.

3 Q. Do you recall this morning we discussed the
4 possibility of classification error in epidemiological
5 studies between cohort groups and other groups?

6 A. Yes.

7 Q. And we discussed that in connection with Dr.
8 Zack's work at the Nitro, West Virginia plant.

9 A. Yes.

10 Q. Did you detect any such errors in the work done
11 by Johansen?

12 A. No, we did not.

13 Q. Do you recall that Johansen's study showed four
14 deaths attributable to lung cancer out of 23 deaths with an
15 expected rate of 1.24 deaths attributable to lung cancer from
16 the 1969 U.S. Male population?

17 A. Yes.

18 Q. Did you think that was statistically significant?

19 A. It's very difficult to interpret lung cancer in
20 the population without knowing smoking, without having
21 background levels in that immediate area. We had an excess
22 of lung cancer in that area anyway; and there is in that
23 Krummrich area an excess of lung cancer.

24 Q. You're saying that the population of Krummich had
25 an excess of lung cancers anyway?

1 A. All I'm saying is there were things that made us
2 have difficulty in interpreting the lung cancer problem and
3 then we struggled with that and wished we had an
4 epidemiologist.

5 Q. Did you ever publish the results?

6 A. No.

7 Q. I think I asked you, you don't know where the raw
8 data is anymore?

9 A. I don't know.

10 Q. Did you work with Johansen -- Was it Dr.
11 Johansen?

12 A. Yes.

13 Q. Ph.D.?

14 A. Yes.

15 Q. Did you work with Johansen in an effort to rule
16 out the other confounding factors like smoking and that sort
17 of the thing?

18 A. Yes.

19 Q. Did you have any success?

20 A. I'm not sure how we went to the next stage, but
21 we continued on.

22 Q. Let me show you something. Tell me if you recall
23 it.

24 (Colloquy held off the record.)

25 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 8.)

1 Q. Have you had a chance to take a look at Exhibit
2 8?

3 A. Yes.

4 Q. What is he referring to when he says highly
5 significant . . . chi squared?

6 A. That's --

7 MR. MALIN: It's chi squared. It is a standard
8 statistical method for determining significance of some kind.

9 MR. COHEN: Can I have the testimony from the
10 witness, please?

11 MR. MALIN: It's not chi.

12 MR. COHEN: It looks like chi.

13 THE WITNESS: The top of the "h" is cut off some
14 way.

15 Q. (By Mr. Cohen) Okay. Chi squared. What does
16 that mean? Do you know?

17 A. It is a test of significance.

18 Q. Does this indicate statistical significance?

19 A. Yes, that's what it says. In excess of lung
20 cancer.

21 Q. Was that conclusion of this study by Johansen?

22 A. I think we did something else. There should be
23 another sheet of paper after this.

24 Q. You sent this out for evaluation by an outside
25 contractor?

1 A. I don't remember what we did. We did something
2 with it.

3 Q. Were you satisfied with these results or not
4 satisfied with these results?

5 MR. MALIN: I object to the form of the question.
6 I don't know what you mean by satisfied.

7 Q. Did you think that this was a well done, well
8 conceived, well carried out study that had results that are
9 worth relying upon?

10 A. No, that population is too small. Any time you
11 have a population as small as 23, you're going to have
12 movement one way or another; and it's difficult to interpret
13 by itself. We really have to take another population that's
14 equal to it and study it.

15 Q. Well, the actual population was 311; wasn't it?

16 A. Yes.

17 Q. And then you ruled out all those people who
18 worked there for less than six months?

19 A. Right.

20 Q. That left you a population of 140?

21 A. Right.

22 Q. Of which you had 23 deaths?

23 A. Yes.

24 Q. That's what you were referring to as the 23?

25 A. Yes.

1 Q. Of which there were actually six who died but two
2 were ruled out. Was that right?

3 A. Yes.

4 Q. So that left you with four?

5 A. Yes.

6 Q. And your conclusion is that that was too small of
7 a population to rely on this study?

8 A. Well, we didn't know what to do with it because
9 it was so small.

10 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 9.)

11 Q. Doctor, let me show you another document. Have
12 you had a chance to look at this document 9?

13 A. Yes.

14 Q. Did you have any participation in the preparation
15 of this document?

16 A. No.

17 Q. Had you ever seen it before?

18 A. I don't think so.

19 Q. You never recall seeing it prior to today?

20 A. No.

21 Q. So, it would be fair to say if I asked you if
22 this was ever used, you wouldn't know?

23 A. That's right.

24 MR. MALIN: He was the medical director. He
25 didn't sell PCB's, and he wasn't in the business department.

1 And this is a contract provision, so I think it's fair to
2 assume it's not in his area of responsibility or knowledge.
3 (Reporter marked Plaintiff's Deposition (Roush) Exhibit 10.)

4 THE WITNESS: What about the date of these two?

5 MR. COHEN: The date of this is September 17,
6 '75.

7 THE WITNESS: Yes.

8 MR. COHEN: The date of the other one?

9 THE WITNESS: Yes.

10 MR. COHEN: You said you didn't know anything
11 about it.

12 THE WITNESS: I'm trying to see.

13 MR. MALIN: He's not asking you a question.

14 Q. (By Mr. Cohen) Your counsel made this nice
15 speech, but if you don't know anything about it, I'm not
16 going to ask you anything about it. Have you had a chance to
17 look at number 10?

18 A. Yes.

19 Q. What can you tell me, sir -- Strike that. You're
20 the author of number 10; correct?

21 A. I'm the one who signed it.

22 Q. Did you write it?

23 A. No.

24 Q. Who wrote it?

25 A. I can't answer that.

1 Q. Down here where it says, "GR/ln," doesn't that
2 indicate you dictated it?

3 A. That says the things that will be done in the
4 second paragraph, I will do that. This up here I didn't
5 write that.

6 Q. Did you normally sign your name to things that
7 you hadn't written?

8 A. Yes. If I was in agreement with it and the fact
9 that I would have to -- the effort that's required in the
10 second paragraph is ours, the medical department's.

11 Q. I see. So the first paragraph was information
12 that was supplied to you; is that right?

13 A. Yes.

14 Q. By someone on your staff?

15 A. No.

16 Q. Someone outside of Monsanto?

17 A. No, no, in Monsanto.

18 Q. Oh, but outside of the medical department?

19 A. Right.

20 Q. And you incorporated it into your memo?

21 A. That's right.

22 Q. What if any activities did you have or anyone in
23 the medical department under your direction or control have
24 with respect to any state or federal agency in formulation of
25 legislation controlling PCB's?

1 A. My department had no responsibility with contact.

2 Q. So, you did nothing?

3 A. Did nothing.

4 Q. With respect to EPA or FDA, NIOSH, anybody?

5 A. No.

6 Q. You did not participate in any way in efforts to
7 change or modify proposed Toxic Substances Control Act or
8 anything else?

9 A. That's right.

10 Q. What did you mean by, "We will have to do much
11 more epidemiology in the future although clear cut
12 conclusions are almost impossible."

13 A. The workers in our plant had not had any
14 epidemiology studies done on them, and there were a number of
15 them which we could be talking about to make sure we don't
16 have some long-term health effects that we were missing; and
17 this is only a demonstration.

18 Q. Well, you said you were doing long-term health
19 effects -- I'm sorry. Strike that. Questions from outside
20 Monsanto about the long-term health effects of chemicals used
21 in two Monsanto plants on the workers in the plants have
22 required organization of epidemiological studies. What
23 studies are you referring to? Was one of them the Johansen
24 study?

25 A. Yes.

1 Q. Any others that you can think of?

2 A. I don't recall.

3 Q. You don't recall. You say, "We will have to do
4 much more epidemiology in the future although clear cut
5 conclusions are almost impossible." What did you mean
6 although clear cut conclusions are almost impossible?

7 A. The statistics of epidemiology make it difficult
8 to explain small variations that appear big on small
9 populations?

10 Q. I see. And that's an inherent limitation in
11 epidemiology itself?

12 A. Yes.

13 MR. COHEN: Thank you. Anybody wish to examine
14 the witness?

15 MR. BURNS: No.

16 MR. GIORDANO: I have no questions.

17 MR. KUHL: I have no questions.

18 CROSS-EXAMINATION

19 QUESTIONS BY MR. MALIN:

20 Q. I just have a few to clear up some questions.
21 Doctor, after you came to Monsanto in 1973, could you give us
22 an estimate of how much of your time you spent on issues
23 involving PCB's if that's possible?

24 A. A very small portion of my time.

25 Q. Could you break it down any better than that,

1 less than five, less than 10?

