

UNITED STATES DISTRICT COURT
DISTRICT OF NEVADA

NEVADA POWER COMPANY, a :
Nevada corporation, :
Plaintiff, :
VS. : CV-S-89-555-LDG-LRL
MONSANTO COMPANY, a :
foreign corporation; :
GENERAL ELECTRIC COMPANY, :
a foreign corporation; :
WESTINGHOUSE ELECTRIC :
CORPORATION; a foreign :
corporation; and DOES I :
XXV, inclusive, :
Defendants. :

READING
COPY

DEPOSITION OF ROBERT EMMET KELLY, M.D.
VOLUME I
TAKEN ON FEBRUARY 15, 1994

MARTIN & ASSOCIATES
CERTIFIED COURT REPORTERS

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I N D E X

THE WITNESS: ROBERT EMMET KELLY, M.D.
VOLUME I

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By Mr. Bauer 11

KELLY EXHIBITS:

Exhibit No. 1 9
"An Acneform Dermatosis," by
Jack W. Jones, M.D., and
Herbert S. Alden, M.D.

Exhibit No. 2 9

Program Symposium on Certain
Chlorinated Hydrocarbons, Harvard
School of Public Health, Boston,
Massachusetts, June 30, 1937, and
Attached Article from September,
1937, The Journal of Industrial
Hygiene and Toxicology, "The Problem
of Possible Systemic Effects from
Certain Chlorinated Hydrocarbons,"
Drinker, et al

Exhibit No. 3 9
Article from The Journal of
Industrial Hygiene and Toxicology,
February, 1938, "Morphological
Changes in the Livers of Rats
Resulting from Exposure to Certain
Chlorinated Hydrocarbons," Bennett,
et al

Exhibit No. 4 9
Report to the Monsanto Chemical
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 5 Company by Cecil K. Drinker, M.D.,
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7 Exhibit No. 6 9
 Article from The Journal of
 Industrial Hygiene and Toxicology,
 8 May, 1939, "Further Observations on
 the Possible Systemic Toxicity of
 9 Certain of the Chlorinated
 Hydrocarbons with Suggestions for
 10 Permissible Concentrations in the
 Air of Workrooms," Cecil K. Drinker

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12 Exhibit No. 7 9
 Article from the Journal of the
 American Medical Association,
 13 April 24, 1954, "Chloracne from an
 Unusual Exposure to Arochlor,"
 14 Meigs, et al

15 Exhibit No. 8 9
 Monsanto Chemical Company Letter
 16 Dated April 28, 1954, to
 Dr. J. Wister Meigs from
 17 R. Emmet Kelly, M.D.

18 Exhibit No. 9 9
 Yale University School of Medicine
 19 Letter Dated May 7, 1954, to
 R. Emmet Kelly, M.D., from
 20 J. Wister Meigs, M.D.

21 Exhibit No. 10 9
 Scientific Associates Certificate
 22 of Analysis Dated November 10,
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 23 Toxicity (LD₅₀) of Aroclor 1254 for
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 1953, Re: "The Acute Oral
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8 Exhibit No. 12 9
 The Kettering Laboratory,
 University of Cincinnati, Report
 Dated June 22, 1955, "The Toxicity
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11 Exhibit No. 13 9
 The Kettering Laboratory,
 University of Cincinnati, Report
 Dated June 28, 1955, "The Toxicity
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 Aroclor 1254," Treon, et al

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15 Exhibit No. 14 9
 Article from Industrial Hygiene
 Quarterly, June, 1956, "The Toxicity
 of the Vapors of Aroclor 1242 and
 Aroclor 1254," Treon, et al

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18 Exhibit No. 15 9
 Younger Laboratories Certificate
 of Analysis Dated March 4, 1963,
 RE: "Toxicological Investigation
 of Inerteen PPO," for Monsanto
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21 Exhibit No. 16 9
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12	1937, from L. A. Watt	
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25	January, 1960, Monsanto Chemical	
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Exhibit No. 29 9
Monsanto, "Toxicity and Safe
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Exhibit No. 30 9
Monsanto Europe S.A. Memorandum
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Exhibit No. 31 9
Monsanto Memorandum Dated
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Richard from Elmer P. Wheeler

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Letter Dated December 20, 1968,
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5 Monsanto Report Dated September 4,
6 1970, "Three-Generation
7 Reproduction Study in Albino Rats
8 With Aroclor 1242, Aroclor 1254,
9 Aroclor 1260; Results of the First
10 Generation," Submitted by R. Emmet
11 Kelly, M.D.

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13 Exhibit No. 35 9

14 Industrial Bio-Test Laboratories,
15 Inc., Letter Dated November 12,
16 1971, to Elmer P. Wheeler from
17 J. C. Calandra, Submitting Report
18 Entitled, "Two-Year Chronic Oral
19 Toxicity Study with Aroclor 1260
20 in Albino Rats," IBT No. B7298

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22 Memorandum Dated October 21, 1968,
23 to W. R. Richard from Elmer P.
24 Wheeler, RE: "Polychlorinated
25 Biphenyls in the Environment"

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27 Minutes of Meeting of the Corporate
28 Development Committee Dated
29 November 17, 1969, RE: "Report on
30 Polychlorinated Biphenyls"

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37

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

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20 THE VIDEOGRAPHER:

21 Mr. Lou Getz
22 Legal Media Systems, Inc.
550 Westcott, Suite 400
Houston, Texas 77007

23
24 ALSO PRESENT:

25 Ms. Lynette Weldon

Martin & Associates
(409) 762-2222

1 The oral videotaped deposition of
2 ROBERT EMMET KELLY, M.D., was taken on
3 February 15, 1994, beginning at 9:14 a.m., in
4 the offices of Husch & Eppenberger, 100
5 N. Broadway, Suite 1300, St. Louis, Missouri,
6 before Irma L. Reyes, a Certified Court
7 Reporter and Notary Public in and for the
8 State of Texas, pursuant to Notice and
9 Agreement, the Federal Rules of Civil
10 Procedure, and the following stipulation and
11 waiver of counsel:

12 IT WAS STIPULATED AND/OR AGREED
13 that the deposition is to be signed by the
14 witness before any Notary Public or officer
15 authorized to administer oaths.

16 IT WAS FURTHER STIPULATED AND/OR
17 AGREED that the court reporter could swear
18 the witness with the same force and effect as
19 if she were a Notary Public in and for the
20 State of Missouri.

21

22 - - - - -

23

24 (Instruments were marked Kelly Exhibit
25 Nos. 1 through 37 for identification.)

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(409) 762-2222

1 MR. ROTH: Scott, are we going to
2 do this thing about the objections?

3 MR. BAUER: Sure.

4 Do you want to agree that an
5 objection from one party is good for
6 everybody?

7 MR. KIM: Yeah.

8 MR. BAUER: We're going to
9 stipulate that if one party objects, other
10 parties can rely on that objection.

11 MR. KIM: We'll stipulate to that.

12 MR. BAUER: If one defendant
13 objects -- if one defendant objects, the
14 other defendants can rely on the objections.
15 If plaintiff wants to object, I assume that
16 plaintiff is going to make his objection.

17 MR. GALLAGHER: Yes.

18 MR. BAUER: Right. So that they
19 don't have to both talk, in other words. Or
20 when you're asking questions, all three of us
21 don't have to make the same objections.

22 MR. KIM: That's fine.

23 Agree that a Texas notary and Texas
24 court reporter can swear the witness in?

25 MR. BAUER: Sure.

1 THE VIDEOGRAPHER: Today is the
2 15th of February, 1994. It's 14 minutes
3 after 9:00 a.m., and we're on the record.
4

5 ROBERT EMMET KELLY, M.D.,
6 was called as a witness and, having been
7 first duly sworn, testified as follows:
8

9 EXAMINATION

10 BY MR. BAUER:

11 Q. Good morning.

12 A. Good morning.

13 Q. Would you please state your name.

14 A. Robert Emmet Kelly, M.D.

15 Q. Dr. Kelly, as you know, my name is Scott
16 Bauer. I'm with the law firm of Kirkland &
17 Ellis representing Monsanto Company. Do you
18 understand that you're here today to give a
19 deposition in a case entitled Nevada Power
20 Company vs Monsanto, General Electric
21 Company, and Westinghouse Electric Company?

22 A. Yes, I do.

23 Q. Where do you live?

24 A. 665 South Skinker, S-k-i-n-k-e-r, St. Louis,
25 Missouri 63105.

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- 1 Q. Are you a medical director -- excuse me. Are
2 you a medical doctor?
- 3 A. Yes, I am.
- 4 Q. And how old are you, Dr. Kelly?
- 5 A. 84.
- 6 Q. Do you -- could you describe your health
7 condition, please?
- 8 A. Well, I think it's pretty good for 84. I
9 have an irregular heartbeat. I have some
10 hypertension. A few other minor things.
- 11 Q. Are you currently under the care of a
12 physician?
- 13 A. Yes, I am.
- 14 Q. Has your doctor placed you under any
15 restrictions?
- 16 A. Yes. He said I should not get in any
17 prolonged -- which is a -- stressful
18 situations, prolonged by -- that means four
19 or five hours. Four hours, I believe is what
20 he specified.
- 21 Q. Has the doctor approved your going forward
22 with testimony subject to those time
23 restrictions?
- 24 A. Yes, he has.
- 25 Q. Have you ever been employed by Monsanto?

- 1 A. Yes, I have.
- 2 Q. For what period of time?
- 3 A. I was employed from 1938 -- January of 1938
- 4 until November the 30th, 1974, with the
- 5 exception of 44 months in the Service. And I
- 6 was -- after 1974 I was engaged as a
- 7 consultant with -- two days a week with the
- 8 company.
- 9 Q. What was the period of time of your -- of
- 10 your military service?
- 11 A. Forty -- from 1942 to 1946.
- 12 Q. Were you ever Monsanto's medical director?
- 13 A. Yes, I was.
- 14 Q. For what period of time were you
- 15 Monsanto's --
- 16 A. Well, I was the first one. Was from March or
- 17 April of 1942 until November the 30th, 1974.
- 18 Q. When and where did you obtain your college
- 19 degree?
- 20 A. I received a Bachelor's Degree in Science
- 21 from St. Louis University in 1930. It was a
- 22 combined course with the medical degree, and
- 23 I received the medical degree in 1932.
- 24 Q. I'm sorry. Did you say where you received
- 25 your medical degree?

1 A. St. Louis University. The same institution.

2 Q. Dr. Kelly, are you board certified in any
3 areas of medicine?

4 A. Yes. I'm board certified in internal
5 medicine, recertified in internal medicine,
6 and also board certified in preventative
7 medicine under the specialty of occupational
8 medicine.

9 Q. What were your job responsibilities when you
10 first started working for Monsanto in the
11 mid-1930's.

12 A. My job responsibilities was plant physician
13 at the Queny, Q-u-e-n-y, plant in St. Louis.
14 That consisted of taking care of the injuries
15 and occupational conditions that might have
16 resulted from the -- their work, as well as
17 carry out a preventative medical program for
18 the employees to detect and prevent any
19 occupational diseases.

20 Q. When did you formally receive the title
21 "medical director"?

22 A. When I returned from the Service in March or
23 April of 1942 -- '46.

24 Q. Were you carrying out certain
25 responsibilities of the medical director

1 position prior to that time?

2 A. Well, I was sort of a medical director
3 without portfolio because if any problem came
4 up in any other plants, I was the only doctor
5 around the headquarters building. So they'd
6 say, "Well, we got a doctor over at the Queny
7 plant. Let's ask him."

8 Q. And during what period of time was that?

9 A. That was roughly from, oh, the end of '36
10 until the beginning of the -- my service
11 in '42.

12 Q. Okay. Dr. Kelly, I believe a little while
13 ago you said that you started working in
14 Monsanto in 1938. And now you just said --

15 A. Oh.

16 Q. -- that you started --

17 A. Did I say '38?

18 Q. -- in 1936.

19 A. '36.

20 Q. Which is it?

21 A. It's '36.

22 Q. 1936?

23 A. That's right.

24 Q. Okay. What were your duties as Monsanto's
25 medical director, starting in 1946?

1 A. Well, I had responsibility to see that there
2 was adequate medical installations in all
3 our plants, laboratories, sales offices,
4 et cetera. I was responsible for
5 development -- developing an industrial
6 hygiene program which monitored the
7 environment of the workplace. I was
8 responsible -- responsible for obtaining the
9 toxicological information on our products,
10 and I was responsible for disseminating that
11 to our customers and to anybody who asked for
12 it.

13 Q. You mentioned in that answer toxicological
14 properties. Would you define the term
15 "toxic" or "toxicity"?

16 A. "Toxicity" is an inherent quality of a
17 product of a compound to cause injury to
18 people. Or lack of it.

19 Q. And the toxic property of the -- of a
20 chemical would be what?

21 A. Harmful property.

22 Q. Do you differentiate between the toxicity of
23 a substance and the hazard associated with
24 the substance?

25 A. Oh, yes.

1 Q. And what's the difference?

2 A. Well, no matter how toxic a product is, if
3 you don't get the chance of absorbing it, it
4 isn't going to hurt you. In other words, if
5 something is inside a kettle or inside a
6 pipe, no matter how toxic it is, it isn't --
7 there's no particular hazard there.

8 Q. Dr. Kelly, you testified a minute ago that
9 one of your responsibilities as medical
10 director was to gather information about
11 toxicological properties. In carrying out
12 that function, did you have a practice of
13 reviewing medical and scientific articles?

14 A. A what?

15 Q. A practice of --

16 A. Oh.

17 Q. -- reading medical and scientific articles.

18 A. Yes, I did.

19 Q. When did you start that?

20 A. I would say as soon as I started with
21 Monsanto.

22 Q. So 1936?

23 A. '36.

24 Q. Okay. And for how long did you have such a
25 practice?

1 A. Up till now.

2 Q. Okay. Did it continue throughout the period
3 of time of your employment --

4 A. Oh, yes.

5 Q. -- through 1974?

6 A. Yes. We subscribed to all the journals,
7 which weren't too many in the early days, in
8 the English language that related to
9 toxicity.

10 Q. Was there a library in the medical department
11 at Monsanto that subscribed to those
12 magazines --

13 A. Well, we had --

14 Q. -- and periodicals?

15 A. Yes, we did. We had a librarian. And I
16 don't know what -- she was a sort of -- not
17 a -- she was not a degreed librarian, but she
18 was -- functioned as a librarian. And we
19 engaged her probably sometime after I came
20 back from the Service. But up till that
21 time, we did not. There weren't too many
22 journals in the 1930's and Forties.

23 Q. Do you recall some of the names of the
24 prominent journals in the early days?

25 A. There were two in the United States. One was

1 American Journal of Toxicology. "Industrial
2 hygiene and toxicology," I believe the term
3 was. The other was a Journal of the
4 Industrial Medical Association. And there
5 was one in the United Kingdom that was
6 published, the American Journal of -- I mean,
7 the new -- the Journal of Industrial
8 Toxico -- of Industrial Hygiene. That was an
9 English journal. There was also Lancet,
10 L-a-n-c-e-t, which was a general medical
11 journal; but it had from time to time
12 information about workers' health in it.

13 Q. Well, over the years, as the numbers of
14 publications that were related to industrial
15 hygiene and occupational medicine expanded,
16 did Monsanto acquire additional
17 subscriptions?

18 A. Yes, we did.

19 Q. Dr. Kelly, are you aware that the Nevada
20 Power case involves polychlorinated biphenyl?

21 A. Yes, I am.

22 Q. Do you also recognize the acronym "PCB" as
23 being polychlorinated biphenyl?

24 A. Yes, I do.

25 Q. Can you tell us what "chlorinated diphenyl"

1 is?

2 A. Chlorinated diphenyl is the same as
3 chlorinated biphenyl. It just changed the
4 name sometime along about the Fifties from
5 "di" to "bi."

6 Q. Okay. So during this deposition, if I say
7 "chlorinated diphenyl" or "PCB" or
8 "polychlorinated biphenyl," you understand
9 we're talking about the same substance?

10 A. Yes, I do.

11 Q. Did you review the available literature on
12 the toxicity of PCBs from the 1930's to the
13 1970's?

14 A. Yes, I did. In the English language.

15 Q. Did others in the medical department also
16 review some or all of that literature?

17 A. Yes. You have to remember that the medical
18 department grew. When we started out, there
19 was myself and a secretary. Then I don't --
20 I engaged a part-time professor at Washington
21 University as an associate medical director.
22 It was a Dr. George Saunders who came onboard
23 probably -- oh, I think he was after the --
24 after 1946. We engaged an Elmer Wheeler, who
25 was an industrial hygienist, in 1946 or '47.

1 When we ended up -- when I left the company,
2 we had four industrial hygienists. We
3 engaged a toxicologist sometime in the early
4 Fifties, I believe. When we left, we had
5 four toxicologists.

6 Q. What was the name of the first toxicologist
7 that you retained?

8 A. William Hunt. Dr. William Hunt. He's a
9 Ph.D.

10 Q. You mentioned an industrial hygienist, a
11 Mr. Elmer Wheeler. Was -- do you know
12 whether he was reading toxicological
13 literature concerning PCBs?

14 A. Yes, he was.

15 Q. And after he came onboard, what about
16 Dr. Hunt, the toxicologist?

17 A. Well, yes, he was also. But he was -- PCBs
18 was a small part of his job.

19 Q. I'd like to focus on electrical equipment now
20 for a minute, Dr. Kelly. Were there any
21 reports in the scientific literature from the
22 1930's until you retired at the end of 1974,
23 reports in the scientific literature of
24 adverse health effects from people exposed to
25 PCBs that was in electrical equipment?

1 A. It all depends what you mean by "electrical
2 equipment." If by electrical equipment you
3 mean wire, cable --

4 Q. I'm focusing on for the moment now -- we'll
5 get to the cable coating items in a minute.
6 I'm talking about in -- electrical fluid in
7 electrical equipment, like transformers and
8 capacitors.

9 A. What was the question again?

10 Q. Sure. From the 1930's to the 1970's, do you
11 recall reading anything in the scientific
12 literature about adverse health effects to
13 people who received exposure to PCBs that was
14 in electrical equipment and transformers or
15 capacitors?

16 A. No, I do not.

17 Q. Did you read any articles during that period
18 of time in which the authors of those
19 articles asserted that PCBs could not be used
20 safely in electrical equipment?

21 A. No, I did not.

22 Q. Did you form an opinion as of the 1930's
23 about whether PCBs could be used safely in
24 electrical equipment?

25 A. Yes.

1 MR. KIM: Object. Improper
2 predicate.

3 Go ahead.

4 A. Yes, I do. It's the same as I have today,
5 that they could be used safely in electrical
6 equipment such as transformers and
7 capacitors.

8 Q. (By Mr. Bauer) Was it your opinion in the
9 1930's that certain precautions were prudent
10 with respect to PCBs in electrical equipment?

11 A. Yes.

12 MR. KIM: Same objection.

13 Q. (By Mr. Bauer) And what was your opinion
14 about precautions?

15 A. You should avoid absorption through the
16 skin. You avoid that by not having prolonged
17 or repeated skin contact. You will avoid
18 breathing the material at elevated
19 temperatures. At room temperature there is
20 no -- not enough vapor pressure to bother
21 you; but if at elevated temperatures or in
22 confined spaces, it could be harmful.

23 Q. Did you acquire more information about the
24 toxicological properties of PCBs over the
25 years after the 1930's?

1 A. Yes. I -- we acquired a great deal of lab --
2 of animal work, information from animal
3 work. We acquired a great deal of work from
4 the negative history of all our -- of our
5 workers and those of our customers' workers.

6 THE COURT REPORTER: "And those of
7 our" what?

8 THE WITNESS: Beg pardon?

9 THE COURT REPORTER: "Those of
10 our"?

11 THE WITNESS: -- customers and
12 people exposed to -- or people who used the
13 electrical equipment.

14 A. We had a lot of negative inform -- negative
15 clinical information.

16 Q. (By Mr. Bauer) Based upon all the
17 information you had after the 1930's up
18 through 1974, did you ever, as Monsanto's
19 medical director, form the opinion that PCBs
20 were unreasonably dangerous?

21 A. On the contrary. In the use that they were
22 put to, they were quite safe. I would say
23 that material has -- all industrial chemicals
24 have some toxicity. In fact, not only
25 industrial chemicals, chemicals we come in --

1 use, whether it's a detergent or condiment.
2 Salt could be dangerous.

3 But I had -- I considered PCBs to
4 be of a mild to moderate toxicity, as far as
5 an industrial chemical was concerned. It
6 wasn't supposed to be taken internally. No
7 industrial chemical is supposed to be taken
8 internally.

9 Q. Did there come a time in the late 1960's or
10 early 1970's where you formed the opinion
11 that precautions other than the workers'
12 safety precautions were prudent with respect
13 to PCB electrical fluids?

