

IN THE UNITED STATES DISTRICT COURT
 FOR THE EASTERN DISTRICT OF TEXAS
 BEAUMONT DIVISION

CECIL SCOTT, ET AL	]	
v.	]	No. B-84-1103-CA
MONSANTO COMPANY	]	

VIDEOTAPE DEPOSITION OF

WILLIAM GAFFEY

June 3, 1987
 1300 Post Oak Boulevard
 Houston, Texas

Jerry Kelley, Court Reporter
 Nell McCallum & Associates Inc.
 2900 Smith, Suite 104
 Houston, Texas 77006
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COPY

LAWYER'S NOTES

Page Line

This image shows a full page of handwriting practice paper. It features multiple rows of horizontal dashed lines spaced evenly down the page, providing a guide for letter height and placement. The background is white, and there are no margins or additional markings.

APPEARANCES

For the Plaintiffs:

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For the Defendant:

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Video operator:

Sue Morgan

1 Videotape Deposition of William Gaffey, taken
2 on June 3, 1987, at 1300 Post Oak Boulevard, Houston,
3 Texas, between the hours of 9 a.m. and 2 p.m., before
4 Jerry Kelley, CSR No. 2004 and Notary Public in and for
5 the State of Texas.

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12 VIDEO OPERATOR: This video deposition is
13 being taken in Cause No. B-84-1103-CA and is filed in
14 U. S. District Court, Eastern District, Beaumont
15 Division. The style of the case is Cecil Scott, et al,
16 versus Monsanto. For identification purposes, the video
17 technician is Sue Morgan of the firm Executive Service
18 Groups, and the certified court reporter present today
19 is Jerry Kelley of the firm Nell McCallum & Associates.
20 Today's date is June 3rd, 1987, and the time is
21 approximately 9:45 a.m. We are here today to take the
22 oral and video deposition of the witness, Dr. William R.
23 Gaffey, and we are located at the Law Offices of Gilpin,
24 Pohl & Bennett, 1300 Post Oak, Houston, Texas. We are
25 now ready to begin the deposition. Will counsel please

1 state their appearances for the record?

2 MR. POHL: My name is Mike Pohl. I'm one of
3 the attorneys for the plaintiffs.

4 MR. ANDREWS: I'm Steve Andrews. I represent
5 Monsanto.

6 VIDEO OPERATOR: Will the court reporter
7 please swear in the witness?

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9
10
11
12 WILLIAM GAFFEY,

13 being duly sworn, testified as follows:

14
15 EXAMINATION BY

16 MR. POHL:

17 Q Dr. Gaffey, my name is Mike Pohl. As the
18 court reporter just indicated, I am one of the attorneys
19 for the plaintiffs in this case. We have never met
20 before, have we?

21 A No, we have not.

22 Q And you are generally familiar with the
23 process of giving a deposition?

24 A Yes, I am.

25 Q Okay. And you understand that your testimony

1 is under oath today and that it may be offered in
2 evidence at the time of trial?

3 A I understand that, yes.

4 Q Good. I'd like to have a couple of
5 agreements with you, if we could, before we proceed
6 further with your deposition. First of all, I would
7 appreciate your answering audibly to each question, that
8 is, do not answer by a shrug of the shoulders or a nod
9 of the head. Can we have that agreement?

10 A Yes.

11 Q Okay. If for some reason my question is not
12 clear to you or for some reason you do not understand my
13 question, I would like you to stop me and ask me to
14 repeat the question, to rephrase the question, to slow
15 down or to speak up, whatever the case may be, so that
16 we're sure that you understand each question that you
17 attempt to answer.

18 A I understand.

19 Q Okay. If at any time you desire to take a
20 break or consult with your attorney, if you will let me
21 know, we will take a recess at your convenience. Okay?

22 A Very well.

23 Q How are you currently employed?

24 A I am Epidemiology Director for the Monsanto
25 Company.

1 Q Is that in the medical department?

2 A Yes.

3 Q Who do you report to?

4 A Dr. George Roush.

5 Q How long have you reported to Dr. Roush?

6 A Since July of 1979.

7 Q When were you first employed by Monsanto?

8 A In July of 1979.

9 Q With whom did you interview for that job?

10 A With Dr. Roush; I believe with Dr. Tillman,
11 who was then one of the occupational physicians; with -
12 Mr. Oliver De Garmo, who has subsequently retired; and I
13 had lunch with a group of the people from the operating
14 companies, who individually I don't remember, but they
15 were directors of environmental operations for the
16 operating companies.

17 Q Okay.

18 Is your specialty, that of epidemiology, a
19 subdepartment in the medical group at Monsanto?

20 A Yes, it is.

21 Q How many people are in your group?

22 A There are six people, plus myself.

23 Q Are all the six, plus yourself,
24 epidemiologists?

25 A No. Three of them are master's level

1 epidemiologists, plus myself. Of the others, one is a
2 computer programmer, one is a data clerk, and one is a
3 secretary.

4 Q All right. So you have a total of seven
5 people in the epidemiology department at Monsanto today?

6 A That is correct.

7 Q Okay. And has that grown significantly over
8 the last few years?

9 A No. In fact, it has grown since 1980 by, I
10 believe, two people.

11 Q So in 1980 you had five people in your
12 department?

13 A That's the best of my recollection, yes.

14 Q Now, does your department work side by side
15 with the toxicology department?

16 A I'm afraid I don't understand exactly what
17 you mean.

18 Q Okay. How many other departments are in the
19 medical department?

20 A Toxicology, industrial hygiene, occupational
21 medicine, quality assurance, and an information service.

22 Q And do each of those subgroups in the medical
23 department report to Dr. George Roush?

24 A Yes.

25 Q Okay. And physically are all of the groups

1 that report to Dr. Roush located in the same building or
2 on the same premises?

3 A They are located on two different floors of
4 the same building.

5 Q Is that in St. Louis?

6 A Yes.

7 Q That's the headquarters of Monsanto?

8 A That is correct.

9 Q And is the medical department that's located
10 at the headquarters in St. Louis the medical department
11 that issues all the guidelines and reports on
12 toxicology, epidemiology and so forth for all of
13 Monsanto's American operations?

14 A To the best of my knowledge, yes.

15 Q Okay.

16 Have you worked with Dr. Levinskass?

17 A Yes.

18 Q Is he head of the toxicology department?

19 A Not at the present time.

20 Q Has he been in the past?

21 A Yes.

22 Q Okay. And did you work with any of the
23 people in the toxicology department that reported to
24 Dr. Levinskass?

25 A From time to time I have worked briefly with

1 one or the other of some three or four toxicologists in
2 that group, yes.

3 Q Okay. Who are they?

4 A Dr. Rashmi Nair, Dr. Michael Stevens, Dr.
5 Bruce Hammond, Dr. Wright, Dr. Levinskis himself.

6 Q These are people in the toxicology department
7 that you can recall today having worked with?

8 A That is correct.

9 Q Okay. And Dr. Wright's first name is Paul?

10 A Paul, yes. I forgot that.

11 Q Okay.

12 And you've done studies on PCBs while
13 employed by Monsanto, have you not?

14 A No, I have not.

15 Q Okay. You haven't researched the literature
16 and made reports with regard to the possible effects of
17 Monsanto's Aroclor products on human beings?

18 A No.

19 Q Okay. Was that work done before you joined
20 Monsanto?

21 A I have done no work on Monsanto's products
22 specifically.

23 Q Okay. Do you mean that when you studied PCBs
24 you studied those produced by Monsanto as well as those
25 that may have been produced by some foreign

1 manufacturer?

2 A I conducted no studies of PCBs.

3 Q Okay.

4 In the work that you have done as an
5 epidemiologist, have you reviewed any animal
6 toxicological reports on Aroclor products?

7 A No, I have not.

8 Q Have you read any at all?

9 A No, I have not.

10 Q Okay.

11 - In any epidemiological studies in which you-
12 may have participated regarding the effect of PCB
13 exposure on human beings, did you consider it not to be
14 important to review animal studies?

15 A I haven't participated in any studies of PCBs
16 in human beings.

17 Q Okay.

18 Regarding your educational background,
19 Doctor, you received your Ph.D. in 1955?

20 A That is correct.

21 Q The University of California at Berkeley?

22 A That's correct.

23 Q And your undergraduate degree was in
24 psychology?

25 A That's right.

1 Q 1948?

2 A That's correct.

3 Q Okay. And you did not obtain a master's
4 degree?

5 A No, I did not.

6 Q Okay.

7 Now, your science, that is, the science of
8 epidemiology, is a science that has been around for
9 quite a long time. Is that correct?

10 A Yes.

11 Q And epidemiologists were people who first
12 studied epidemics?

13 A That is correct.

14 Q They studied epidemics of infectious
15 diseases. Is that correct?

16 A Yes.

17 Q And how far back does that go? The first
18 thing that comes to my mind as a layman, Doctor, are
19 some of the plagues that existed in medieval Europe.
20 Does your profession go back that far?

21 A Yes. John Snow, who was involved in a
22 cholera epidemic in London, is usually thought of as one
23 of the earliest epidemiologists.

24 Q Okay. And this epidemic in London that Mr.
25 Snow was involved in, when did it occur, as best you can

1 recall?

2 A As best I can recall, it was sometime in the
3 16th century.

4 Q In your work as an epidemiologist, you use
5 statistics, do you not?

6 A Yes.

7 Q And that's a large part of what you do. Is
8 that correct?

9 A A fairly large part, yes.

10 Q Okay. Let me see if I understand this
11 correctly. What you look at in the statistics is you
12 take a certain group that you want to study and you try
13 to find if there's any statistically significant result,
14 is that correct, or effect?

15 A That's essentially correct, although the
16 process is somewhat more complicated than you've
17 suggested.

18 Q I'm speaking very, very basically or very
19 simply. Epidemiology is not a profession whereby you
20 examine the individual who has been exposed to the
21 particular chemical under study. Is that correct?

22 A Generally speaking, that's correct.

23 Q And it's not a situation where you look at
24 individual effects in individual human beings, generally
25 speaking, but rather you would look at the average or

1 the statistically significant effect, if any, on the
2 group. Is that correct?

3 A That is correct.

4 Q And you're not qualified by your background
5 to express an opinion one way or another on the cause or
6 effect with regard to a particular illness and a
7 person's exposure to a chemical, are you?

8 A Could you clarify that? I'm not quite sure
9 what you mean.

10 Q Sure. Let me back up and approach it this
11 way.

12 For one, you don't have a medical degree?

13 A No, I do not.

14 Q And you've never taken, in your studies, any
15 courses in anatomy?

16 A No, I have not.

17 Q And no courses in infectious diseases?

18 A No.

19 Q No courses in biochemistry?

20 A No.

21 Q No courses in pharmacology?

22 A No.

23 Q And in terms of the type of study you do, you
24 look at statistics, but not at the individual cause-and-
25 effect relationship between a chemical and the potential

1 adverse effects in a given individual in terms of trying
2 to diagnose whether or not the chemical caused the
3 effect in that person?

4 A That is correct.

5 Q Okay.

6 Now, in the past, you've testified for
7 Monsanto several times, have you not?

8 A I have -- yes, I have given depositions and I
9 have testified.

10 Q All right. And you've testified in cases
11 involving benzene as well as PCBs?

12 A I have given a deposition in such a case.

13 Q Okay. And you've also testified in cases
14 involving alleged environmental contamination as a
15 consequence of PCBs. Is that correct?

16 A I testified in one such case.

17 Q That's the Outboard Marine case?

18 A No. I gave a deposition in that case.

19 Q Okay. I'm referring generally to giving
20 testimony --

21 A Yes.

22 Q -- either by deposition, like you are doing
23 today, or in the actual courtroom.

24 And you testified in a case that involved an
25 alleged benzene exposure in Beaumont, Texas. Is that

1 correct?

2 A Yes.

3 Q Okay. And that was where a workman had sued
4 Monsanto and some others claiming that he had been
5 injured by exposure to benzene?

6 A I believe that is correct.

7 Q And you've done research and studies, as an
8 epidemiologist, on benzene, have you not?

9 A I have done one study which could be
10 interpreted as having implications for benzene exposure.

11 Q Okay. And there's been quite a lot of
12 literature about benzene over the last few years, has
13 there not?

14 A I believe there has been.

15 Q Okay. Have you tried to keep yourself up to
16 speed or up to date on that literature?

17 A I have tried to keep myself current on the
18 epidemiology studies of human exposures to benzene, yes.

19 Q Okay. And have you tried to keep yourself
20 current on the human exposure studies with regard to
21 PCBs?

22 A Yes, I have.

23 Q Okay. And when is the last time you tried to
24 read anything, any literature about PCBs?

25 A Approximately September of 1986.

1 Q Okay. And in what connection was that?

2 A Two studies were completed which were updates
3 of earlier studies of -- I beg your pardon. You're
4 talking -- would you repeat that question, please?

5 Q Sure.

6 A I'm a bit confused.

7 Q Yes. I'm trying to find out when is the last
8 time you made any study of the literature with regard to
9 PCBs --

10 A Yes.

11 Q -- and what the reason for that study was. -

12 A There were two studies that were updates of
13 earlier studies of PCBs. I read the updates because the
14 earlier studies had left some unfinished business that
15 was completed or at least enlarged on by the updates.

16 Q Was one of those studies Dr. Levinskis's
17 study?

18 A Dr. Levinskis has done no human studies, to
19 the best of my knowledge.

20 Q His review of the literature.

21 A In connection with that review, I looked at
22 the updates that I have discussed.

23 MR. PHOL: Okay.

24 Would you mark this?

25 [Exhibit 1 marked]

1 MR. POHL:

2 Q Your attorney has handed to me this morning a
3 document which Monsanto has provided, and it's a memo
4 addressed to George Levinskis, dated December 18, 1986,
5 purports to have your signature, with an attachment.
6 Can you tell me -- Can you identify this document?

7 A Yes. To the best of my recollection, Dr.
8 Levinskis was preparing a review of recent data on PCBs
9 and came upon some human health studies which he asked
10 me to comment on.