2 A. Less than five.

3 Q. And why was that?

4 A. I had responsibilities to do and many things I
5 assigned out to be completed by someone else.

6 Q. Well, you had other responsibilities besides
7 PCB's; is that correct?

8 A. That's right.

9 Q. What other responsibilities did you have? What
10 other types of chemicals or divisions did you have
11 responsibility for? What other types of chemicals or
12 divisions did you have responsibility for?

13 A. We were involved in the Keller trial as a major
14 project.

15 Q. Anything else?

16 A. Some efforts with the ag products.

17 Q. Monsanto makes a great many agricultural
18 chemicals; does it not?

19 A. Right.

20 Q. And you had responsibilities in all those areas?

21 A. That's right.

22 Q. Approximately how many other products were there
23 for which you had responsibilities, if you recall?

24 A. I can't answer that.

25 Q. Well, during your tenure as medical director of

1 Monsanto, were you aware of any adverse health effects among
2 Monsanto PCB workers?

3 A. No, none.

4 Q. Do you believe that you as medical director
5 during the period of time that you were there, that '73 to
6 '88, did everything that was reasonable to determine if
7 Monsanto's workers who worked on PCB products experienced any
8 adverse health effects?

9 A. Yes.

10 Q. During your tenure as medical director, were you
11 aware of any reports of adverse health effects from people
12 outside of Monsanto who were the users of PCB fluids?

13 A. I don't recall.

14 Q. Well, do you recall receiving any reports of
15 adverse health effects?

16 A. On Monsanto products?

17 Q. From Monsanto PCB products.

18 A. On PCB's, the question of people being exposed to
19 the product and wanting to know whether they're going to be
20 adversely affected or not.

21 Q. Were there actually reports of actual adverse
22 effects, of people sick?

23 A. No.

24 Q. Doctor, do you now consider PCB's to be a human
25 carcinogen?

1 A. No.

2 Q. Did the -- Strike that. Did Monsanto follow your
3 recommendations for determining whether or not Monsanto
4 workers, in fact, had any adverse health effects from
5 producing PCB's?

6 A. Yes.

7 Q. Were there ever any recommendations that you made
8 for studies or otherwise that they did not follow?

9 A. No.

10 Q. Do you know of a single case of PCB poisoning
11 during your entire tenure as medical director, either inside
12 Monsanto or outside Monsanto?

13 A. No.

14 MR. COHEN: I object to the form. I object to
15 your leading your own witness.

16 MR. MALIN: We're not leading our own witnesses.
17 He's a subpoenaed witness.

18 MR. COHEN: Not only is he your witness, he
19 testified that you represent him. I don't know how much more
20 of your witness he can be.

21 Q. (By Mr. Malin) Do you consider that Monsanto was
22 adequately staffed to handle any inquiries that were made
23 from the outside on PCB health effects or PCB usage?

24 MR. COHEN: I object. Same objection.

25 Q. You may answer the question.

1 A. Yes.

2 Q. What kind of a staff did you have? Would you
3 describe the staff, its size, and its composition with the
4 extent you can remember?

5 A. Well, the industrial hygiene had gone to the
6 place where we could monitor what was taking away of exposure
7 in each one of our plants. We have got it recorded. We set
8 up a medical surveillance program and got it so that we could
9 record the data and have it transmitted electrically into
10 headquarters, so we could look at the data in a relative PC
11 form. We set up and put together a toxicology laboratory and
12 had something of the order of a hundred people or more
13 working in that facility, doing the studies that was within
14 their province of being able to do, because a lot of
15 toxicology is very specific and people who do it only do one
16 little precise study. And we also developed our epidemiology
17 to a reasonable form under Dr. Gaffey.

18 Q. Do you believe that it's possible to extrapolate
19 from one species of animal studies to determine human
20 causation with respect to any disease if we assume that the
21 animal studies are from especially sensitive animals; they
22 are high dose, and -- well, all right -- especially sensitive
23 animals; and they are high dose?

24 MR. COHEN: Objection. I object not only to the
25 form of the question, but I object to it being a hypothetical

1 and assuming a whole bunch of facts that may not have any
2 relevance to anything in this case.

3 MR. MALIN: You may answer the question.

4 A. We had the facilities developed so that we could
5 do the animal studies and we could follow the workers with
6 their exposure to see whether they're responding the same.
7 So we knew quite well whether the animal data was related to
8 human exposure or not and we could make the judgment based on
9 what we got.

10 Q. Did you make any such judgment?

11 A. Lots of times.

12 MR. COHEN: Same objection.

13 Q. You have not been hired as a consultant by
14 Monsanto in this case; have you?

15 MR. COHEN: I object to the form.

16 A. No, I have not been hired.

17 Q. And you don't have the authority to speak on
18 behalf of Monsanto in this case; do you?

19 A. No.

20 MR. COHEN: Object to the form.

21 Q. You're hear as a subpoenaed witness. Doctor, you
22 were asked whether or not you knew of trace levels of
23 impurities such as anthracenes, naphthalenes, phenanthrenes,
24 polychlorinated dibenzofurans in PCB's during the 70's.
25 Would it have made any difference to anything that you had

1 done had you known about the existence of those impurities?

2 MR. COHEN: I object to the form.

3 Q. You may answer the question.

4 A. We have looked at the history and the data that's
5 available on human poisonings, primarily Yusho, and we did
6 not see anything there, but we did say that we had to have
7 some other effect besides PCB and the dioxin to be causing
8 the Yusho incident. The workers exposed to PCB's did not
9 show that they had any response to PCB's at the levels of
10 presence in the work place.

11 Q. So therefore, even if we assume that these
12 impurities were there, they made no difference.

13 MR. COHEN: I object to the form.

14 A. In terms of the fact that if there was sporadic
15 cases of chloracne, and those sporadic cases of chloracne
16 occurred where there was a possibility of some other
17 contaminants that was producing the effect.

18 Q. Were there any cases of chloracne while you were
19 with Monsanto?

20 A. No.

21 MR. COHEN: Object to the form.

22 Q. Do you yourself know of any cases of chloracne
23 that occurred while you were medical director of Monsanto
24 anywhere?

25 MR. COHEN: Object to the form.

1 A. No.

2 MR. MALIN: I have no further questions for this
3 witness.

4 REDIRECT EXAMINATION

5 QUESTIONS BY MR. COHEN:

6 Q. Earlier, doctor, in response to a question put
7 to you by your counsel, you said that you do not presently
8 consider PCB's to be a carcinogen; is that correct?

9 A. Human carcinogen.

10 Q. Is that what you were limiting it to?

11 A. Yes.

12 Q. Do you believe it to be an animal carcinogen?

13 A. Yes.

14 Q. Is that only in certain special strains of
15 animals?

16 A. Yes.

17 Q. Do you believe those to be animals that were bred
18 to be particularly susceptible to this particular toxin?

19 A. No.

20 Q. Then what makes them a special strain?

21 A. They're responding to this and the others did
22 not.

23 Q. So it's just that they did respond. You don't
24 know that they were bred or have any particular genetic
25 predisposition to?

1 A. That's right. There's something else that makes
2 that one respond to dose.

3 Q. And it happened in that particular animal?

4 A. That's right.

5 Q. Now when you said that you don't consider PCB's
6 to be a carcinogen, are you speaking of just the PCB's or are
7 you talking about the commercial production grade compound
8 that you were selling, such as 1248, 1254, 1260?

9 A. Commercial grade.

10 Q. That includes then whatever it is that's in
11 there. You don't consider it to be carcinogenic in humans.

12 A. That's right.

13 MR. COHEN: I have no further questions.

14 RE CROSS-EXAMINATION

15 QUESTIONS BY MR. MALIN:

16 Q. Just one last question, doctor. With respect to
17 animal carcinogenicity, do you believe that all PCB mixtures
18 are animal carcinogens in this special species of animal or
19 rat or whatever it is, that is whether it's 1016, 1242, 1254,
20 or 1260?

21 MR. COHEN: I'll object. I don't think he said
22 that at any time. He said -- I think he said 1260 was the
23 one which proved to be carcinogenic.

24 THE WITNESS: Yes.

25 Q. It's only 1260; isn't it?

1 A. Yes.

2 MR. COHEN: Object to the form of the question.

3 DIRECT EXAMINATION

4 QUESTIONS BY MR. D'URSO:

5 Q. Doctor, you mentioned the attempts to improve the
6 data collection, epidemiology and toxicology efforts that
7 were made under tenure. All these efforts --

8 A. Yes.

9 Q. were designed to protect Monsanto workers; were
10 they not?

11 MR. MALIN: I object to the form of the question.

12 A. Yes. But also to understand the chemical because
13 we do have a responsibility to a customer. That was one of
14 my assignments.