14 A. In the which? Which years?

15 Q. The late 1960's to early 1970's. You've
16 talked already about the workers' safety
17 precautions. Were there others that came
18 into play at that time?

19 A. In the late Sixties the environmental aspect
20 of discarding PCBs became quite prominent due
21 to some work that originated in Europe and
22 was eventually cooperate -- confirmed in the
23 United States. And it showed that it could
24 be an environmental hazard to avian species,
25 a-v-i-a-n, avian species. Birds, especially

1 predatory birds.

2 Q. And --

3 A. That it might be.

4 Q. -- what -- what additional precautions did
5 you -- did you have the opinion were prudent
6 after that period of time? Let's say around
7 1970.

8 A. To disposable -- to dispose of used PCBs and
9 discarded equipment in a safe manner, which
10 that varied with the type of material and the
11 type of equipment, whether it was a landfill,
12 whether it was deep injection or
13 incineration. It could be any one of them.

14 Q. Let's go back to the beginning in the 1930's
15 again and talk a little bit about the
16 toxicological properties of PCBs that you
17 did -- that you did have an understanding and
18 opinion about.

19 You've already testified that there
20 were some precautions that were prudent. Was
21 that because, in your opinion, there were
22 certain toxic properties of PCBs?

23 A. Yes.

24 Q. Okay. And would you generally describe what
25 those were and your understanding in the

1 1930's.

2 A. In the Nineteen -- the early 1930's -- I have
3 to start with 1936 -- '37 probably, when they
4 first came to my attention.

5 I knew that if individuals who were
6 working with PCBs -- well, not -- it turned
7 out it was not PCBs. It was -- it was a
8 polychlorinated diphenyl benzene rather than
9 polychlorinated diphenyl, per se. There was
10 an episode, several episodes, of wire coating
11 where a compound called chlorinated
12 naphthalene, N-a-p-h-t-h-a-l-e-n-e --
13 chlorinated naphthalene was manufactured by
14 the Halowax, H-a-l-o-w-a-x, Corporation.
15 They used to -- used this to impregnate wire
16 coating for insulating properties. In one of
17 their formulations, a 10 percent solution, or
18 10 percent mixture, of chlorinated diphenyl
19 benzene --

20 THE COURT REPORTER: What?

21 THE WITNESS: Chlorinated diphenyl
22 benzene, B-e-n-z-e-n-e.

23 A. -- was used. That was these workers.

24 Q. (By Mr. Bauer) Let me stop you there for a
25 second, Dr. Kelly. Was there a Monsanto

1 product in any of those mixtures that you
2 were talking about?

3 A. The chlorinated diphenyl --

4 Q. Yes, uh-huh.

5 A. -- benzene was a manufactured -- was a
6 Monsanto product.

7 MR. KIM: Objection.

8 Q. (By Mr. Bauer) Okay. Do you recall the
9 number designation for that product?

10 A. Yes. It was 4465.

11 Q. Okay. And were you saying that 4465 was a
12 mixture of -- of chlorinated diphenyl and
13 chlorinate diphenyl benzene?

14 A. That's correct.

15 Q. Okay. All right. I'm sorry. And in very
16 general terms, what was the result of
17 information that you received in the 1930's?

18 A. Oh, it was pretty disastrous in some cases.
19 These individuals absorbed a great deal of
20 the Halowax mixture; and the majority of
21 cases, by far the majority of cases, were
22 Halowax alone without any chlorinated
23 diphenyl benzene in it. And they developed
24 chloracne, which is a situation similar to
25 teenage acne but much more generalized. It's

1 a more serious type. It lasts longer, and
2 it's associated with black pigmentation
3 around the face. And in some cases, after
4 sufficient absorption, chemical hepatitis
5 occurred; and several of the people who were
6 exposed to this over prolonged periods of
7 time died.

8 Q. Was it your opinion in the 1930's that
9 chlorinated diphenyl alone in sufficient dose
10 could cause chloracne?

11 A. Yes.

12 Q. Was it your opinion in the 1930's that
13 chlorinated diphenyl alone in sufficient dose
14 caused liver damage to experimental animals?

15 A. In sufficient dose at elevated temperatures,
16 yes.

17 Q. Was it your opinion, therefore, that it was
18 prudent to limit exposure to humans?

19 A. Yes.

20 Q. I'd like to switch now to -- for a moment to
21 the topic of the responsibility for toxicity
22 and safe handling instructions.

23 During the time that you were
24 medical director of Monsanto, what department
25 had the responsibility for approving toxicity

1 and safe handling instructions that were
2 given to customers?

3 A. The medical department.

4 Q. Was that practice implemented at your
5 request?

6 A. Yes.

7 Q. Why did you request that that practice be
8 implemented?

9 A. Well, because the medical department knew
10 more about the toxic properties of Monsanto
11 products than anybody -- any other group in
12 the company.

13 Q. Were there a number of different methods by
14 which information about toxicity and safe
15 handling was disseminated to Monsanto's
16 customers?

17 A. Oh, yes.

18 Q. Could you generally describe the various
19 means?

20 A. Yes. It all depends on the level of worker
21 we were talking with. In other words, you
22 start off with the labels. The label
23 eventually is this thing that goes down to
24 the worker on the factory floor. On that --
25 on the label we would put what was a safe

1 handling data -- safe handling procedures to
2 avoid injury.

3 Q. Okay. And --

4 A. That was universal on our products. Then we
5 had development bulletins. A development
6 bulletin would be, "We've got product 'X.'
7 These are the characteristics of it," the
8 physical characteristics, the suggested
9 uses. They would be sent to any prospective
10 user of a product, even though we were not
11 exactly sure what he wanted it for.

12 There we put more information. We
13 put what toxicological information we had
14 with our own experience with our employees,
15 as far as lack of illness was concerned, and
16 whatever animal toxicity information we
17 possessed.

18 Then there was a marketing bulletin
19 which with a compound was used, was already
20 for the market we had a definite sales target
21 for it. It was going to be used in a
22 particular manner. We expend -- we expanded
23 that information with relation to the
24 proposed use.

25 Then, of course, we had direct

1 communication with doctors, industrial
2 hygienists, customers, purchasing agents who
3 would call the medical department or write
4 and ask for information; and we were -- these
5 were usually technical people or scientific
6 people. And we would expand what information
7 we had in a letter -- in an individual letter
8 to him with regard to his particular
9 question.

10 So the information we sent out
11 really depended on what particular group we
12 were trying to, should I use the word,
13 "educate."

14 Q. Do you recall whether information about the
15 toxicity and the safe handling of PCBs was
16 disseminated to Monsanto's customers through
17 one or more of those methods?

18 A. Yes. Through all of them. One or more,
19 certainly.

20 Q. What was Monsanto's policy regarding who
21 responded to inquiries from customers about
22 the potential adverse health effects of
23 Monsanto product?

24 A. The medical department. Supposed somebody
25 came into the -- or salesperson from the

1 Detroit sales office goes into Ford Motor.
2 He's got Product X. Says it's PCB. And he's
3 saying to the customer, "What about this
4 product? What do we know about it?"

5 He'd say, "Well, I'll have the
6 medical department call you or write you."
7 And then we do that.

8 Of course, this didn't mean that if
9 the man at Ford Motor said, "Has this thing
10 been used safely?" he wouldn't say, "Well,
11 ask the medical department." He'd say,
12 "Yes. I've sold this to General Motors,
13 Chrysler. They've been using it for five
14 years. They've had no problems."

15 But he would not give the
16 definitive toxic -- toxicological
17 information.

18 Q. That came from who?

19 A. That came from us.

20 Q. Okay. And over what period --

21 A. The medical department.

22 Q. The medical department?

23 A. Right.

24 Q. Over what period of time was that the
25 practice?

1 A. Well, it was definitely established from the
2 time I was formally the medical director.
3 But prior to that, say from '38 on, when the
4 people of the company knew me better, they
5 would be happy to buck these things down to
6 the medical department. I mean, to the -- to
7 me at the Queny plant, as a sort of in a
8 sense, I was a medical director without a
9 portfolio on that particular aspect of the
10 position.

11 Q. During the -- after 1946, in that time
12 period, when you testified earlier that you
13 were essentially -- you were essentially were
14 the medical department -- with a secretary, I
15 believe you said -- were you personally
16 responding to inquiries from customers?

17 A. Oh, yes. I had telephone conversations. I
18 had letters. Not too many on PCB, but we
19 made a bunch of products.

20 Q. As the medical department expanded, did
21 others working for you also respond to
22 customer inquiries?

23 A. Yes. We were -- when we expanded, we were
24 still a pretty small department. We were in
25 a -- and we all saw each other's

1 correspondence. We had lunch every day. We
2 had some formal meetings once a week. We had
3 contact during the day dozens of times. So
4 we all knew what everybody was doing. And if
5 I were out of town or if something had
6 particular industrial hygiene overtones,
7 Elmer Wheeler or one of the other industrial
8 hygienists would do the -- would answer the
9 letter. Sometime they went out over his
10 signature, sometime over mine. And when it
11 went out over my signature that I signed, I
12 certainly reviewed and I saw the
13 correspondence -- I mean, I certainly
14 reviewed it before it went out. And the ones
15 that he signed, I would see the carbons of
16 it; and we were both on the same wavelength
17 as far as dispensing the information was
18 concerned.

19 Q. Were there -- were there times when he
20 prepared initial drafts of letters that you
21 signed?

22 A. Yes.

23 Q. Were there times that he prepared letters and
24 signed them but asked you to review them
25 before they went out?

1 A. Yes.

2 Q. This being Elmer Wheeler?

3 A. Yes. Well, it was not only Elmer Wheeler.
4 Sometime Jack Garrett. If there was a
5 particular -- this wasn't universal. It
6 didn't happen all the time. It was strictly
7 a question of industrial hygiene material
8 which he knew -- information which he knew
9 more than I did about industrial hygiene, he
10 would answer it himself.

11 Q. We've already talked a little bit about
12 Mr. Wheeler. When do you recall he joined
13 Monsanto as an industrial hygienist?

14 A. I came back from the Service in '46. He
15 joined, I believe, in '46 or '47. He had
16 been an industrial hygienist at the Army
17 Laboratory of Industrial Hygiene. He had
18 been an industrial hygienist for one of the
19 New England states. I think it was either
20 Vermont or New Hampshire or something like
21 one of those. He was quite experienced in
22 industrial hygiene. In the early Forties
23 there weren't too many industrial
24 hygienists. I guess we probably started the
25 industrial hygiene department when there were

1 only a half a dozen companies had them.

2 Q. And you also now mentioned a second name,
3 Jack Garrett. When did he join Monsanto,
4 approximately?

5 A. Approximately early Fifties -- around that, I
6 believe -- he joined the medical department.
7 Then he was a research chemist at the Texas
8 City operations.

9 Q. Was Mr. Wheeler involved in the American
10 Industrial Hygiene Association?

11 A. Yes. He was a member. First I got to say
12 what the American Industrial Hygiene
13 Association was. It's a group of industrial
14 hygienists. Just like the AMA is a group of
15 physicians, it's a group of industrial
16 hygienists. He was engaged in, he had many
17 offices. He ended up being president of it
18 for one particular year.

19 Q. Do you recall approximately when Mr. Wheeler
20 was president of that association?

21 A. Sixties, I guess. Sometime late Sixties.

22 Q. All right. Was there another organization
23 that medical directors frequently belonged
24 to, of medical directors of different
25 companies?

1 A. There's American Academy of Occupational
2 Medicine. There was a Medical Directors
3 Forum, which was sort of a group of 35 or 40
4 people of medical directors of multi-plant
5 operations. I think those are the only two.

6 Q. Was that a forum for medical directors to
7 share information about issues of common
8 concern?

9 A. Yes. There's also an Industrial Medical
10 Association, which anybody who was interested
11 in industrial medicine can join, and
12 eventually changed its name to the American
13 Occupational Medical Association. But the
14 criteria for joining it was not particularly
15 strict, whereas the criteria for joining the
16 Medical Directors Forum was quite strict, as
17 well as for the American Academy of
18 Occupational Medicine. You had to be a
19 full-time physician in the industry.

20 Q. Was the American Industrial Hygiene
21 Association a forum for industrial hygienists
22 to share information about issues?

23 A. Yes.

24 Q. All right. Let's move back now to Monsanto's
25 production and uses of polychlorinated

1 biphenyls and move back to the 1930's again.

2 Do you recall when Monsanto started
3 producing polychlorinated biphenyls known
4 then as chlorinated diphenyl?

5 A. Not exactly. I came, as I said, in March
6 of '36. They were manufacturing it then, and
7 the information I received or that I gathered
8 at that time was that a company called a
9 Swann Chemical Company, S-w-a-n-n, had
10 manufactured chlorinated PCBs starting
11 sometime around the early Thirties, 1931
12 or '32. Monsanto took over Swann in either
13 1936 or 1935, and we continued the
14 manufacture and sale of the product then.

15 Q. Okay. For how long did Monsanto manufacture
16 and sell PCBs?

17 A. Till after I left. I think it was 1977
18 they -- or '76 or '77 they discontinued it.

19 Q. There's some additional terms that we'll be
20 using during the day today that I'd like to
21 get out on the table now.

22 What was Monsanto's trade name for
23 the chlorinated biphenyl -- chlorinated
24 diphenyl?

25 A. It was Aroclor, but it -- also, Aroclor was

1 used as a trade name for chlorinated diphenyl
2 benzene or chlorinated terphenyl.

3 Q. Okay. And how do you spell Arocclor?

4 A. A-r-a-c-l-o-r [sic].

5 Q. Do you know what "Pyranol" is?

6 A. Yes. I know generally. I don't know all the
7 constituents. Pyranol is a trademark name
8 for a dielectric patented by General
9 Electric. It's their product. And it
10 contains PCBs, and it also contains in some
11 formulations trichlorobenzene. And of
12 course, there's scavengers and some other
13 things that I don't know about that are in
14 there.

15 Q. Do you know what Inerteen is? That's
16 I-n-e-e-r-t -- no.

17 A. -- e-e-n.

18 Q. I-n-e-r-t-e-e-n -- t-e-e-n.

19 MR. KIM: Spell that again.

20 MR. BAUER: I-n-e-r-t-e-e-n.

21 A. That's Westinghouse's copyright name for
22 chlorinated diphenyl benzene for a dielectric
23 fluid, which contains -- in some cases
24 contains trichlorobenzene along with the
25 PCBs. Whether they use the term "Inerteen"

1 in capacitor filling, I just don't know.

2 Q. (By Mr. Bauer) Okay. So both Pyranol and
3 Inerteen would contain chlorinated diphenyl,
4 or what we call "PCB" today?

5 A. Correct.

6 Q. And some Aroclors were PCB?

7 A. Say that over.

8 Q. Some Aroclors, some substances sold by
9 Monsanto as Aroclor, contained chlorinated
10 diphenyl, or what we call "PCB" today?

11 A. Well, they were, yes. Some of the Aroclors
12 were PCBs, some of them were still called
13 Aroclor but they were chlorinated diphenyl
14 benzene, which is a different property.

15 Q. You -- strike that.

16 Do you know when, approximately,
17 the electrical fluid use of PCBs was
18 developed?

19 A. No, I don't. I know it was developed by GE
20 and it was patented by GE, but I don't know
21 when.

22 Q. Was Monsanto making PCBs for use in
23 electrical equipment at the time you started
24 working with the company in the mid to late
25 1930's?

1 A. Yes, they were.

2 Q. Did you understand at that time that there
3 were benefits to using PCBs in electrical
4 fluid to be used in transformers and
5 capacitors?

6 A. Oh, yes.

7 MR. KIM: Objection. Improper
8 predicate. Improper foundation.

9 A. They were relatively nonflammable. The
10 substitute -- the other compound was mineral
11 oil, which burns a little sort of like
12 gasoline. And PCBs did not have that
13 particular product -- property.

14 Q. (By Mr. Bauer) Would you briefly describe,
15 please, other uses of PCBs that developed
16 over the years, other than the electrical
17 fluid that we've been talking about.

18 A. Yes. There were -- other uses were heat
19 transfer agencies. In other words, if you
20 were heating a particular compound inside
21 your building and you didn't want a heating
22 element in there, you would have the heating
23 element outside the building; and that
24 would -- that heating element would contain
25 PCBs, which at that was called Therminol,

1 T-h-e-r-m-i-n-o-l, in that application so
2 that you'd heat it out here and it would go
3 through the pipes into the particular area
4 that you wanted heated. That was the heat
5 transfer use.

6 There was also a hydraulic use.
7 There it was called Pidraul, P-i-d-r-a-u-l.
8 In other words, if you're using a die-casting
9 machine or something like that. Now we're
10 getting outside of my field a little bit.

11 MR. KIM: Then I'll object to
12 speculation.

13 THE WITNESS: Beg pardon? I
14 couldn't hear you.

15 MR. KIM: I said I'm going to
16 object to speculation and improper
17 foundation. You can go ahead and answer.
18 It's just something that we've got to do --

19 THE WITNESS: Okay.

20 MR. KIM: -- to protect our record,
21 Doctor.

22 Q. (By Mr. Bauer) Just -- if you can just
23 briefly describe what Pidraul was for.

24 A. Pidraul was used as a hydraulic fluid, just
25 like hydraulic fluids in your brake. I'm not

1 saying in your automobile. I don't say that
2 Pidraul was used in that, but it was used as
3 a hydraulic fluid to transmit pressure from
4 one area to the other.

5 It's also used as a plasticizer.
6 It's use started expanding. Whenever you
7 wanted a product that was not inflammable and
8 had some characteristics of a plasticizer.

9 Q. Now, you mentioned earlier that Pyranol and
10 Inerteen were General Electric and -- General
11 Electric's and Westinghouse's trade names for
12 electrical fluids?

13 A. Yes.

14 Q. Did Monsanto make the PCBs that went into
15 General Electric's Pyranol and Westinghouse's
16 Inerteen?

17 A. Yes. Monsanto was a sole producer of PCBs in
18 the United States, as far as I know.

19 Q. Okay. Do you know who manufactured the other
20 constituents of Pyranol and Inerteen?

21 A. No, I don't.

22 Q. You mentioned, for example, trichlorobenzene
23 was sometimes in some formulations. Do you
24 know what company manufactured trichloro --

25 A. No, I do not.

1 Q. Okay. Do you know over the years whether
2 Monsanto was doing all of the blending of the
3 various constituents of Pyranol and Inerteen?

4 A. I do --

5 Q. As opposed to some other company doing
6 blending.

7 A. I do know they did blending. I'm not sure
8 what years they did it or how much they did
9 it. They did do it.

10 Q. I'd like to move now to questions about the
11 human experience with PCBs.

12 Were there any PCB related health
13 problems in any of Monsanto's PCB workers
14 during all of the years that you worked for
15 Monsanto?

16 A. No, sir, there were not.

17 Q. To your knowledge, has Monsanto ever had a
18 personal injury or workers' compensation
19 claim filed against it in relation to PCBs by
20 any of its employees?

21 A. No. And I would have occasion to see all the
22 compensation cases or injury cases that were
23 considered occupational in nature, and I have
24 no recollection of any of them.

25 Q. And you would have seen those up through

1 December of 1974?

2 A. That's correct.

3 Q. Did the fact that Monsanto's PCB workers did
4 not report adverse health effects to you play
5 a role in your opinion about the relative
6 toxicity of PCBs?

7 A. Yes.

8 Q. Why is that?

9 A. Well, here's an industrial chemical that
10 we've been using for 40 years, manufacturing
11 for 40 years; and we had no trouble with our
12 workers.

13 Q. Dr. Kelly, during the decades of your
14 employment at Monsanto, do you recall how
15 many times you received outside reports of
16 adverse health effects from people exposed to
17 PCBs?

18 A. Probably less than half a dozen, I think.
19 Want me to list them if I could remember
20 them?

21 Q. We'll try to go through them --

22 A. Okay.

23 Q. -- generally here in a minute. But let me
24 ask you another question before you do that.

25 Do any of those reports that you

1 received from 1936 to 1974 from outside of
2 Monsanto, from exposure to PCBs causing
3 adverse health effects, were any of them
4 related to PCBs in transformers or
5 capacitors?

6 A. No, sir, they were not.

7 MR. FEATHERSTONE: Scott, can we
8 take a break?

9 MR. BAUER: Let's take a break.

10 THE VIDEOGRAPHER: We're going off
11 the record. It's 57 minutes after 9:00
12 o'clock.

13

14 (A recess was taken.)

15

16 THE VIDEOGRAPHER: It's 13 minutes
17 after 10:00 o'clock. We're back on the
18 record.

19 Q. (By Mr. Bauer) Dr. Kelly, you testified
20 earlier today that you reviewed scientific
21 literature from the 1930's about chlorinated
22 diphenyl, now known as "PCBs." Would you
23 please look at what's been marked Deposition
24 Exhibit 1 and tell us whether that's one of
25 the articles that you read.