11 Q And did you do so? -

12 A Yes, I did.

13 Q And are your comments this handwritten memo,
14 or are your comments the typewritten attachment?

15 A My comments are the two typewritten
16 attachments which bear my name.

17 Q Okay. If you'll look at the handwritten
18 memo, which is the first page of Exhibit No. 1 to your
19 deposition, do you see your signature at the bottom of
20 that page?

21 A Yes, I do.

22 Q And do you recognize that as being your
23 signature?

24 A I do.

25 Q And was your memo prepared on or about

1 December 18, 1986?

2 A To the best of my recollection, yes.

3 Q The last three lines of your memo, would you
4 read those to me, starting with this word?

5 A "I think we can ignore the melanoma issue
6 because the paper was withdrawn."

7 Q Okay. What melanoma issue are you making
8 reference to?

9 A A paper was published sometime in the -- I
10 beg your pardon. A letter was written to a medical
11 journal sometime in the late 1970s alleging the --
12 occurrence of two deaths from melanoma in a population
13 allegedly exposed to PCBs. A more detailed description
14 of the work done in that letter was submitted to NIOSH
15 to be included in a criteria document for PCBs, and then
16 was withdrawn because question had arisen in the
17 author's mind as to whether the people were accurately
18 characterized as being exposed.

19 Q And who authored this paper?

20 A A Dr. Anita K. Bahn, that's B a h n, of the
21 University of Pennsylvania.

22 Q Did you ever review Dr. Bahn's paper?

23 MR. ANDREWS: Are we talking about a paper
24 here, or a letter?

25 MR. POHL: Either one.

1 A I looked at the letter, and I have looked at
2 the references to her study in the NIOSH criteria
3 document.

4 MR. POHL: Okay.

5 Q And what did you conclude from that
6 examination?

7 A That not enough detail was provided to be
8 able to decide whether the population was selected
9 because they were exposed or because there had been
10 occurrences of melanoma. If the former was the case,
11 then the study would be a bona fide description of risk-
12 subject to many problems of interpretation. If the
13 latter is the case, then it's impossible to decide what
14 significance, if any, the observations have.

15 Q You indicated a moment ago that one of the
16 things you did was review the text of a report that
17 pertained to PCBs. Is that correct?

18 A I reviewed several individual papers at
19 Dr. Levinskis's request. I believe that's what I said.

20 Q And were any of these human studies, or were
21 they all animal studies or all reviews of the
22 literature?

23 A They were -- the studies I'm referring to
24 were all human studies. And I have never reviewed any
25 animal studies nor, to the best of my recollection, have

1 I reviewed any reviews of the literature.

2 Q Okay. So that we can understand what we're
3 talking about, then, you on one or more occasions have
4 reviewed reports by Dr. Levinskass pertaining to human
5 studies?

6 MR. ANDREWS: Now --

7 A No. I have provided Dr. Levinskass with
8 reviews of human studies for inclusion in documents
9 which he was forwarding to other places.

10 MR. POHL:

11 Q Okay. I'm confused. Because what you did --
12 then was you provided data or information --

13 A I provided information and evaluation of
14 human studies to Dr. Levinskass.

15 Q Okay. I think I understand. And on how many
16 occasions did you do that?

17 A I'm trying to recall. To the best of my
18 knowledge, on this one occasion. I do not recall that I
19 did anything of this kind on any other occasion.

20 Q Okay.

21 On what Monsanto products have you done
22 epidemiological studies?

23 A On 2,4,5-T, acrylonitrile, and -- no others.

24 Q And were these studies of Monsanto's worker
25 population?

1 A Yes, they were.

2 MR. ANDREWS: Can we take about a ten-minute
3 break? I recognize that we got started early and we
4 haven't gone too far, but I need to take about a
5 ten-minute break.

6 MR. POHL: Sure. Let's do.

7 VIDEO OPERATOR: We're off the record.

8	[Recess]
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9 VIDEO OPERATOR: We've been off the record
10 for a short break. We're now back on the record. The
11 time is 10:14 a.m.

12 MR. POHL:

13 Q Dr. Gaffey, the 2,4,5-T, that's dioxin, is it
14 not?

15	A	No.
----	---	-----

16	Q	What is it?
----	---	-------------

17 A 2,4,5-T is a weed killer produced by -- at
18 that time by Monsanto.

19 Q Okay. And what is the name of that product
20 commercially?

21 A I don't know what the commercial name of the
22 product was nor do I know that it was sold commercially.

23	Q	Okay.
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24 Now, in connection with your review of a
25 Monsanto epidemiological study involving PCBs, did you

1 visit the Monsanto Krummrich plant?

2 A No, I did not.

3 Q Okay. Do you know where the Krummrich plant
4 is?

5 A Yes.

6 Q Is that outside of St. Louis?

7 A Yes.

8 Q In Sauget?

9 A That is correct.

10 Q Okay. Do you have any knowledge of an
11 epidemiological study that involved Monsanto workers who
12 worked at the Krummrich plant and who may have been
13 exposed to PCBs?

14 A Yes.

15 Q Okay. Who conducted that study?

16 A Mrs. Judith Zack and a Dr. David Musch,
17 M u s c h.

18 Q And did they publish a draft of their report?

19 A I'm not aware that any report was published.

20 Q Okay. By publish, I don't mean published in
21 final form in the official literature, but I mean
22 prepared in typewritten form.

23 A Yes.

24 Q They did do that?

25 A Yes.

1 Q And they submitted a copy of that to you?

2 A Yes.

3 Q And you reviewed it?

4 A Yes.

5 Q Okay. And did that report deal with workers
6 at Monsanto who had been exposed for one or more years
7 to PCBs?

8 A That is the best of my recollection, yes.

9 Q And were these workmen all hourly workmen?

10 A Yes, they were.

11 Q And were these all the types of workmen who-
12 were provided with all the normal safety equipment and
13 safety gear that Monsanto would have provided to its own
14 workmen during those times?

15 A I have no knowledge one way or the other of
16 that.

17 Q Any reason to believe that the workmen
18 involved in the Zack and Musch study did not receive the
19 benefits of Monsanto's normal safety program?

20 A I have no knowledge about them, because these
21 events occurred before I came to Monsanto.

22 Q Okay. And it's not the type -- and data with
23 regard to safety precautions provided by the employer
24 for these PCB workers is not the type of data that would
25 have been included in the files pertinent to this

1 report?

2 A I don't know whether it was included or not.

3 Q You didn't read the file?

4 A No, I did not.

5 Q Okay. You just read the typewritten report?

6 A That is correct.

7 Q Okay. Do you recall from your reading of the
8 report whether any foremen or management-level employees
9 were included within the study?

10 A To the best of my recollection, they were
11 not. -

12 Q Do you know whether all the workers included
13 in this study were male?

14 A I believe they were.

15 Q Do you know whether this study attempted to
16 include any workers who might have been indirectly
17 exposed to PCBs, that is, not exposed in the actual
18 process of manufacturing PCBs, but exposed in the
19 shipping department as a truck driver, as a rail car
20 worker?

21 A To the best of my knowledge, such people were
22 not included.

23 Q Okay. And in connection with the report of
24 this study by Zack and Musch, did you learn the length
25 of exposure of the workmen who were studied?

1 A If I did, I cannot now remember it.

2 Q Okay. Do you recall what the dose of
3 exposure was with regard to those workmen?

4 A No, I do not.

5 Q Do you recall if the study even attempted to
6 measure the dose of exposure?

7 A I don't recall that it did.

8 Q And do you recall whether or not the study
9 attempted to differentiate between different routes of
10 exposure?

11 A To the best of my knowledge, it did not. -

12 Q Okay. And you understand what I mean when I
13 say route of exposure, don't you?

14 A Yes, I believe I do.

15 Q Okay. And that can be exposure through
16 inhalation, skin contact or any number of other means.
17 Is that correct?

18 A That is my understanding.

19 Q Okay.

20 Now let me talk to you again about another
21 very general concept in epidemiological studies, and
22 that is the more complete the study in terms of
23 information gathered with regard to the group under
24 study, then the more reliable the results are likely to
25 be as a general rule?

1 A No.

2 Q Okay. Would you agree that within reason the
3 larger the size of the group that's being studied, the
4 more reliable the results would be statistically?

5 A All other things being equal, yes.

6 Q Okay. And in fact groups can become so small
7 that the results achieved from the epidemiological study
8 would be very questionable at best from a statistical
9 point of view. Is that correct?

10 A Not necessarily.

11 Q Okay. So there's no limit on the size of the
12 group in terms of smallness of numbers?

13 A Not from the point of view of the issues that
14 you have raised.

15 Q Okay. Well, as a layman maybe I've
16 inartfully worded it. Let's assume that of all the
17 workmen that Monsanto has that participated in its
18 production, distribution, sales of PCB products someone
19 chose to study ten workers at a plant. Would that be a
20 statistically valid study?

21 A Depending on the design of the study, yes, it
22 could be.

23 Q Okay. And if these were just ten people from
24 the general population of workers exposed to PCBs as
25 opposed to ten who had had a particular type of

1 purported adverse effect, would it still be
2 significantly valid, statistically valid?

3 A Yes. Statistical validity has nothing to do
4 with sample size.

5 Q Okay. And how does sample size affect the
6 validity of an epidemiological study?

7 A Sample size has no effect on the validity of
8 the study.

9 Q Okay.

10 Now, in trying to understand how a
11 statistical study would work of people who were exposed
12 to PCBs, are there different types of groups that can be
13 studied, such as groups who were exposed occupationally,
14 groups who are fish eaters and exposed because they eat
15 fish out of rivers or streams that have been polluted by
16 PCBs, groups who live near landfills that have been
17 contaminated by PCBs, or groups that are salvagers who
18 salvaged copper out of capacitors or transformers and
19 thus exposed their skin to the PCBs?

20 A The question was rather long. Could you
21 please repeat the beginning of that?

22 Q Sure.

23 MR. ANDREWS: I think the problem was it
24 wasn't a question, it was a statement. So if he will
25 make it a question, maybe you can answer it.

1 MR. POHL:

2 Q Are these the types of groups that can be
3 studied by an epidemiologist?

4 A Yes.

5 Q Okay.

6 Now, the human literature that you indicated
7 earlier that you had read, let me refer back to that,
8 please, Doctor. Does the human literature demonstrate
9 that PCBs cause adverse liver effects?

10 A No.

11 Q Okay. Does the human literature demonstrate
12 effects of PCBs on liver enzymes?

13 A Yes.

14 Q Does the human literature demonstrate adverse
15 skin effects?

16 A Yes.

17 Q And does the human literature demonstrate
18 melanoma?

19 A No.

20 Q Does the human literature demonstrate
21 increases in blood pressure as a consequence of PCB
22 exposure?

23 A No.

24 Q Does the human literature demonstrate adverse
25 pulmonary function as a consequence of PCB exposure?

1 A No.

2 Q Does the human literature demonstrate
3 leukemia as a consequence of PCB exposure?

4 A No.

5 Q Does the human literature suggest any of
6 those that you have said no to?

7 A Would you please tell me what you mean by
8 suggest?

9 Q Give indication of. For example, adverse
10 liver effects resulting from PCB exposure.

11 A I know of none.

12 Q Does the human literature demonstrate or
13 suggest arthritis as a result of PCB exposure?

14 A No.

15 Q And by the literature I mean literature --
16 any literature that you have read, including any change.
17 Okay?

18 A [Moving head up and down]

19 Q Okay.

20 Now, does the literature demonstrate malaise
21 as a consequence of PCB exposure?

22 A No.

23 Q Does the human literature demonstrate effects
24 on children born of parents exposed to PCBs?

25 A No.

1 Q And have you studied the European, American
2 and Japanese literature?

3 A Yes.

4 Q Does the literature demonstrate early
5 abortion as one of the consequences of PCB exposure?

6 A No.

7 Q Does it suggest that?

8 A No.

9 Q Have you studied paint workers exposed to
10 Aroclor products?

11 A No, I have never studied any PCB exposures.-

12 Q I'm asking you now if you've studied paint
13 exposures which included Aroclor products.

14 A No, I have not.

15 Q Okay. And did you conduct a study or
16 participate in a study of solvents, the solvents used in
17 paint?

18 A Not specifically.

19 Q In what way did you conduct such a study or
20 participate in such a study?

21 A I participated in a study of persons employed
22 in the manufacture of paints and coatings.

23 Q And do those paints and coatings include
24 solvents such as Aroclors?

25 A They include solvents. I do not know whether

1 they include the Aroclors or not.

2 Q And when did you participate in this study?

3 A To the best of my recollection, approximately
4 in 197 -- '76 or '77.

5 Q And who sponsored this study?

6 A The National Painting and Coating
7 Association.

8 Q And did you find any incidence of human
9 effects, health effects, resulting from exposure to
10 these products?

11 A I don't recall specifically what we found. -

12 Q Did you reduce your report to writing?

13 A The report was reduced to writing after I had
14 left the organization that did the study.

15 Q Okay. And was that report published?

16 A Yes.

17 Q And can you give us the citation so we can
18 find that?

19 A The citation is in my curriculum vitae. I
20 don't have a copy with me. I don't recall in which
21 journal it was, but there were multiple authors. The
22 senior author, I believe, was a Dr. Robert Morgan.

23 Q Can you furnish us a copy of your CV?

24 A Yes.

25 Q Okay.

1 Are you familiar with a study by C r y e s,
2 Cryes?

3 A Cryes, I believe, yes.

4 Q Cryes. And it pertained to Aroclor products?

5 A I thought it was a study of fish eaters.

6 Q Wasn't it a study of fish eaters who ate fish
7 that were contaminated by PCBs?

8 A Yes.

9 Q Okay. And where did these fish eaters live?

10 A In the town of Treana, Alabama.

11 Q And that's near Anniston, Alabama?

12 A I have no idea of the location.

13 Q It's a town by a river?

14 A So I've been told.

15 Q Okay. And does Monsanto now have or has it
16 ever had a plant in Alabama that manufactures PCBs?

17 A I've been told that Monsanto did have, yes.

18 Q What plant was that?

19 A I've been told that it's the Anniston plant.

20 Q In Alabama?

21 A In Alabama.

22 Q Okay. And what were the results of Cryes'
23 study of the fish eaters who had eaten fish contaminated
24 by PCBs?

25 A Her principal finding was that the most --

1 the facts most strongly associated with PCB blood levels
2 were age, sex, and amount of fish consumed. Among the
3 other factors that she investigated were cholesterol
4 levels and blood pressure. The first of these was found
5 to have been unassociated with PCB levels, the second
6 one appeared to be associated. This has not been
7 duplicated in any other study.