15 MR. D'URSO: Thank you, doctor.

16 MR. COHEN: I want the witness to read and sign.
17 I want all exhibits attached.

18

19 _____
GEORGE ROUSH, JR., M.D.

20 Subscribed and sworn to before me this _____
21 day of _____, 1992.

22 My commission expires _____.

23 _____
Notary Public

24

25 (TMS/PAOLI RAILROAD YARD PCB LITIGATION)

NOTARIAL CERTIFICATE

STATE OF MISSOURI)
)
CITY OF ST. LOUIS)

I, TINA M. STUMPF, a Certified Shorthand Reporter and a duly commissioned Notary Public, within and for the State of Missouri, do hereby certify that there came before me at the offices of Brown & James, 705 Olive Street, 11th Floor, St. Louis, MO 63101,

GEORGE ROUSH, JR., M.D.,

who was by me first duly sworn to testify to the truth and nothing but the truth of all knowledge touching and concerning the matters in controversy in this cause; that the witness was thereupon examined under oath and said examination was reduced to writing by me; and that this deposition is a true and correct record of the testimony given by the witness.

I further certify that I am neither attorney nor counsel for, nor related or employed by, any of the parties to the action in which this deposition is taken; further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto or financially interested in this action.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this _____ day of _____, 1992.

My commission expires February 1, 1994.

Notary Public



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460



SCIENCE AND ENVIRONMENTAL PROTECTION

MEMORANDUM

DATE: February 23, 1990

SUBJECT: Newly Revealed Fraud by Monsanto in an Epidemiological Study Used by EPA to Assess Human Health Effects from Dioxins

FROM: Cate Jenkins, Ph.D. *Cate Jenkins*
Chemist, Waste Characterization Branch (OS 332)
Characterization and Assessment Division

TO: Raymond C. Loehr, Ph.D.
Chair, Executive Committee
Science Advisory Board (A 101)
Office of the Administrator

On November 28, 1989 you transmitted to the Administrator a review by the Science Advisory Board (SAB)¹ of "A Cancer Risk-Specific Dose Estimate for 2,3,7,8-TCDD."² This review concluded that the existing epidemiologic studies were conflicting, and did not provide definitive data on human health effects of dioxins, and thus EPA should continue to utilize animal toxicologic data as a basis for dioxin risk assessments.

A key epidemiological study leading to this conclusion was performed by Monsanto Corporation. This study examined medical records were examined of employees exposed to dioxins from a 1949 explosion of a 2,4,5-trichlorophenol manufacturing process, and

¹ U.S. EPA, Science Advisory Board, Ad Hoc Dioxin Panel (November 28, 1989) Review of Draft Documents "A Cancer Risk-Specific Dose Estimate for 2,3,7,8-TCDD and "Estimating Exposure to 2,3,7,8-TCDD."

² U.S. EPA, Office of Health and Environmental Assessment (June, 1988) A Cancer Risk-Specific Dose Estimate for 2,3,7,8-TCDD, EPA Publication No. EPA/600/6-88/007Aa.

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Printed on Recycled Paper

Exhibit 12

found no statistically significant excess cancer deaths.³ The Monsanto study was important, since although the exposed population was small (121 workers), exposure to dioxins was clearly established because the workers experienced chloracne. Other studies were confounded by the fact that exposure to dioxins was not so demonstrated.

In Appendix B of "A Cancer Risk-Specific Dose Estimate for 2,3,7,8-TCDD" this Monsanto study is discussed in juxtaposition with other studies on small populations where excess cancer morbidity and mortality were in fact found. As a result, the studies where excess cancers were observed were rendered suspect. For example, EPA discussed in the same sentence the fact that although the studies by Thiess et al.⁴ and Axelson et al.⁵ reported statistically significant excesses of stomach cancer, the study by Monsanto did not. EPA discussed the fact that significantly elevated levels of cancers (e.g., prostate, non-Hodgkins lymphoma, connective tissue, soft tissue sarcomas, reticulum cell sarcoma, kidney cancer, etc.) had been found in other dioxin-exposed populations. The study by Monsanto, however, either did not find any such cancers, or the cancers observed were not statistically significant.

This study by Monsanto apparently has now been shown to be a fraud. Attached is a brief filed by the plaintiffs in a case where damages are being sought resulting from a spill of dioxin-contaminated pentachlorophenol wood preservative by Monsanto. This study on behalf of Monsanto is described, where it is

³ Zack, J.A. and R.R. Suskind (1980) The Mortality Experience of Workers Exposed to Tetrachlorodibenzodioxin in a Trichlorophenol Process Accident. J. Occup. Med. 22(1):11-14.

⁴ Thiess, A.M., R. Frantzel-Boyme, and R. Link (1982) Mortality Study of Persons Exposed to Dioxin in a Trichlorophenol-Process Accident that Occurred in the BASF AG on November 17, 1983. Am. J. Ind. Med. 3:173-189.

⁵ Axelson, O. (1986, Jan. 21) Rebuttals of the Final Report on Cancer by the Royal Commission on the Use and Effects of Chemical Agents on Australian Personnel in Vietnam. Department of Occupational Medicine, University Hospital, Universitetet Linkoping, Linkoping, Sweden.

⁶ Plaintiffs-Appellees' Brief (October 3, 1989) Frances L. Kemner, et al. v. Monsanto Company, Appeal from the Circuit Court of St. Clair County, Illinois, No. 89-L-970, filed by Rex Carr, CARR, DORIN, TILLERY, DUNIN, MONROY, GLASS & BOGARD, 412 Missouri Avenue, East St. Louis, IL 62201 and Jerome W. Seigfried, SEIGFRIED, RUNGE, LEONETTI & FOHLMEYER, P.O. Box 160, 123 East Jackson St., Mexico, MO 65265-0160.

alleged that the record demonstrated a deliberate course of conduct by Monsanto through "altered" research to prove to the world that the only health consequence of dioxins was the relatively harmless, reversible condition of chloracne. The cross examination of Dr. Roush, Medical Director of Monsanto, was said to clearly establish the fraudulent nature of the cancer mortality study by Dr. Zack, a Monsanto employee, and an "independent" researcher, Dr. Suskind, described as having performed "joint" studies with Monsanto.

An earlier, predecessor study performed by Dr. Zack was alleged to have deliberately and knowingly omitted 5 deaths from the group exposed to dioxins in the 1949 accident, while removing 4 workers who had been exposed and putting these workers in the unexposed group, serving to provide an apparent increase the cancer death rate in the unexposed group. The overall cancer death rate was alleged to have actually been 68% greater in the exposed population, with 143% higher lung cancers, 108% higher genitourinary cancers, 80% higher bladder cancers, and 92% higher lymphatic cancers.

The Monsanto study performed by Dr. Suskind on workers exposed to dioxins in the 1949 accident, published in 1980 in the Journal of the American Medical Association and the same year, in the Journal of Occupational Medicine with Dr. Zack as co-author (this was the study was reviewed by EPA), was also alleged to be fraudulent. It was claimed that the actual medical records revealed gross misclassifications and omissions. The correct classification was said to have been 28 cancers in the exposed group compared to only 2 in the unexposed group; Suskind reported 14 cancers in the exposed group and 6 in the unexposed group. In addition, it was alleged that in November of 1958, Dr. Suskind colluded with Monsanto to conceal findings of psychoneuroses in the exposed workers from the Workers Compensation Commission. Dr. Suskind was alleged to have falsely stated that workers' nervous system and liver problems had disappeared by 1953, with the stated intention by Suskind to make the world believe that only a few of the workers continued to have problems. Dr. Suskind was reported as acknowledging to the Court that the world and the scientific community were intended to, and indeed had, relied upon his reports of no adverse cancer effects from human exposures to dioxins.

It is a commonly bandied adage that dioxins have not been demonstrated to have caused cancer in humans, despite documented exposures. Perhaps this may now been seen as yet another "old industry tale" in light of the fraud allegedly committed by Monsanto in conducting its "research" on its workers exposed to dioxins. It could be that other studies on exposed populations are similarly flawed and subject to fraud.