1 A. This is an article by Jones and Alden called,
2 "An Acneform," A-c-n-e-f-o -- pardon me --
3 f-o-r-m, "Dermatargosis." I'll have to spell
4 it. I can't even pronounce it.
5 D-e-r-m-a-t-e-r-g-o-s-i-s. That's one of
6 them. It was published in -- probably
7 around --

8 Q. Do you recall --

9 A. Yes. I recall.

10 Q. -- approximately when it was published?

11 A. Yes. 1935 or '36.

12 Q. When you say, "This was one of them," did you
13 mean this was one of the articles that you
14 read?

15 A. Yes.

16 Q. All right. What does Jones and article --
17 excuse me. Strike that.

18 What is the Jones and Alden article
19 reporting about?

20 A. It's reporting about an outbreak of chloracne
21 in employees at a plant manufacturing PCB in
22 Anniston, Alabama. The plant was a Swann
23 Chemical Company. It was not -- this was a
24 plant that was taken over by Monsanto
25 sometime after this article was published.

- 1 Q. So the --
- 2 A. Around that time.
- 3 Q. So the workers who were involved in the Jones
4 and Alden reports eventually became Monsanto
5 employees?
- 6 A. That's correct.
- 7 Q. Dr. Kelly, do you recall approximately when
8 you first read the Jones and Alden paper?
- 9 A. Probably late '36. Probably. Or early '37.
10 I'm not sure.
- 11 Q. Do you recall whether you attended the
12 symposium put on by Dr. Drinker in June of
13 1937?
- 14 A. '37?
- 15 Q. Yes.
- 16 A. Yes, I did.
- 17 Q. And is it your recollection that you read the
18 Jones and Alden article --
- 19 A. I'd read this before then. That's correct.
- 20 Q. Before going to the symposium?
- 21 A. That's correct.
- 22 Q. Do you recall whether -- how long before you
23 went to the symposium you read it?
- 24 A. No, I don't.
- 25 Q. All right. Do you recall whether the

1 chloracne outbreak at the Anniston plant
2 occurred several years before you read the
3 article?

4 A. Yes, it did.

5 Q. Okay. After you became a doctor for
6 Monsanto, did you go to visit the workers at
7 Monsanto's Anniston plant?

8 A. Yes, I did.

9 Q. Did you see and speak with any of the
10 specific workers who were in the PCB unit?

11 A. Yes. I certainly don't remember their names;
12 but I spoke with some of them, yes, and
13 looked at their faces.

14 Q. And approximately when was that?

15 A. Gosh. '36 or '37. I'm not sure when.

16 Q. Did those workers have chloracne at that
17 time?

18 A. They did not. They had some residue. They
19 had some small scarring around their face
20 where the pustules had been opened. But
21 there was no active chloracne and no other
22 symptoms.

23 Q. Was there a plant physician at the Anniston
24 plant when you went to visit it in the
25 mid-1930's?

1 A. Yes, there was. A Dr. Martin.

2 Q. Did you discuss the workers in the PCB unit
3 with Dr. Martin?

4 A. Yes, I did.

5 Q. And what was -- what were his conclusions
6 about the health of those workers?

7 A. Well, he said whatever testing he would do on
8 them -- first of all, they had no clinical
9 symptoms outside of the -- outside of the
10 chloracne. Some of them complained of
11 fatigue, but his clinical examination was
12 negative. And what laboratory work was
13 available to check out liver functions, he
14 did; and he said they were -- turned out to
15 be negative.

16 Q. Now, you testified in Anniston that there was
17 no -- there were no clinical symptoms. What
18 do you mean --

19 A. With the exception of fatigue.

20 Q. What do you mean by that?

21 A. Well, "Do you feel sick?" In other words,
22 "Do you have any particular complaints? Do
23 you have any pains? Do you have any nausea?
24 Do you have any headaches? Do you have" --
25 there's a difference between "symptoms" and

1 "signs."

2 "Symptom" is not an objective
3 finding.

4 A "sign" is chloracne. It's a
5 pigmentation or pustules or swelling of the
6 glands in the skin, whereas a "symptom" --
7 as I said, headache, nausea, diarrhea,
8 et cetera.

9 Q. Did you have discussions in the 1930's with
10 Dr. Martin or others about the cause of the
11 chloracne problem that occurred earlier at
12 the Anniston plant?

13 A. Yes, I did.

14 Q. And what did you learn?

15 A. Well, I learned that it was the belief that
16 the chloracne episode was caused when Swann
17 Chemical changed their benzene supplier.
18 They ended up with a product that was a
19 different color than their usual one and
20 ended up with some different dielectric
21 constants, properties, and also ended up with
22 giving the people, the workers, chloracne.
23 So they decided to get smart and change back
24 to the original benzene supplier and the
25 color came back to normal and the dielectric

1 constants came back to normal and they --
2 were no more development of chloracne. So --
3 Q. Did that change-back in the benzene supply
4 occur before you visited the Anniston plant?
5 A. Yes, it had.
6 Q. Was that conclusion, that there was a problem
7 with the benzene supply, reported by
8 Drs. Jones and Alden in the -- their article
9 which we've marked as Exhibit 1?
10 A. Yes, it was.
11 Q. Did Monsanto manufacture PCBs at the Anniston
12 plant from whenever it purchased the plant
13 in '35 or so up through the time you retired?
14 A. Yes, it did.
15 Q. Was there ever any chloracne problem during
16 that entire period of time?
17 A. There was none.
18 Q. None with the workers in the PCB unit there?
19 A. That's correct.
20 Q. All right. And did Monsanto later make PCBs
21 in another plant?
22 A. Yes. We made one in -- we made some PCBs in
23 our East St. Louis plant, also called the
24 Krummerich, K-r-u-m-m-e-r-i-c-h, plant. We
25 also made it in one of the United Kingdom. I

1 think it was in Wales or someplace in
2 England.

3 Q. Is there --

4 MR. KIM: Can I ask him just real
5 quickly? Is the East St. Louis plant, the
6 Krummerich plant, also the Sauget plant?

7 THE WITNESS: Yes.

8 MR. KIM: Okay.

9 THE WITNESS: S-a-u-g-e-t. Also
10 called Plant B when I started.

11

12 (Discussion off the record.)

13

14 Q. (By Mr. Bauer) Did you receive any reports
15 of chloracne among the workers that
16 manufactured PCB at the Krummerich plant
17 during the entire time that you were medical
18 director?

19 A. I did not.

20 Q. Separate and apart from the work by
21 Drs. Jones and Alden, do you know whether
22 Swann did any other investigation into the
23 source of the chloracne problem?

24 A. Yes. I have seen reports from a Dr. Flinn --
25 F-l-i-n-n, I believe -- at Columbia

1 University in New York. I believe they
2 engaged him to do some patch testing. I
3 don't know if he did any animal testing on
4 them, on the particular product.

5 Q. Do you recall what Dr. Flinn's conclusion
6 was?

7 A. Yes. He thought there was some impurity in
8 the -- in the product that -- in the PCBs.
9 And he came out with -- he was never definite
10 about it. But I don't think he ever -- he
11 talked about something with a styrene
12 compound. Or I don't know which, but it
13 was -- it certainly wasn't very definite.

14 Q. Do you recall that Doctors -- strike that.

15 Let me back up and ask you: Do you
16 know how Drs. Jones and Alden got involved in
17 the -- in the chloracne issue with respect to
18 Anniston?

19 A. No, I don't. I have to assume that
20 Dr. Martin sent them to them. These people
21 were dermatologists in Atlanta, I believe.
22 And Anniston is about -- I don't know how far
23 it is from -- I think it was Atlanta. Either
24 Atlanta or Birmingham. I don't know where
25 they were.

1 Q. Well, I'm -- I wasn't asking you to assume
2 whether Dr. Martin did it or not. What I was
3 asking you was: Were they -- were they
4 involved clinically in treating the workers
5 who were exposed?

6 A. Oh, yes.

7 Q. Okay. And -- strike that.

8 Do you recall whether Drs. Jones
9 and Alden reported in the paper that we've
10 marked as Exhibit 1 that an impurity that
11 they thought was chlorinated styrene was the
12 source of the chloracne problem?

13 A. Yes.

14 Q. Was that your understanding as to the source
15 of the chloracne problem when you were
16 working at Monsanto in the late 1930's, that
17 the earlier problem at the Anniston plant had
18 been the result of chlorinated styrene in the
19 benzene?

20 A. Well, I wasn't an authority of what the
21 impurity was; and I wasn't sure that
22 everybody was saying Jones and Alden were
23 right on the impurity. I recognized the fact
24 there was an impurity in that particular
25 batches -- those particular batches that were

1 made.

2 Q. And --

3 A. I don't know what it was, and I don't think
4 anybody else knew what it was in those days.

5 Q. And the problem was resolved how?

6 A. By changing back to getting something that
7 didn't have that contaminant, whatever it
8 was, in it. Everybody believed it was the
9 benzene, but it was a contaminant of benzene
10 that carried through and was chlorinated
11 along with the benzene.

12 Q. All right. Let's switch now to the Harvard
13 symposium in 1937.

14 You testified a little earlier
15 about wire coating problems and Halowax and
16 chlorinated naphthalene. And you also
17 mentioned a symposium in 1937. Let's first
18 back up and ask you to tell us what your
19 understanding is of what is -- what is
20 Halowax?

21 A. Halowax is a product -- was. I don't know if
22 it's still around -- of the Halowax
23 Corporation, H-a-l-o-w-a-x, which was a
24 subsidiary of Union Carbon and Carbide. I
25 don't know what they called it, if that was

1 the same name they use today. That was a
2 whole series of compounds that had quite a
3 few uses. The one we're talking about is
4 a -- use of it as an insulating -- insulating
5 agent in cotton or covering of wires. The --

6 Q. You mentioned electrical wires earlier. It
7 was -- it was used how with respect to
8 electrical wires?

9 A. It impregnated the coating. And I don't know
10 what the coating was. The coating was a
11 fabric. If you're -- you're not young enough
12 to realize it. When you used to have
13 electrical wire and you pulled on it, you'd
14 get some brown stuff on your hands. It
15 wasn't a vinyl or a rubber compound. It was
16 a -- sort of a sticky covering that you got
17 your hands brown. That was chlorinated
18 naphthalene. And --

19 Q. So is this something different than
20 electrical fluids that were used in
21 transformers and capacitors?

22 A. Oh, yes.

23 Q. Now, you earlier mentioned that one of the
24 constituents of Halowax was chlorinated
25 naphthalene; is that correct?

1 A. That's correct.

2 Q. All right.

3 A. That was a major constituent.

4 Q. All right. Is that something different than
5 PCBs?

6 A. It's chlorinated naphthalene. 100 percent
7 different. It's a different horse entirely.

8 Q. All right. And did Monsanto manufacture
9 chlorinated naphthalene that went into
10 Halowax compounds?

11 A. No, it did not.

12 Q. All right. Now, you also mentioned a
13 constituent of Halowax that was chlorinated
14 diphenyl benzene. Is that something
15 different than what we call PCBs today?

16 A. Yes. It has another benzene ring on it.
17 It's a different compound.

18 Q. All right. Was chlorinated diphenyl benzene
19 part of a Monsanto product that went into
20 some of the Halowax compounds?

21 A. Yes, it was.

22 Q. All right. Were some of the Halowax
23 compounds straight chlorinated naphthalene?

24 A. Yes.

25 Q. All right. And do you recall what percentage

1 of a Monsanto product was in any of the
2 Halowax compounds?

3 A. Yes. The impression I gathered was there was
4 10 percent in one formulation. They had 90
5 percent chlorinated naphthalene and 10
6 percent chlorinated diphenyl benzene, which
7 was a Monsanto product. Now, a mixture of
8 chlorinate diphenyl benzene and PCBs. So it
9 was really 5 percent PCB in the mixture, 5
10 percent or less than 5 -- somewhat less than
11 5 percent PCB. Around 6 percent or so of
12 chlorinated diphenyl benzene and 90 percent
13 Halowax --

14 Q. Okay.

15 A. -- in this one formulation.

16 Q. Now, the mixture of chlorinated diphenyl and
17 chlorinated diphenyl benzene, the two
18 Monsanto products, is that what you earlier
19 referred to as "4465"?

20 A. Yes. I don't know if I talked about that
21 today, but that's what it's -- that was the
22 Monsanto designation for it.

23 Q. All right. Now, you mentioned earlier that
24 there were some people who were exposed to
25 the wire coating product, the Halowax

1 compounds, that suffered health problems.

2 And there were even several deaths?

3 A. That's correct.

4 Q. All right. Now, how were they exposed to the
5 Halowax compounds?

6 A. They were exposed -- well, I don't know.
7 I've never been in a wire coating factory.

8 Q. All right. Was there discussions of that at
9 the symposium?

10 A. Yes. The impression was that it was mostly
11 skin absorption, although I'm not sure
12 whether they talked about the inhalation
13 avenue of exposure. I don't know.

14 But they -- they probably -- the
15 impression I gathered was they had to heat
16 this wire -- heat the stuff what they put on
17 the wire. But these people were grossly
18 contaminated as far as their skin was
19 concerned.

20 Q. And they were grossly contaminated with
21 chlorinated naphthalene, chlorinated diphenyl
22 benzene, and chlorinated diphenyl in the case
23 of one of the Halowax products?

24 A. That's correct.

25 Q. All right. And do you recall whether any of

1 the people that suffered serious injuries
2 received those injuries as a result of
3 exposure to the Hallowax compound that was
4 just chlorinated naphthalene?

5 A. Yes. Some of the reports I read, some of the
6 deaths were -- I do not recall any of the
7 deaths being associated with the Hallowax
8 compound that contained the chlorinated
9 diphenyl benzene.

10 Q. And what about the chlorinated diphenyl?

11 A. Well, no. The only -- no. That's the same
12 thing. I mean, they had the same -- if
13 they --

14 Q. The mixture product, the 4465 that we talked
15 about?

16 A. That's what I'm talking about, yes.

17 Q. All right. Who requested that Dr. Drinker
18 start some animal studies with respect to
19 these -- the three compounds that we've
20 talked about?

21 A. Somebody at Hallowax.

22 Q. Okay. Did -- and they were a Monsanto
23 customer at the time?

24 A. That's correct.

25 Q. And did they talk to you about that?

1 A. Yes, they talked to me. Not about who to
2 pick or what to do, but how much to get some
3 money to pay for this.

4 Q. Some money to pay for what?

5 A. The work.

6 Q. And what was your response?

7 A. Well, "I'll look. I'll check it out." So I
8 talked to the people in charge of the
9 marketing and said, "Do you want to go along
10 with Halowax on this?" And so they did. I
11 don't know what the percentage we paid; or at
12 the present time, I don't know how much it
13 was. Toxicological expenses were much
14 cheaper in those days than they are now.

15 Q. Do you recall whether Halowax Corporation or
16 Monsanto paid for the majority of the expense
17 for the Drinker work?

18 A. Oh, yes, I think so. They -- but Halowax
19 paid for the majority of the expense.

20 Q. Do you know whether any other company, other
21 than Halowax and Monsanto, contributed to the
22 Drinker -- the funding for the Drinker work?

23 MR. KIM: I'll object --

24 A. I don't know.

25 MR. KIM: -- to the -- excuse me,

1 Doctor.

2 I'll object to your question.

3 There's a mischaracterization in that I think
4 he only testified that Halowax funded it. I
5 don't believe he indicated Monsanto did.

6 But --

7 MR. BAUER: Well, I thought he just
8 said that when you turned around. But let's
9 just ask him right now.

10 Q. (By Mr. Bauer) What was your recollection
11 about whether Monsanto contributed to the
12 funding for Dr. Drinker's work?

13 A. We did. I don't know what percentage or I
14 don't know the amount now but I thought it
15 was under 25,000. I don't know. That's the
16 impression I got.

17 Q. And you don't recall the total cost, so you
18 don't recall the percentage?

19 A. I don't know. I don't know. When you talk
20 about the Drinker work, there was some work
21 after that first symposium that Monsanto
22 defrayed completely itself.

23 Q. All right. So the shared funding arrangement
24 with Halowax related to work done prior to
25 the symposium?

- 1 A. That's correct.
- 2 Q. And then Monsanto hired Dr. Drinker on its
3 own after the symposium?
- 4 A. Yes.
- 5 Q. All right.
- 6 A. I don't like the word "hired," but engaged
7 him.
- 8 Q. Engaged his services?
- 9 A. Yes.
- 10 Q. All right. And Dr. Drinker was with what
11 organization?
- 12 A. Harvard University. Whether it was the
13 Harvard School of Public Health -- he was a
14 well-recognized -- there were two Drinker
15 people, Phillip and Cecil; and one of them
16 invented the iron lung, which -- but he was a
17 well-known paramedical. He was a Ph.D. He
18 was not an M.D.
- 19 Q. Did Dr. Drinker present the summary results
20 of his work at the symposium at Harvard in
21 June of 1937?
- 22 A. Yes. The work that he had done obviously up
23 till then.
- 24 Q. Right. And were you present for that?
- 25 A. Yes, I was.

1 Q. Were you present during discussions
2 afterwards among the people that were at the
3 symposium?

4 A. Yes, I was.

5 Q. Do you recall anyone else who was present?

6 A. Well, there were about 40 or 50 people.
7 There was a state office -- health offices
8 from the New England states. There was
9 people from industry. There was Dr. Vosburgh
10 from GE was there. There was Dr. von
11 Oettingen, who was a toxicologist from
12 DuPont. There was quite a collection of
13 authorities of one sort or other there.

14 Q. You mentioned Dr. Vosburgh from General
15 Electric. Did you know Dr. Vosburgh at that
16 time?

17 A. I met him then. I don't believe I knew him
18 before then.

19 Q. All right. What can you tell me about
20 Dr. Vosburgh?

21 A. Well, he was in the business before I
22 started. He was -- I don't know when he
23 started with GE, but he was a well-known
24 occupational physician --

25 Q. Well, what --

1 A. -- at that --

2 Q. Sorry. What was his position with General
3 Electric?

4 A. Medical director.

5 Q. All right. Do you recall how long he was
6 medical director after 1937?

7 A. No, I don't.

8 Q. Did anyone at the symposium discuss any
9 experience that any of the General Electric
10 operations had with respect to Hallowax
11 compounds?

12 A. Yes. I don't know if Vosburgh did it, but I
13 think some of the manufacturing people did.

14 Q. And what do you recall about that?

15 A. Well, I can recall it if I look at that
16 paper. They said we had problems.

17 Q. All right. Well, you -- we can look at the
18 paper in a minute. But let me just get your
19 general recollection as to whether it was
20 related to a wire coating operation that
21 General Electric had or a transformer and
22 capacitor operation.

23 A. Oh. It was all wire coating. There was
24 nothing -- no mention of transformers or
25 capacitors at this time.

1 Q. After the symposium did you have discussions
2 with Dr. Vosburgh about the experience with
3 the transformer and capacitor workers that
4 were putting PCBs fluids in transformers and
5 capacitors at General Electric?

6 A. Yes, although I can't recall how specific I
7 was. But I -- at that particular time, there
8 weren't too many people who were -- or too
9 many medical directors who were around to --
10 there just weren't too many medical
11 directors, period. And there was only this
12 one big meeting where industrial hygienists
13 and occupational physicians went. And I
14 would see Vosburgh there, and I would -- knew
15 him from the Drinker business. And I talked
16 to him.

17 But at that particular time, PCBs
18 were still a popular topic. GE was a big
19 customer of ours, and Vosburgh and I had
20 mutual interests in PCBs. So I would talk
21 and say, "Are you having any problems?" And
22 he'd say, "No." And I don't specifically
23 know whether I said, "Do you have any
24 problems with the capacitor workers," or
25 not. But he would ask me, "How are you

1 getting along? How are your people doing?"

2 I would say, "We haven't seen anything."

3 And that's about the -- when you
4 say "discussion," it wasn't a formal thing.
5 We didn't sit down and say, "Let's talk about
6 PCBs." But it was brought up in our
7 conversations.

8 Q. All right. Do you recall Dr. Vosburgh ever
9 reporting to you that there were health
10 problems among the transformer and capacitor
11 workers that were putting PCB electrical
12 fluids --

13 A. No. His reports were always negative. He
14 had no reports of any ill effect of
15 transformer workers. In fact, I don't know
16 if they still kept on using Halowax or not or
17 if he had any of his cable workers after
18 that.

19 Q. More broadly, do you recall whether anyone
20 from General Electric's medical department
21 ever reported to you health problems from
22 workers that were using PCBs in the
23 manufacture of transformers or capacitors?

24 A. No. But I don't recall talking to anybody
25 outside of Vosburgh. But the answer to your

1 question is "no."

2 Q. Did Mr. Wheeler or Mr. Garrett or anyone else
3 in the Monsanto medical department tell you
4 that they'd been informed by General Electric
5 that General Electric's transformer and
6 capacitor workers were experiencing any
7 health problems from exposure to PCBs?