8 Q Okay. So what Dr. Cryes found was that
9 people who ate fish contaminated by PCBs had an effect
10 on their blood pressure as a consequence of eating these
11 contaminated fish?

12 A There was an association between average
13 blood pressure level and the level of blood PCBs, to the
14 best of my recollection.

15 Q And so I can understand that, Doctor, are you
16 telling me that the higher the level of PCBs in the
17 blood of one of the fish eaters, the higher that
18 person's blood pressure might be?

19 A On the average, yes.

20 Q Okay. And again, as I think we established
21 at the outset of your deposition, what you deal with as
22 an epidemiologist is the, quote, average?

23 A That is correct.

24 MR. ANDREWS: May I ask a question? Because
25 I'm a little confused here. I'm not sure that I'm

1 following the testimony.

2 It's my understanding that you were
3 responding to questions about the levels of PCBs in
4 someone's blood. But the last question had to do with
5 blood pressure. Am I just not following the testimony,
6 or have we got a mixture of apples and oranges here?

7 THE WITNESS: My understanding is that we
8 were talking about the relationship between blood levels
9 of PCBs and blood pressure.

10 MR. POHL: That's correct.

11 Q And your indication, I believe, was -- so we
12 can clear the record up, if there's any confusion, was
13 that Dr. Cryes, in her study, found a relationship
14 between the level of PCBs in a fish eater's blood and
15 that person's blood pressure. Is that correct?

16 A That is correct.

17 Q Okay.

18 As a general rule, epidemiologists do not
19 concern themselves with animal studies. Is that
20 correct?

21 A That is correct.

22 Q Okay.

23 In the study of the literature which you said
24 that you conducted, you indicated first of all that you
25 looked at the worldwide literature. Is that correct?

1 A All of it that was included in the major data
2 bases maintained by the National Library of Medicine.

3 Q Okay. And did you look at all the
4 literature, no matter how early or how late, or did you
5 look at specific time periods?

6 A I looked at all the literature that involved
7 epidemiology studies, no matter when those studies were
8 done.

9 Q Now let me ask you something about the nature
10 of your job and about why companies like Monsanto hire
11 people of your profession. First of all, Doctor, why —
12 would a company want to sponsor an epidemiological study
13 of its workers? What is the company's motivation for
14 doing that?

15 A I really can't state what the company's
16 motivation is. I can only state what has been told to
17 me in connection with these studies.

18 Q And what is that?

19 A They start for various reasons. Sometimes
20 there are indications in the animal literature that a
21 substance might be worth studying, sometimes there are
22 indications from industrial hygiene measurements that a
23 study of exposure or a study of certain plants should be
24 done.

25 Q So if a company sees an indication in the

1 animal literature, for example, that a product may cause
2 carcinomas in rats, then that is the kind of impetus
3 that could result in an epidemiological study by one
4 such as yourself?

5 A It could, yes.

6 Q Okay. Or if an industrial hygienist who
7 works for a company notices that a number of employees
8 who work around a particular product have an adverse
9 health effect such as chloracne, that could be another
10 impetus for another epidemiological study. Correct?

11 A Yes, that is correct. →

12 Q And since you've been employed by Monsanto,
13 Monsanto has never conducted an epidemiological study of
14 PCBs that you've been involved in. Is that correct?

15 A That is correct.

16 Q Okay.

17 And prior to the time that you were hired by
18 Monsanto, did Monsanto have an in-house epidemiologist?

19 A Yes.

20 Q Who was that?

21 A Mrs. Judith Zack.

22 Q How long had she been in Monsanto's employ?

23 A I am told that she was hired in 1977.

24 Q And when did she leave?

25 A To the best of my recollection, it was

1 approximately 1982 or '83.

2 Q What was her title when she left?

3 A Epidemiologist.

4 Q Okay. And did she report to you while y'all
5 worked at Monsanto together?

6 A Yes.

7 Q Okay. Prior to the time that you were
8 employed by Monsanto, and while she was there, do you
9 know whether or not there was anyone in Monsanto's
10 employ who was an epidemiologist besides Judith Zack?

11 A I don't know.

12 Q Prior to the time that you joined Monsanto,
13 did Judith Zack or anyone else at Monsanto conduct an
14 epidemiological study of Monsanto's PCB workers?

15 A I'm told that she did.

16 Q Did you ever read her study?

17 A Yes.

18 Q What were her conclusions?

19 A That there were no observable carcinogenic
20 effects associated with exposure to PCBs.

21 Q Did she attempt to define any other effects?
22 Or identify any other effects?

23 A I'm afraid I don't understand your question.

24 Q You say she concluded there were no
25 observable carcinogenic effects.

1 A The study was a study of mortality from all
2 causes. But the concern of the authors, I believe, was
3 primarily for cancers.

4 Q Do you know what precipitated Monsanto's
5 sponsoring of this epidemiological study?

6 A No, I do not.

7 Q Did you ever confer with Mrs. Zack about this
8 study?

9 A I conferred with her about some of the
10 details of the study report.

11 Q Was the report concluded in final form before
12 you were employed by Monsanto?

13 A I don't know.

14 Q What I'm getting at, Doctor: Did you help in
15 any way to put the report in final form?

16 A Yes.

17 Q Okay.

18 Other than the report or the study that was
19 done by Judith Zack, were there any other Monsanto-
20 sponsored epidemiological studies pertinent to PCBs?

21 A No.

22 Q Okay.

23 Are you familiar with what's known as the
24 latency period?

25 A Yes.

1 Q And certain chemicals have a latency period,
2 such as asbestos, benzene, even PCBs. Is that correct?

3 MR. ANDREWS: Doctor, I want to object just
4 for purposes of the record to that question as being
5 compound. And I just ask you to listen to his question,
6 and when he asks you a question like the last one that
7 is really three questions in one, it might be
8 appropriate to have him break it down.

9 A I wonder if you could repeat the question,
10 please.

11 MR. POHL: Sure.

12 Q I was asking you if various chemical
13 products -- and I identified three, asbestos, benzene,
14 PCBs -- have a latency period.

15 A Only if they are carcinogens.

16 Q Okay. Is there a latency period for
17 asbestos?

18 A I've been told there is.

19 Q What is your understanding of that latency
20 period?

21 A That in the case of some of the asbestos
22 effects it can be as long as 40 years. In the case of
23 some of the other asbestos effects, it can be as short
24 as, I believe, 10 or 15 years.

25 Q What is the latency period for leukemia

1 resulting from a significant or substantial exposure to
2 benzene?

3 MR. ANDREWS: Doctor, if you know the answer
4 to these questions, then you ought to give them, of
5 course. But I'd make an objection as to relevancy.
6 We're here to discuss PCBs, not other chemicals. To the
7 extent, however, that you have personal knowledge of
8 these matters, I want to permit you to answer them. But
9 I hope we don't intend to go down this trail too far,
10 because I don't see any relevancy.

11 A I don't know the answer to your question. →

12 MR. POHL: Okay.

13 Q What is the latency period for PCBs as a
14 cause of cancer?

15 A PCBs do not cause cancer.

16 Q Okay. So you wouldn't be familiar with any
17 latency period for PCBs, then?

18 A None exist, to the best of my knowledge.

19 Q Okay.

20 And just so we can be sure that we have an
21 understanding the court and jury can comprehend with
22 regard to latency period, tell us in your own words what
23 you mean by latency period.

24 A The interval from the time the exposure began
25 until death from the particular cause that is under

1 discussion.

2 Q And do you know whether or not PCBs are the
3 type of chemical that accumulate in the body?

4 A I have been told that they do, but I do not
5 know of my own knowledge.

6 Q Okay. Is that something that would be
7 significant to an epidemiological study?

8 A It could be.

9 Q Would it be particularly significant if you
10 were trying to do a chronic study?

11 A [No reply]

12 Q Let me approach the question this way. I
13 think you indicated earlier today that the duration of
14 exposure is an important factor to consider. Is that
15 correct?

16 A I meant --

17 MR. ANDREWS: I object to that as a
18 mischaracterization of his testimony. I think that he was
19 quite clear that it has an awful lot to do with the
20 design of the study and the purpose of the study, and
21 there were a whole series of variables that were
22 discussed earlier this morning. That's a
23 mischaracterization of what he said.

24 MR. POHL:

25 Q I understand you said several other things.

1 But one of the things you said was the duration of the
2 exposure. Is that correct?

3 A All other things being equal, one would
4 expect duration to be a relevant factor, if there is an
5 effect.

6 Q And so far as you know there's been no --
7 there is no accepted latency period for PCBs in your
8 profession. Is that correct?

9 A There is no accepted belief that PCBs are
10 causes of cancer, and therefore no opinions or
11 statements about latent periods. →

12 Q All right. So the answer to my question is
13 no?

14 A No.

15 Q Now, PCBs have been declared to be
16 carcinogenic in animals by various governmental
17 agencies, have they not?

18 A I don't know what has been done in animal
19 work. I've been told so.

20 MR. ANDREWS: Excuse me, Doctor. For
21 purposes of this deposition, this gentleman wants to
22 know what you have knowledge of. And he may want to
23 expand on that or he may not want to expand on that, but
24 you should try to answer the questions on what you know.

25 MR. POHL:

1 Q So there will be no confusion, I want you to
2 tell me the whole truth. And if somebody has told you
3 something and that's one of the things you know as an
4 epidemiologist and a Ph.D. and a researcher for
5 Monsanto, I want to know these other sources of
6 information as well, Doctor. Okay?

7 A Okay.

8 MR. ANDREWS: The problem with that
9 instruction, Doctor, is two-fold: First of all, I, too,
10 want you to be as truthful as you possibly can. And I
11 know you are trying to do that. But to the extent that
12 you start testifying as to what other people have told
13 you, then you sometimes get in an awkward position about
14 vouching for the veracity of what somebody else has
15 done. And I don't want you to do that, because you are
16 under oath, and I want you to be careful and truthful.

17 MR. POHL:

18 Q Now, you are aware, are you not, Doctor, that
19 the International Agency for Research on Cancer has
20 declared PCBs to be carcinogenic in animals, are you
21 not?

22 A That is not true.

23 Q What is your understanding of that?

24 A I beg your pardon. You -- What you said is
25 correct.

1 Q Okay.

2 And you are aware, are you not, Doctor, that
3 the manufacture and sale of PCBs is banned by law?

4 A I am aware of that.

5 Q And you are aware, are you not, that the
6 Toxic Substances Control Act states that PCBs are a
7 carcinogen. Is that correct?

8 A I am aware that the act so states.

9 Q Okay. And I take it from what you've
10 testified to already today as an epidemiologist you
11 disagree with the Toxic Substance Control Act statement
12 that PCBs are a carcinogen. Is that correct?

13 A I disagree with the statement that they are a
14 human carcinogen.

15 Q Okay. Are you expressing an opinion one way
16 or the other as to whether or not they are a carcinogen
17 in animals as found by the International Agency for
18 Research on Cancer?

19 A I have no opinion on that matter.

20 Q Okay. That's because you don't concern
21 yourself with the animal studies. Is that correct?

22 A I'm not an expert in animal studies.

23 Q Okay.

24 What contaminants, if any, do Monsanto's
25 Aroclor products contain?

1 A I have no idea.

2 Q Okay. And did that ever come up in any of
3 the -- or was it ever revealed in any of the literature
4 which you read regarding the human PCB studies?

5 A No, it was not.

6 Q So then that's not something you can comment
7 on?

8 A That is correct.

9 Q Okay.

10 Are you able, Doctor, to rule out PCBs as a
11 possible cause of human cancer? →

12 A Yes.

13 Q And what enables you to do so?

14 A The results of four studies of human exposure
15 to PCBs and the resulting mortality experience of those
16 people.

17 Q Okay. And which four studies are those?

18 A 1. An untitled study by Anita K. Bahn
19 which was the subject of a letter to the New England
20 Journal of Medicine.

21 2. A study of mortality in capacitor workers
22 by a David Brown and a Mr. Jones from the National
23 Institute for Occupational Safety and Health.

24 3. A study of Monsanto workers employed in
25 the manufacture of PCBs by Judith Zack and David Musch.

1 And a study of Italian capacitor workers by a
2 group of authors headed by a man named Bertazzi. That's
3 B e r t a z z i.

4 Q And are there any studies which -- the
5 results of which is contrary to these four upon which
6 you rely?

7 A No, there are no other studies that are
8 contrary.

9 Q Okay. And so it's the consensus among
10 epidemiologists, and your opinion as well, that you can
11 rule out PCBs as a possible cause of cancer in humans?--

12 A It is my opinion, and I believe that it is a
13 consensus among epidemiologists.

14 Q Okay.

15 Have you made any efforts to reconcile your
16 opinion with the animal toxicology studies that have
17 been conducted on PCBs?

18 A I have not looked at the toxicology studies
19 that have been done.

20 Q Did you read any of them?

21 A No, I did not.

22 Q Okay.

23 In your discussions with Dr. Paul Wright at
24 Monsanto, did you discuss his studies or his
25 participation in studies of Monsanto's Aroclor products?

1 A No, I did not.

2 Q Did you ask him any questions about what he
3 had observed in his studies of Monsanto's Aroclor
4 products?

5 A No.

6 Q Are there any -- Is there any published
7 literature that -- suggesting that there is a direct
8 relationship between PCB exposure and a particular type
9 of cancer?

10 A I know of none.

11 Q Okay. Even in the four that you have cited--
12 to us, they don't document any particular type of cancer
13 resulting from exposure to PCB in human populations?

14 A None of them agrees as to the site of cancers
15 that are found.

16 Q Well, do they separately note different sites
17 of cancer in the populations they studied?

18 A Yes.

19 Q For example, what are some of the types of
20 cancers which they separately found?

21 A The study by Bahn found two deaths from
22 melanoma, which were found in none of the other studies.

23 Q Is melanoma a skin cancer?

24 A It is a skin cancer, yes.

25 Q Is it generally considered to be a serious

1 form of skin cancer?