I request that the SAB on its own, or by way of direction to EPA's Office of Research and Development, obtain the full files from the ongoing case against Monsanto to determine whether definitive conclusions may now be drawn regarding the evidence establishing a causal link between dioxins and human cancer in the Monsanto population. I believe that an audit of other dioxin-related human epidemiological studies should be performed, to determine whether misclassification of medical records or other errors has resulted in similarly flawed conclusions. Studies that would be particularly prone to bias would be those performed by any manufacturing firm on its own employees, or in conjunction with an outside researcher, since a positive finding of excess cancer mortality or morbidity would result in the financial liability of that firm.

cc: Donald G. Barnes, Ph.D.
Director, Science Advisory Board (A 101)
Office of the Administrator

Hugh McKimmon, Ph.D.
Director, Human Health Assessment Group (RD 688)
Office of Research and Development

Peter W. Preuss, Ph.D.
Chairman, Interoffice Workgroup for a
Cancer Risk-Specific Dose Estimate for 2,3,7,8-TCDD



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
FOOD AND DRUG ADMINISTRATION
WASHINGTON, D. C. 20204

December 23, 1974

Dr. James Mieure
Monsanto Company
800 North Lindbergh
St. Louis, Missouri 63166

Dear Dr. Mieure:

In response to your recent request made to John Roach, I am enclosing a copy of the presentation made at the October 1974 AOAC Meeting, entitled "Finding of Chlorinated Dibenzofurans in Aroclor PCB's of Recent Manufacture." Additional work to determine the levels of chlorinated dibenzofurans in the Aroclors is now underway in our laboratory.

You are probably aware that evidence for chlorinated dibenzofuran contaminants has been reported for PCB's made in France and Germany, by Vos, and in Japan, by Reach and Pomerantz, prior to our recent findings in the 1200 Series Aroclors. You may have considered, as we have, possible means by which the chlorinated dibenzofurans are formed. Can you please tell us whether the parent dibenzofuran has been looked for or found in the starting biphenyl? Are hydroxylated, chlorinated biphenyls, conceivable precursors to the dibenzofurans, present in the Aroclors? Are they formed in a base treatment step (lime or alkali) after chlorination? Perhaps there are alternative explanations for which you have some experimental support.

Your discussion of these points would be welcome and I look forward to your response.

Sincerely,

C. F. Jelinek

C. F. Jelinek, Ph.D.

Director

Division of Chemical Technology (HFF-420)
Bureau of Foods

Enclosure

PRR 004361

HARTOLDMON0030745

The procedure used in the current work was a considerably modified version of that applied earlier to the analysis of Kanechlor 400. The current procedure used three types of adsorbent columns for sample preparation.

Call for Slide 1. (Flow chart of sample preparation)

The alumina column was 50 g of WOELM W-200 alumina which was eluted with 400 ml of 1% methylene chloride/hexane followed by 400 ml of 20% methylene chloride/hexane. The 20% eluate containing the material of interest was then concentrated to less than one ml prior to addition to an alumina micro column.

The micro columns were disposable pipets of roughly 5 mm bore into which a small wad of glass wool had been inserted to retain the aluminum oxide. WOELM W-200 alumina was poured into the columns to a depth of 2.5 cm. The micro columns were eluted with 10 ml of 1% methylene chloride/hexane and 6 ml of 20% methylene chloride/hexane.

Prior to the Florisil column, eluates from two, 100 mg Aroclor portions each being less than one ml, were combined. The Florisil column was 8 g of 60/100 mesh PR grade Florisil which was eluted with 10 ml of hexane and 100 ml of 5% ethyl ether/hexane. The latter eluate was concentrated to less than 20 microliters and was never permitted to go to dryness.

PRR 00436

All for Slide 1.

The concentrated eluates were analyzed by combined gas chromatography/mass spectrometry using a Finnigan 1015 quadrupole mass spectrometer interfaced thru a Gohlke all-glass jet separator to a six-foot by two millimeter bore 3% OV-101 column at 200°C with a helium carrier gas flow of twenty milliliters per minute. Mass spectra of authentic chlorinated dibenzofurans were obtained under identical operating conditions using a mixture of mono-, di-, tri-, and tetra- chlorodibenzofurans kindly provided by Dr. Albert Pohland of FDA. A summary of the results for each Aroclor sample analyzed is given in the following slides. In each case, the mass spectral data obtained for the chlorinated dibenzofurans included the parent ion and fragment ions derived from losses of CO + Cl. Taken together, these data are considered characteristic for the chlorinated dibenzofurans. Each analyzed extract also gave evidence of some chlorinated biphenyls indicating the column separation procedure used did not completely separate Cl-DBF from the chlorinated biphenyls.

PRR 0043

In each Aroclor found to contain Cl-DBF, the level of contamination was estimated to be in the ppm range. Studies are now under way to obtain more meaningful quantitative data on the level of Cl-DBF contamination.

Call for Slide 2.

Six, 200 mg replicates of an Aroclor 1254 sample were analyzed ^{along} with a reagent blank. Tetra- and pentachlorodibenzofurans were found in all six extracts. Hexa- and heptachloronaphthalene were also found. None of these compounds was found in a reagent blank equivalent in size to a 200 mg sample.

Call for Slide 3.

Two, 600 mg replicates of an Aroclor 1242 sample were analyzed. Di- and tetrachlorodibenzofurans were detected in both. In addition, tetra-, penta- and hexachloronaphthalene, a trichloroterphenyl, and three unidentified halogenated compounds were detected. The unidentified halogenated compounds may form a homologous series differing from one another only in their degree of chlorination. The tentative molecular weights of these unidentified components were 278 (possible 4 chlorines), 312 (5 chlorines) and 346 (possible 6 chlorines).

These may have been methylchloronaphthalenes or chlorophenyl cyclopentadienes. However, their only observed fragmentation was a loss of one chlorine atom. The data for these unidentified compounds was therefore too sparse to permit identification.

PRR 004365

Call for Slide 4.

Two, 200 mg replicates of an Aroclor 1016 sample were analyzed. Dichlorodibenzofuran was found in each of the samples.

Call for Slide 5.

Initially, 2, 200 mg replicates of an Aroclor 1221 sample and a reagent were analyzed. No Cl-DBF were detected. Sensitivity of the instrument for the molecular ions of lower Cl-DBF was then enhanced by limiting the mass scan to roughly 170 to 290 a.m.u. and a third 200 mg sample was analyzed. The results were again negative for Cl-DBF. Mono-, di- and trichlorobiphenyls were the only halogenated species detected in the sample extracts. The reagent blank analyzed with this lot contained a barely detectable trace of dichlorobiphenyl. Another reagent blank was then prepared and was found to be free of halogenated materials.

Call for Slide 6. (flow chart of recycle experiment)

To investigate the possibility that the observed chlorinated dibenzofurans may be artifacts produced in the sample analytical