8 A. No, they did not.

9 Q. Let's go back to the Drinker symposium. Did
10 Dr. Drinker publish an article about his
11 tests in the symposium in a periodical?

12 A. Yes, he did.

13 Q. Would you turn to what's marked as Exhibit 2
14 and tell us -- well, identify Exhibit 2 for
15 us.

16 A. Exhibit 2 is a "Symposium on Certain
17 Chlorinated Hydrocarbons" under the auspices
18 of the Harvard School of Public Health,
19 June 30th, 1937. He lists three papers.

20 Q. All right. Is Exhibit 2 -- well, first of
21 all, is Exhibit 2 a document that was the
22 same -- the same paper was summarized or
23 discussed at the symposium?

24 A. Yes, it was. It is.

25 Q. And then it was subsequently published in the

1 Journal of Industrial Hygiene and Toxicology?

2 A. That's correct. September, 1937.

3 Q. All right. Was that one of the periodicals
4 that you had a subscription of at Monsanto?

5 A. Yes. It also disbanded. I don't know what
6 happened to it, but it isn't published
7 anymore. But it was one of the ones we had.

8 Q. All right. And did you receive a copy of
9 Exhibit 2 in 1937?

10 A. Yes, I did.

11 Q. Can you generally describe the types of tests
12 that Dr. Drinker performed?

13 A. Yes. He did inhalation studies of which he
14 exposed rats to measured amounts of various
15 compounds. He did some -- I think he did
16 some feeding, also; but I'm trying to find
17 that.

18 Yes. He did feeding tests on
19 chlorinated naphthalenes and also on
20 chlorinated diphenyl, which he called
21 "chlorinated diphenyl." So he did a -- he
22 also did a few subcutaneous injections. So
23 he did a pretty thorough series of tests,
24 certainly from 1937. It was pretty good
25 work.

- 1 Q. And he reported that the products that he did
2 these studies on were chlorinated
3 naphthalenes?
- 4 A. Yes.
- 5 Q. And he also reported that he did work on a
6 Monsanto product?
- 7 A. That's correct.
- 8 Q. And what did he report in the 1937 paper the
9 product was?
- 10 A. He said it was chlorinated diphenyl.
- 11 Q. All right. Now, turn to what's marked
12 Exhibit 3 and identify that for us, please.
- 13 A. This is a second of three papers read at the
14 symposium by Dr. Bennett, a pathologist.
15 This -- the title was, "Morphological,"
16 M-o-r-p-h-o-l-o-g-i-c-a-l, "Changes in the
17 Livers of Rats Resulting from Exposure to
18 Certain Chlorinated Hydrocarbons." In other
19 words, this is a pathology that he found
20 out --
- 21 Q. Was --
- 22 A. -- after their experiments.
- 23 Q. Was Exhibit 3 also a paper presented at the
24 1937 symposium?
- 25 A. Yes, it was.

- 1 Q. And was it subsequently published in the
2 Journal of Industrial Hygiene and Toxicology
3 in 1938?
- 4 A. Yes, it was. February, '38.
- 5 Q. And did you receive and review a copy of this
6 article in 1938?
- 7 A. Yes, I did.
- 8 Q. Was the Journal of Industrial Hygiene and
9 Toxicology a widely read journal in the
10 industrial -- strike that -- in the
11 occupational medicine field?
- 12 A. Yes, I think so. It was the only one that
13 was around, also.
- 14 Q. Do you recall the conclusion of Dr. Drinker
15 and Dr. Bennett with respect to the relative
16 toxicity of chlorinated naphthalene and what
17 they reported in Exhibit 2 and Exhibit 3 were
18 chlorinated diphenyl?
- 19 A. Yes.
- 20 Q. What do you recall their conclusion was?
- 21 A. Well, he found that -- he said that
22 chlorinated diphenyl and chlorinated
23 naphthalene were both quite toxic. And he
24 stated that chlorinated di -- what he called
25 chlorinated diphenyl was as toxic as

1 chlorinated naphthalene.

2 Q. Would you turn to Page 123 of Exhibit 3 and
3 look at the paragraph labeled "4" on the
4 second column. The last sentence of that
5 paragraph says: "Chlorinated diphenyl
6 appears to be the most injurious compound of
7 all those tested."

8 A. That's right. That's what he said.

9 Q. Do you recall hearing that at the symposium
10 and reading it in Exhibit 2 and Exhibit 3?

11 A. I got two questions there. I read -- I
12 recall reading it. I don't know how to
13 characterize chlorinated diphenyl at the --
14 if he used that term as the most injurious
15 compound of the whole batch we tested. I
16 don't know that.

17 Q. You don't recall whether he said that at the
18 symposium, but he did put that in the
19 articles that you read?

20 A. That's correct. He may have said it at the
21 symposium, but I don't recall it.

22 Q. All right. Now, you've testified a couple of
23 times that it's what he reported, was
24 chlorinated diphenyl?

25 A. That's correct.

1 Q. Did you later come to the conclusion that he
2 had misidentified his -- the substance that
3 he was testing and calling chlorinated
4 diphenyl in these papers?

5 A. Did I come --

6 Q. Yes.

7 A. Yes. I had the -- came to the conclusion
8 when I got back to St. Louis at that time,
9 over all this, in fact. So I called up
10 Professor Drinker and said, "Look, we don't
11 have" -- "our chlorinated diphenyl, we don't
12 have the clinical experience that shows that
13 this is as bad as you have painted it to be.
14 Where did you get the chlorinated diphenyl?
15 You said it was a chlorinated diphenyl
16 chlorinated to 65 percent. We don't make a
17 chlorinated diphenyl at 65 percent. We make
18 a 62 and a 68. Where did you get it?"

19 He said, "We got it from Halowax."

20 I said, "Well, I don't know how
21 they came to that conclusion, that this is
22 chlorinated diphenyl, because we don't sell
23 them chlorinated diphenyl. We sell them what
24 we" -- "what is chlorinated diphenyl
25 benzene. Why don't you retest this thing,

1 and I'll send you some material right off our
2 production line as close to a 62 percent
3 chlorination as we've got."

4 So I thought, I'll send him the
5 most highly chlorinated one, which is 1268,
6 because the thinking at that day, those days
7 and even today, was that the more chlorine
8 you get in, the more toxic it is.

9 Q. All right.

10 A. So I sent him 1268.

11 Q. Let me stop you there for a minute.

12 Did Dr. Drinker report to you that
13 the Halowax Company identified the sample
14 that he tested in the 1937 work as
15 chlorinated diphenyl?

16 A. I don't know what you mean by "identified."
17 He -- they called it that.

18 Q. Okay. The Halowax Company was the one that
19 called it chlorinated diphenyl --

20 A. Yes.

21 Q. -- when they gave the sample to Dr. Drinker?

22 A. That's correct.

23 Q. And was this the product that we talked
24 earlier about as being 4465?

25 A. Yes.

1 Q. And what is the "65" in "4465" mean?

2 A. 65 percent chlorination of a whole compound.

3 Q. All right. We've talked before -- you've
4 talked before about 1268 and 1262 and various
5 things like that. Was there a -- was there a
6 naming practice at Monsanto where
7 Aroclor 1254 meant a particular thing?

8 A. Yes. It meant chlorinated biphenyl
9 chlorinated to 54 percent average.

10 Q. Okay. So --

11 A. In other words, there was some 1248 in there,
12 maybe some 1252 in there. But the average of
13 the diphenyl was chlorinated to 54 percent.

14 Q. So the last two digits of Aroclor 1254 means
15 54 percent chlorine?

16 A. That's correct.

17 Q. What do the -- do the first two digits
18 designate something?

19 A. It was an Aroclor.

20 Q. Did the first two digits mean that it was a
21 chlorinated diphenyl?

22 A. Yes.

23 Q. What about the -- was there also a 5,000
24 series of Aroclors?

25 A. Yes. I don't know how extensive that was.

- 1 There was a -- the one I remember was 5460.
- 2 Q. All right. And Aroclor 5460 was what
- 3 compound?
- 4 A. It was a chlorinated diphenyl benzene
- 5 chlorinated to 60 percent.
- 6 Q. All right.
- 7 A. Diphenyl benzene could also be called
- 8 chlorinate terphenyl, which means there's
- 9 another phenyl ring in it.
- 10 Q. All right. Was there a 4,000 series, Aroclor
- 11 4465?
- 12 A. I don't know about the series. I know there
- 13 was one compound called 4465.
- 14 Q. And was a mixture of what?
- 15 A. Of chlorinated -- chlorinated diphenyl plus
- 16 5460, which is chlorinated diphenyl benzene.
- 17 Q. All right. And what did you do after having
- 18 a conversation with Dr. Drinker about his
- 19 source of chlorinated diphenyl? Or what he
- 20 labeled as "chlorinated diphenyl"?
- 21 A. I said, "I don't know what you tested. I can
- 22 send you some honest to goodness chlorinated
- 23 diphenyl, and test that." So --
- 24 Q. And did you do that?
- 25 A. So I called Anniston and said, "Send him a

1 couple of quarts of 1268." So we sent it
2 up -- we sent it up to him.

3 Q. Did you also send Dr. Drinker samples of
4 5460?

5 A. Yes, I did.

6

7

(A recess was taken.)

8

9 Q. (By Mr. Bauer) With respect to the substance
10 that Dr. Drinker labeled 4465 at the
11 symposium and his first two papers, would the
12 conclusion that he reached about the relative
13 toxicity of that compound at that time, did
14 he ever suggest that it was too dangerous to
15 use an electrical fluid?

16 A. No, he did not.

17 Q. Did he --

18 A. In the electrical fluid?

19 Q. Right.

20 A. He wasn't talking about the fluids. He was
21 talking about wire impregnation.

22 Q. I understand that. The -- I understand that
23 what caused his concern was the wire
24 coating.

25 A. But he never did, no.

1 Q. Did he ever -- did he ever -- did Dr. Drinker
2 ever suggest that what he identified as
3 chlorinated diphenyl was too dangerous to use
4 in PCB electrical fluid?

5 A. No, he did not.

6 Q. All right. Did he suggest it was too
7 dangerous to use for any use?

8 A. For what?

9 Q. Any use. Including the wire coating.

10 A. Oh, you mean in electrical? I mean, if --
11 when you say "any," suggests use on a serial
12 or something like that. But any electrical
13 use.

14 Q. All right. Let me ask more specifically.

15 A. Industrial use.

16 Q. All right. There was in -- there was a prior
17 industrial use of the substances, the various
18 Halowax compounds that had been used in a
19 prior industrial use where people had been
20 exposed to it and suffered serious injuries,
21 including some deaths.

22 A. Yes.

23 Q. Did Dr. Drinker suggest this as a result of
24 his tests, that the substances that he
25 tested, including chlorinated naphthalene and

1 what he identified as chlorinated diphenyl,
2 was too dangerous to use in the wire coating
3 use?

4 A. No, he did not.

5 Q. Did anyone at the Drinker symposium state
6 that the substances chlorinated naphthalene
7 or what was identified as chlorinated
8 diphenyl were too dangerous to use as
9 industrial chemicals?

10 A. No. There were several -- on the contrary,
11 there were several people from the Government
12 that said, "There's no reason why these
13 things can't be handled safely."

14 Q. Did anyone at the Drinker symposium state the
15 opinion that chlorinated naphthalenes or
16 chlorinated diphenyls were too dangerous to
17 use in electrical equipment such as
18 transformers or capacitors?

19 A. No, sir.

20 Q. Do you recall a Dr. Schwartz who was at the
21 symposium?

22 A. Yes.

23 Q. Who is he?

24 A. Dr. Schwartz was a dermatologist who worked
25 for the United States Public Health Service

1 for a long, long time. I don't know how
2 long. He was quite a man, fairly well-known
3 for his work with skin -- skin problems in
4 the industry.

5 Q. Would you turn next to what's been marked
6 Exhibit 4 in your binder, Dr. Kelly?

7 A. Yes.

8 Q. That's a report to Monsanto with a cover
9 sheet that states -- that's dated
10 September 15, 1938, and on the second page
11 says "Report on 4465."

12 A. Yes, sir.

13 Q. Did you receive a copy of Exhibit 4 in 1938?

14 A. Yes, I did.

15 Q. Can you tell us what this report is?

16 A. It's a report of work done by Drinker,
17 sponsored by Monsanto. 4465 are material --

18 Q. He --

19 A. -- which was --

20 Q. Let me stop you there. He identifies 4465 in
21 this paper as chlorinated diphenyl. Do you
22 recall whether this paper was written before
23 or after your discussions with him?

24 A. Oh, if he -- if he referred to it as
25 chlorinated diphenyl, it was written before

1 my discussion with him.

2 Q. Okay.

3 A. I mean, I don't know when he -- this paper,
4 am I looking at the same one you have? It
5 says June, 1937. I don't know what that
6 means.

7 Q. It says June of 1937 in handwriting on the
8 top of the first page?

9 A. Yes.

10 Q. But it has a typed date of what on the
11 first -- on --

12 A. Of the report, right.

13 Q. Let's go over that again.

14 The typed date on the first page of
15 the report is what?

16 A. Is September 15th, 1938.

17 Q. All right. And what's the handwritten date
18 on the first page of the text?

19 A. June, 1937.

20 Q. And do you recall now whether the substance
21 that was talked about at the 1937 symposium
22 was reported by him to be 65 percent
23 chlorine?

24 A. Yes.

25 Q. All right. Now, you testified a few minutes

1 ago that you submitted two samples to
2 Dr. Drinker after you had the conversation
3 with him of two Aroclors. Would you turn
4 next to what's been marked as Exhibit 5?

5 A. Yes.

6 Q. That's another document entitled, "Report to
7 the Monsanto Chemical Company," by Cecil K.
8 Drinker, with a date on the first page of
9 September 15, 1938.

10 A. That's correct.

11 Q. And it has four compounds identified as being
12 tested, on the second page. Did you receive
13 a copy of Exhibit 5 in 1938?

14 A. Yes, I did.

15 Q. The third -- on the second page of the
16 document, which lists -- it's the table of
17 contents. It lists, Compound No. 3,
18 "Chlorinated diphenyl #1268." Is that the
19 sample of chlorinated diphenyl that you sent
20 to Dr. Drinker?

21 A. Yes.

22 Q. Does the report marked as Exhibit 5 contain
23 the contents of Dr. Drinker's studies that --
24 for the portion of the work that you
25 testified earlier that Monsanto paid 100

1 percent of the work of?

2 A. Yes.

3 Q. All right. Is Exhibit 4, the prior exhibit,
4 Exhibit 4, the paper that shows the work that
5 was funded jointly by Halowax and Monsanto?

6 A. Yes.

7 Q. What did Dr. Drinker conclude with respect to
8 Chlorinated Diphenyl No. 1268 in Exhibit 5?

9 A. He concluded that Chlorinated Diphenyl 1268
10 was much less toxic than his report on what
11 he had previously identified as a chlorinated
12 diphenyl. He said he was surprised about the
13 low order of magnitude of toxicity of 1268.

14 Q. Did Dr. Drinker publish a subsequent
15 published article after 1938 when he did the
16 report --

17 A. Yes.

18 Q. -- that's marked as Exhibit 5?

19 A. Yes, he did.

20 Q. And is that what we've marked as Exhibit 6?

21 A. Yes, sir.

22 Q. And was that also a paper published in the
23 Journal of Industrial Hygiene and Toxicology?

24 A. Yes, it was.

25 Q. Did Dr. Drinker include in this paper a

1 statement of his earlier misidentification of
2 chlorinated diphenyl?

3 A. Yes.

4 Q. Where is that?

5 A. It's on Page 158, the third paragraph.

6 Q. It's the -- is it the paragraph that starts
7 on the bottom of Page 158 -- the bottom of
8 the first column on Page 158 and carries
9 over?

10 A. Yes.

11 Q. All right. Now, Dr. Kelly, are you
12 testifying that because of Dr. Drinker's
13 misidentification of the compound initially,
14 that chlorinated diphenyl had no toxic
15 properties at all?

16 A. No, I'm not testifying to that.

17 Q. All right.

18 A. I'm testifying that it didn't have the toxic
19 properties that he stated it had. But it had
20 some, certainly.

21 Q. And as a result of those toxic properties,
22 was it your opinion in the 1930's, the
23 1940's, and the 1950's that it was prudent to
24 take steps to limit human exposure to
25 chlorinated diphenyl?

1 A. Yes.

2 Q. Did the literature in the 1930's, Forties,
3 and Fifties also demonstrate to you that
4 there was a safe level of exposure to
5 chlorinated diphenyl?

6 A. What years?

7 Q. Thirties, Forties, and Fifties.

8 A. Yes.

9 Q. Would you turn next to what's been marked
10 Exhibit 7 and identify that for us?

11 A. Yes. This is an article by Dr. Meigs,
12 M-e-i-g-s, which appeared in -- someplace.
13 Oh, the Journal of the American Medical
14 Association, April of 1954, entitled,
15 "Chloracne from an Unusual Exposure to
16 Arochlor." He spelled "Aroclor" wrong, but
17 it's --

18 Q. Did you read Dr. Meigs' article in 1954?

19 A. Yes, I did.

20 Q. Did you write a letter to Dr. Meigs after you
21 read Exhibit 7?

22 A. Yes, I did.

23 Q. Would you turn to Exhibit 8 and tell us
24 whether that's a copy of the letter that you
25 wrote to Dr. Meigs?

1 A. Yes, it is.

2 Q. There's no signature on Exhibit 8. Did you
3 have a practice in the 1950's of maintaining
4 file copies of correspondence that were
5 unsigned?

6 A. Yes. I never signed the carbon copy.

7 Q. Okay. Is Exhibit 8 a copy of the letter that
8 you sent to Dr. Meigs in 1954?

9 A. Yes, it is.

10 Q. Now, you state in the first sentence of
11 Exhibit 8: "Your article in the current
12 number of the JAMA is certainly confusing to
13 me."

14 Why did you tell that to Dr. Meigs?

15 A. Well, the second sentence explains it: "We
16 have had men exposed to concentrations of
17 chlorinated diphenyl four or five times what
18 you have recorded..." We have had them
19 exposed for five to ten years and have no
20 chloracne. Here you've said you've got
21 something one fifth this level for a period
22 of definite months, not years, and you get
23 chloracne. How come? I mean, no wonder I'm
24 confused.

25 Q. All right. Now, the article that's been

1 marked Exhibit 7 has a report in it, on the
2 first column on Page 1418, that the state
3 Department of Health had done some air
4 concentration samples several months before
5 the diagnosis of chloracne and there were
6 reports of point one milligram per cubic
7 meter of chlorinated hydrocarbon in the air.

8 A. Right.

9 Q. Do you recall how that related to what was
10 considered the safe level of exposure at that
11 time?

12 A. It was one-fifth the level for 1242 and
13 one-tenth the level -- or for 1254 and
14 one-tenth the level for either 42 or 48. I
15 don't know which. I think it was 42. Work
16 sponsored by Monsanto showed that the
17 material could be used at levels of point
18 five milligrams per cubic meter in the
19 atmosphere of workers for an eight-hour day
20 for their working lifetime. And I'm not sure
21 whether the point five was 42 or 40. The
22 point five was 1254. The point --

23 Q. Well, let me stop you there. There was --
24 from work that Monsanto sponsored in the
25 1950's, there was a different safe level

1 established for Aroclor 1254 versus
2 Aroclor 1242?

3 A. Yes.

4 Q. All right. Was that called a maximum
5 allowable concentration at the time?

6 A. I presume it was. I don't know whether
7 the -- whether that industrial hygienist
8 changed the phraseology from "maximum
9 allowable concentration" to "threshold limit
10 value." But regardless of the semantics, it
11 was a safe level.

12 Q. You ask in the second paragraph to
13 Dr. Meigs: "Could you tell me which Aroclor
14 was used?" And then you go on in that
15 paragraph to ask about whether certain other
16 substances were used at that plant. Why did
17 you ask Dr. Meigs those questions?

18 A. Because I was looking for a reason for the
19 chloracne. I could not believe that the
20 chloracne would occur at levels of one tenth
21 of a milligram per cubic meter of air. If
22 the chloracne were due to
23 pentachlorophenol -- pentachlor -- I mean,
24 the chlorinated diphenyl -- biphenyl, it
25 doesn't have an exclusive franchise on

1 causing chloracne. There are a number of
2 things that cause chloracne. So I asked him
3 if there was any other thing around that
4 could be doing it.

5 Q. And did Dr. Meigs respond to your letter
6 which we've marked as Exhibit 8?

7 A. Yes, he did.

8 Q. Would you turn to Exhibit 9 and identify that
9 for us, please.

10 A. This is a letter from Dr. Meigs dated
11 May 7th, 1954, in which he answered my letter
12 of April the 28th of the same year.