2 A Yes.

3 Q Okay. So Bahn found melanoma, but none of
4 the other three studies found melanoma in the human
5 populations exposed to PCBs. Correct?

6 A That is correct.

7 Q What about the study by Brown and Jones?
8 What cancers, if any, did they find in the worker
9 studies that they conducted?

10 A They found nonstatistically significant
11 excess of liver cancer which was largest -- the excess--
12 was largest in the group with the shortest exposure.

13 Q They found lesions in the livers of humans
14 exposed to PCBs?

15 A No. They looked at cause of death and they
16 found that the risk of death from liver cancer was
17 lowest in the people with the longest exposure to PCBs
18 and highest in the people with the shortest exposure to
19 PCBs.

20 Q So, in the study conducted by Brown and
21 Jones, they found that an acute exposure of PCBs rather
22 than a chronic exposure of PCBs was more likely to
23 result in liver cancer. Is that correct?

24 A They passed up several opportunities to say
25 that, and therefore I do not believe that they concluded

1 that.

2 Q Would that being a reasonable assumption,
3 based on their study, to you as an expert?

4 A No.

5 Q Okay.

6 Now, what type of cancer did Zack and Musch
7 find?

8 A The -- They found lung cancer.

9 Q And again that was a type of cancer found by
10 Zack and Musch that was not found by the authors of the
11 other three studies that you have cited to us this
12 morning. Is that correct?

13 A That is correct.

14 Q And was there any particular type of lung
15 cancer that Zack and Musch found in their study of human
16 beings exposed to PCBs?

17 A No.

18 Q Okay.

19 Now, you mentioned another -- the fourth that
20 you mentioned was a man named Bertazzi. Is that
21 correct?

22 A That is correct.

23 Q Did the Bertazzi study find any cancers in
24 the human beings that they studied?

25 A Yes. They found an excess mortality from all

cancers. In fact, in the group studied by Bertazzi, most of whom were women, he found an excess mortality from all causes of death among the women. And examining the study makes it seem very probable that the excess existed because the standard rate against which he compared his people was too low.

Q Okay. So in Bertazzi's study of a human population exposed to PCBs he found an excess of all types of cancers. Is that correct?

A Yes. And in women he found an excess of all types of mortality.

Q All right. Now --

A From all causes.

Q Okay. And so I can understand this, are you telling me, then, that in Bertazzi's study, where he found an excess of all types of cancers in the worker populations exposed to PCBs, that would have included things like the melanoma found by Bahn, the liver cancer found by Brown and Jones, and the lung cancer found by Zack and Musch?

A I don't remember specifically what Bertazzi found, because I don't believe he listed the cancers with any degree of detail. So there was no reference to melanomas, no reference to liver cancer, and, to the best of my recollection, no reference to lung cancer.

1 Q So, to summarize then, Doctor, in the four
2 studies that you have cited to us in your deposition
3 today by name, there was a finding of skin cancer in one
4 study, liver cancer in another study, lung cancer in yet
5 another study, and an increased risk of all forms of
6 cancer in the fourth study of workers exposed to PCBs.
7 Is that correct?

8 A That is correct.

9 Q Okay.

10 In conducting an epidemiological study
11 generally of people exposed to PCBs, what would it mean
12 to you as a Ph.D. epidemiologist if one of the
13 particular persons under study had an increased level of
14 PCBs in his blood?

15 A I can't evaluate what that would mean,
16 because I wouldn't study a person in the course of doing
17 a study, I would study a group of people.

18 Q Okay. I understand. That was my mistake,
19 because we cleared that up before. You don't study
20 individuals in the type of work you do. Is that
21 correct?

22 A That is correct.

23 Q Okay. Well, let's assume there's a group of
24 people and this is your study group. What could you
25 conclude if you found that nine out of the ten people in

1 your group had at least a moderately high level of PCBs
2 in their blood?

3 A I would conclude that they had probably been
4 exposed to PCBs.

5 Q Okay. And if you had a fat sample taken from
6 the people in this same study group and that fat showed
7 that these people had PCBs in their fat, what would you
8 conclude from that?

9 A Again, that they had probably been exposed to
10 PCBs.

11 Q If people show PCBs in their fat, would -
12 that -- would those PCBs be generally distributed
13 throughout the body?

14 A That I don't know.

15 MR. POHL: Okay.

16 Would you number these next four documents as
17 the next numbered exhibits?

18 [Exhibit 2 marked]

19 [Exhibit 3 marked]

20 [Exhibit 4 marked]

21 [Exhibit 5 marked]

22 MR. POHL: Would you also mark this document
23 as the next numbered exhibit?

24 [Exhibit 6 marked]

25 MR. POHL:

1 Q As an epidemiologist, Dr. Gaffey, if a
2 manufacturer makes a statement that, "At ordinary
3 temperatures Aroclors have not presented industrial
4 toxicological problems," is that the type of general or
5 blanket representation that can be made in the absence
6 of an epidemiological study?

7 A Yes.

8 Q Okay. And you would agree that that's a
9 proper procedure?

10 A I agree that that sort of statement can be
11 made whether or not an epidemiology study has been done.

12 Q Okay. So a manufacturer of a product can
13 draw conclusions such as that Aroclors have not
14 presented industrial toxicological problems without
15 conducting an epidemiological study upon which to base
16 that conclusion. Correct?

17 A Would you read the particular sentence to me
18 again, please?

19 Q Yes, sir, I will. It reads: "At ordinary
20 temperatures, Aroclors have not presented industrial
21 toxicological problems."

22 A That seems to me to be an observation on the
23 physical nature of the substance, and as far as I can
24 see has nothing to do with health effects or
25 epidemiology.

1 Q Industrial toxicological problems doesn't
2 make any reference to health effects, in your opinion?

3 A Neither in my opinion nor anybody else's.

4 Q Okay. The bottom line, then, is that as an
5 epidemiologist you would have no problem with a
6 manufacturer making that representation without
7 conducting an epidemiological study upon which to base
8 it. Is that correct?

9 A I would have no trouble with that particular
10 representation.

11 Q Let me read to you another representation. -
12 I'm reading from Gaffey Deposition Exhibit 2, which has
13 previously been identified as Plaintiff's Exhibit 172.
14 This will be under the caption on Page 4 of that
15 document entitled "Use Ordinary Personal Precautions."
16 Let me read this to you, Doctor. "Transformer Askarel
17 has been made, handled, and used for over 30 years
18 without causing toxic or other ill effects. It can be
19 handled with only minor precautions." Did you
20 understand that?

21 A Yes.

22 Q Okay. Now, is that the type of
23 representation or comment that can be made by a
24 manufacturer without having an epidemiological study
25 upon which to base that statement?

1 A That's a statement about industrial hygiene
2 levels and could be made by reference to an industrial
3 hygiene establishment, yes, that can be made without
4 reference to epidemiological studies.

5 Q Okay. But no question in your mind that the
6 statement that I read you, when it speaks of ill
7 effects, is talking about health effects. Is that
8 correct?

9 A I understand that to mean health effects,
10 yes.

11 Q And because it talks about personal
12 precautions, you understand that this refers to health
13 effects in human beings?

14 A I assumed that it did.

15 Q Okay.

16 Let me read to you a small segment from
17 Plaintiff's Exhibit No. 124 and Gaffey Deposition
18 Exhibit 3. It reads as follows: "Aroclor is the
19 registered trademark for a range of chlorinated
20 polyphenols manufactured by Monsanto. These compounds
21 are manufactured in this country and have been used
22 safely in industry throughout the world for 30 years."
23 Did you understand that?

24 A Yes.

25 Q Okay. Is that the type of comment that can

1 properly be made by a manufacturer without the support
2 of an epidemiological study?

3 A Would you read the statement again, please?

4 Q Yes, I'll be happy to, Doctor. "Aroclor is
5 the registered trademark for a range of chlorinated
6 polyphenols manufactured by Monsanto. These compounds
7 are manufactured in this country and have been used
8 safely in industry throughout the world for over 30
9 years."

10 A That's a question of fact which has nothing
11 to do with health effects and therefore has nothing to
12 do with epidemiology.

13 Q Okay. And when the statement contained in
14 Plaintiffs' No. 124 refers to used safely in industry
15 throughout the world for over 30 years, in your opinion
16 that has nothing to do with health effects?

17 A Nothing to do with health effects other than
18 what might be found in an acute situation.

19 Q Is this statement somehow limited to acute
20 exposure, since it talks about the effects of 30 years?

21 A Well, I don't know what was in the minds of
22 the people who wrote that. I have no problem myself
23 with it.

24 Q Okay. That's all I'm trying to establish,
25 Doctor. You have no problem with a company properly

1 making this type of representation and drawing this type
2 of conclusion without first conducting an
3 epidemiological study upon which to base this
4 conclusion. Is that correct?

5 A I think that would depend very much on when
6 the statement was made. But in general, yes, that is my
7 position.

8 Q Okay.

9 Doctor, I'm going to refer to Plaintiffs'
10 Exhibit No. 196 and what has been marked as Deposition
11 Exhibit 4 to your deposition. Let me read to you the -
12 following statement found on Page 002532 of that
13 document. I'm quoting: "Askarel fluids have been
14 manufactured, handled, and used for over 30 years
15 without encountering toxic or ill effects." Did you
16 understand that statement?

17 A Yes.

18 Q And is that the type of statement that could
19 be properly made by a manufacturer without first
20 conducting an epidemiological study?

21 A In common with the other statements of this
22 kind that you have read to me, they are statements which
23 are true. I have no problem with them because I do not
24 believe that PCBs or any trade name or label for them
25 constitute a health problem. The statement that's made

1 there is, to the best of my belief, a true statement.

2 Q Okay. And is not the kind of statement that
3 would require the support of an epidemiological study
4 before the manufacturer could make such a
5 representation?

6 A I cannot say about that. But the existence
7 of the epidemiology studies proves that the statement is
8 true.

9 Q I'm not asking that question, though, Doctor.
10 I just want to find out, as I did in these other
11 instances when I quoted from documents, whether or not--
12 in your opinion the manufacturer would have to first
13 conduct an epidemiological study before it could
14 properly make such a representation.

15 A Not in the context in which these are being
16 mentioned here, no, I do not believe so.

17 Q Okay.

18 And I've got one more document to look at. I
19 want to ask you the same question. But before I do, in
20 one of your immediately-preceding responses you said
21 that in your opinion PCBs have no -- or did you say that
22 PCBs, in your opinion, have no adverse human health
23 effects?

24 A That is what I said.

25 Q Okay. Then that's your opinion as an

1 epidemiologist working for Monsanto?

2 A No. I would have to qualify that by saying
3 that PCBs have been shown to be associated with
4 dermatitis at high levels.

5 Q Okay.

6 And would you then disagree with the
7 testimony of anyone who said that severe exposure to
8 PCBs could cause problems with the liver or problems
9 breathing, problems with the gastrointestinal tract?

10 A I would disagree with all of those
11 statements.

12 Q Okay.

13 And would you disagree with the statement
14 that PCBs in high levels of exposure or severe exposure
15 can cause loss of hair?

16 A I disagree with that statement.

17 Q Okay.

18 Would you disagree with the statement that
19 PCB exposure at high levels can cause skin
20 discoloration?

21 A Yes, I disagree with that.

22 Q And would you disagree with the statement
23 that PCB exposure at high levels can cause a hardening
24 or turning under of the fingernails?

25 A I disagree with that also.

1 Q Okay.

2 And let me turn to Plaintiffs' Exhibit

3 No. 197, which has been marked as Exhibit 5 to your

4 deposition. This is a statement similar to that

5 contained in some of the other Monsanto documents I've

6 already quoted to you. But let me cover this one as

7 well. It reads as follows, and I'm quoting:

8 "Transformer Askarel has been made, handled, and used

9 for over 30 years without causing toxic or other ill

10 effects." Again, is this the type of statement that can

11 be properly made by the manufacturer of such a product-

12 without first conducting an epidemiological study?

13 A I think -- yes, I think it is.

14 Q Okay.

15 Doctor, speaking generally again about

16 epidemiological studies -- and let's assume that we're

17 studying a group of workers, two groups of workers who

18 are involved in handling PCB products, and let me ask

19 you if the following fact which I'm going to relate to

20 you would cause a difference in the result of such a

21 study. Okay?

22 A Okay.

23 MR. ANDREWS: Let me ask a question for my

24 own clarification. Are you now going to ask him a

25 series of questions about cause and effect of variables?

1 Because I think you've established quite clearly that
2 he's not qualified to answer those questions, he's
3 qualified to answer questions about studies.

4 MR. POHL: This is about studies, Steve.

5 Q Are you ready to proceed?

6 A Yes.

7 Q Okay.

8 Let's assume that in one study the workers
9 who are handling the PCBs have various types of
10 protections provided to them by their employer and those
11 protections include but are not limited to protective -
12 clothing, skin creams, bathing, including hand-washing
13 and face-washing facilities, rubber booties or rubber
14 shoes and other things. And let's assume that the other
15 group of workers who handle PCB product are provided
16 with no protective clothing, with the possible exception
17 of white cotton gloves. Would you expect that the
18 results of your epidemiological studies would vary as
19 between these two groups?

20 A No.

21 Q Let me try to reconcile that, Doctor, with
22 your prior testimony today. We've talked about a number
23 of the factors that you considered. I asked you a
24 question a few moments ago, as well as did your lawyer,
25 about the duration of the exposure, and while it wasn't

1 the only factor, it was one of them.

2 MR. ANDREWS: I object to the form of the
3 question in that it contains a statement that the
4 testimony has to be reconciled. I don't think it has to
5 be reconciled at all. His testimony has been clear and
6 unequivocal, and it wasn't an answer -- it wasn't a
7 question, it was a statement.

8 MR. POHL:

9 Q And one of the other factors that we talked
10 about earlier this morning was the amount of the
11 exposure. Correct? -

12 A Yes.

13 Q And we detailed that somewhat because we
14 talked about dose and we talked about route of exposure
15 and so forth. Do you recall that testimony?