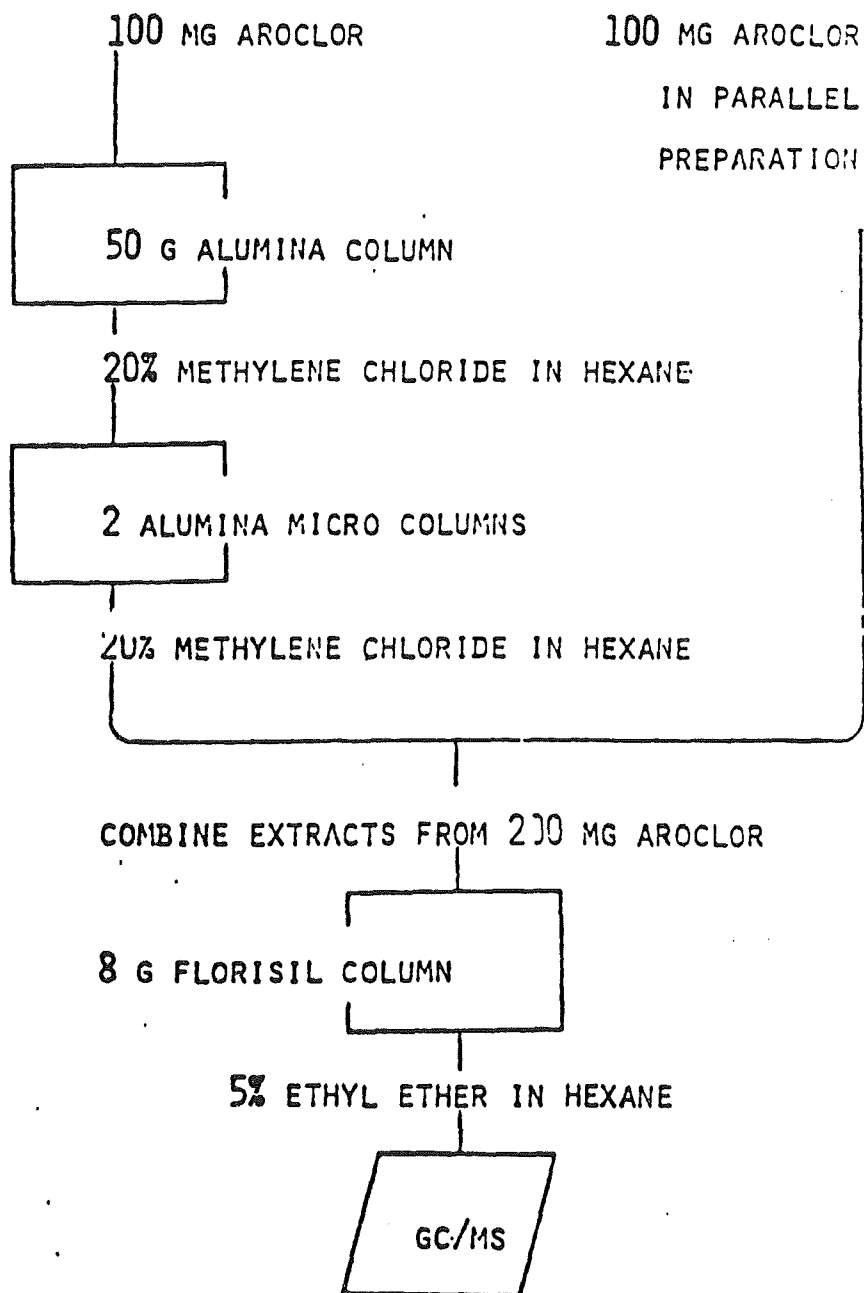
PRR 004366

procedure, duplicate experiments with Aroclor 1254 were carried out in all eluates normally discarded in the procedure were retained and pooled. The pooled sample eluates were then concentrated and re-subjected to the sample preparation procedure. The original samples and the samples prepared from the pooled eluates were examined by combined gas chromatography/mass spectrometry on the same day under identical operating conditions. No chlorinated dibenzofurans were detected in the samples resulting from the pooled eluates that had been resubjected to the sample preparation procedure. If we had found a significant level of chlorinated dibenzofurans in the pooled samples, this would have suggested that the procedure itself was capable of making chlorinated dibenzofurans from one or more constituents of the sample.

In summary, we have shown the presence of chlorinated dibenzofurans as trace contaminants in recent production lots of Aroclor 1254, 1242, and 1016 but not in Aroclor 1221 when samples of comparable size were analyzed. No dibenzofurans were detected in reagent and equipment blanks run with the samples. The procedure itself does not appear to produce chlorinated dibenzofurans as an artifact of analysis.

The authors wish to acknowledge the technical assistance of Tom Lyon and Linda Laderach in the preparation of these samples for analysis.

PRR 004367



PRR C04368

PRR 004369

AROCLOR 1254

PRODUCTION DATE 10/73

SAMPLES ANALYZED: 6

SAMPLE SIZE: 200 IG

FOUND: TETRA- AND PENTACHLORODIBENZOFURANS
CHLORINATED NAPHTHALENES

AROCOR 1242

PRODUCTION DATE 9/73

SAMPLES ANALYZED: 2

SAMPLE SIZE: 60 MG

FOUND: DI-, TRI-, AND TETRACHLORODIBENZO-
FURANS

CHLORINATED NAPHTHALENES
TRICHLOROTERPHENYL
UNIDENTIFIED HALOGENATED COMPOUNDS

PRR 004371

AROCLOP 1016

PRODUCTION DATE 10/73

SAMPLES ANALYZED: 2

SAMPLE SIZE: 200 M3

FOUND: DICHLORODIBENZIFURAN

PRR CC4372

AROCLOR 1221

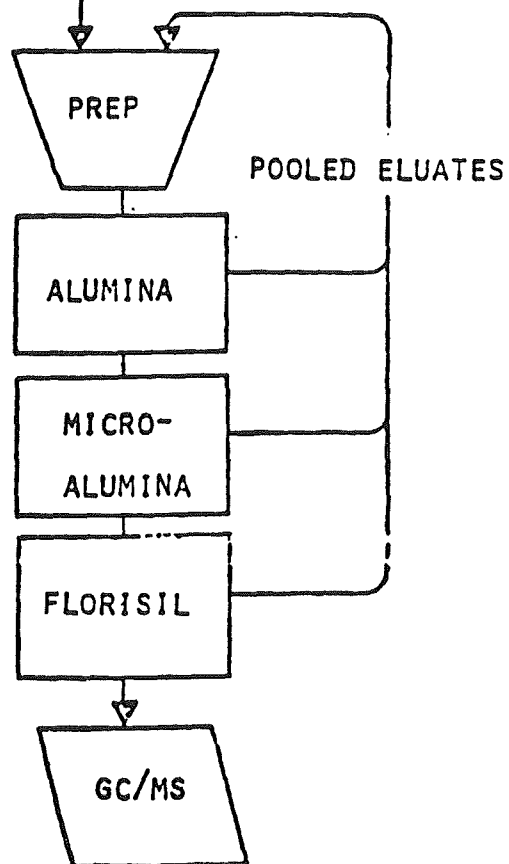
PRODUCTION DATE 6/73

SAMPLES ANALYZED: 3

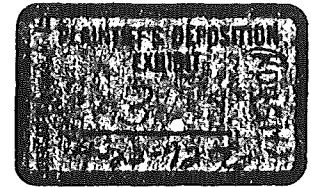
SAMPLE SIZE: 20.0 MG

NO CHLORINATED DIBENZOFURANS DETECTED

ORIGINAL SAMPLE



PRR 004373



From the desk of

R. E. KELLER

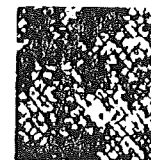
5F 11-11-71
→ Gordon T. O'Neil

Howard Bergen

The attached
summary on furans
& dioxins in PCB's
covers inputs for the
report you requested.
It is sent to you in
case you need background
info before the other
report issues via Bill Rickard.

REK

PRR 004260



Monsanto INDUSTRIAL CHEMICALS COMPANY

FROM (NAME & LOCATION) R. E. Keller - South Second Street - St. Louis

DATE October 28, 1971
SUBJECT ALLEGED DIOXINS AND BENZOFURANS
IN PCB'S - INPUTS FOR REPORT
REFERENCE HSB 10-22-71 Memo to REK/WRR
TO W. R. Richard
General Offices

C. W. Roos - Res. 1
T. M. Patrick - Res. 1
M. W. Dietrich - Res. 2
J. P. Misure - Res. 2
E. S. Tucker - Res. 2

The attached reports and summary data table for furans cover information in hand on the above subject.

Overall, we should be able to meet predicted regulatory agency maximum permissible levels of chlorodibenzofurans in our PCB/PCT products. Data in hand show that Aroclor 1242, 1254, 1260 and MCS 1016 contain no detectable (<2 ppm)^a furans (or chlorodibenzo-p-dioxins). Aroclor 5442 contains no detectable (<5 ppm) furans.

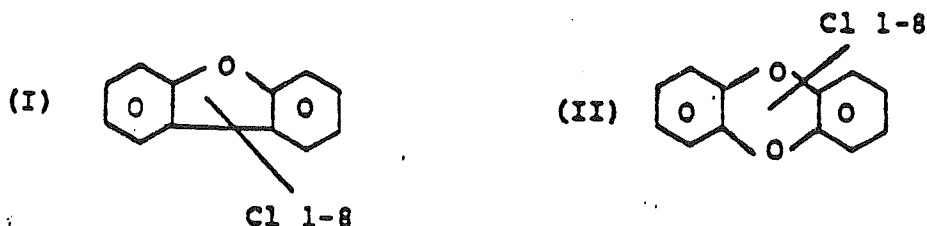
The above position is based on the belief that higher levels would be permitted for furans because of lower toxicity compared to dioxins. The data shown on the confidential attachment from a European manufacturer shows that tetrachlorodibenzo-p-dioxin has an acute toxicity to rabbits at least 30X that for tetrachlorodibenzofuran. Regulatory agencies, including the EPA, are currently imposing 0.1 ppm max. for tetrachlorodibenzo-p-dioxin in 2,4,5-T and hexachlorophene. On this basis, a 2 ppm max. level should be acceptable for furans.

If we are required to push the detection to 0.1 ppm, we will need to synthesize furans and develop more sensitive methods. This will be costly, and difficult technically, especially for PCT products.

Based on experimental work in our own laboratories and in part at the University of Utrecht -

We Know

1. Monsanto Aroclor 1242, 1254, 1260 and MCS 1016 contain no detectable (<2 ppm) chlorodibenzofurans (I) or chlorodibenzo-p-dioxins (II) of the type below. Aroclor 5442 also contains no detectable (<5 ppm) chlorodibenzofurans or chlorodibenzo-p-dioxins.



^aOn a per component and not total furan basis.