13 Q. Did Dr. Meigs respond to your inquiry about
14 being confused about the report of chloracne
15 at point one milligram per cubic meter of air
16 for the chlorinated hydrocarbon?

17 A. Yes. He responded by saying he was confused,
18 too.

19 Q. And did he tell you anything about the air
20 concentrations?

21 A. He said the air concentrations were taken by
22 the state health department quite some time
23 before he wrote his paper and quite some time
24 before the rash -- the chloracne showed up.
25 He also suggested -- he also stated he was

1 not suggesting the MAC was set too high.

2 Q. Okay. Now, that's in the last paragraph.

3 A. Right.

4 Q. It says "M," period, "A," period, "C,"
5 period?

6 A. Yes.

7 Q. And what --

8 A. MAC.

9 Q. And what's that?

10 A. Maximum allowable concentration.

11 Q. That MAC is an acronym for "maximum allowable
12 concentration"?

13 A. Right. Uh-huh.

14 Q. Okay. Did Dr. Drinker conduct -- strike
15 that. Still on Dr. Drinker, Dr. Kelly.
16 We're on Dr. Meigs now.

17 Did Dr. Meigs conduct his own
18 samples of the air at the time he was working
19 with the people at this plant in Connecticut
20 who developed chloracne?

21 A. No, he did not.

22 Q. All right.

23 A. He also stated in this letter -- I think it
24 was pretty important. He said: "My
25 conclusion is that chlorinated hydrocarbons

1 should be ultimately judged as safe or
2 hazardous in relation to observations of the
3 workers themselves," which is really what I
4 told him. I said, "We've watched our
5 workers, and we don't have any problem."

6 Q. All right. There is a reference to the state
7 health department survey people at the end of
8 the first paragraph.

9 A. Yes, sir.

10 Q. And there is a reference to -- well, the
11 sentence says: "None of us here (including
12 the State Health Department Survey people)
13 have any good answer to why the air samples
14 were so low."

15 And the next sentence says: "We
16 assume that somehow other conditions may have
17 existed for a few weeks or months prior to
18 the recognition of chloracne," closed quote.

19 Now, when you read that, what was
20 your understanding thereafter about this
21 cause of the chloracne problem in
22 Connecticut?

23 A. Well, my understanding was that they did not
24 get the chloracne from exposures of one tenth
25 of a milligram of Aroclor -- of chlorinated

1 biphenyl per cubic meter of air. Regardless
2 of anything else, whatever their -- their
3 figures were wrong or the exposure was not --
4 the figures were not indicative of the
5 exposure that these people had when they got
6 the chloracne.

7 Q. Well, was your concern and confusion after
8 reading the article lessened by receiving the
9 letter from Dr. Meigs?

10 A. Well, no. I was just -- I welcomed him to
11 the club. He was confused, also.

12 Q. Did Dr. Meigs -- was Dr. Meigs able to
13 respond to your inquiry from Exhibit 8 about
14 which Aroclor was used?

15 A. No, he was not. He said it was a combination
16 of high boiling chlorinated hydrocarbons. So
17 it was a little confusing to me. A
18 combination? Does that mean he mixed several
19 together? Did he mix chlorinated diphenyl
20 benzene along with these other things? I
21 don't know. I don't know what they tested,
22 what they had in that -- in that heat
23 transfer medium.

24 Q. Was there another common name within Monsanto
25 for chlorinated diphenyl benzene at this

1 time?

2 A. Chlor -- yes. 5460.

3 Q. Well, separate and apart from the trade name,
4 a reference to --

5 A. Chlorinated terphenyl.

6 What was the question?

7 Q. Do you recognize the name "chlorinated
8 diphenyl high boiler"?

9 A. Oh. No. I don't know -- we didn't use
10 that. I don't know what that was.

11 Q. Okay.

12 A. I don't know what he -- and I don't know what
13 he was saying as a combination. I thought
14 the heat transfer -- the material we sold for
15 heat transfer -- remember, I get back, this
16 is not electrical. This is heat transfer. I
17 don't think we sold a combination of PCBs for
18 this. We certainly didn't sell a chlorinated
19 diphenyl benzene for it, either.

20 Q. I understand that. That wasn't my question,
21 Dr. Kelly.

22 Was there -- was there -- was there
23 a substance at Monsanto that you sometimes
24 called -- rather than its trade name, you
25 sometimes called it "chlorinated diphenyl

1 high boiler"?

2 A. I don't recall Monsanto using that particular
3 term.

4 Q. All right.

5 MR. BAUER: Take a short break?

6 MR. KIM: Sure.

7 THE VIDEOGRAPHER: We're going off
8 the record. It's ten minutes after 11:00
9 o'clock. This is the end of Tape No. 1.

10

11 (A recess was taken.)

12

13 THE VIDEOGRAPHER: It's 26 minutes
14 after 11:00 o'clock. This is the beginning
15 of Tape No. 2. We're back on the record.

16 Q. (By Mr. Bauer) Dr. Kelly, in your answers
17 about the correspondence that you had with
18 Dr. Meigs, you talked about the maximum
19 allowable concentration for chlorinated
20 diphenyl and that his report of chloracne was
21 from an exposure that was lower than the
22 maximum allowable concentration.

23 A. That's correct.

24 Q. Do you recall who set maximum allowable
25 concentrations?

1 A. Yes. It all depends on the year you're
2 talking about. The first group that set the
3 maximum allowable concentrations was the
4 American Conference of Governmental
5 Industrial Hygienists. That was a group of
6 industrial hygienists who worked either for
7 city, county, state, or U.S. Government. It
8 did not include anybody from industry, and it
9 did not include anybody from academia. Then
10 after when OSHA came along, they set the
11 concentrations; but they used -- in the vast
12 majority of cases, the OSHA people used the
13 ACGIH figures.

14 Q. Now, what was -- what was the maximum
15 allowable concentration in terms of -- I
16 mean, what did it mean to have something set
17 at a maximum allowable concentration?

18 A. It meant that you should keep your levels
19 under that, the working levels under that,
20 that they believe that if you stay under that
21 maximum allowable concentration, no harm will
22 exist even if you worked there eight hours a
23 day for 40 years.

24 Q. And was the initial maximum allowable
25 concentration for chlorinated diphenyl

1 1 milligram per cubic meter of air?

2 A. Yes. It was the one that was -- the official
3 one, Joe Treon, who did the work, he believed
4 that it could be two. But the Government
5 people were -- the Government hygienists were
6 a little more conservative. He said it
7 should be -- they should be one for 1242 and
8 point five for 1254.

9 Q. Was that Dr. Treon at Kettering Laboratory?

10 A. Yes, it was.

11 Q. And do you -- would you recall whether that
12 was later in 1956?

13 A. '54, I thought.

14 Q. 1954 is when he did his work?

15 A. Yes.

16 Q. Was it significant to you that Dr. Meigs
17 stated in his letter to you, which has been
18 marked Exhibit 9, that he's not suggesting
19 that the maximum allowable for
20 concentra -- strike that.

21 Was it significant to you that
22 Dr. Meigs wrote in Exhibit 9 that he was not
23 suggesting that the maximum allowable
24 concentration for Aroclor had been set too
25 high?

1 A. Well, it wasn't too significant. He just
2 made -- just meant -- he was really not an
3 expert in this field. Even though you write
4 a paper doesn't make you an expert. So he
5 was just joining the forces with everybody,
6 all the industrial hygienists who had worked
7 in -- who had supervised the workers in the
8 field. He -- so I was glad that he was
9 agreeing with the rest of the Country. In
10 spite of his paper that said he got chloracne
11 at point one, it seemed to me that he didn't
12 believe it himself.

13 Q. I'd like to turn now to the topic, Dr. Kelly,
14 of toxicological testing sponsored by
15 Monsanto.

16 You've already testified to some
17 extent about Monsanto's role in Dr. Drinker's
18 work, funding in part for Dr. Drinker's
19 work. Did Monsanto continue to sponsor
20 toxicological testing after the 1930's?

21 A. Yes. They continued up until the time I
22 retired and are still doing it.

23 Q. With respect to chlorinated diphenyl or what
24 we call today "PCBs," did those tests
25 include -- did the work that Monsanto

1 sponsored include animal studies?

2 A. Yes.

3 Q. Did Monsanto perform those tests in-house?

4 A. No. Up till 1974 we did not have a
5 laboratory inside. We made preparations for
6 building a laboratory around the time I was
7 retiring, and I think that came to
8 fulfillment in 1975 or '76. But I don't know
9 if they did any work on PCBs at that time.

10 Q. All right. Do you recall the names of some
11 of the outside laboratories that Monsanto
12 retained over the years?

13 A. Yes. We -- there were two laboratories in
14 St. Louis, which are relatively small
15 laboratories which we used for acute
16 studies. Acute is roughly one shot of the
17 material. That was the Younger Laboratories,
18 Y-o-u-n-g-e-r, and Scientific Associates,
19 both in St. Louis.

20 We used the Kettering Laboratory at
21 the university of -- K-e-t-t-e-r-i-n-g --
22 Laboratory of the University of Cincinnati
23 for inhalation studies in 1954. We used the
24 Industrial Bio-Test Laboratories of
25 Northbrook, Chicago, for dermal testing and

Martin & Associates
(409) 762-2222

1 feeding testing, quite an extensive array of
2 tests that started in 1968.

3 Q. In your view, during the decades when you
4 were Monsanto's medical director, was it
5 possible to extrapolate directly from the
6 results of those animal studies to human
7 beings?

8 A. No, it was not. But the -- it's the only way
9 you can test it. In this Country you're not
10 supposed to test on people.

11 Q. And so did you rely on the results of animal
12 testing? Notwithstanding what you just said,
13 did you rely on the results of animal testing
14 in part in exercising your judgment as to the
15 relative toxicity of various Monsanto
16 compounds?

17 A. Oh, certainly. You have really three points
18 that you make a judgment on. One is the
19 inherent toxicity of the product itself. You
20 get that from animal testing. Two, you make
21 a judgment from the exposure. One sort of
22 exposure, is this going to be an open
23 centrifuges. Is this going to be a
24 plasticizer where it's dropped onto a hot
25 rolling mill. Or three, what -- and most

1 important in my point of view -- from my
2 point of view, what is the clinical record of
3 the workers that have been exposed to this
4 product during its manufacture or use. In
5 fact, that's what Meigs said. He said it
6 should be judged safe or hazardous by
7 relation to observation of the workers
8 themselves.

9 So you got really a three -- a
10 three-legged stool, that you have to make a
11 judgment call using all three of those
12 items.

13 Q. With respect to testing, in an answer a
14 minute ago, you mentioned "acute testing."
15 Would you elaborate on that for us, please,
16 what you mean by "acute testing."

17 A. Well, it's a testing to show what would
18 happen if you have a one-shot dose of the
19 material, either one or over a short period
20 of time, several days.

21 We would have a package where we
22 dropped the material in the ice to see what
23 happened to the ice. We put it on the skin
24 sometimes for 24, 48 hours, sometime
25 repeatedly over two or three days; but that

1 was a small time frame of testing to see
2 whether it was absorbed through the skin or
3 what it did to the skin. Third, we tried to
4 get a saturated atmosphere of the material to
5 see how rats handled six- or eight-hour
6 exposure, one exposure. Then we fed it to
7 find out what was called first the minimum
8 "lethal dose," later changed it to the
9 Lethal Dose 50, or LD₅₀, to give a benchmark
10 of the rough toxicity from an acute, which
11 means a short exposure.

12 Q. All right. Now, Lethal Dose 50, or LD₅₀,
13 what did that mean when a substance was given
14 an LD₅₀?

15 A. It means that you take a batch of rats,
16 usually 20 or 50, and see what dose kills
17 half of them.

18 Q. And was that a commonly accepted -- strike
19 that.

20 Was that a commonly used method of
21 determining a relative toxicity of compounds
22 in the chemical industry in the 1950's?

23 A. Yes. As far as the rats were concerned.

24 Q. Okay.

25 A. I mean, when you use it on a rat, that

1 doesn't mean it would have the same toxicity
2 effect on a dog or a -- but it was a common
3 benchmark to get a relative toxicity index of
4 the product.

5 Q. Did Monsanto conduct studies in the 1950's to
6 get a LD₅₀, or Lethal Dose 50, for various
7 PCB products?

8 A. Yes. Not only the Fifties. I think almost
9 up to the time we -- I retired.

10 Q. Would you turn, please, to Exhibit 10, which
11 is dated November 10, 1953. And it's a
12 certificate of analysis from Scientific
13 Associates. Can you identify that for us,
14 please?

15 A. Yes. That's -- "Subject: The Acute Oral
16 Toxicity of Aroclor 1254 for Rats."

17 Q. All right. Is this a report of work
18 sponsored by Monsanto?

19 A. Yes.

20 Q. Who at Monsanto made the decision to request
21 this study?

22 A. Ultimately I did. Whether or not -- '53,
23 yes, I did it.

24 Q. Did you receive and review a copy of
25 Exhibit 10 in 1953?

1 A. Yes.

2 Q. Were similar LD₅₀ tests performed by
3 Scientific Associates for other Aroclor
4 products?

5 A. Yes.

6 Q. Is -- well, strike that.

7 Can you identify Exhibit 11,
8 please?

9 A. That's by the same organization on 1242 for
10 rats, dated the same day, I think,
11 December, '53. The same year, at any rate.
12 Yes. The same year.

13 Q. Did the results of the LD₅₀ work in the
14 1950's performed by Scientific Associates --
15 of which we've seen two examples now,
16 Exhibit 10 and Exhibit 11. Did the results
17 of those tests change your opinion about the
18 relative toxicity of PCBs?

19 A. No. I always thought the PCBs, as far as an
20 industrial chemical was concerned, was a mild
21 to moderate toxicity. And that certainly
22 falls in that range of four to four point
23 three milliliters per kilogram.

24 Q. And you're now referring to the "Discussion"
25 section of Exhibit 11?

- 1 A. That's correct.
- 2 Q. Would you turn next to Exhibit 12, please,
3 and identify that for us?
- 4 A. Yes. This is a report from the Kettering
5 Laboratory of the University of Cincinnati.
6 The principal author is a Dr. Treon,
7 T-r-e-o-n, on "The Toxicity of the Vapor of
8 Aroclors 1242 and 1254."
- 9 Q. And what's the date?
- 10 A. June the 22nd, 1955.
- 11 Q. And would you tell us what Exhibit 13 is?
- 12 A. Beg pardon?
- 13 Q. Exhibit 13.
- 14 A. That's the toxicity of 1254 by the same
15 author and the same organization.
- 16 Q. And what's the date of the second report?
- 17 A. June the 28th, 1955.
- 18 Q. All right. Now, what company requested that
19 Dr. Treon of Kettering Laboratory undertake
20 tests of the toxicity of the vapor of
21 Aroclors 1242 and 1254 in 1950's -- in the
22 1950's?
- 23 A. Monsanto Company.
- 24 Q. All right. Who at Monsanto made that
25 request?

1 A. I did.

2 Q. What was Kettering's reputation at the time?

3 A. Well, it was top drawer. It was excellent.

4 It was a university. It was -- the head of

5 it was Dr. Keel, who had spent his life

6 investigating the toxicology of lead. And it

7 was an extremely well-recommended

8 organization.

9 Q. All right. What type of tests did Dr. Treon

10 and his co-workers perform in terms of

11 ingestion versus skin contact versus

12 inhalation?

13 A. Repeated inhalation studies.

14 Q. Why did you ask Dr. Treon to do repeated

15 inhalation studies on twelve -- Aroclor 1242

16 and Aroclor 1254 in the 1950's?

17 A. Because these materials were beginning to be

18 used in applications where elevated

19 temperatures were used, such as the hydraulic

20 fluids in the die-cast industry and there

21 would be a possibility of repeated levels --

22 repeated exposures to the material at

23 elevated temperatures. At room temperatures

24 we didn't -- weren't worried at all. You can

25 have a bucketful of Aroclor sitting in this

1 room here with no lid on it, it wouldn't
2 bother anybody. But if you heated it up,
3 you've got enough of it in the air, at some
4 time it would be harmful. We wanted to see
5 what a safe level was.

6 Q. Did you have -- did you understand in the
7 1950's that if Aroclors were heated and
8 openly exposed to the air, one might
9 eventually exceed the maximum allowable
10 concentration?

11 A. Oh, certainly.

12 Q. Just to make sure we're clear about what
13 we're talking about, the toxicity of the
14 vapor of Aroclors 1242 and 1254 is what the
15 report is about. Is Aroclor 1242 a
16 chlorinated biphenyl product?

17 A. Yes, it is.

18 Q. And is Aroclor 1254 a chlorinated biphenyl
19 product?

20 A. Yes, it is.

21 Q. And the "42" in the 1242 means what?

22 A. The chlorinated concentration. The biphenyls
23 chlorinated to average concentration of 42
24 percent.

25 Q. Okay. Were those two specific Aroclors being

1 used for some of these new uses that you were
2 describing earlier?

3 A. Yes, they were.

4 Q. Do you recall what types of animals Dr. Treon
5 performed his work on?

6 A. He did a sort of a mixed bag of animals. He
7 did rabbits, rats, mice. He did about five
8 cats. He did a cat in there. He did quite a
9 few.

10 Q. So there were tests on two PCB products on a
11 number of different species?

12 A. That's correct.

13 Q. Do you recall the length of time of the study
14 that is set forth in the initial report?

15 A. The initial report, he did two studies. One
16 was with a fairly high concentration for
17 something like -- I'm not sure -- 120 days or
18 something. Maybe less than 120 days. Then
19 he did another series of experiments with a
20 higher -- with a smaller concentration for a
21 150 days, which is close to five and a
22 half -- five months.

23 Q. All right.

24 A. That was pretty long for the 1950's. In
25 fact, it's long for any inhalation study even

1 today.

2 Q. Do you recall whether the two reports relate
3 to the two different lengths of times of the
4 studies?

5 A. Yes.

6 Q. And the first report was for which, the
7 report that we've marked Exhibit 12, from
8 June 22 of 1955?

9 A. The first one was the lower level -- I mean,
10 the higher levels.

11 Q. For the shorter periods of time?

12 A. Yes. Correct.

13 Q. Were your previous conclusions about the
14 toxicity and safe handling of PCBs changed by
15 the results of the Kettering Laboratory tests
16 that were reported in Exhibit 12 and
17 Exhibit 13?

18 A. No. We had proved two things: One, if you
19 get too much of it, you can get problems.
20 No. 2, which is the more important thing,
21 there are safe levels that you don't get any
22 problems with. So they bolstered our
23 clinical thinking along this line.

24 Q. What kind of problems were reported in the
25 animals that the exposure was too high?

1 A. There was some pulmonary irritation; but I
2 think, as I recall, the animals developed
3 some systemic effects on the liver when the
4 level was too high.

5 Q. Was -- the liver being the organ that would
6 be of concern if the exposure to chlorinated
7 diphenyl was too high, was that conclusion by
8 Dr. Treon a surprise to you in the 1950's?

9 A. No. Because getting back to Drinker, he
10 found that the liver was a target organ
11 anyway.

12 Q. After -- well, let me ask you this: Did you
13 receive and review both Exhibit 12 and
14 Exhibit 13?

15 A. Yes.

16 Q. After you received and reviewed those two
17 documents, were you of the opinion that
18 chlorinated diphenyl could be used in
19 transformers and capacitors safely so long as
20 certain precautions were taken?

21 A. That's correct.

22 Q. And generally what were the precautions that
23 would be required?

24 A. Avoid breathing in elevated temperatures or
25 in confined spaces. Avoid repeated or

1 continuous skin contact.

2 Q. Did Dr. Treon publish the results of his
3 tests in a scientific journal?

4 A. Yes, he did.

5 Q. Is Exhibit 14 a copy of his publication?

6 A. Yes, it is.

7 Q. It's identified as a publication from 1956 in
8 Industrial Hygiene Quarterly. Did Monsanto
9 subscribe to Industrial Hygiene Quarterly in
10 1956?

11 A. Yes, it did.

12 Q. Was Industrial Hygiene Quarterly a widely
13 read periodical in the occupational medicine
14 and industrial hygiene field?

15 A. I don't know how many occupational physicians
16 read it, but certainly every industrial
17 hygienist in the United States read it. And
18 anybody who had an industrial hygiene group,
19 if a physician was their supervisor, he read
20 it, also.

21 Q. Did you read Exhibit 14 in the 1950's?

22 A. Did I read it?

23 Q. Yes.

24 A. Yes. As soon as it came out.

25 Q. Were the conclusions in the published article

1 by Dr. Treon the same as the conclusions from
2 his -- from the fuller reports we've marked
3 as Exhibit 12 and Exhibit 13 that you've
4 already described?

5 A. To the best of my recollection, yes. Yes.

6 In fact, I'll read his
7 conclusions. "Prolonged intermittent
8 exposure of animals to vapors of Aroclor 1242
9 1.0 to 8.6 micrograms per liter" -- that's
10 parts per million -- "demonstrated no
11 injury. Prolonged exposure to comparable
12 concentrations of 1254 resulted in reversible
13 degenerative changes of certain viscera."
14 That's the liver.