16 A Yes.

17 Q Okay.

18 Now, let's assume that in the first group
19 that I have described to you, the group that was
20 provided the protective clothing, the rubber shoes, the
21 gloves, the skin cream, that the amount of exposure was
22 significantly less because the workmen just simply
23 didn't get it on their bodies, that is, the protective
24 clothing or the barrier creams or other safety
25 precautions prevented that type of exposure; and let's

1 assume in the second group that there was substantial
2 exposure and that the men had no safety equipment or
3 clothing or, alternatively, extremely minimal safety
4 equipment or clothing. Are you telling me that in those
5 two instances there would be no variance or significant
6 difference between the results to be achieved from an
7 epidemiological study of those two groups?

8 A I don't think that was the question you asked
9 me earlier. I wonder if I could hear the earlier
10 question back. Because I think what you asked me was
11 whether there would be a difference between the results
12 observed in the studies.

13 Q Okay. Maybe I've misstated it. Ignore the
14 first question, then, and just answer the latter
15 question I've just asked.

16 A I would want to study people with a
17 substantial exposure in order to evaluate the effects of
18 the substance that I was concerned with.

19 Q Okay. So if in the first group that we've
20 hypothesized the exposure was either minimal or
21 virtually none as a consequence of protective clothing
22 or other safety precautions provided by the
23 manufacturer, then that would not be the type of group
24 you would want to study to determine the effects of
25 exposure?

1 A All other things being equal, I would prefer
2 a more heavily-exposed group.

3 Q Okay. So what you would prefer as an
4 epidemiologist, if you were trying to conduct a study to
5 determine the effects of exposures of human beings to
6 PCBs, would be a group that was actually exposed in that
7 it got the PCBs on their skin or inhaled them. Is that
8 correct?

9 A Not quite. If I were interested in the
10 question of whether exposure to PCBs could cause a
11 health problem, I would want to look at heavily-exposed
12 people. If I wanted to ask the question "Does exposure
13 as it currently occurs constitute a health problem," I
14 would look at people who have the protections that are
15 ordinarily given to workers.

16 Q I think I understand that.

17 Now, when you deal in averages, as we've
18 discussed in your epidemiological studies, the actual
19 effect of a chemical on an individual worker may vary
20 from your average. Is that correct?

21 A That is usually the case, yes.

22 Q Okay. And what I'm getting to, Doctor, is
23 that some people -- and you know this as an
24 epidemiologist -- some people are going to be affected
25 more adversely by exposure to a chemical than other

1 people.

2 A That's generally agreed upon, yes.

3 Q And what you do in your epidemiological
4 studies is you look to the average of the effects of the
5 exposures of these people to a particular chemical?

6 A That is essentially correct.

7 Q And the fact that the average person exposed
8 to a particular chemical has a certain result doesn't
9 mean that a particular individual might not have a
10 different or more severe effect from exposure to a
11 chemical. Is that correct?

12 A Epidemiology studies don't make statements
13 about individuals, they make statements about groups of
14 people measured, if you will, by the mean of something.

15 Q I understand. My question, I think, was a
16 little simpler than that, and that is that while the
17 average effect as found by one of your epidemiological
18 studies resulted from exposure to a particular chemical
19 may be a certain type of health effect, that does not
20 mean that an individual worker might not have a
21 different and even a more severe health effect in his
22 individual case.

23 A That is true. But it would also have to mean
24 that that was balanced by a worker who had less effect
25 in order to create the average that I would get.

1 Q Exactly. So -- and I think that -- I'm glad
2 you stated that, Doctor. So that what you have is, in
3 an epidemiological study, an average, and individuals
4 may vary from that average either by a small amount or
5 by a great amount. Is that correct?

6 A One can't rule out that possibility.

7 Q Okay. And so because you've concluded in an
8 epidemiological study that PCBs do or don't cause a
9 particular type of adverse health effect, that does not
10 rule out that an individual exposed to PCBs may or may
11 not have a certain health effect resulting from exposure
12 to PCBs?

13 A That can never be ruled out by any
14 epidemiology study.

15 Q Okay.

16 Now, also in an epidemiological study, if a
17 worker hadn't gone through the latency period applicable
18 to a particular chemical product, then you wouldn't
19 expect in that particular study that that worker's case
20 would demonstrate causation?

21 A That is correct.

22 Q Okay.

23 Now, are you familiar with a study done of
24 Mobil Oil Company workers in Trenton, New Jersey?

25 A I believe that's the study by Professor Bahn.

1 Q Okay.

2 A The one that we discussed earlier involving
3 melanomas.

4 Q Okay. And you indicated, I believe, that her
5 study was not published.

6 A That is correct.

7 Q Okay. And, again, what type of cancers did
8 Bahn find in the Mobil Oil Company workers?

9 A She stated that she found two deaths from
10 melanomas.

11 Q Okay. That's the skin cancer?

12 A That is correct.

13 Q Is it possible, Doctor, that even though an
14 epidemiological study does not show a statistically-
15 significant health effect in the group of individuals
16 who were studied that an educated professional such as a
17 company doctor or an industrial hygienist might
18 nevertheless observe adverse health effects in
19 individual workers?

20 A An industrial hygienist doesn't look at
21 health effects, he looks at the level of exposure.
22 Whether an astute company doctor could find something
23 out, I do not know.

24 Q You wouldn't be able to express an opinion on
25 that one way or the other?

1 A I would not.

2 Q Okay.

3 Are you familiar with the epidemiological
4 studies that have attempted to compare smoking and lung
5 cancer?

6 A Yes.

7 Q Okay. And I take it you are aware, then,
8 that there are studies which have concluded that there
9 is a link between smoking and lung cancer.

10 A I am aware of those studies, yes.

11 Q Studies conducted by competent
12 epidemiologists?

13 A Yes.

14 Q Are you also aware that there are studies
15 conducted by epidemiologists working for cigarette
16 manufacturing companies that have found no link between
17 smoking and lung cancer?

18 A No. I am not aware of that.

19 Q All right. So are you indicating to me that
20 as among epidemiologists there is no longer any
21 disagreement between whether or not smoking in the human
22 population can result in lung cancer?

23 A No, I'm not indicating that.

24 Q Okay. Is there still disagreement?

25 A I believe there is.

1 Q Okay. And are some epidemiologists taking
2 the position that in their studies smoking appears to
3 result in lung cancer?

4 A There are epidemiologists who are taking that
5 position, yes.

6 Q Are there epidemiologists who take the
7 contrary position?

8 A Yes.

9 Q Okay. So there are areas in epidemiology
10 where trained professionals can have a disagreement?

11 A Yes.

12 Q And, in the case of cigarette smoking, rather
13 pronounced disagreement. Correct?

14 A Yes.

15 Q Okay. So that reasonable people or
16 reasonable minds could disagree about the results of
17 epidemiological studies. Correct?

18 A No one who disagrees would characterize
19 himself as unreasonable. So I suppose I must agree with
20 you.

21 Q Okay.

22 Now, other than the variables that we've
23 talked about earlier today about the duration of
24 exposure, the route of exposure, and so forth, are there
25 any other -- and the size of the group being studied,

1 what other variables are there that you can tell me that
2 might affect the outcome of an epidemiological study,
3 generally speaking?

4 A The duration of follow-up.

5 Q Anything else, Doctor?

6 A That's about the only one I can think of.

7 MR. POHL: Okay.

8 Steve, it's 11:30. Can you check the office
9 to see if you've got those documents ready for me?
10 Maybe, if you do, we could just take a very short lunch
11 break, grab a sandwich, then we can just finish this up.
12 I don't have much more, Doctor. I can be through in
13 another half hour at the outside.

14 MR. ANDREWS: I've got a phone message here
15 from Jon. It's likely that's what he's calling about.
16 So why don't we take a break here and I'll call him and
17 see what's going on.

18 MR. POHL: Okay. I'll just wait here till
19 after you've talked to him.

20 VIDEO OPERATOR: Off the record.

21 [Recess]

22 VIDEO OPERATOR: This is the continuing
23 deposition of Dr. William R. Gaffey. We've been off the
24 record for a lunch break. The time is 12:39 p.m. and
25 the date is June 3rd, 1987. We're back on the record.

1 MR. POHL:

2 Q Doctor, this is the continuation of your
3 deposition following the lunch break. Before we get
4 started, I understand that there are some documents
5 pertinent to the deposition that are going to be
6 unavailable today, but you and your attorney and I have
7 talked about that off the record and we will try to
8 review those documents as soon as we can, if necessary,
9 resume your deposition at a time convenient to all
10 parties. And place.

11 A I understand. -

12 MR. ANDREWS: I don't know, just for purposes
13 of the record, whether or not the documents are
14 pertinent to his deposition. We were just simply
15 requested to produce them, and we've been unable to do
16 so. But I agree with you that, if necessary, we will
17 reconvene the deposition, hopefully when we're in
18 St. Louis doing other matters.

19 MR. POHL: Would you mark this as the next
20 numbered exhibit, please?

21 [Exhibit 7 marked]

22 MR. POHL:

23 Q Dr. Gaffey, you've had an opportunity to
24 review Gaffey Exhibit No. 7, have you not?

25 A Yes, I have.

1 MR. POHL: Okay.

2 MR. ANDREWS: May I look at it just for a
3 second? I was out of the room when he was looking at
4 it.

5 MR. POHL: Sure.

6 Q One of the items that this document discusses
7 is the medical department's attention to support
8 business group efforts. What does that mean to you?

9 A I have no idea. This is three, four years
10 before I joined the company. I have no idea what it
11 means. -

12 Q Okay.

13 The second paragraph of this document notes
14 that questions from outside Monsanto have required the
15 organization of epidemiological studies. Are those --
16 To your knowledge, were there more than one
17 epidemiological study conducted?

18 A Not to my knowledge, no.

19 Q Okay. The document concludes with the
20 sentence: "We will have to do much more epidemiology in
21 the future although clear-cut conclusions are almost
22 impossible." What is Dr. Roush implying or stating when
23 he says that clear-cut conclusions are almost
24 impossible?

25 MR. ANDREWS: Excuse me.

1 A I have no idea.

2 MR. POHL:

3 Q Does Dr. Roush have any training in
4 epidemiology himself?

5 A I don't know whether he has had formal
6 training or not.

7 Q Now, you indicated earlier today that you
8 helped review or contribute information towards
9 Dr. Levinskys's rather lengthy paper on PCBs. Is that
10 correct?

11 A Yes.

12 Q Okay. And that paper, I believe, was done
13 during the time that you were employed by Monsanto. Is
14 that correct?

15 A Yes.

16 Q At the time that you contributed information
17 towards Dr. Levinskys's paper, were you the head of
18 epidemiology at Monsanto?

19 A Yes.

20 Q And at the same time was Dr. Levinskys the
21 head of toxicology at Monsanto?

22 A I believe he may have been retired at that
23 time. We're talking now about September of 1986, I
24 believe.

25 Q Was there also a paper that he had done in

1 1981?

2 A I'm not aware of any.

3 Q Okay. But Dr. Levinskis, immediately before
4 his retirement, had been the head of the toxicology
5 department at Monsanto?

6 A That is correct.

7 Q Okay. So you and he were coequal in that you
8 were both in subsections or subdepartments of the
9 medical department. Correct?

10 A That is correct.

11 Q And you both reported to Dr. Roush, who was-
12 the chairman of the medical department?

13 A Yes.

14 Q Okay.

15 Now, we talked very briefly right before
16 lunch about your study of a product known as 2,4,5-T.

17 A Yes.

18 Q I asked you if there was a name for that, or
19 commercial name, and you didn't recall any?

20 A That's correct.

21 Q Okay. What was the purpose of that study?

22 A An earlier study had shown no effects
23 resulting from short-term, high-level, acute exposure.
24 We wanted to look at the effect of long-term, low-level
25 exposure to 2,4,5-T. And to do that, we conducted the

1 mortality study that I referred to.

2 Q Okay. Is this a study that Monsanto
3 sponsored itself, or was it a study that was done in
4 conjunction with other manufacturers of the same
5 product?

6 A Monsanto did this on its own.

7 Q Okay. What was the name of the study that
8 you were comparing? What study did you refer to in your
9 prior answer?

10 A The initial study was done by Judith Zack and
11 Raymond Suskind. I forget the title, but it appeared in
12 the January 1980 issue of the Journal of Occupational
13 Medicine.

14 Q At the time that you did your study of
15 2,4,5-D -- sorry, T, did you understand that dioxins
16 were a part of or contaminant of 2,4,5-T?

17 A I understood that they were a possible
18 contaminant at some times in the past, yes.

19 Q At the time that you reviewed the literature
20 of the possible human health effects of exposure to
21 PCBs, did you understand what the contaminants of PCBs
22 were or might have been?

23 A I understood from my reading on the Yusho
24 case what some of the contaminants of the Japanese PCBs
25 might have been.

1 Q And the Japanese PCBs are known as Kanechlor?

2 A I believe so.

3 Q Okay. And you understood that Kanechlor had
4 some contaminants?

5 A Yes.

6 Q Okay. And what were they?

7 A By the time the product was consumed by
8 Japanese, there were dibenzofurans and another class of
9 chemicals whose name I forget.

10 Q Okay. But in the Japanese studies which you
11 read as part of your review of the PCB issue, you were-
12 aware that dibenzofurans were a contaminant of the PCB
13 product which the Japanese and the Taiwanese people were
14 exposed?

15 A I became aware of that as -- in the course of
16 my reading, yes.

17 Q Okay. Did you do any reading on the
18 contaminants that might be contained in Monsanto's
19 Aroclor product as compared to the Japanese Kanechlor
20 product?

21 A No. My interest in the Japanese product was
22 because the issue was raised by the Japanese
23 investigators who were looking at the Yusho incidents.
24 I made no attempt to investigate further than what I
25 found in the Japanese accounts.

1 Q From your reading of the Japanese accounts,
2 were you able to determine or draw any conclusion
3 whatsoever as to whether or not it was the PCBs or the
4 dibenzofurans that were causing the illnesses reported
5 in the Japanese literature?