PRR 004241

Dr. W. R. Richard
October 28, 1971
Page two

2. Competitive products - Prodelec and Bayer chlorinated biphenyls similar in composition to Aroclor 1260 contain detectable furans (up to 30 ppm) and no dioxins (<2 ppm). Japanese product from Shizuki similar to Aroclor 1242 contains no detectable (<2 ppm) furans or dioxins.
3. All the above PCB products contain chlorinated naphthalenes at ppm levels. Aroclor 5442 contains either chlorinated anthracene or phenanthrene.

Don't Know or Limited Information Only

1. Biodegradability of furans -
Toxicity to bacteria may be a problem for biodegradation studies.
2. Photodegradation of furans -
Work by the USDA indicates that photodegradation of dioxins under conditions in which water is the solvent is probably extremely slow in the natural environment.
3. Existence of furans (or dioxins) in the environment or as biological residues -
Methodology normally applied to analysis of environmental materials will not make this detection.

Questions for Medical

1. Toxicity of other impurities -
Chlorinated naphthalenes, anthracene and/or phenanthrene found in above commercial products?
2. Acute toxicity or teratogenic effects of chlorodibenzofurans relative to dioxins? Availability of published data in the public domain for reference purposes?
3. Based on the above - the odds that 2 ppm max. for chlorodibenzofurans will be put on our products?

I suggest that the only immediate analytical work would be to firm up furan data for remaining PCB/PCT products with existing methodology. Out of this, we should decide what minimum monitoring is needed to insure that our manufacturing process produces no furans in our final products. Additional analytical method development work should be done only if lower detections are needed, based on inputs such as adverse toxicity findings from others.


R. E. Keller

PRR 004242

db

GC/MS ANALYSIS DATA FOR TOXIC COMPONENTS IN PCB/PCT PRODUCTS

LABORATORY/PRODUCTS

	CHLORODIBENZOFURANS FOUND		
	<u><4 Cl/mol</u>	<u>4 Cl/mol</u>	<u>5 Cl/mol</u>
<u>Vos, et al</u>			
University of Utrecht			
Prodelec Phenoclor DP6 (Composition similar to Aroclor 1260)	ND (<1 ppm)	Detected (1-20 ppm)	Detected (1-20 ppm)
Bayer Clophen A60, Lot 912434 (Composition similar to Aroclor 1260)	ND (<1 ppm)	Detected (1-20 ppm)	Detected (1-5 ppm)
Monsanto Aroclor 1260, Lot AK-3	ND (<1 ppm)	ND (<1 ppm)	ND (<1 ppm)
<u>Applied Sciences</u>			
Monsanto Industrial Chemicals			
Prodelec Phenoclor DP6	ND (<2 ppm)	Detected	Detected (15-30 ppm)
Prodelec Phenoclor DP6	ND (<2 ppm)	Detected	Detected (15-30 ppm)
Bayer Clophen A60, Lot 931134	ND (<2 ppm)	Detected	Detected
Kaneclor KC-300 Shizuki, July 1970 (Composition similar to Aroclor 1242)	ND (<2 ppm)	ND (<2 ppm)	ND (<2 ppm)
Monsanto Aroclor 1242, Lot AK-255	ND (<2 ppm)	ND (<2 ppm)	ND (<2 ppm)
Monsanto Aroclor 1254, Lot AK-38	ND (<2 ppm)	ND (<2 ppm)	ND (<2 ppm)
Monsanto Aroclor 1260, Lot AK-3	ND (<2 ppm)	ND (<2 ppm)	ND (<2 ppm)
Monsanto MCS 1016, Drum B	ND (<2 ppm)	ND (<2 ppm)	ND (<2 ppm)
Monsanto MCS 1016, KA-708	ND (<2 ppm)	ND (<2 ppm)	ND (<2 ppm)
Monsanto Aroclor 5442, Lot AI-9	ND (<5 ppm)	ND (<5 ppm)	ND (<5 ppm)

PRR 004243

HARTOLDMON0030760

CONFIDENTIAL

CONFIDENTIAL		3/45	(2000- Reference)	200 720
2,4,5-Trichlorophenol		1,0	0/8	0/
1,2,4,5-Tetrachlorbenzol		1,0	0/5	1/5
Pentachlorophenol		0,5	0/2	-
		0,2	0/2	2/2
Hexachlornaphthalin		0,1 0,05 0,01 0,003	+ 2/2 + 2/4 + 1/4 0/2	- - 3/4 0/2
Pentachlordiphenyl		0,05 0,005	0/1 0/2	0/1 0/2
Heptachlor-4,4'-dioxy- diphenyl		0,05	0/2	0/2
Tetrachlor-2,2'-dioxy- diphenyl		0,05	0/2	0/2
Tetrachlor-4,4'-dioxy- diphenyl		0,05	0/2	0/2
Trichlor-2,2'-dioxy- diphenyl		0,05	0/4	0/4
Hexachlordiphenylenoxyd		0,005 0,001 0,0003 0,0001	+ 2/2 + 3/4 + 1/7 0/2	2/2 3/4 3/7 0/2
Pentachlordiphenylen- oxyd		0,001 0,0003	+ 5/5 + 1/2	3/4 2/2
Tetrachlordiphenylen- oxyd		0,0001 0,001 0,0003 0,0001	+ 1/11 + 2/2 + 1/2 0/2	11/11 2/2 2/2 2/2
Trichlordiphenylenoxyd		0,005 0,001 0,0003 0,0001	+ 2/2 + 6/20 + 4/9 0/2	1/1 5/20 6/9 2/2
Tetrachlordiphenylen- dioxyd		0,0001 0,0001 0,0001 0,0001	+ 4/4 + 3/3 + 3/3 0/3	3/4 - 3/3 3/3

T J. R. Savage - St. Louis - B2SL

June 13, 1972

C. Paton

Chlorodibenzofuran

W. R. Richard
T3A

Cumming Paton has asked that we develop a history on chlorodibenzofuran content of our PCB products. The plant has no methods for this analysis. If we just need to screen a few current batches, this is perhaps better done in Research, but if we want to develop a continuing history, of say every fifth batch as we did with Dioxins and Penta, we should have a method developed that is suitable for routine plant use. Let me know how you would like to proceed.

J. R. Savage

/b1

PRR 004245

HARTOLDMON0030762

Monsanto

FROM (NAME & LOCATION): B2SC Cumming Paton

Equal

DATE May 23, 1972
SUBJECT Dielectric Aroclor
REFERENCE

cc B2SL T. L. Gossage
T3A W. R. Richard
1760 R. H. Munch
B2SC P. G. Benignus
B2NK W. B. Papageorge

TO : B2SL
J. R. SAVAGE


Jim, at our presentation to the PCB Task Force in Washington on May 15 we presented the composition of Aroclor 1016 as containing 1% pentachlorobiphenyl and higher homologs and 0.1% hexachlorobiphenyl and higher homologs. By now I think the idea that Aroclor 1016 has under 0.4% pentachloro and higher homologs is pretty well established. The fact that methodology is involved in making distinctions is not going to be of immediate significance to many people. In order to prevent more of a credibility problem I think we need to know what current Aroclor 1016 is running as far as penta-chloro and higher homologs and hexachloro and higher by our latest analytical techniques. We should have available evidence to show that our May 15 numbers can be substantiated.

The second point concerns chlorodibenzofurans. At our meeting the FDA showed concern regarding getting definite proof that chlorodibenzofurans were absent from our PCBs. I suggest we have several current batches of Aroclor 1016, 1242 and 1254 screened. I think we need to have this data available.


Cumming Paton

CS

*Jim: See Notes
Act*

PRR 004240

Monsanto

FROM (NAME & LOCATION): M. W. Dietrich - Technology Department - S. Second Street

DATE: January 27, 1971
SUBJECT: DIBENZOFURANS IN AROCLOR PRODUCTS
REFERENCE: R.E.Keller Memo to W.B.Papageorge 10/20/70
TO: W. R. Richard *also* cc to *(Full Ameston)*
General Offices *W Engstrom R*
G Miller - Ameston
R McLutchen R
D Landerbach Ameston
cc: W. B. Papageorge - GO
M. W. Farrar - Res. 1
H. S. Bergen - GO
E. P. Wheeler - GO
E. S. Tucker - Res. 2
E. M. Emery - Res. 2
R. E. Keller - Res. 1
R. H. Munch - Res. 2
Q. E. Thompson - GO
J. P. Mieure - Res. 2

We initially reported that Aroclor 5442 (Lot AI-9) contained 1-3 ppm tetrachlorodibenzofuran. Additional work by Dr. Mieure has shown that this identification is not conclusive; tetrachloromethylbiphenyl cannot be distinguished from the above dibenzofuran. Since Dr. Mieure has also found methylbiphenyl in Santowax R, chlorinated methylbiphenyls could be expected in Aroclor 5442.