15 Q. Did Dr. Treon suggest that the prior maximum
16 allowable concentration for Aroclor 1242 set
17 by the American Counsel of Governmental
18 Hygienist -- Hygienists could be made higher?

19 A. There wasn't any prior -- until this work,
20 there was no prior maximum allowable
21 concentration -- or TLV, whichever they
22 used -- because they didn't have any
23 information on prolonged vapor inhalation.

24 So he sent all his work, his
25 reports in to the American Government

1 Industrial Hygienists; and he said, "I think
2 we can use one point zero for 1254 and two
3 point zero for 1244." They looked it all
4 over and said, "Well, we're going to be a
5 little more conservative than you. We're
6 going to use" -- "cut these levels in half."
7 And which is sort of par for a regulatory
8 body.

9 Q. All right. Who --

10 A. Even though they were not regulatory. They
11 didn't have the force of law, but it was --
12 in essence, it did.

13 Q. Who was it that concluded that they were
14 going to set the maximum allowable
15 concentration at one half the level suggested
16 by Dr. Treon?

17 A. The American Government Industrial
18 Hygienists. And that eventually was picked
19 up by OSHA, but OSHA didn't commit until
20 considerably after that.

21 THE WITNESS: You know "OSHA" is
22 all caps?

23 THE COURT REPORTER: Yes. Yes.

24 Q. (By Mr. Bauer) Would you identify Exhibit 15
25 for us, please, Dr. Kelly?

1 A. Yes. This is a acute study, "Toxicological
2 Investigation of Inerteen PPO," by Younger
3 Laboratories, March the 4th, 1963.

4 Q. And who requested that Younger Laboratories
5 do this toxicological investigation?

6 A. Either myself -- the medical department. I
7 don't know if it was I or if I was the one or
8 Wheeler was.

9 Q. Was it the medical department --

10 A. It was the medical department --

11 Q. -- of Monsanto Company?

12 A. -- the medical department at Monsanto,
13 right.

14 Q. And would you identify Exhibit 16, please?

15 A. 16 is the same type of work, done by the same
16 laboratory, with the same date, on Pyranol
17 1470.

18 Q. The experimental procedures identified in
19 Exhibit 15 and Exhibit 16 are "Oral LD₅₀" and
20 "Skin Absorption MLD," "Skin Irritation,"
21 "Eye Irritation," and "Vapor Inhalation"?

22 A. Yes.

23 Q. Were those all acute toxicity tests?

24 A. Yes, they all were. That was in that package
25 that I referred to earlier.

1 Q. All right. Did the -- strike that.

2 At this time in March of 1963, was
3 Younger Laboratories also doing similar acute
4 toxicity studies on other PCB products than
5 the ones we've identified here?

6 A. Yes.

7 Q. Did the results of those acute toxicity tests
8 in the 1960's done by Younger Laboratories
9 change your earlier conclusion about the
10 ability to use PCBs safely in electrical
11 fluid?

12 A. Well, it reinforced my thinking.

13 Q. Would you turn next to what is marked
14 Exhibit 17, please?

15 A. Yes.

16 Q. Would you identify that?

17 A. This is a report to the Monsanto Chemical
18 Company entitled, "Subacute Dermal Toxicity
19 of Aroclor 1254," by the Industrial Bio-Test
20 Laboratories in Northbrook, Chicago.

21 I must make a statement here that
22 they call "subacute." I don't know how you
23 could have anything shorter than short time,
24 which is what "acute" is. So the term they
25 finally got around to using was subchronic.

1 Q. All right. At some date after this paper was
2 written, it was common in industry to refer
3 to this length of time period as a subchronic
4 study?

5 A. Yes.

6 Q. All right. Who -- well, strike that. Let me
7 ask this first.

8 Well, did Monsanto Chemical Company
9 sponsor these studies?

10 A. Yes, they did. It did.

11 Q. Did the medical department request that
12 Industrial Bio-Test do these tests?

13 A. Yes, it did.

14 Q. Who selected Industrial Bio-Test as the
15 outside contractor?

16 A. I did.

17 Q. Why did you select Industrial Bio-Test?

18 A. Well, we had used them before. Almost from
19 their inception, we were one of their
20 earliest clients. We knew they were held in
21 quite high regard. The Army used them. The
22 FDA used it. The large chemical companies,
23 even those that had their own toxicological
24 laboratories like Dow and DuPont, used it.
25 So it was recognized as the premier

1 commercial toxicological laboratory in the
2 United States.

3 Q. Did you receive and review Exhibit 17 in
4 1963?

5 A. Yes, I did.

6 Q. Did Monsanto perform other subacute dermal
7 toxicity testings on other Aroclor
8 products -- strike that.

9 Did Industrial Bio-Test do similar
10 work on other Aroclor products at the time?

11 A. Yes.

12 Q. This one is Aroclor 1254.

13 A. In 1963?

14 Q. (Nods head.)

15 A. I don't know if they did right at that time;
16 but subsequent to it, I think around that
17 time, they did it. But I don't recall.

18 Q. All right. Did the results of the studies
19 done by Industrial Bio-Test in the early
20 1960's on the toxicity of Aroclor products
21 alter your opinion about the ability to use
22 PCBs safely in transformers and capacitors?

23 A. No, it did not. I still believed they are
24 safe.

25 Q. Was there any information in any of the

1 reports that we've reviewed here today or in
2 any of the other reports that you received at
3 the same time on other PCB products that made
4 you question in any way whether chlorinated
5 diphenyl could be used safely if the
6 precautions you've talked about earlier were
7 used?

8 A. No. And I think that was backed up by the
9 fact that 40 years that we were making the
10 material, we didn't have any -- we had very
11 minor episodes of acute exposure from
12 nonindus -- nonelectrical uses. But
13 surprisingly few, judging by the tonnage that
14 we manufactured.

15 Q. Now, let's turn to the topic of toxicity and
16 safe handling information distributed to
17 customers. All right?

18 A. All right.

19 Q. Would you identify Exhibit 18 for us, please?

20 A. Yes.

21 Q. Could you identify it for us, please?

22 A. It's a memorandum of L. A. Watt, W-a-t-t, to
23 somebody. I don't know to whom because
24 there's no -- it doesn't show who it went
25 to. Dated October the 11th, 1937, in which

1 he talks about what the experimental work in
2 animals showed and what can happen if we --
3 if you got too much of it on your skin. And
4 also, the statement of -- that adequate
5 ventilation should be taken care of -- should
6 take care of any problems. And he mentioned
7 that he and I discussed this, and we agreed
8 that this is the way we ought to write it up.

9 Q. Is the language in Exhibit 18 language that
10 you approved in 1937?

11 A. Yes.

12 Q. In terms of information to customers about
13 toxicity and safe handling of chlorinated
14 diphenyl?

15 A. Yes.

16 Q. To put this in perspective in time a little
17 bit, is this the time period when you were --
18 you didn't have the title of medical director
19 but -- did not have the title of medical
20 director but were performing some of those
21 functions?

22 A. I think so. Probably it was the beginning of
23 it. Around '37 and '38 I was really more
24 involved in it; but '37, I was just getting
25 started in it. At least they knew I was

1 there, and they came in to see me. Watt was
2 in what would be called the technical
3 services department of the organic division,
4 or what division manufactured Aroclors at
5 that time.

6 Q. You described earlier that there were
7 different kinds of ways to disseminate
8 information to customers, to get out
9 information about the toxic properties of a
10 Monsanto product to customers; and you talked
11 about labels and bulletins and direct
12 contact. Did you, as medical director of
13 Monsanto, have a philosophy about what type
14 of information would go on the labels as
15 opposed to the other types of methods?

16 A. Yes.

17 Q. What was that?

18 A. Well, remember first of all, on the label you
19 are generally targeting the information to a
20 group who are not scientific in training or
21 wage roll employees who are not supposed to
22 be chemists or scientists. And you put on
23 information that you want them to read, and
24 you put on information that will protect
25 them. And my philosophy was, and always has

1 been, that if you can get the material in a
2 crisp, succinct form -- s-u-c-c-i-n --

3 MR. FEATHERSTONE: -- c-t.

4 A. -- c-t -- that --

5 Q. (By Mr. Bauer) She'll get the words down,
6 Dr. Kelly. You don't have to try to spell
7 too many of them.

8 A. Well, I couldn't even pronounce that for a
9 while.

10 That if you've got adequate
11 information, the less you put on, the
12 better. Nobody is going to read a label that
13 stretches around the entire circumference of
14 a 55-gallon drum. But if you put on there,
15 "Don't get it on your skin in repeated doses
16 or in large amounts. Don't breathe it in
17 elevated temperatures. Don't breathe it in
18 confined spaces," you've got information
19 there that would protect the worker. And
20 anybody who sees the label and reads it,
21 he'll remember that.

22 Q. Do you recall anything about the role of a
23 committee formed by the surgeon general in
24 the 1930's concerning the specific language
25 put on warning labels for chlorinated

1 naphthalene and chlorinated diphenyl?

2 A. I don't know too much about it. I don't
3 recall too much. I was not on that
4 committee. We had a labeling expert in
5 St. Louis. I mean a labeling director, who
6 directed himself, I think. I don't know how
7 large a group he had. First it was a Robert
8 Mentier, then it was a Robert Sido, S-i-d-o.
9 And the surgeon general had for some time
10 this committee that would approve warning or
11 cautionary material, safe handling data on
12 various compounds, including chlorinated
13 biphenyls. And they had approved the type of
14 warning that we had on there.

15 Later that group was suspended; and
16 the duties were taken over by a committee of
17 the Manufacturing Chemists Association, LAPI,
18 L-A-P-I, Label and Protective Information, I
19 guess, Committee. I wasn't on that one,
20 either; but the director was -- of the
21 labeling department was on that.

22 Q. The director of Monsanto's labeling
23 department?

24 A. Of Monsanto's labeling department.

25 Q. All right. Would you turn next to what's

1 been marked as Exhibit 19?

2 A. Oh, I got to get a new book.

3 Q. Fair enough.

4 A. Yes. I'm all set.

5 Q. Can you identify that for us, please?

6 A. Yes. It's a label for Aroclor 1260 by the
7 Monsanto Company.

8 Q. Can you tell us the, approximately, time
9 frame when this type of label with that kind
10 of information on it was used by Monsanto?

11 A. I can't tell the earliest time. I've seen
12 these labels on drums, but I think it was
13 sometime -- gosh, the Forties or Fifties. I
14 don't know how -- the earliest date, I just
15 can't tell you that.

16 Q. All right. Now, the language of this label,
17 "Caution: Avoid prolonged and repeated
18 contact with skin. Avoid prolonged breathing
19 of vapor and dust," was that language that
20 you approved for this label?

21 A. Yes. I wrote it.

22 Q. The next exhibit is marked Exhibit 20, and
23 it's a different label for Transformer
24 Pyranol.

25 A. Yes.

1 Q. Can -- and this has some additional
2 statements in terms of precautionary
3 information. Can you tell us approximately
4 when that was added?

5 A. I think this was added sometime in the
6 Fifties, I believe, to the best of my
7 recollection.

8 Q. The two statements about if skin contact
9 occurs?

10 A. It's removed by washing. "If clothing
11 becomes soaked, launder before wearing
12 again." I think we put that on then.

13 Q. In the 1950's?

14 A. I think so.

15 Q. All right. Whenever the exact date is, was
16 that also language that you approved --

17 A. Yes.

18 Q. -- to be added to the label?

19 A. Yes. I wrote it.

20 Q. Would you turn next to Exhibit 21 and
21 identify that for us, please.

22 A. That's the same type of label that Monsanto
23 put on Inerteen PPO, which was made for
24 General Electric -- or Westinghouse. It was
25 a trademark compound of Western Electric --

1 Westinghouse Electric.

2 Q. All right. Now --

3 A. It also had -- it also has an environmental
4 statement on this.

5 Q. All right. Can you give us the approximate
6 date that that environmental warning label
7 language was added?

8 A. '69, '70, something around that.
9 Probably '70.

10 Q. All right. Was there someone in addition to
11 yourself who was involved in the evaluation
12 of the appropriate precautionary language
13 with respect to the environmental label?

14 A. Yes. William Papageorge, who was appointed
15 as the environmental point man, I guess -- I
16 don't know the exact term -- for
17 environmental products of the organic
18 division. I don't know the -- whether that
19 was called Monsanto Chemical Company at that
20 time, a subsidiary of Monsanto Company, I
21 don't know. Or a division of Monsanto
22 Company.

23 But anyway, he was the guy.

24 Papageorge was also involved. All the
25 medical department, especially Wheeler, had a

- 1 lot of input in it. And I knew this was
2 going on the label, and I approved it from
3 the medical department view.
- 4 Q. So the --
- 5 A. The medical department point of view.
- 6 Q. The addition of the environmental warning
7 label, was that a --
- 8 A. Yes.
- 9 Q. -- was that -- deciding that language, was
10 that a joint responsibility?
- 11 A. I guess it was.
- 12 Q. Now, let's back up to Exhibit 20. That's a
13 label that deals specifically with
14 Transformer Pyranol. At the time that that
15 particular warning language was being used,
16 which you've identified as approximately
17 sometime in the 1950's, was the same language
18 also used on Inerteen?
- 19 A. Yes.
- 20 Q. Now, Pyranol was the product that was blended
21 for whom?
- 22 A. General Electric.
- 23 Q. All right. And did it contain PCBs?
- 24 A. Yes.
- 25 Q. And Inerteen was manufactured for whom?

1 A. Westinghouse Electric.

2 Q. And did it contain PCBs?

3 A. Yes.

4 Q. All right. Was the same warning language
5 used during this period of time also on drums
6 of Aroclor?

7 A. Was the same what?

8 Q. This precautionary language here --

9 A. Oh, yes. The precautionary language was.

10 Q. All right. And that was -- Aroclor was whose
11 trade name for PCBs products?

12 A. Monsanto.

13 Q. All right.

14 MR. FEATHERSTONE: Scott, why don't
15 you take a break here for a second.

16 MR. BAUER: All right.

17 THE VIDEOGRAPHER: We're going off
18 the record at six minutes after 12:00
19 o'clock.

20

21 (A recess was taken.)

22

23 THE VIDEOGRAPHER: It's eight
24 minutes after 12:00 o'clock. We're back on
25 the record.

- 1 Q. (By Mr. Bauer) Dr. Kelly, did you, as
2 Monsanto's medical director, also approve
3 precautionary language that was put into
4 product bulletins?
- 5 A. Yes.
- 6 Q. Would you identify Exhibit 22, please.
- 7 A. It's a bulletin of the Monsanto Chemical
8 Company entitled, "The Proper Handling of
9 Aroclors and Their Mixtures in the Electrical
10 Industry."
- 11 Q. Chapter 9 -- excuse me. Chapter 12, which is
12 on Pages 98 to 100, is entitled, "Dermatology
13 and Toxicology." Did the medical department
14 approve the language of that particular
15 chapter of this bulletin?
- 16 A. Up to what page?
- 17 Q. 98.
- 18 A. Yes, we approved it.
- 19 Q. Who was responsible -- this -- the document
20 that you call -- you say was entitled,
21 "Proper Handling of Aroclors and Their
22 Mixtures in the Electrical Industry," has the
23 name P. G. Benignus on it.
- 24 A. That's right.
- 25 Q. Who is that?

1 A. He is a retired Monsanto employee who was
2 involved in the electrical use of PCBs for a
3 number of years until his retirement. I
4 think he started in that field in the Forties
5 or Fifties. I don't know what he was -- he
6 retired after I did.

7 Q. You're saying he's retired now?

8 A. Yes.

9 Q. All right.

10 A. Retired after I did.

11 Q. And was he involved in marketing of PCB
12 products?

13 A. I guess it was marketing, whether it was
14 development and marketing or marketing
15 alone. I think it was both, though.

16 Q. Which department -- well, strike that.

17 Let me ask this: Was the medical
18 department or Mr. Benignus' department
19 actually responsible for sending this out to
20 people, the document that we've marked
21 Exhibit 22?

22 A. Well, certainly the medical department was
23 not.

24 Q. Okay. Would you turn next to what's been
25 marked Exhibit 23?

1 A. Yes.

2 Q. Can you identify that for us, please?

3 A. This is a Monsanto bulletin in which -- the
4 inspection and maintenance guide of Monsanto,
5 askarel, a-s-k-a-r-e-l.

6 Q. And here's yet another name --

7 A. Yeah.

8 Q. -- that we haven't used today?

9 A. That's a generic name for a relatively
10 noninflammable compound dielectric for
11 electrical use in capacitors and
12 transformers.

13 Q. Okay. Was askarel a generic name that
14 sometimes people used for fluids that
15 contained PCBs?

16 A. Yes.

17 Q. There is a discussion of handling directions
18 on the bottom of Page 4 and the top of
19 Page 5. Would you review that language,
20 please?

21 A. Yes.

22 Q. Did the medical department approve that
23 language for this bulletin?

24 A. Yes, we did.

25 Q. Was this also a bulletin that was

1 disseminated by some department of Monsanto,
2 sent out to customers or whoever by some
3 department other than the medical department?

4 A. That's correct.

5 Q. Is this -- you talked earlier about
6 development bulletins and product bulletins.
7 Where does this bulletin fall in in that --
8 those descriptions?

9 A. Well, this -- this even later, it says
10 development is trying to offer it for sale to
11 people. The sales bulletin is just what the
12 name implies, where we're trying to get the
13 people to use it. And this after they use
14 it, we tell them how to use it as far as the
15 maintenance of the -- of the apparatus is
16 concerned.

17 Q. All right.

18 A. Where it talks about leaks and cleanup spills
19 and stuff like that.

20 Q. All right.

21 A. That is what happens down the road when
22 you're using the product.

23 Q. All right. Now, you testified earlier that
24 the medical department also was involved in
25 direct communications with customers about

1 Monsanto products. Was that true of PCBs?

2 A. Yes. Now, remember, when you say "direct
3 communi" -- if they called us or wrote us. I
4 didn't write out de novo to a customer. They
5 had to write in or call in. Anyplace in the
6 company, if they asked about safety or safe
7 handling information or toxicity, that phone
8 call or letter was referred to the central
9 medical department. It was answered by
10 somebody in the medical department.

11 Q. Were you one of the people that answered some
12 of those inquiries?

13 A. Oh, yes. For a long time I was the only one;
14 but then after we got a couple more doctors
15 and industrial hygienists, they did some of
16 the answering.

17 Q. Did -- do you recall whether some of the
18 correspondence that you personally were
19 involved in dealt with chlorinated diphenyl
20 or PCBs?

21 A. Yes.

22 Q. Would you turn to Exhibit 24, please, and
23 identify that for us?

24 A. Yes. This is a letter from me -- from me
25 to -- signed by me to J. C. Sullivan of the

1 Linck, L-i-n-c-k, Company, March the 8th,
2 1961. But it seems it's an answer to an
3 inquiry or a request from one of our
4 salespeople, Howard Bergen, who received a
5 request for oral toxicity information on
6 Aroclor products.

7 Q. All right. Is this exhibit, Exhibit 24, the
8 file copy of a letter that you, in fact,
9 signed and sent out on or about March 8th of
10 1961?

11 A. Yes, it is.

12 Q. Is this letter a typical example of a
13 response that you would write to an inquiry
14 about chlorinated diphenyl specifically?

15 A. Yes. I answered his question. I mean, he
16 asked just for the oral toxicity of it; and I
17 gave him the oral toxicity and told him how
18 to avoid exposure to the product. If
19 somebody had asked specifically about, "How
20 should I use this?" it might have been a
21 different type of letter.

22 Q. All right. Is there anything in this letter,
23 Exhibit 24, that you sent to Mr. Sullivan of
24 the Linck Company that you somehow or for
25 some reason would not want to share with

1 other Monsanto customers?

2 A. No.

3 Q. You tell Mr. Sullivan that the maximum
4 allowable concentration set by the American
5 Counsel of Governmental Industrial Hygienists
6 was 1 milligram per cubic meter for
7 Aroclor 1242 and point five milligrams per
8 cubic meter for Aroclor 1254.

9 A. That's correct.

10 Q. Is that your recollection of the differences
11 in what was the recommended safe level for
12 those two products at the time?

13 A. Yes. That was what the Government Industrial
14 Hygiene Conference set. They said according
15 to them, they think Aroclor 1254 is more
16 toxic than Aroclor 1242. So they picked
17 point five and wanted one or the other.
18 That's not really a very high concentration
19 if you look over the list of things that they
20 have and that they set for various industrial
21 products.

22 Q. All right.

23 A. It falls into a mild to moderate industrial
24 toxic product.

25 Q. Was there a specific maximum allowable

1 concentration for Aroclor 1260?