6 A The Japanese investigators ended up
7 concluding a decade or so after the event that the Yusho
8 incident was probably primarily caused by contaminants,
9 most likely dibenzofurans. This evidence came from
10 assorted studies that they had done.

11 Q And the Japanese studies concluded that there
12 were various effects, human health effects, from the
13 exposure of these PCB products and these contaminants,
14 dibenzofurans, such as early abortions, respiratory
15 problems, arthritis and others as well. Is that
16 correct?

17 A I'm aware that such problems were reported,
18 yes.

19 Q Okay. And in your opinion, then, the
20 conclusion that you draw from that is that those human
21 health effects were more likely caused by the
22 dibenzofurans as opposed to the PCBs themselves?

23 A I accept the conclusion of the Japanese
24 investigators that that is the case.

25 Q Okay. And you have no opinion one way or

1 another as to whether or not the Monsanto Aroclor
2 products contained dibenzofurans as an acknowledged
3 contaminant thereof?

4 A I have no opinion or knowledge one way or the
5 other.

6 Q So no study or investigation that you did and
7 no review of the literature that you did would enable
8 you to opine on Monsanto's Aroclor products as a human
9 health hazard to the extent that such product contained
10 dibenzofurans as a contaminant?

11 A That is correct. -

12 Q Okay.

13 Now, we talked very briefly about
14 environmental effects of PCBs, and I asked you about
15 some cases you had worked on, and you mentioned the one
16 about -- up in Oregon, I believe it was, in the -- where
17 EPA had filed a lawsuit against Monsanto and others in
18 the Outboard Marine case. Is that correct?

19 A I gave a deposition in connection with that
20 case, yes.

21 MR. POHL: Okay.

22 MR. ANDREWS: Excuse me, Doctor. Was that in
23 Oregon?

24 THE WITNESS: I'm sorry, it was in --

25 MR. POHL:

1 Q Where was that?

2 A In fact, the deposition was given in Chicago.

3 The issue was, I believe, concerning the Waukegan

4 Harbor, Waukegan, Illinois.

5 Q All right.

6 Doctor, do you know what the background or

7 environmental exposure levels of PCBs are?

8 A Would you please -- Could you be more

9 specific by what you mean by background?

10 Q Sure. What is the -- is there -- Are there

11 PCBs that have contaminated the environment? -

12 A Yes.

13 Q Okay. And there are PCBs floating around out

14 there in rivers and in lake beds and soil, so forth?

15 A They've been found in a large number of

16 places.

17 Q They've been found in fish, they've been

18 found in mothers' milk, they've been found in animal

19 tissues. Correct?

20 A That's correct.

21 Q Okay. And is there a level or is there a

22 body burden of PCBs for the population generally?

23 A There are detectable levels of blood PCBs in

24 most people. I don't know what the level is, because

25 the value you get depends a little bit on what

1 analytical technique you use. It could be anywhere up
2 to 30 parts per billion, I suppose, depending on where
3 you are, how old you are, how much fish you eat, and
4 what analytic method was used.

5 Q Okay. What would be the range, then, of
6 that? The body burden.

7 A That I really don't know. I have read or
8 been told that figures can range up to about 30 parts
9 per billion, but I don't know any more about the
10 variability than that.

11 Q Okay. And at the 30 parts per billion, is -
12 that any particular group of people such as the fish
13 eaters in Alabama or the people who resided adjacent to
14 landfills contaminated with PCBs?

15 A I don't know what groups of people were
16 referred to in getting that figure.

17 Q All right.

18 Do you have any idea what the -- You're from
19 St. Louis?

20 A Yes.

21 Q Okay. What would be the average body burden
22 of your typical St. Louis, Missouri, office worker?

23 A I have no idea.

24 Q Okay. Would you have any idea what the body
25 burden of PCBs would be of the typical resident in

1 mid-America?

2 A No. No.

3 Q At what level are you as an epidemiologist
4 able to distinguish between the body burden that someone
5 would have just as an ordinary member of the population
6 from that which might be caused by exposure to PCBs in
7 the workplace?

8 A I know that workplace studies have shown
9 values which frequently run above one or two hundred
10 parts per billion, up possibly to eight or nine hundred
11 parts per billion, but I can't be more precise than
12 that.

13 Q Okay. And how many parts per million would
14 100 to 200 parts per billion?

15 A It would be .2 parts per billion.

16 Q .20 -- .02?

17 A 0.2.

18 Q Okay. So 100 to 200 parts per billion of
19 PCBs in the blood would be 0.2 parts per billion. Is
20 that correct?

21 A 200 parts per billion would be 0.2 parts per
22 million.

23 Q Okay. And the high that you described is 800
24 to 900 parts per million. How many parts per million
25 would that be of PCBs in the blood?

1 A That would be .8 to .9 parts per million.

2 Q And again these levels, 0.2 to 0.9, would be
3 levels of PCBs in the blood of the individual that would
4 indicate to you, Doctor, occupational exposure to this
5 chemical?

6 A Those levels have been found in
7 occupationally-studied populations.

8 Q Okay. And do you accept that?

9 A Yes.

10 Q Okay.

11 The PCBs that you have described that are -
12 generally in the environment that are in the blood of
13 the population generally, do you know as an
14 epidemiologist how that has affected the rate of cancer
15 in this country generally?

16 A I know that during the time when this sort of
17 contamination was increasing the mortality from cancer
18 other than lung has been decreasing. I know nothing
19 more than that.

20 Q Okay. Well, I'm not asking about the
21 mortality. I'm really asking, Doctor, about the
22 incidence of cancer. Has that been decreasing?

23 A I don't know.

24 Q So, from what you know as a Ph.D. in
25 epidemiology and from all the literature you've read,

1 the worldwide literature about PCBs, you don't know what
2 the effect of PCBs in the blood of the general
3 population has on the incidence of human cancer in this
4 country?

5 A Either it has no effect or it has an effect
6 which is hiding a rather spectacular decrease. My point
7 is that in a period in which the exposures to these PCBs
8 are increasing, mortality has been decreasing.

9 Q Okay. And by mortality you mean the deaths
10 resulting from --

11 A That is correct.

12 Q -- a case of cancer?

13 A [Moving head up and down]

14 Q Okay. You are not intending to imply by that
15 that somehow PCBs are what's curing people of cancer?

16 A No. Also, in the last 20 or 30 years the
17 trends in survivorship from cancer have not changed
18 much.

19 Q So in the last 20 or 30 years the various
20 medical techniques that are used in curing or abating
21 cancer have not resulted in any significant medical
22 gains in that regard?

23 A That is correct.

24 Q Okay.

25 A Generally speaking.

1 [Exhibit 8 marked]

2 MR. POHL:

3 Q Dr. Gaffey, I've made a xeroxed copy for the
4 court reporter of this little pamphlet you gave me. Is
5 this pamphlet that I'm showing you -- let me pass it to
6 you -- is that a chapter or part of a larger work?

7 A Yes. This is a chapter from a book which
8 represents the proceedings of a symposium.

9 MR. ANDREWS: Excuse me. I know we haven't
10 been back on the record very long, but I would like to
11 take just a very short break at this point.

12 MR. POHL: Certainly.

13 VIDEO OPERATOR: We're off the record.

14 [Recess]

15 VIDEO OPERATOR: We've been off the record
16 for a short break. We're back on the record. The time
17 is now 1:02 p.m.

18 MR. POHL:

19 Q What symposium was this, Doctor?

20 A It was a symposium held by the Michigan State
21 University on, I believe, health problems in the
22 environment.

23 Q Were you the only one who presented a paper
24 on PCBs at that particular symposium?

25 A I can't recall. I can't recall.

1 Q And was this a one-day symposium or one-week
2 symposium or --

3 A I believe it was a one- or two-day symposium.

4 Q Okay. Who sponsored the symposium?

5 A I believe it was sponsored by EPA.

6 Q And are they the ones that requested that you
7 attend and speak?

8 A I believe I was requested to attend by the
9 organizers of the symposium.

10 Q The EPA?

11 A The people who organized the symposium with-
12 EPA funds.

13 Q Who were they?

14 A I'm trying to remember their names. One of
15 them was named D'Itri, D ' I t r i. I forget the name
16 of the other person.

17 Q And what was the date of the symposium?

18 A I can't remember, but I believe it was in
19 1982 sometime.

20 Q This was after Monsanto had stopped
21 manufacturing PCBs?

22 A Yes.

23 Q Okay. And why was Monsanto interested in
24 having you participate in a symposium on PCBs in 1982?

25 A I don't know whether Monsanto was interested

1 or not.

2 Q Was this something that was done outside the
3 scope of your employment at Monsanto?

4 A No.

5 Q And did you obtain clearance for your
6 presentation at this seminar from Dr. Roush or anyone
7 else at Monsanto?

8 A I informed Dr. Roush of the request and my
9 interest in accepting it.

10 Q And he concurred?

11 A He concurred.

12 Q All right. And then you proceeded at that
13 point to publish this paper that has been marked as an
14 exhibit to your deposition?

15 A I proceeded to give the paper at the
16 symposium.

17 Q And was the paper prepared especially for the
18 symposium?

19 A No.

20 Q Well, why had the paper -- had a paper
21 already been prepared at the time you were asked to
22 speak at the symposium?

23 A Yes.

24 Q Okay. And when had the paper been prepared?

25 A The main outlines of the paper had been

1 prepared about a year or a year and a half before, to
2 the best of my recollection.

3 Q Okay. And why had this paper on the
4 epidemiology of PCBs been prepared a year earlier?

5 A I received a call from a person named Fawcett
6 from the American Chemical Society who was organizing a
7 session on epidemiology for the annual meeting of that
8 society. The members had expressed interest in hearing
9 about chlorinated organic compounds, and he had come in
10 some way upon my name and asked me if I would be willing
11 to talk about them. And it occurred to me that a good-
12 and easy topic to prepare would be one on PCBs. In the
13 process of doing it, I found a great deal more
14 literature than I had thought, and so I proceeded to do
15 a rather complete review based on that literature, in
16 addition to the rather brief presentation that I made at
17 the meeting.

18 Q All right. I note in your paper, on
19 Page 285, the page numbered 285, under Table 3, the
20 following sentence, which commences with the first full
21 paragraph on that page: "In summary, body burdens of
22 PCBs are clearly related to the level of exposure to
23 environmental PCBs." Do you find that, Doctor?

24 A Yes, I see that.

25 Q Okay. What do you mean by that?

1 A I mean that people who are exposed generally
2 have higher blood levels of PCBs than people who were
3 not exposed.

4 Q Okay. Well, here you're talking about
5 exposure to environmental PCBs. Are you talking about
6 the general PCBs that exist in some of our waterways, in
7 fish or meat that we might eat or in milk that we might
8 drink?

9 A No. I'm referring to the measurements of
10 exposure that occurred in the studies that I reviewed.

11 Q Then are you referring to some of the
12 measurements, for example, that the Swedish published
13 noting the persistence of PCBs in the environment?

14 A No. Because those were not epidemiology
15 studies.

16 Q Okay. Well, are you making reference, then,
17 to occupationally-exposed persons?

18 A I'm making reference to the series of studies
19 which I reviewed in this particular paper, some of which
20 were occupational and some of which were not.

21 Q Okay. And those that were not, were they
22 environmental exposures?

23 A Yes.

24 Q Okay. And by environmental exposures do you
25 mean some concentrated exposure that exists in the

1 environment because individuals were members of groups,
2 for example, that lived adjacent to landfills
3 contaminated by PCBs, or do you mean just the population
4 in general?

5 A Neither of those groups was represented in
6 any of the studies that I looked at here.

7 Q Okay. Well, I'm trying to figure out what
8 you mean by the exposure to environmental PCBs. What
9 groups are you referring to?

10 A To one study of a population which included
11 people who used fertilizer made from sewage sludge which
12 contained PCBs; a second study of sports fishermen who
13 ate fish whose PCB levels were unusually high.

14 Q All right. And the sports fishermen who ate
15 fish that had high levels of PCB, were these saltwater
16 fish or freshwater fish?

17 A These were freshwater fish.

18 Q All right. And the people that you talked
19 about who used sludge contaminated with PCBs, was that
20 the study where people used sludge from a local
21 community that was contaminated with PCBs and used it as
22 fertilizer for their gardens?

23 A Yes.

24 Q Okay. And they then ate the vegetables,
25 tomatoes and radishes, that grew in that garden and

1 ingested PCBs. Correct?

2 A That is correct.

3 Q Okay. Were there any adverse health effects
4 found in the group that ingested the tomatoes and
5 radishes and whatever else there might be that had been
6 grown as a consequence of PCB-contaminated sludge
7 fertilizer?

8 A No adverse health effects were found in that
9 group.

10 Q Was there any evidence of adverse health
11 effects, even though none were concluded?

12 A No. None is reported in the reported study.

13 Q Okay. And how many people were studied in
14 that particular study?

15 A I don't know. I would have to look and see
16 whether I've included it in my review.

17 Q Okay. Do you recall the name of the study?
18 I know you --

19 A The senior author was Baker.

20 Q Okay. That's the second study on your list?

21 A That is the second study in my Table 4.

22 Q All right. It says under physiological
23 parameters -- it has the letter Y. What does that mean?

24 A That means that physiological parameters were
25 looked at and an association was found with blood levels

1 or some other measure of exposure to PCBs.

2 Q Okay. And what was the specific finding in
3 that study?

4 A I would have to look at what I've got here to
5 see. I classified them in various categories which I
6 can't now recall.

7 Q Okay. Could you do that just briefly?

8 A The study in question found no abnormalities
9 in liver function, no relationship of cholesterol to
10 blood PCBs, no relationship with the number of symptoms
11 such as weight loss, anorexia, fever, headache, eye -
12 irritation, cough, shortness of breath, nausea,
13 vomiting, diarrhea, abdominal pain, arthralgia, and
14 persistent rash.

15 Q Was that found in some of the other studies?

16 A Some of those were found in the Yusho study.

17 Q Okay. And that's the one that you
18 distinguished because the literature indicates to you
19 that it was -- that the contamination of the PCBs by
20 dibenzofurans played a large part in that incident?