High resolution mass spectrometry at the Physical Sciences Center has been unsuccessful in distinguishing between these materials. We have explored several other approaches to make this identification and feel none have reasonable odds of success. At this time, we plan no additional work on this problem.

Recipients of this memo are asked to delete the identification of "1-3 ppm tetrachlorodibenzofuran in Aroclor 5442, lot AI-9" (memo JPM to REK, 10/20/70) and replace it with 1-3 ppm unidentified tetrachloro compound with molecular weight of 304 (based on Cl = 35.0). The other analyses in that memo including that of 15-30 ppm pentachlorodibenzofuran in Phenecolor DP 6, Prodelec are unchanged. At this higher 15-30 ppm level, an unambiguous identification is possible.

If it becomes necessary to quote a figure for oxygenated impurities in Aroclor 5442, a figure of less than 5 ppm should be safe based on our analyses.

M W Dietrich

M. W. Dietrich

db

PRR 00424

HARTOLDMON0030764

Monsanto

FROM (NAME & LOCATION)

W. R. Richard - T3A

DATE

May 29, 1975

cc.

J. P. Mieux

T2F

R. H. Munch

- T1B

SUBJECT

DIBENZOFURANS IN AROCLOR

REFERENCE

HSB/WRR 5/23/75

TO

H. S. Bergen - B2SL



Bob Kaley attended "5th Annual Symposium on Recent Advances in Analytical Chemistry of Pollutants", May 19-21. Irwin Pomerantz of FDA presented a paper claiming 1 to several ppm chlorinated dibenzofurans in Aroclor 1016, Aroclor 1242, none in Aroclor 1221. No technical proof was presented - just a claim.

Kaley and Mieux have done more work. They are still not convinced chlorinated benzofurans are present; possible level 10X less than Pomerantz claim. Papageorge and Mieux are to call on Pomerantz to discuss analytical methods next week.

Mieux does report 0.3 ppm benzofuran in biphenyl. We have speculated that we could have 0.3 ppm of chlorinated benzofuran present in Aroclor.

Munch has not tackled Levinskas on the biological significance of 0.3 ppm. This is the level of argument for tetrachlorodibenzodioxin in 2,4,5-T. The case was never brought to trial vs. Dow because of lack of evidence.

In our case the argument is about chlorinated dibenzofurans. The toxicity should be lower and the chlorination level should be lower than tetra if they are present in Aroclor 1016. Fractional distillation at the same chlorination level as biphenyl should concentrate any chlorinated dibenzofurans in the still pot.

Will tackle Levinskas and see what comes out of Papageorge-Mieux visit before doing more work.

WR.

W. R. Richard

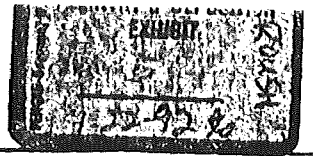
/is

PRR 004382

HARTOLDMON0030765

Monsanto

FROM: David Wood-St. Louis-B2SD



DATE: August 29, 1975

SUBJECT: TELEPHONE CALL REPORT

REFERENCE: 8/29/75

TO: ~~Mr. J. R. Allen~~
B2SK

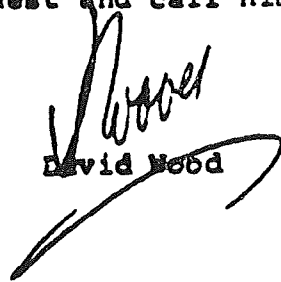
cc: H. S. Bergen-B2SL
C. Paton/T. L. Gossage-B2SC
G. Roush-A28A
G. Levinskas-A28C
R. Keller-T1B
J. P. Mieuze-T2B
W. R. Richard/R. H. Munch-T
W. W. Withers-B2SA

AUG 29 1975

CALL FROM: Dr. J. R. Allen
University of Wisconsin
(608)263-3524

Dr. Allen called about Dibenzylfurans and Dioxins in Chlorinated Biphenyls as a result of his reading the Risebrough paper. He is concerned about levels of these compounds in the Aroclors which he is using for his U. of Wisconsin feeding studies since he is unclear as to potential interferences in results which can be ascribed to PCB per se or contaminants in PCB.

He asked if we could check samples to be used in his studies to determine positively if contaminants were or were not present in those specific samples. I said that I did not believe our analytical techniques were fully developed to the stage where we were confident that we could properly consider ourselves able to meet his need. I told Dr. Allen that we would discuss his request and call him next week.

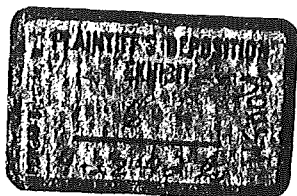

David Wood

/deb

PLAINTIFF'S
EXHIBIT

#120 CW 8-6-8

PRR 074856



Kalby EXHIBIT 3
M. WISE
11/16 1990

PYRANOL™ COMPOSITIONS
GENERAL ELECTRIC COMPANY
1932 - 1976

* GE Specification - 1488, 1467, 1470, A13B38. (1497 = A13B38), A50P5..
ASTM D 2283 Type (), Annual Book of Standards, Vol. 10.03.
1242, 1254, 1260 - Aroclor™ PCB mixtures - Monsanto Chemical
T₃CB - tri- & tetra-chlorobenzenes - Hooker Chemical
Sn₄ - tin tetraphenyl - Hooker Chemical(1944-1957),
Metal & Thermite Corp
EDDC - epoxide dicyclo-diepoxy carboxylate - ERL 4221, Union Carbide &
CY-179, Ciba-Geigy

PITTSFIELD, MA

<u>1932-NOV 1944</u> <u>1488*</u>	<u>NOV 1944-APR 1952</u> <u>1467</u>	<u>APR 1952-MAR 1963</u> <u>1470</u>	<u>MAR 1963-APR 1972</u> <u>A13B38 (B)#</u>
60% 1260 40% T ₃ CB	60% 1260 40% T ₃ CB 0.125% Sn ₄	45% 1260 40% T ₃ CB 15% T ₄ CB 0.125% Sn ₄	45% 1260 40% T ₃ CB 15% T ₄ CB 0.125% EDDC
<u>APR 1972-NOV 1973</u> <u>A13B382 (F)</u>	<u>NOV 1973-FEB 1974</u> <u>A50P559</u>	<u>JAN 1974-END</u> <u>A13B383 (G)</u>	
45% 1254 40% T ₃ CB 15% T ₄ CB 0.125% EDDC	65% 1254 23% T ₃ CB 12% T ₄ CB 0.125% EDDC	60% 1254 40% T ₃ CB 0.125% EDDC	

ROME, GA

<u>1953 - 1963</u> <u>1470</u>	<u>1963 - 1965</u> <u>A13B38 (B)</u>	<u>1965 - 1970</u> <u>A50P524 (C)</u>	<u>SEP 1969 - OCT 1970</u> <u>A13B38 (B)</u>
45% 1260 40% T ₃ CB 15% T ₃ CB 0.125% Sn ₄	45% 1260 40% T ₃ CB 15% T ₄ CB 0.125% EDDC	80% 1242 13% T ₃ CB 7% T ₄ CB 0.125% EDDC	45% 1260 40% T ₃ CB 15% T ₄ CB 0.125% EDDC
<u>1970 - 1972</u> <u>A50P559</u>	<u>1972 - 1974</u> <u>A13B382 (F)</u>	<u>NOV 1973-FEB 1974</u> <u>A50P559</u>	<u>MAR 1974-END</u> <u>A50P570</u>
65% 1254 23% T ₃ CB 12% T ₃ CB 0.125% EDDC	45% 1254 40% T ₃ CB 15% T ₄ CB 0.125% EDDC	65% 1254 23% T ₃ CB 12% T ₄ CB 0.125% EDDC	40% 1254 60% T ₃ CB 0.125% EDDC

HICKORY, NC & SHREVEPORT, LA

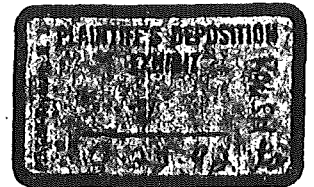
Pyranol - never used

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GEP 000654

HARTOLDMON0030767



W. B. Papageorge

B2SK

February 10, 1975

AROCLOR 1260 - HEW STUDIES

H. S. Bergen - B2SL

D. R. Bishop - C2SA
G. L. Bratsch - B3NA
K. W. Easley - 1920
P. J. Fitzgerald - B3SA
T. L. Gossage - B2SL
G. J. Levinskas - A2SC
C. Paton - E2SC
W. R. Richard - T3A
G. Roush - A2SA
E. Tillman - A2SA
W. W. Withers - B2SA
P. L. Wright - A2SC