2 A. No.

3 Q. Do you recall what you told people about
4 exposure to inhalation vapors from that
5 Aroclor product?

6 A. I would say I would -- I probably told them
7 that -- in fact, I know I told them, "We
8 haven't run it on 1260; but if you run it on
9 1250, use the same level as 1254, you'll be
10 home free. You won't get any problem. It
11 will be harder to get point five milligrams
12 of 1260 because of the vapor pressure is a
13 lot less. You've got to heat it up a lot
14 higher."

15 Q. What does it mean, that "the vapor pressure
16 is a lot less"?

17 A. If the vapor pressure is a lot less, you
18 don't get anything in the air. It takes a
19 larger amount of heat to disperse the vapors
20 from the liquid material.

21 Q. Was Aroclor 1260 also a chlorinated diphenyl
22 product that was used in transformer fluids
23 and capacitor fluids?

24 A. I don't know about capacitors, but they -- it
25 was used in transformers.

1 Q. You state in this letter, as of March 8 of
2 1969: "I do not have chronic oral toxicity
3 information on these products."

4 Why was it that you didn't have
5 chronic oral toxicity on those products at
6 that time?

7 A. Because the material was not supposed to be a
8 additive -- food additive or either an actual
9 or inadvertent food additive. We didn't know
10 that it was eventually going to get into the
11 food of the United States at that -- in
12 1961. So there was -- in an industrial
13 chemical you really do not run chronic oral
14 toxicity because you don't expect somebody to
15 be taking a couple teaspoonsful of this every
16 day.

17 Q. What was the practice in the chemical
18 industry in the United States about getting
19 oral chronic toxicity information on
20 industrial chemicals that were not intended
21 for being used in food residues, becoming a
22 food residue because it was used in food
23 crops or the like?

24 A. Well, the current thinking was, you do enough
25 to find out the acute hazard if a man spills

1 it on himself or inhales too much of it. You
2 try to get some idea of the target organ. Of
3 course, we had that from the Drinker work.
4 We had -- he did chronic work back in 1938,
5 which is still valid in 1961. But as far as
6 running long-term testing, nobody did it.
7 Industrial chemicals were not expected to be
8 used in food for chronic testing -- for
9 chronic oral testing.

10 Q. Chronic and -- chronic testing of ingestion
11 or --

12 A. Yes.

13 Q. -- or eating it?

14 A. That's right.

15 Q. All right. Would you turn next, please, to
16 Exhibit No. 25 and identify that for us.

17 A. That's a letter to a Mr. Speicher of
18 industrial hygiene of the Westinghouse
19 Electric Corporation by Mr. Wheeler, who was
20 the assistant director of the medical
21 department at that time.

22 Q. Do you recognize Mr. Wheeler's signature,
23 "Elmer" --

24 A. Yes.

25 Q. -- on the second page?

1 A. Yes.

2 Q. What was the practice in the medical
3 department in 1956 about distribution of
4 correspondence such as Exhibit 25?

5 A. We had a practice; and we put a stamp on it,
6 on the carbon, and then on the file copy.
7 And the person who wrote the letter would
8 check off whether the toxicologist would get
9 it, whether I would get it, whether the
10 assistant medical director would get it.

11 So we were pretty cognizant of what
12 was going on in other people's
13 correspondence. And if they sent out
14 material on safe handling, concerning safe
15 handling data or toxicological effects, I
16 would always see that.

17 Q. All right. And did you and Mr. Wheeler have
18 conversations over the years about the type
19 of information that should go into
20 correspondence that he wrote to customers?

21 A. Oh, yes. We got on the same wavelength after
22 not too long a period.

23 Q. All right. Now, Mr. Speicher at Westinghouse
24 was someone that you knew from the industrial
25 hygiene department there?

1 A. I didn't know him. Wheeler knew him.

2 Q. All right. And what did --

3 A. I knew where he was. I mean, I knew of him.
4 I knew he had been in some state place, I
5 thought, some state organization. But he was
6 a friend of Wheeler's, and Wheeler saw him at
7 all their meetings.

8 Q. All right. Did Mr. Wheeler talk with you
9 about anyone else in the Westinghouse
10 industrial hygiene department with whom he
11 dealt?

12 A. There's a man -- I get a little confused on
13 the name. I thought it was Brandt,
14 B-r-a-n-d-t, or Barnes or something like
15 that. That was -- he was a Ph.D., and I
16 believe he may have been -- I don't know what
17 his type relationship was as far as Speicher
18 was concerned. But I think he was the head
19 of the organization, of the industrial
20 hygiene group. They had a fair size group at
21 Westinghouse.

22 Q. All right. While we're on the topic of
23 Westinghouse's organization, did Westinghouse
24 also have a medical department?

25 A. Yes, they had one. I was never at Pittsburgh,

1 but I knew their medical director. He was a
2 pioneer in industrial medicine. His name was
3 T. Lyle, L-y-l-e, Hazlett, H-a-z-l-e-t-t.
4 When I came into the industrial -- in the
5 occupational medical field, he was already in
6 there. He had been in there for quite some
7 time, and he was a well-known fellow.

8 Q. All right. Was it a common practice of
9 medical departments at companies such as
10 General Electric and Westinghouse in the
11 Thirties, Forties, and Fifties to keep
12 current with the scientific literature about
13 substances that they used?

14 A. I can't talk about GE or Westinghouse. It
15 certainly was me. And certainly from -- by
16 talking with Hazlett and Vosburgh and other
17 people of the other companies, they knew it.
18 I think it was common practice, yes; but I
19 can't be sure.

20 Q. All right. Did you have an understanding
21 from talking to Dr. Vosburgh of GE and
22 Dr. Hazlett of Westinghouse about whether
23 they were reading the literature about PCBs?

24 A. They knew probably more about it than I did.

25 Q. Let's go back, then, to Exhibit 25, the

1 letter in 1956 from Mr. Wheeler to
2 Mr. Speicher. It says that he include --
3 he's enclosing -- I'm sorry. That's not what
4 he says.

5 He says he's sending under separate
6 cover two detailed reports published by
7 personnel at the Kettering Laboratories
8 entitled, "The Toxicity of the Vapors of
9 Aroclors 1242 and 1254." Are those the two
10 exhibits that we looked at earlier today --

11 A. Yes.

12 Q. -- and marked?

13 A. Treon's work. Yes.

14 Q. Exhibits 12 and Exhibit 13?

15 A. That's correct.

16 Q. Would you turn next to what's been marked as
17 Exhibit 26?

18 A. Yes.

19 Q. Can you identify that for us, please?

20 A. That's another letter to Dr. Speicher by --
21 Mr. Speicher by Wheeler. He wanted more
22 information. So he gave him a three-page
23 letter this time. And it was a little more
24 exhaustive. I don't know why -- why
25 Mr. Speicher was asking him again. Maybe he

1 lost the first letter or something. I don't
2 know. But anyway --

3 Q. Is Exhibit 26 the unsigned file copy of a
4 letter that was sent out to Mr. Speicher in
5 1959?

6 A. Yes. Exhibit 26, yes.

7 Q. Yes. The top of Page 2, Mr. Wheeler
8 states --

9 A. Yes.

10 Q. -- "...sufficient exposure, whether by
11 inhalation of vapors or skin contact, can
12 result in chloracne which I think we must
13 assume could be an indication of more serious
14 systemic injury if the exposure was allowed
15 to continued."

16 A. That's correct.

17 Q. Was that your view in 1959, as well?

18 A. Yes.

19 Q. Was that information that -- was that
20 information that was shared only with
21 Westinghouse? I mean, was there any reason
22 why Mr. Wheeler was --

23 A. No. I think that was the general impression
24 of everybody in the field. They thought that
25 chloracne was the sort of hallmark of

1 excessive PCB -- chlorinated PCB exposure.
2 And they thought that this was a systemic
3 reaction on the skin rather than a local
4 reaction, as a sunburn or an irritation from
5 paint remover. So that we thought if you got
6 the systemic reaction on the fat cells of the
7 skin, you could very well get problems
8 elsewhere in the body. And that's why we
9 were concerned if chloracne occurred.

10 Q. And was that information that Monsanto shared
11 with any health professional that asked
12 questions about the toxic properties of
13 chlorinated diphenyl?

14 A. Oh, yes. That was -- other people who were
15 working in the same field had written about
16 it or talked about it.

17 Q. All right. Now, Exhibit 25, which we talked
18 about just a minute ago, is a letter that's
19 about Aroclors?

20 A. Right.

21 Q. Again, is that Monsanto's trade name for
22 chlorinated diphenyl or PCB products?

23 A. Yes, it is.

24 Q. Now, Exhibit 26 is a reference to
25 Aroclor 1242 and a combination known as

1 Inerteen PPO.

2 A. Yes.

3 Q. Is this letter also about PCB products?

4 A. Yes, it is. Mixed with trichlorobenzene.

5 Q. Right. Would you identify Exhibit 27,
6 please?

7 A. Yes. This is a letter signed by me to a
8 Mr. Crow, someplace in Alaska, the U.S. Naval
9 Station in Kodiak, Alaska, who must have
10 written a letter to Monsanto and eventually
11 got to the medical department to ask for
12 information concerning fire resistant
13 transformer fluids which of the generic name
14 askarel.

15 Q. All right. Now, this letter is about
16 askarel.

17 A. Right.

18 Q. Is that -- is that also a name for fluids
19 that contain PCBs?

20 A. Yes. But all askarels are not PCB
21 containers.

22 Q. All right. In the terms of ones that the --
23 the askarels that Monsanto manufactured --

24 A. -- were all PCBs.

25 Q. All right. Is Exhibit 27 the file copy of a

1 letter that you, in fact, signed and sent out
2 to Mr. Crow responding to his inquiries about
3 the toxic properties and safe handling of
4 askarel?

5 A. Yes, it is.

6 Q. Did you tell Mr. Crow anything in this letter
7 that you were hiding from other companies
8 that were using PCB electrical equipment?

9 A. No. Of course not.

10 Q. Is this, again, a letter that was typical of
11 the letters that you wrote to people who
12 asked you questions about the toxic
13 properties of chlorinated diphenyl, also
14 known as PCBs?

15 A. Yes. Correct.

16 Q. There are two enclosures to Exhibit 27. The
17 first is entitled -- the bottom of the second
18 page says, "Enclosure: Ask" -- "Enclosure:
19 Askarel booklet." Is that the booklet that
20 we talked about earlier that's marked
21 Exhibit 23?

22 A. I think so. I'm not sure, but I don't know
23 if there's another askarel bulletin. But to
24 the best of my recollection, that's the one
25 we would have sent because that's the only

1 one I remember Monsanto had with the term
2 "askarel" on it.

3 Q. The other enclosure is entitled, "Hygienic
4 Guide 'Chlorodiphenyls.'"

5 A. Uh-huh.

6 Q. Can you tell us what that is?

7 A. This is a -- it was a series of guides put
8 out by the Industrial Hygiene Association.
9 At that particular time they were sort of
10 associated with the Industrial Medical
11 Association, and it was put out. But mainly
12 it was put out by the industrial hygiene
13 group. It discusses the standards, the toxic
14 properties, the industrial hygiene practices,
15 and the medical information as far as
16 treatment is concerned.

17 Q. You're looking now at Exhibit 28; is that
18 correct?

19 A. That's correct.

20 Q. All right. Is that the hygienic series guide
21 from 1965 entitled, "Chlorodiphenyls"?

22 A. "Chlorodiphenyls," right.

23 Q. Well, is that the enclosure that you
24 referenced in Exhibit 27?

25 A. Yes.

1 Q. The last page of Exhibit 28 identifies the
2 hygienic guides committee of the American
3 Industrial Hygiene Association. Is that the
4 committee that you were talking about in your
5 answer a minute ago?

6 A. Yes. But -- and I see in here they're mostly
7 industrial hygienists. The ones I
8 recommend -- I mean, the ones I remember --
9 Sutton was a physician. He was with Eastman
10 Kodak. But Elkins was an industrial
11 hygienist for Massachusetts, I believe, or
12 Connecticut. Halley, H-a -- Halley was --
13 H-a-l-l-e-y, was the industrial hygienist for
14 the State of West Virginia. I don't know the
15 other people.

16 Q. All right. The footnote on the first page of
17 Exhibit 28 states: "The Committee wishes to
18 acknowledge the preparation of the medical
19 information section of this Guide by the
20 Industrial Hygiene and Clinical Toxicology
21 Committee of I.M.A., and to acknowledge also
22 the assistance of Elmer P. Wheeler and Jack
23 T. Garrett in the writing of this guide."

24 First, what was the "IMA"?

25 A. Industrial Medical Association.

1 Q. And Mr. Wheeler is the same Mr. Wheeler that
2 you earlier identified as being an industrial
3 hygienist who worked for you?

4 A. Right. Correct.

5 Q. And who is Mr. Garrett?

6 A. He was also an industrial hygienist, a second
7 industrial hygienist. And he reported to
8 Mr. Wheeler. Mr. Wheeler had more
9 functions. He was administrator in charge of
10 our toxicological section and our industrial
11 hygiene section, although he was an
12 industrial hygienist by training.

13 Q. Did the medical department of Monsanto have a
14 set of reprints of this hygienic series --
15 hygienic guide series on chlorodiphenyls --

16 A. Oh, yeah.

17 Q. -- which has been marked as Exhibit 28, that
18 were available to distribution and response
19 to inquiries from customers?

20 A. We had it not only on chlorodiphenyls, but on
21 every product we made that they had a
22 hygienic guide series on. We sent it out to
23 anybody who asked for it.

24 Q. Were --

25 A. And some that didn't ask.

- 1 Q. Did the medical department also keep a set of
2 reprints of Dr. Treon's 1956 article on
3 Aroclor 1242 and Aroclor 1254 that were
4 disseminated to people who made an inquiry?
- 5 A. Yes. We didn't send that out as much as we
6 did this one.
- 7 Q. All right. To whom did you send out the
8 hygienic guide series?
- 9 A. To whom?
- 10 Q. Yes.
- 11 A. Anybody that would write in inquiring about
12 the safe handling of the material or the
13 toxicity information or any medical problems
14 that might be associated with excessive or
15 undue exposure.
- 16 Q. And to whom would you send a reprint of the
17 Treon articles?
- 18 A. Anybody who was interested in the same thing
19 but it was a physician or a toxicologist or
20 an industrial hygienist.
- 21 Q. Would you identify Exhibit 29, please?
- 22 A. Yes. This is a memorandum of mine on the
23 toxicity and safe handling of askarel, dated
24 March the 4th, 1971.
- 25 Q. Is that your signature on Exhibit 29?

1 A. Yes, it is.

2 Q. And what was the purpose of this page?

3 A. I think this was probably written to be a
4 suitable packet of information that people
5 would write about, asking the problems that
6 maybe occurred in accidental ingestion or a
7 skin absorption -- acute skin absorption,
8 like a spill on it, as well as safe handling
9 data. It sort of was a -- just a handy guide
10 for anybody who was on the work floor that --
11 or in charge of the use of askarel.

12 Q. The date of this document is March 4 of
13 1971. Was the focus of this exhibit,
14 Exhibit 29, worker safety concerns; or was it
15 also intended to cover environmental
16 precautions?

17 A. No. It was just safety concerns. This
18 was --

19 Q. For workers?

20 A. For workers. This was written because we had
21 talked -- we had bulletins talking about
22 Aroclors all the time but people might -- I
23 don't know how they got -- I do not know how
24 customers of Monsanto knew that Monsanto was
25 using the generic term of "askarel." I don't

1 know that. I don't remember that. But
2 that -- obviously they would be -- write and
3 must have written in enough times saying,
4 "We're using askarel produced by Monsanto.
5 What do you know about it? What can you tell
6 us about it?"

7 Q. And you prepared this sheet so you could use
8 it as a common response to many such
9 inquiries?

10 A. That's correct. I don't know how many -- I
11 don't know how much we used it.

12 Q. All right. But in response to inquiries
13 specifically about askarel, this sheet was
14 available to send out?

15 A. That's correct.

16 Q. All right.

17 MR. BAUER: Let's take another
18 short break.

19 THE VIDEOGRAPHER: We're going off
20 the record. It's 38 minutes after 12:00
21 o'clock.

22

23 (A recess was taken.)

24

25 THE VIDEOGRAPHER: It's 51 minutes

1 after 12:00 o'clock. We're back on the
2 record.

3 Q. (By Mr. Bauer) Dr. Kelly, I'd like to turn
4 now to the topic of PCBs in the environment.

5 Did there come a time when Monsanto
6 heard reports that PCBs were being found in
7 wildlife samples from different parts of the
8 environment?

9 A. Yes.

10 Q. When did Monsanto first learn of such
11 reports?

12 A. It was either in late '66 or '67.

13 Q. Where did the first reports come from?

14 A. From Sweden. In Europe. I think it was
15 Sweden.

16 Q. Do you recall the name or -- the name or
17 names of any of the researchers who were
18 involved in that first work?

19 A. Dr. Widmark, W-i-d-m-a-r-k, and Jensen,
20 J-e-n-s-e-n.

21 Q. Did you personally hear about those reports
22 sometime at the end of 1966 or early in 1967?

23 A. Well, yes. I heard about it from people --
24 it was third-hand. They had read it, and
25 people in our European office heard about

1 it. We don't subscribe to the Swedish
2 newspapers in the United States. So we had
3 an office in Brussels and an office in
4 London; and they also manufactured PCB, along
5 with several other European manufacturers.
6 We were relatively small amount of -- small
7 percentage of the total tonnage over there.
8 So, yes, we heard about it; and I heard about
9 it from them.

10 Q. What did you do after first hearing these
11 reports about Dr. Jensen and Dr. Widmark's
12 work?

13 A. Said, "We ought to find out more about
14 this." Sent it to our analytical people, to
15 our management people, to our merchandising
16 people.

17 Q. All right. Would you look at Exhibit 30,
18 please, and tell me what that is.

19 A. Yes. This is a letter from Dr. Wood, who is
20 a research man in our Brussels office. He's
21 English. And he enclosed a copy of Soren
22 Jensen's paper. And I must have written to
23 him on the 10th of February of that year,
24 asking -- or a telephone conversation the day
25 before he dictated this letter, saying, "What

1 do you know about" -- I must have said, "What
2 do you know about it? Send me anything you
3 know so I can get the information out to
4 people here."

5 Q. Is this a letter written by David Wood to
6 you?

7 A. Yes.

8 Q. And did you receive a copy of this in early
9 1967?

10 A. Yes.

11 Q. Is Dr. Jensen's typed manuscript paper
12 attached?

13 A. Yes, it is.

14 Q. What did you do with Exhibit 30, with
15 Dr. Jensen's paper in Exhibit 30, when you
16 received it in early 1967?

17 A. Well, I photostated it and sent it to the
18 people in our management group in -- who were
19 the product managers for PCB. I sent it to
20 our analytical people. And I guess those are
21 the ones I sent it to. I said, "What are we
22 going to do about this?"

23 Q. Who do you -- well, strike that.

24 Do you recall the names of some of
25 the analytical people who were involved in

1 Monsanto's research department at that time?

2 A. Dr. Robert Keller, K-e-l-l-e-r, and a Scott
3 Tucker, a Dr. Scott Tucker.

4 Q. Was it clear at the outset that the Swedish
5 scientist -- the Swedish scientists'
6 identification of these substances as PCBs
7 was correct?

8 A. No, it was not. I'm not an analytical
9 chemist; but the analytical chemists that I
10 talked to and the research people, both in
11 the United States and England, said, "We're
12 not sure this is" -- that this is the right
13 designation for this peak in their
14 chromatograph.

15 Q. Were you told that by any of the analytical
16 people at Monsanto?

17 A. Yes.

18 Q. Did Monsanto confirm at some point in time
19 that these substances that were being found
20 in the environment, the peaks on the
21 chromatograms that you talked about, that
22 they were PCBs?

23 A. Yes. There was a gradual awareness that they
24 were -- they really were PCBs. But still
25 there was still some scepticism among some of

1 the people at Monsanto as late as 1970 that
2 we're really talking about PCBs because
3 Jensen first was looking for DDT. And
4 according to my information, DDT and PCBs are
5 pretty close on a gas chromatography or --

6 Q. All right. You mentioned gas chromatogram
7 now and gas chromatography. And knowing that
8 you're not an analytical chemist, would you
9 generally describe what your understanding is
10 of what's involved there?

11 A. Yes. It's a pretty involved apparatus that
12 is supposed to pick up small amounts, parts
13 per million, of substances and a bunch of
14 interfering -- a bunch of other material.
15 There were also some additions to it. Some
16 people used electron capture in it. Some
17 people used a mass spectroscope in addition
18 to this gas chromatograph. It was a pretty
19 involved, sophisticated analytical tool.

20 Q. Okay. And --

21 A. I can't know any more about it than that.

22 Q. Sure. Well, you mentioned peaks, similarity
23 between peaks of DDT and PCB, in one of your
24 answers. What did you mean by "peaks"?