21 A That is correct.

22 Q Okay.

23 Have you found the part yet you were looking
24 for on Baker?

25 A I am looking for the part on physiological

1 parameters, and -- Ah. Baker found an increase in
2 triglyceride levels with increasing blood PCBs.

3 Q And what is the effect of an increase in the
4 triglyceride level?

5 A I am unable to say. I'm aware that it's a
6 physiological parameter whose difference was found. I
7 do not know what, if any, is the effect.

8 MR. POHL: Okay.

9 Would you mark this?

10 [Exhibit 9 marked]

11 MR. POHL:

12 Q Let me pass to you now Exhibit No. 9 to your
13 deposition and ask you to look at this letter from you
14 to David Brown, as well as the accompanying report, and
15 see if you can identify these documents.

16 MR. ANDREWS: I'll look over your shoulder
17 here, Doctor, if you don't mind.

18 THE WITNESS: You may.

19 MR. ANDREWS: Would you like him to look
20 through the report that's attached to it as well?

21 MR. POHL: Sure.

22 Q Do you want to thumb through it, Doctor --

23 A Okay.

24 Q -- and see if you can identify it?

25 MR. ANDREWS: Doctor, if Mr. Pohl intends to

1 ask you some questions about that report, and I assume
2 that he does, I would rather that you not thumb through
3 it but take whatever time you feel is necessary to be
4 able to respond to his questions accurately.

5 THE WITNESS: All right.

6 I want to verify that, as far as I can tell,
7 it's indeed the study that we've been talking about as
8 the Zack and Musch study. It appears to be, yes.

9 MR. POHL: Okay.

10 Q Is that a study that you reviewed while you
11 were employed at Monsanto? -

12 A Yes.

13 Q Okay. And this is one that was done by
14 Judith Zack?

15 A That is correct.

16 Q And she's not a Ph.D., is she?

17 A No, she is not.

18 Q Okay. What was the purpose of this report
19 prepared by her?

20 A I don't know, since it originated before I
21 came to Monsanto. My concern was with the quality of
22 the resulting report.

23 Q Okay. Well, I notice that one of the things
24 she does is she reviews some of the literature like
25 Yucheng, she reviews Yusho, starting, for example, on

1 Page 3 of her report.

2 A Yes.

3 Q Okay. So she reviews some of the literature,
4 then she goes on to talk about a study of 2,567
5 capacitor plant workers exposed to PCBs. Is that
6 correct?

7 A It's correct that she makes a reference to
8 such a study, yes.

9 Q And in her reference, which has been marked
10 as Exhibit No. 9 to your deposition, she says in
11 connection with that study that there were excesses of-
12 liver and rectal cancer deaths. Is that correct?

13 A She does say that, yes.

14 Q Then she goes on to conclude that even though
15 there were such deaths she doesn't consider them
16 statistically significant. Is that correct?

17 A I don't believe she said she did not consider
18 them. I think she said they were not statistically
19 significant.

20 Q What she writes is that they were not
21 statistically significant?

22 A Yes.

23 Q Then she goes on to note on Page 5 another
24 study of 1,310 workers from a capacitor-manufacturing
25 plant with at least six months employment. Do you see

1 that?

2 A Yes.

3 Q She says there that a statistically-
4 significant excess of deaths from all cancer in males
5 was found. Is that correct?

6 A That's what it says, yes.

7 Q Okay. And she says that the study suggested
8 but did not find statistically-significant excesses in
9 deaths due to digestive system cancers in males. Is
10 that correct?

11 A She does say that, that is correct. -

12 Q And malignancies of lymphatic and hemato --
13 what?

14 A Hematopoietic.

15 Q Tissue. Is that correct?

16 A It does say that, yes.

17 Q And what is hemato, whatever you called it,
18 tissue?

19 A The blood-forming organs, essentially.

20 Q Okay. And what are malignancies of that
21 organ? What does that mean in layman-like terms? Is
22 that like a malignancy of the lymph node or of the bone
23 marrow, or what?

24 A Yes, it's a -- it's a type of cancer.

25 Q Okay. Usually when I think of cancer, people

1 tell you you've got cancer of the skin or cancer of the
2 liver or cancer of the lungs. What is that a cancer of?

3 A The tissues that produce blood.

4 Q Okay. Is that inside the bone, in the bone
5 marrow?

6 A I don't know.

7 Q Okay. And what about malignancies of the
8 lymphatic tissues? Is that the lymph glands?

9 A It is the lymph glands.

10 Q Okay.

11 And Judith Zack, in her study, looked at ---I
12 believe these are Monsanto PCB workers, are they not,
13 this group that she's referring to on the bottom of
14 Page 6 of her study?

15 A That is correct.

16 Q Okay. In her study of the Monsanto PCB
17 workers, she states on Page 7 that she found diseases of
18 the circulatory system which accounted for almost half
19 of the deaths. Is that correct?

20 A That's correct.

21 Q And she excluded from that arteriosclerotic
22 heart disease. Is that correct?

23 A That's correct. That's what she says, yes.

24 Q Okay. And did she also find among the same
25 worker population at Monsanto that lung cancer accounted

1 for 75 percent of the deaths due to malignant neoplasms?

2 A That's what she says, and I assume that is
3 correct.

4 MR. POHL: Let me show you what's been
5 previously marked as Plaintiffs' Exhibit 574, and let me
6 also ask the court reporter to mark it as the next
7 numbered exhibit to this deposition.

8 [Exhibit 10 marked]

9 MR. ANDREWS: While he's doing that, Mr.
10 Pohl, would you hand me the last exhibit that you were
11 looking at? -

12 MR. POHL: Certainly.

13 Q Can you identify this letter dated December
14 14, 1981?

15 A I haven't seen this -- I saw this yesterday
16 in Mr. Andrews' office, but I had not seen it
17 previously.

18 Q Okay. And what do you know about this
19 letter, if anything?

20 A Nothing.

21 Q Okay.

22 Prior to looking at Exhibit No. 10 yesterday
23 in Mr. Andrews' office, did you know that information
24 with regard to your paper on the epidemiology of PCBs
25 had been transferred to the Environmental Protection

1 Agency?

2 A Yes.

3 MR. POHL: I'll pass the witness.

4
5 EXAMINATION BY

6 MR. ANDREWS:

7 Q Dr. Gaffey, I have a few questions for you
8 this afternoon. First of all, I'd like you to locate
9 Exhibit No. 8, if you would.

10 A Yes, I have Exhibit No. 8.

11 Q And just for consistency within the
12 deposition, would you identify what that document is
13 again?

14 A It says "Chapter 20, the Epidemiology of
15 PCBs, William R. Gaffey, Monsanto Company, St. Louis,
16 Missouri, 63167."

17 Q All right. Now, did you write that document?

18 A Yes, I did.

19 Q And as far as you can tell from your
20 examination of it, is it a true and correct copy of the
21 document that you wrote on or about the date indicated?

22 A With one trivial difference. In the original
23 document that I wrote, there were -- oh, I beg your
24 pardon. No, this is a correct copy. This is exactly
25 the same. Exactly the same.

1 Q Is there a date on that document?

2 A No, there is not.

3 Q Can you tell me approximately when you wrote
4 the document?

5 A It would have been in 1980 or '81, I believe.

6 Q Now, what was the purpose of your undertaking
7 a review of the literature so as to write this document?

8 A I originally intended to give a much rather
9 brief review of the literature with respect to cancer,
10 because I knew that that collection of documents was
11 small and manageable and would be appropriate topic for
12 a 15-minute talk before a chemical group.

13 Q All right. Now, this was in response to the
14 request --

15 A It was in response to a request from a
16 Mr. Fawcett, who was a session organizer for the
17 American Chemical Society.

18 Q Now, what did you do in response to that
19 request?

20 A I started out to search the literature for
21 PCB studies of cancer, and as a by-product turned up
22 with a rather long list of studies of all kinds of
23 health effects of PCBs. I prepared the presentation
24 that I gave to the American Chemical Society, and at the
25 same time took advantage of the literature search to

1 prepare a comprehensive review, which included the work
2 that I had done for the American Chemical Society.

3 Q Now, I notice that there's a bibliography
4 attached to this exhibit.

5 A Yes.

6 Q And what does that include?

7 A That includes health studies -- pardon me.
8 It includes epidemiology studies of the relationship
9 between PCB exposure and various measures of ill health,
10 it includes a couple of studies which I included as
11 examples of the kind of thing I was not going to put in,
12 and one or two technical references.

13 Q How many articles are represented in the
14 bibliography?

15 A I don't have a count here, but there were
16 about 22 studies, I believe; and there are probably some
17 26 or 27 references, because some of them included, as I
18 say, things that I gave as examples of things that I was
19 not going to include.

20 Q Did you make an attempt to do a comprehensive
21 review of the status of the literature in order to write
22 this paper?

23 A Of the literature of studies of human beings,
24 yes.

25 Q Now, Mr. Pohl asked you some questions

1 earlier about some of the studies that you have reported
2 in this paper.

3 A Yes.

4 Q Specifically, he asked you a few questions
5 about the Brahn study. Do you address the Brahn study
6 in Exhibit No. 9?

7 A Are you referring to the study which reported
8 two melanomas?

9 Q Yes, sir.

10 A The Bahn study, yes, I do address it here.

11 And --

12 Q Would you turn to that section of your paper,
13 please?

14 A I address it on Page 292 in that study.

15 Q Now, specifically, what did that study show?

16 A It showed 3 cases of melanoma out of 92
17 workers in a research and development position in a
18 refinery where there was thought to be exposure to PCBs.

19 Q Now, was that study ever published?

20 A No, it was not; in fact, it was withdrawn.

21 Q Now, why was it withdrawn?

22 A The reason was that doubt had arisen as to
23 the accuracy of the exposure classification of the
24 subjects. In other words, people weren't sure whether
25 they really had a group of people exposed to PCB or not.

1 Q Is that type of information important in
2 understanding the validity of a scientific study?

3 A Yes, it is, if the study alleges a positive
4 result.

5 Q I take it by your earlier response that,
6 because of the question surrounding whether or not the
7 individuals were actually exposed, this paper was
8 withdrawn. Is that correct?

9 A That is correct.

10 Q In your mind, does that cast doubt on the
11 validity of the findings?

12 A It does. I have other reasons to question
13 the validity of this particular finding.

14 Q What other reasons do you have?

15 A It's not clear either from the original
16 letter to the New England Journal of Medicine or from
17 the discussion in the NIOSH criteria document whether
18 this group of workers was being studied because they
19 were exposed or because they had an excess of melanoma.
20 If it was the second case, then the author is in the
21 position of saying "There's too much melanoma; let's go
22 look and see if there's too much melanoma." I'm not
23 suggesting that shouldn't be done, I'm simply suggesting
24 that any of the usual calculations about statistical
25 significance go by the board if you looked at a

1 population because they were sick rather than because
2 they were exposed.

3 Q Were there questions raised about the reason
4 for the study?

5 A I'm not aware that any questions were raised.

6 Q You were also asked some questions about the
7 Brown and Jones study.

8 A Yes.

9 Q Do you also address that in your paper?

10 A Yes, I do. There are two comments about the
11 Brown and Jones study. One of them, of course, is that
12 the excess was not statistically significant.

13 Q Now, what excess are we talking about?

14 A We're talking about the excess of liver
15 cancers, which is frequently talked about as the main
16 finding of the Brown and Jones study.

17 Q All right. Now, when you use the phrase that
18 the liver cancer findings were not statistically
19 significant, what does that phrase mean?

20 A Because the population that we're studying is
21 a finite number, the number of deaths from liver cancer
22 that we see will be subject to some random variation.
23 And when we say that a result is not statistically
24 significant, we mean essentially that the number that's
25 observed is within the range that could be expected as a

1 result of chance variation.

2 Q Now, with that definition in mind, how does
3 that impact on the scientific validity of a study?

4 A It certainly weakens the validity of the
5 study. And in fact it was given by Brown as a reason
6 for updating the study several years later.

7 Q Now, in addition to the statistical
8 insignificance of the finding, was there also another
9 finding in the Brown and Jones study that was of note to
10 you?

11 A Yes. The fact that the observed excess of
12 liver cancer deaths was greatest in people with the
13 shortest exposure. In other words, it violated the
14 usual ground rules for inferring occupational
15 association, which is that if a little bit is bad, a lot
16 is worse. And here we find a situation in which the
17 deaths occurred more often in people with short exposure
18 than in people with long exposure.

19 Q From that relationship, are
20 epidemiologists -- or can epidemiologists make a
21 conclusion as to whether or not the exposure to the PCBs
22 were causing disease?

23 A The pattern of -- of liver cancer deaths here
24 is not consistent with PCBs as a causal factor. It
25 might conceivably be consistent in slight extent with

1 PCBs as a protective factor.

2 Q Let's turn now to the Bertazzi study that
3 Mr. Pohl asked you about earlier. I think there was an
4 indication or you testified earlier that in that study
5 there was an indication of excess mortality from all
6 causes of death. Is that correct?

7 A That is correct.

8 Q Now, would that also include cancer?

9 A It included cancer, heart disease, accidents,
10 infectious diseases, all causes. My first reaction was
11 that the news was too bad to be true in the sense that a
12 typical experience in occupational studies is that if
13 there is an occupational cancer it will generally be
14 lung cancer or a group of closely-allied cancers, and
15 it's not at all uncommon to find people even like
16 uranium miners who have a substantial excess mortality
17 from a particular cause, lung cancer, whose overall
18 mortality is not much different from what you would
19 expect. Here we have a group whose every -- overall
20 mortality was more than double what was expected. No
21 such cohort has ever been seen in the history of
22 occupational epidemiology.

23 Q Sometimes, Doctor, you use terms that are
24 very familiar to you but are not very familiar to those
25 of us who are not epidemiologists. Could you tell the

1 jury what the term "cohort" means?

2 A Yes. A cohort is a group of people who are
3 identified as having been exposed at a particular time
4 and who are then followed to see whether disease
5 develops in that population.

6 Q During the course of time that you were
7 reviewing the Bertazzi studies, did you make any
8 comparisons of his mortality rate with other cohorts or
9 known populations?