The following met on Thursday, February 6 to review the results of a rat feeding study recently completed by Dr. Renate Kimbrough, Center for Disease Control, HEW:

T. L. Gossage	W. R. Richard
G. J. Levinskas	G. Roush
H. B. Papageorge	E. Tillman
C. Paton	W. W. Withers
	P. L. Wright

George Levinskas summarized a meeting held at the National Cancer Institute, Washington, D. C. on January 31, at which sections of liver tissue from Dr. Kimbrough's study were reviewed. Discussion relating to interpretation, significance and required action followed. The following conclusions were drawn:

1. Cancerous liver cells were observed in approximately 8% of the rats exposed to Aroclor 1260 in Dr. Kimbrough's study.
2. This effect was not observed in similar studies conducted for Monsanto Company by Industrial Bio-Test Laboratories.
3. This difference in observed effects could be due to the difference in rat strains used in the two studies.
4. Dr. Kimbrough will in all probability present and/or publish her findings as soon as she can.
5. WIOGH has Dr. Kimbrough's data and certainly, following publication of this information and in the absence of any contradicting reports, the regulatory agencies will be pressured into reviewing their policies and regulations relating to polychlorinated biphenyls. As in the past there will very likely be limited attempts made to distinguish between types of commercial mixtures of polychlorinated biphenyls. The cancer cell formation observed in Dr. Kimbrough's study with Aroclor 1260 under conditions unique to that test will in all probability be quickly and without scientific basis assumed to occur with all polychlorinated

SCM 077226

PRR 043367

85

The following action plan was developed and is recommended for adoption:

<u>Action</u>	<u>Responsibility</u>	<u>Dates</u>		<u>Estimated Cost</u>
		<u>Start</u>	<u>Complete</u>	
1. Publish the results of the Monsanto studies conducted by Industrial Bio-Test Laboratories.	G. Roush J.F. Stapleton	Immediately	July 1, 1975	-
2. Obtain services of cancer specialist to review both studies and interpret significance to current PCB applications.	G. Roush	Immediately	April 1, 1975	\$2000 - \$5000
3. Obtain National Cancer Institute interpretation.	G. Roush	Following 2 above.		-
4. Discuss with NIOSH, OSHA, FDA, EPA.	G. Roush K.W. Easley W.B. Papageorge	Immediately following 2 and 3 above.		-
5. Discuss with key customers	G. Roush T.L. Gossage W.B. Papageorge	Coincident with 4 above.		-
6. Complete WDK plant employee exposure study.	G. Roush	Immediately	April 1, 1975	
7. Conduct study of Aroclor 1260 with rats to determine effect at 24 months when exposure is withdrawn at 18 months.	G. Roush	Immediately	March, 1977	\$ 70,000.
8. Conduct study of Aroclor 1260 with second species (hamster?) to establish if species differences exist.	G. Roush	Immediately		\$ 70,000

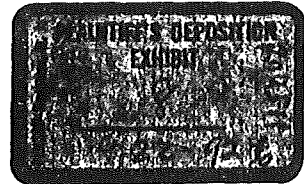
PRR 043368

SCM 071227

<u>Action</u>	<u>Responsibility</u>	<u>Dates</u>		<u>Estimated Cost</u>
		<u>Start</u>	<u>Complete</u>	
9. Conduct 2-year rat feeding study with Aroclor 1016.	G. Roush			\$ 85,000
10. Review rat liver sections from Monsanto A-1242 study.	G. Roush	Immediately		\$2000 - \$5000

PRR 043369

SCM 077228



Monsanto

FROM (NAME & LOCATION): Dept. of Medicine & Environmental Health - F.R. Johannsen, A2SC

DATE: August 27, 1976

CC:

SUBJECT: Epidemiology

REFERENCE: Krummrich Plant

TO: G. Roush
A2SA

A group of 311 present/former W.G. Krummrich Plant employees have been compiled. Each of the 311 is known to have worked in Dept. 246, based on work history records. Information on the cause of death has been obtained on 50 former employees from this group. Evaluation of death certificates attribute 6 of those deaths to lung cancer.

A review of this population, omitting all those who worked in Dept. 246 for less than 6 months, yielded the following sub-population:

total number of employees	- 140
identified deaths (all cases)	- 23
deaths attributed to lung cancer	- 4

When compared to the 1969 U.S. male population, this group of 23 deaths would be expected to contain 1.24 cases attributable to lung cancer. Statistical comparison of the observed lung cancer versus the expected lung cancers yielded a highly significant chi ² value of 7.1. This number is even more significant than the value (chi ² = 6.8) obtained following evaluation of the full 50-person mortality population.

Frederick R. Johannsen

alw

PRR 034870

SCM 068365

IN-1000-18778

HARTOLDMON0030771



Monsanto

MONSANTO INDUSTRIAL CHEMICALS CO.
800 N. Lindbergh Boulevard
St. Louis, Missouri 63186
Phone: (314) 894-1000

SPECIAL UNDERTAKING BY PURCHASERS OF POLYCHLORINATED BIPHENYLS

Monsanto Company ("Monsanto") manufactures certain polychlorinated biphenyl products ("PCB's") which _____ ("Buyer") desires to purchase. While Buyer desires to purchase PCB's because of certain desirable flame resistant and insulator properties, Buyer acknowledges that it is aware and has been advised by Monsanto that PCB's tend to persist in the environment; that care is required in their handling, possession, use and disposition; that tolerance limits have been or are being established for PCB's in various food products.

Monsanto has therefore adopted certain restrictive policies with respect to its further production, sale and delivery of PCB's, including the receipt of undertakings from its customers as set forth below, and Buyer is willing to agree to such undertakings with respect to sales and/or deliveries of PCB's by Monsanto to Buyer.

Accordingly, Buyer hereby covenants and agrees that, with respect to any and all PCB's sold or delivered by or on behalf of Monsanto to Buyer on or after the date hereof and in consideration of any such sale or delivery, Buyer shall defend, indemnify and hold harmless Monsanto, its present, past and future directors, officers, employees and agents, from and against any and all liabilities, claims, damages, penalties, actions, suits, losses, costs and expenses arising out of or in connection with the receipt, purchase, possession, handling, use, sale or disposition of such PCB's by, through or under Buyer, whether alone or in combination with other substances, including, without implied limitation, any contamination of or adverse effect on humans, marine and wildlife, food, animal feed or the environment by reason of such PCB's.

PRR 043740

a unit of Monsanto Company

SCM 016437

HARTOLDMON0030772

All existing contracts for the sale of PCB's by Monsanto to Buyer are hereby amended to contain the provisions set forth above.

Nothing herein shall create or imply any duty or obligation of Monsanto to sell or deliver any PCB's to Buyer. No conditions, understandings or agreements purporting to modify or vary the terms hereof shall be binding unless hereafter made in writing specifically referring to this agreement and signed by the party to be bound and no modification or variance of the above undertaking shall be effected by the acknowledgment or acceptance of any sale document, purchase order, shipping instruction or other forms containing terms or conditions at variance herewith.

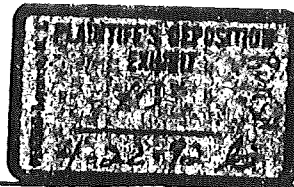
_____	MONSANTO COMPANY
(Buyer)	
BY: _____	BY: _____
TITLE: _____	
DATE: _____	

PRR 043741

SCM 016438

Monsanto

FROM NAME & LOCATION: George Roush, Jr., M. D.



Plw
FAS
Fals

DATE: September 17, 1975

SUBJECT: MONTHLY COMMENTS - MEDICAL DEPARTMENT

OFFICER:

CONFIDENTIAL

TO: Corporate Administrative Committee

State and federal agency activities related to PCB's continue to require Medical Department attention to support business group efforts. Recent public hearings in Wisconsin served as a forum for Mr. Schweitzer, of EPA's Toxic Substances Office, to make his pitch again in support of the Toxic Substances Control Act now being considered in Congress. Between now and the end of November, FDA, EPA, and NIOSH will conduct hearings on various aspects of the PCB's in foods and the environment.

Questions from outside Monsanto about the long-term health effects of chemicals used in two Monsanto plants on the workers in the plants have required organization of epidemiological studies. These require acquisition of data on individual work assignments within the plant over long periods of time, collection of death certificates of deceased employees, and comparison of causes of death with frequency of cause to some segment of the general population. We will have to do much more epidemiology in the future although clear cut conclusions are almost impossible.

George Roush, Jr., M. D.

GR/ln

EXHIBIT "A"

PRR 073526