25 A. Well, a peak in a chromatograph is almost the

1 same as the balance analytical scale. You
2 run this thing through this -- you run the
3 sample through this apparatus, and you get
4 readings of -- the needle jumps up and down
5 in some different places. And you got a peak
6 here and a certain wavelength, and you know
7 that's DDT. You got another peak here, you
8 don't know what that is. And sometimes
9 they're so close that it's awful hard to
10 identify individual compounds.

11 Q. So is the chromat -- the peaks in the
12 chromatogram that you were talking about
13 actually a drawing of --

14 A. Well, peaks --

15 Q. -- peaks and valleys --

16 A. Yes.

17 Q. -- in a chart?

18 A. Yes. I apologize for my lack of knowledge
19 about analytical chemistry.

20 Q. There's no need for you to apologize,
21 Dr. Kelly.

22 Would you generally describe -- you
23 mentioned after you got Dr. Jensen's paper
24 that one of the things you did personally was
25 give it to the analytical people. Would you

1 generally describe the response within
2 Monsanto to the detection of PCBs in the
3 environment in the late 1960's?

4 A. Well, we don't know if it's there or not
5 because there were spots. Let's be sure this
6 man knows what he's talking about.

7 Q. So what did that mean the initial response
8 was?

9 A. What did the what?

10 Q. What was the initial response, then?

11 A. It was sort of, "Maybe it's true, maybe it
12 isn't true." But there was a very healthy
13 amount of scepticism -- among not only
14 Monsanto people, but an awful lot of other
15 people outside of Monsanto -- that what
16 Jensen and Widmark were identifying was
17 really honest to goodness PCBs.

18 Q. Did Monsanto undertake any analytical work to
19 try to verify whether he was correct or not?

20 A. Well, we did by the means we had at our
21 disposal; but we did not have the
22 sophisticated instruments we had -- he had.
23 So we ordered some. But this you don't go
24 down to Radio Shack and order one of these
25 things off the shelf, you know. So it took

1 quite some time before we got one.

2 Q. Do you recall -- was that a GCMS? Is that
3 what they called that?

4 A. I think so.

5 Q. Do you recall how soon after -- how soon
6 after 1967 Monsanto ordered a GCMS?

7 A. No, I don't.

8 Q. Okay. Was that --

9 A. Pretty short time.

10 Q. Was that the research department that did
11 that?

12 A. Yes. It wasn't the medical department.

13 Q. So that would have been Dr. Keller and --

14 A. Keller.

15 Q. -- and Scott Tucker?

16 A. Right.

17 Q. All right. And do you know the approximate
18 date when Monsanto actually received a GCMS?

19 A. No, I do not.

20 Q. All right. At some point in time, did
21 Monsanto also initiate degradation studies?

22 A. Yes.

23 Q. What's a "degradation study"?

24 A. A "degradation study" is a -- consists of a
25 series of experiments to see whether a

1 compound can be broken down by bacterial
2 action, sunlight, other chemicals that the
3 compound you're concerned about is in close
4 proximity to.

5 Q. Do you recall where and within what
6 department of Monsanto that work was being
7 done?

8 A. It was done in the research department. I
9 don't know whether it was central research or
10 the research department or agricultural
11 chemicals division or the organic division,
12 the one that made PCBs. I don't know to this
13 day.

14 Q. All right. Do you know approximately when
15 Monsanto started degradation studies on PCB
16 products?

17 A. I think sometime in '68, I believe.

18 Q. Did Monsanto consider doing additional
19 toxicological studies in the end of the
20 1960's as a result of the information learned
21 about PCBs being in the environment?

22 A. Yes, it did.

23 Q. Do you recall when that started, the
24 discussions about additional toxicological
25 testing?

1 A. Well, it's -- I would say that started as
2 soon as -- whenever they found out that the
3 material was ending up in birds and in fish.
4 And we thought we better find out. Somebody
5 may be eating the fish and eating the birds.
6 So we started that, I guess -- we certainly
7 started discussing it in 1977 or so.

8 Q. I'm sorry. Did you --

9 A. '66, '67. Sixty -- yeah. '67.

10 Q. All right. Would you turn to Exhibit 31,
11 please. And Exhibit 31 is a September 11,
12 1968, memo from Elmer Wheeler to Dr. W. R.
13 Richard with several carbon copies. And
14 attached to that is a letter dated
15 September 9, 1968, to Mr. Wheeler from
16 Industrial Bio-Test. And that attachment has
17 its own attachments.

18 First of all, were you one of the
19 people that received a carbon copy of
20 Mr. Wheeler's September 11 memorandum?

21 A. Yes.

22 Q. The attachments to Mr. Wheeler's letter
23 include documents entitled, "Proposed
24 Protocols for Aroclor Toxicity Studies"; is
25 that correct?

1 A. Right.

2 Q. Did you receive and review those proposed
3 protocols in the fall of 1968?

4 A. Yes, I did.

5 Q. Was Industrial Bio-Test eventually selected
6 to do additional toxicological testing on a
7 long-term chronic feeding basis with respect
8 to PCBs?

9 A. Yes. It was not only at that, there was
10 quite an array of testing they carried out.
11 Yes, they were.

12 Q. What do you recall about the scope of the
13 testing program that was actually undertaken?

14 A. It was pretty extensive, in fact. We went
15 down with Dr. Joe Calandra, who was the head
16 of Bio-Test, to the food and drug
17 department. At that time, obviously, they
18 were interested, too, because they seemed to
19 have evidence that the material may be
20 getting into the food chain and they didn't
21 know anything about the toxicity -- the
22 chronic toxicity of it.

23 And I said, "Well, here's what
24 we're going to do. We're all set to go.
25 This is what we're going to do. What do you

1 think of it?"

2 And whether they have anything
3 addition -- additional to add, I don't know.
4 But they certainly approved the final
5 protocol. They didn't have to; but I mean,
6 they -- they said, "This is" -- "yeah, this
7 is it."

8 Q. Okay. Was this in 1968 that you had these
9 discussions with the FDA?

10 A. Yes.

11 Q. And with whom at the FDA did you have such
12 discussions?

13 A. Fitsu, Arnold Leiman, Herb Blumenthal. These
14 are all Ph.D.s. Leiman was head of the
15 toxicological section of the -- of the FDA.
16 Blumenthal was head of the biochemistry
17 section, and Fitsu was the associate director
18 of the toxicological program.

19 Q. Were you personally involved in face-to-face
20 meetings with those officials about the scope
21 of the toxicological program that Monsanto
22 was proposing?

23 A. Yes. I was there, just like here.

24 Q. Okay. And --

25 A. They were at the table, I was at the table.

1 Q. All right. And do you recall whether anyone
2 from Industrial Bio-Test was there?

3 A. Calandra was there. I don't know if anyone
4 else -- I don't recall anyone else there; but
5 I remember Joe was, Joe Calandra.

6 Q. Did you provide the protocols to the FDA for
7 their review?

8 A. Yes.

9 Q. Did you invite their comments?

10 A. Yes.

11 Q. Did the FDA, anyone from the FDA --
12 Mr. Leiman or Fitsu or Blumenthal --
13 criticize the selection of Industrial
14 Bio-Test as the outside contract lab retained
15 to do this -- the work that was being
16 discussed?

17 A. Not then or not at any other time that I knew
18 of.

19 Q. Did anyone from the FDA suggest an
20 alternative to Industrial Bio-Test -- suggest
21 an alternative to Industrial Bio-Test as the
22 outside contract lab to perform the
23 toxicological testing being discussed with
24 the FDA?

25 A. No, sir, they did not. No one did.

1 Q. How many different PCB products were tested
2 by Industrial Bio-Test?

3 A. Three.

4 Q. All right. And the first attachment to
5 Exhibit 31, the letter from Dr. Calandra,
6 talks about a number of different types of
7 tests to be performed. It's the September 9
8 letter.

9 A. It wasn't from Calandra. It was from
10 Dr. Fancher.

11 Q. I'm sorry. Dr. Fancher?

12 A. Right.

13 Q. He worked for Joe Calandra?

14 A. Yes. He was No. 2 or 3 person.

15 Q. All right.

16 A. Yes. He said we got three different Aroclors
17 plus a control plus two levels. We were
18 going to do chicken toxicity, reproduction,
19 and meat and egg residue study, mallard
20 ducks, three-generation reproduction study in
21 rats, two-year chronic toxicity testing in
22 rats and dogs, fish studies.

23 Q. Do you recall whether Monsanto, in fact,
24 initiated through Industrial Bio-Test in the
25 late 1960's two-year oral chronic testing of

1 PCBs in rats?

2 A. Yes, they did.

3 Q. Also in dogs?

4 A. Yes.

5 Q. What about a three-generation reproduction
6 study in rats?

7 A. Yes.

8 Q. What about a mutagenicity study in rats?

9 A. Yes.

10 Q. And were there also chicken toxicity and
11 reproduction studies?

12 A. Yes. The only one I'm a little confused
13 about is the mallard ducks. We were -- we
14 had been working with the fish and wildlife
15 people, but wild ducks -- and I guess a
16 mallard is a wild duck -- have a peculiar
17 habit -- not peculiar, but a habit of laying
18 eggs only twice a year. So if you miss one
19 chance of the eggs, you can't do anything.
20 So that sort of fell through. The wild ones
21 fell through. I don't know if he did the
22 domestic mallards or not. I don't know.

23 Q. Okay. So although there's a proposed
24 protocol in here for duck studies, your
25 recollection, for the reason you stated, the

1 duck study was never initiated?

2 A. I'm not sure. I know the wild one was given
3 up. That was the one we were -- it was --
4 the fish and wildlife people were supposed to
5 trap wild mallards and test them. But that
6 didn't work out. Whether Joe did mallards or
7 not, I don't know. I know he did the
8 chickens, but I'm not -- I don't recall
9 having seen the mallard duck study.

10 Q. All right. Do you recall an effort to do
11 range finding before the long-term, two-year
12 study started?

13 A. Oh, sure. That's the usual situation. If
14 you start a two-year study, before you start
15 it, there's about a -- six months that you
16 have to -- first you got to get the animals.
17 You got to put them in a quarantine. When we
18 started, we told Joe -- I told Joe, "Start
19 getting these animals. This is going to go
20 through. We're going to okay it. Start
21 getting the rats and dogs and quarantine them
22 and be sure that they aren't going to break
23 down with worms or white diarrhea or God
24 knows what laboratory animals get."

25 Then you run a range finding test

1 because you want to find out that you
2 aren't -- if you're going to run this for two
3 years, you don't want to kill the animals by
4 giving them too much so they die in 6 months,
5 12 months. You've got to try to analyze
6 under a 30-day -- a 90-day test what level
7 the animal can take. In a two-year testing,
8 you want a level that won't harm them. You
9 want to get a safe level. You want to get a
10 level that you know they can live for two
11 years and will harm them, and then you want
12 to see what pathology will occur and what the
13 target organ is. Then you want to get a
14 level in between so that you get a safe
15 level. You know you got a safe level. You
16 hope this middle one will be safe, too; but
17 you don't want to give them a middle level
18 that's going to kill all the animals and
19 screw up the results.

20 Q. All right. So were each of the -- the three
21 Aroclors that you talked about before, the
22 three PCB products, were they each given
23 these various tests at three dose levels?

24 A. Yes.

25 Q. All right. Do you recall when the range

1 finding studies that you described earlier
2 commenced?

3 A. As soon as we approved the protocol. They
4 got the dogs -- they got the dogs, and they
5 wanted to hurry it up. I mean, they wanted
6 to get started. So they got the rats and
7 dogs and isolated them earlier. But I
8 don't -- I'll have to find out when they
9 actually started it.

10 Q. Well, why don't you identify Exhibit 32 for
11 us.

12 A. We authorized it in '68, and I think they
13 started it almost immediately afterwards.

14 Q. What is Exhibit -- Exhibit 32?

15 A. Exhibit 32 is an authorization for two of the
16 Aroclor studies. He had two batches of
17 Aroclor studies. He had four of them there
18 at first. The fourth -- the fourth was --

19 Q. The first being?

20 A. The first one was of fowl, the gross
21 toxicity. And then the other one was a rat
22 tissue study. And when he started the
23 two-year feeding --

24 Q. Well, let's back up to Exhibit 32.

25 A. Yeah.

1 Q. Is that a letter that Mr. Wheeler sent to
2 Dr. Calandra in 1968 authorizing the
3 initiation of some of these studies?

4 A. That's correct.

5 Q. All right. Now, you said there was -- there
6 was a fourth there, fourth Aroclor.
7 There's -- the first three Aroclors
8 referenced are Aroclor 1242, 1254, and 1260.

9 A. Right.

10 Q. Were all three of those PCB products?

11 A. Yes.

12 Q. And the fourth one you mentioned is
13 Aroclor 5460?

14 A. That's chlorinated diphenyl benzene.

15 Q. All right. After the tests were initiated,
16 did you continue to have contacts with the
17 FDA?

18 A. Oh, yes. We had written contacts, and we
19 kept in touch personally. I sent them --
20 every time I got a quarterly report, I sent
21 it up to Leiman. And I would see Leiman at
22 least -- or Fitsu -- once a year, maybe once
23 every eight months, every time I was in
24 Washington. I saw them at least between once
25 a year and twice a year in those years of '69

1 and '70.

2 Q. How often did you get summary reports on the
3 various studies being conducted by Industrial
4 Bio-Test that you sent out to the FDA?

5 A. We got a bundle.

6 Q. Would you look at Exhibit 33, please, and
7 identify that for us.

8 A. Yes. This is a letter from me to
9 Blumenthal. And I told him what we were
10 doing, and I sent him copies of the status
11 report for the chronic testing at Industrial
12 Bio-Test.

13 Q. And what's the date of Exhibit 33?

14 A. April 8th, 1970. And that was the end of six
15 months' administration under rats. So that
16 meant we really -- six months -- we
17 started -- must have started about nine
18 months before April the 8th, 1970, because as
19 I said, it takes that long to get the thing
20 rolling.

21 Q. When you sent status report -- well, strike
22 that. Let me back up.

23 Is Exhibit 33 the file copy of a
24 letter that you sent to Mr. Blumenthal, or
25 Dr. Blumenthal, in April of 1970?

1 A. Right. Yes.

2 Q. And when you sent it to Dr. Blumenthal, there
3 were -- were there a series of status reports
4 attached?

5 A. Yes.

6 Q. Were there status reports attached with this
7 letter and other similar letters with respect
8 to each of the studies and each of the
9 species?

10 A. Yes. We sent them everything we got from
11 Bio-Test. We sent food and drug everything
12 we got.

13 Q. Would you turn next to Exhibit 34, please,
14 which is a document entitled,
15 "Three-Generation Reproduction Study in
16 Albino Rats with Aroclor 1242, Aroclor 1254,
17 Aroclor 1260, Results of the First
18 Generation," September 4, 1970, submitted by
19 R. Emmet Kelly, M.D. And that's on Monsanto
20 letterhead. Attached is a document bearing
21 the same title, dated September 4, 1970, with
22 the Industrial Bio-Test letterhead.

23 A. Right.

24 Q. Is this one of the summary reports that you
25 submitted to the FDA?

1 A. Yes, it is.

2 Q. This is a summary report specifically with
3 one study, the three-generation reproduction
4 study, for all three Aroclors?

5 A. Well, it's 1242, 1254, and 1260. Yes, all
6 three.

7 Q. The fourth page of Exhibit 34 has an outline
8 of the study which includes the starting
9 date. Do you see that there?

10 A. Yes.

11 Q. And what does it say the starting date was
12 for the three-generation?

13 A. May the 8th, 1969.

14 Q. All right. Does that comport with your
15 recollection as to when these long-term
16 feeding studies were actually on feeding, if
17 you will?

18 A. Well, these aren't the long-term. This is
19 three-generation rats. That's a different
20 experiment.

21 Q. Different than the two-year --

22 A. Yes. The two-year --

23 Q. -- lifetime studies?

24 A. -- you take a batch of animals; and once you
25 get a dose that you're sure that the rats

1 could take over a period of two years, you
2 start them on it. A three -- and you keep it
3 going for two years. This, you get the --
4 reproduction study, you get male and female
5 rats. You feed them, mate them, then check
6 the pups, mate and feed those and mate them.
7 That's the first generation. Go to the
8 second generation, you get another series of
9 pups. Then you go on and check the -- feed
10 the third generation. So it's a different
11 story. It takes pretty long. I don't know
12 what the gestation period of rats are. It's
13 not too -- it doesn't take long. But by the
14 time you get all this business taken care of,
15 it takes quite a while because --

16 Q. So is what you're saying that May of 1969 was
17 the starting date for the three-generation
18 reproduction study?

19 A. That's correct.

20 Q. And do you recall approximately when the
21 other two -- the two-year feeding studies
22 were in relation to that?

23 A. I think they were started before that. I'm
24 sure they were.

25 Q. Do you know -- well, strike that.

1 Compare the scope of this
2 toxicological program with the kinds of
3 toxicologic work that Monsanto was doing in
4 the late 1960's with pesticides that would
5 leave residues on food.

6 A. This was certainly as involved, as extensive
7 as anything used either on a direct food
8 additive or an inadvertent food additive. It
9 was probably more so because I don't think
10 they were having three-generation studies in
11 those days on food additives. So this was as
12 wide a test as the Government could figure
13 out and as well as our toxicological
14 consultant could figure out. They're in
15 essence given a blank check, and they run
16 everything.

17 MR. BAUER: This is a convenient
18 breaking time if we can pick up with the rest
19 of it tomorrow.

20 MR. KIM: Certainly.

21 THE VIDEOGRAPHER: We're going off
22 the record. It's 19 minutes after 1:00
23 o'clock. This is the end of Tape No. 2.

24

25

(Whereupon the deposition of Robert Emmet Kelly, M.D., was recessed at 1:19 p.m. and is to be continued at 9:00 a.m. on February 16, 1994.)

THE STATE OF Missouri :
COUNTY OF ST. Louis :

I, ROBERT EMMET KELLY, M.D., hereby certify that I have read the foregoing transcript of my testimony given in the foregoing numbered and styled case and that same is true and correct to the best of my knowledge and belief.

I further certify that any and all corrections have been made on a separate page and initialed by me.

This the 30th day of March, 1994.

Robert Emmet Kelly MD
ROBERT EMMET KELLY, M.D.

SUBSCRIBED AND SWORN TO BEFORE ME,
this the 30th day of March, 1994.

Josephine S. Niblock
Notary Public in and for
the State of Missouri

My Commission Expires

Job No. 94-511

JOSEPHINE S. NIBLOCK
NOTARY PUBLIC STATE OF MISSOURI
ST. LOUIS COUNTY
MY COMMISSION EXP. JAN. 15, 1995

Martin & Associates
(409) 762-2222

WATER_PCB-SD0000030387

1 THE STATE OF TEXAS :

2 I, Irma L. Reyes, Certified
3 Shorthand Reporter in and for the State of
4 Texas, hereby certify that this deposition
5 transcript is a true record of the testimony
6 given by the witness named herein, after said
7 witness was duly sworn or affirmed by me.

8 I further certify that I am neither
9 attorney nor counsel for, related to, nor
10 employed by any of the parties to the action
11 in which this testimony was taken. Further,
12 I am not a relative or employee of any
13 attorney of record in this cause, nor do I
14 have a financial interest in the action.

15 Further certification requirements,
16 if any, pursuant to the Rules will be
17 certified to in the Supplemental Certificate
18 after they have occurred.

19 the 2nd day of March, 1994.

20
21 
22 _____
23 Irma L. Reyes, CSR
24 Certificate No. 4071
25 Expires December 31, 1994

My Notary Commission expires September 21,
1996

LIST OF CHANGES OR CORRECTIONS

To the Deposition of _____

If there are any changes or corrections, please list them below giving the page number, line number, and reason for the change.

The reasons for making changes are:

- (1) To clarify the record:
- (2) To conform to the facts:
- (3) To correct transcription errors:

Page No. 60 Line No. 11 Reason for Change either misstatement or misinterpretation
Changed 6% To 10%

Page No. 71 Line No. 24 Reason for Change misinterpretation
Changed from To for

Page No. 75 Line No. 24 Reason for Change omission
Changed --- To make

Page No. 80 Line No. 13 Reason for Change misspelling
Changed Aerial To Cereal

Page No. 89 Line No. 22 Reason for Change misinterpretation
Changed 40 To 48

Page No. 102 Line No. 22+23 Reason for Change misinterpretation
Changed the ice To eyes

Page No. 104 Line No. 2 Reason for Change omission
Changed the To human

Page No. 107 Line No. 6 Reason for Change misspelling
Changed Keel To Kehoe

Page No. 164 Line No. 13 Reason for Change misprint
Changed Peter Leiman To Fitzhugh Leiman

Witness R. Emmet Keely