10 A Yes, I did.

11 Q What was the purpose in doing that?

12 A It was my belief, based on what I've seen of
13 Bertazzi's work, that he himself is a capable and
14 competent epidemiologist. I therefore speculated that
15 the excesses that he found, which were, as I say,
16 suspiciously universal, might have been due to some
17 problem with the comparison group that he used, the
18 group against which he compared. So what I did was I
19 looked at the mortality rates in the comparison group
20 that Bertazzi used. This was a group the mortality
21 rates among Italian women in a nearby city. And I
22 compared them with mortality rates for white males in
23 the United States. And the average rate that Bertazzi
24 got for his study was equal to the rate for females age
25 15 to 19 in the United States. In other words, if

1 Bertazzi had done his study in the United States, in
2 order to get those results, his work force through the
3 entire course of their working would have had to have
4 been under the age of 20. I concluded, therefore,
5 either:

6 A. The mortality of Italian women is
7 spectacularly lower than that of United States white
8 females, or

9 B. The Italian public health authorities are
10 not as diligent in identifying deaths as Dr. Bertazzi
11 was for the group in his study.

12 Q Now, based on those conclusions and the
13 defect that you observed in the mortality rates, what
14 does that lead you to conclude about the study insofar
15 as it purports to find an excess of mortality for all
16 causes?

17 A I doubt that it really exists. The
18 difficulties I pointed out are true for the rates for
19 females, but females are the majority of Bertazzi's
20 cohorts. And until that doubt is cleared up, I'm
21 skeptical of the reality of the excess mortality.

22 Q All right. Now, if, as you have suggested,
23 there is this excess mortality for all causes, what
24 impact does that have on any relationship between
25 exposure to PCBs and disease?

1 A If that excess is real, it's the only finding
2 of its kind in existence. And I don't know what it
3 means. It certainly -- it's a spectacular finding,
4 because, if my recollection is correct, these women had
5 something over twice the expected mortality from all
6 causes. That excess sticks out like a sore thumb. And
7 it's inconceivable that one would find it there and not
8 find it in any other studies.

9 I think in summary there's another
10 characteristic of these studies which is not a
11 characteristic of any one of them particularly, and that
12 is that the studies among themselves show no
13 consistency; that is, the --

14 Q Well, let me ask you a couple of questions
15 about that. Is consistency of findings from one study
16 to another important in validating a scientific theorem
17 or a scientific hypothesis?

18 A It's certainly important in the case of
19 epidemiology studies.

20 Q Why is that?

21 A Because the studies themselves are not
22 experimental, so that one cannot control the conditions
23 of observation precisely, as one can, for example, in
24 toxicology studies. Therefore, the next best thing is
25 to try and rule out the effect of various complicating

1 biases by looking at the studies -- looking at different
2 studies done under different circumstances at different
3 times. And that issue of consistency has been brought
4 up, has been listed as one of the essentials for
5 inferring causal relationship by the International
6 Agency for Research in Cancer and by two or three
7 epidemiologists. These groups differ from one another
8 slightly in the details of what they present as their
9 requirements, but they all agree on consistency.

10 Q Doctor, if exposure to PCBs in fact had no
11 effect on human health, what would you expect these
12 studies that we've been discussing by Bahn, Brown and
13 Jones, Zack, and Bertazzi to show?

14 A I'd expect them to show pretty much what they
15 did show. In other words, in any -- if one does a study
16 of a group with no particular exposure and no particular
17 excess risk, and if, as is typically the case in these
18 follow-up studies, one looks at all causes of death,
19 then one expects that a certain number of these deaths
20 will occur in apparent excess. And if I found a study
21 that showed no excesses from any cause of death, I
22 wouldn't believe it. Because I would say chance
23 requires that some of these be greater. And that's just
24 what we have here. We have a sporadic excess, no excess
25 that occurs in one study is found in any of the others.

1 Q And is that the lack of consistency from
2 study to study that you were referring to earlier?

3 A Precisely.

4 Q And what does that lack of consistency
5 demonstrate to you as an epidemiologist?

6 A I think that what we're seeing here is the
7 noise level that one would expect in a study of groups
8 of people with no particular hazard.

9 Q What does noise level mean?

10 A The random variation that results from the
11 fact that sample sizes are not infinitely large.

12 Q Do the results of all the studies that we've
13 been talking about -- are those results consistent with
14 an hypothesis that PCBs are having no effect on human
15 health?

16 A Absolutely.

17 Q Have any epidemiological studies ever shown
18 any relationship between PCB exposures and cancer?

19 A No.

20 Q Mr. Pohl asked you some questions earlier
21 about individuals as opposed to averages. And I think
22 you will recall your testimony about epidemiologists
23 dealing with averages.

24 A Yes.

25 Q If a study shows -- an epidemiological study

1 shows that there is no evidence of a link between PCBs
2 and disease, is it likely that an individual who's
3 exposed to PCBs will develop any disease?

4 A No, it is not likely.

5 Q Mr. Pohl asked you some questions about the
6 Zack study, which has been marked as Exhibit No. 9,
7 insofar as it related to heart disease. Do you recall
8 those questions?

9 A Yes, I do.

10 Q Was there any attempt in the Zack study to
11 correlate those findings with known risk factors of
12 heart disease?

13 A No.

14 Q What are those factors?

15 A Well, certainly smoking, cholesterol level,
16 weight, blood pressure. I think there is -- there are
17 some ethnic differences, but I'm less sure about them.

18 Q Without an attempted correlation of those
19 items, is the finding of heart disease statistically
20 significant?

21 A Well, it may be statistically significant,
22 but it's not substantively significant, it's not
23 important.

24 Q Can you explain the difference between those
25 concepts?

1 A The -- when we talk about the statistical
2 significance of something, we're talking about whether a
3 difference is real. When we talk about the substantive
4 significance, we're saying: Is the difference big?
5 A difference can be real and yet be so small that nobody
6 would have any particular concern about it or any worry
7 about it. I think the difficulty we have here also is
8 that with four deaths we can't really -- we can't answer
9 the questions that we would like to have answered about
10 the pattern of mortality. All we can say is it's big.
11 We really can't say anything about latency, anything -
12 about duration.

13 Q Does that have to do with the sample size?

14 A Yes.

15 MR. ANDREWS: I'll pass the witness.

16
17 FURTHER EXAMINATION BY

18 MR. POHL:

19 Q You just mentioned latency, didn't you?

20 A Yes.

21 Q Didn't you tell me this morning that in your
22 opinion there was no latency period as it affected PCBs?

23 A That's right.

24 Q Okay. Have you ever testified differently
25 under oath?

1 A No.

2 Q Okay. You are sure you haven't testified
3 that the latency period for PCBs was 15 to 20 years?

4 A Not that I can recall.

5 Q Do you recall when you testified in the
6 Bad Axe case?

7 A I recall that I gave testimony there, yes.

8 Q Do you recall that Mr. Jungerheld examined
9 you in that case?

10 A Yes, I remember Mr. Jungerheld.

11 Q Do you recall when Mr. Jungerheld asked you
12 the question: How long a latent period do you think we
13 need to look at for PCBs as a cause of cancer?

14 A That's a different question.

15 Q Why is that question different?

16 A Because you asked me if there were a latent
17 period for PCBs. In order for there to be a latent
18 period, one must assume that PCBs are a carcinogen.
19 What Mr. Jungerheld was asking was: How long a period
20 would I require to elapse in order to investigate the
21 issue of whether or not PCBs were a carcinogen.

22 Q So the question I asked you about the latency
23 period for PCBs and the question I asked you more
24 specifically this morning about the latency period for
25 PCBs as a cause of cancer is different than the question

1 that Mr. Jungerheld asked you at trial?

2 A Yes. Your question presupposes the
3 assumption that PCB is a carcinogen. His question is:
4 What would it take for you to investigate whether or not
5 it was a carcinogen?

6 Q Well, in response to his question of what was
7 the latency period, about how long a latency period do
8 you think we need to look at for PCBs as a cause of
9 cancer, what is your answer?

10 A If I wanted to find out whether or not PCBs
11 were a cause of cancer, I would have to -- I would want
12 to look at a latent period of 15 to 20 years.

13 Q All right. And then, as an epidemiologist,
14 for you to determine whether or not a group of workers
15 had a statistically-significant increase in cancer as a
16 cause of exposures to PCBs, you would have to look at
17 those workers after the latency period. Correct?

18 A That is correct.

19 Q Okay. So if you looked at the workers
20 earlier than this 15- to 20-year period you just
21 testified about, that would jeopardize the validity of
22 the examination, would it not?

23 A If you lumped all those data together, it's
24 possible that your effect would be diluted by the
25 short-term observations. Those people with a latency

1 period of less than 15 years or whatever.

2 Q And why is the latency period for the
3 possible cause of cancer of people by PCBs so long?

4 A I made that estimate because that is typical
5 of latent periods for cancers that are supposed to be
6 chemical in origin.

7 Q In other words, that's a typically-accepted
8 latency period?

9 A A study with a shorter latency period would
10 be criticized by most people because there could be a
11 longer latent period.

12 Q Remember when we talked this morning about
13 benzene exposure?

14 A I recall that we did, yes.

15 Q Okay. In your opinion, Doctor, from the
16 epidemiology work that you have done as a Ph.D., can
17 benzene exposure in large amounts lead to leukemia?

18 A Are you asking me on the basis of studies
19 that I have done?

20 Q On the basis of any knowledge that you have
21 in your head.

22 A I believe that large doses of benzene can
23 cause leukemia.

24 Q Okay.

25 Are you familiar with a product known as

1 Kanechlor?

2 A Yes, yes.

3 Q Is Kanechlor a product that, to your
4 knowledge, could be contaminated with dibenzofurans?

5 A I know Kanechlor as the trade name for a
6 Japanese PCB. And I know from reading the Yusho studies
7 that people have stated that it's been contaminated with
8 dibenzofurans.

9 Q All right.

10 Now, you indicated in regard to the Bahn
11 study that Monsanto's attorney asked you about a moment
12 ago that the fact that paper was never published, and I
13 believe you said even withdrawn, cast doubt on the
14 validity of the findings. Is that correct?

15 A Yes.

16 Q All right. And are you telling the court and
17 jury that you wouldn't rely on a study whose validity
18 might be undermined?

19 A I wouldn't rely on a study whose validity had
20 been undermined.

21 Q Okay. What are some of the other things that
22 in your professional opinion could undermine the
23 validity of a study?

24 A Bias in the selection of the exposed
25 population, and, more often than one would think,

1 statistical errors in the analysis.

2 Q Now, in talking about the Brown and Jones
3 study that pertained to liver cancer, do you recall
4 that?

5 A Yes, I do.

6 Q All right. Would it be important to you as
7 an epidemiologist that the finding of liver cancer in
8 humans by Brown and Jones was independently confirmed in
9 animal studies?

10 A No. Because there are too many other
11 variables involved.

12 Q All right. Would it be important to you in
13 determining whether or not the Brown and Jones study was
14 accurate or correct to know if a manufacturer's own
15 experiences with a particular product had demonstrated
16 liver dysfunction as a result of exposure?

17 A Not unless that manufacturer had done a study
18 of the risk as opposed to simply observation that there
19 was or was not a dysfunction of the liver.

20 Q And in the case of Monsanto's Aroclor
21 products, were you familiar with the very early
22 literature that Monsanto generated with regard to the
23 problems experienced with its own local populations?

24 A No, I am not familiar with any of that.

25 Q Okay. That's not some of the material that

1 you read or studied in drawing your conclusions that
2 PCBs are not harmful to human beings?

3 A No, it is not.

4 Q Okay.

5 Are you familiar with a study that was
6 sponsored by Monsanto with Dr. Drinker?

7 A I -- no, I'm not.

8 Q And you're not familiar with a report, then,
9 that was published by Dr. Drinker in 1937?

10 A No.

11 Q Okay.

12 Would it affect you one way or the other that
13 Monsanto had known since the '30s and 1940s that its
14 workers who were exposed to PCBs had a demonstrated
15 yellow dystrophy of the liver as a consequence of such
16 exposure?

17 A I do not know that this is the case, but if
18 it was, it was never -- there's been no published data
19 showing this in any population that I'm aware of.

20 Q Okay. At least none that you have read?

21 A None that I have read.

22 Q And nobody from Monsanto has ever come and
23 told you as Monsanto's chief epidemiologist that in the
24 1930s, for example, they were having problems with
25 yellow dystrophy of the liver in connection with workers

1 who were contaminated by PCBs?

2 A Nobody has come and told me, and, as of this
3 moment, without seeing the studies, I cannot say whether
4 or not this is true.

5 Q Okay. And my question was simply that nobody
6 from Monsanto has come and told you that in their early
7 working with PCBs Monsanto was experiencing yellow
8 dystrophy of the liver in its workers?

9 A Nobody has come and told me that.

10 Q Has anybody at Monsanto ever come and told
11 you that in Monsanto's early experiences with PCBs its-
12 workers were developing chloracne?

13 A No.

14 Q Okay.

15 Are you familiar with Krotosky's study?

16 A No, I'm not.

17 Q The study of 1310 workers?

18 A I'm not familiar with the study at all.

19 Q Okay.

20 Have there been any comparison studies,
21 Doctor, that would compare the effects on humans of
22 exposure to various potentially toxic chemicals such as
23 DDT, 2,4,5-T or PCB?

24 A I am aware of no studies of exposure to any
25 of these except separate studies.

1 Q If workmen in the 1930s had been diagnosed as
2 having yellow dystrophy of the liver as a consequence of
3 their exposure to PCBs, that would be inconsistent with
4 your statement today that PCBs cause no adverse human
5 health effects. Is that correct?

6 A That is correct.

7 Q Okay.

8 Does the medical department at Monsanto keep
9 records of its early findings in regards to the workers
10 who were exposed to PCBs in the 1930s and 1940s?

11 A I don't know.

12 Q Have you ever searched those records to see
13 if Monsanto had documented any adverse health effects
14 resulting from the exposure of workers to PCBs?

15 A No. Because I'm not aware that the records
16 exist.

17 MR. POHL: Okay.

18 I'll pass the witness.

19 MR. ANDREWS: I don't have anything further.

20 MR. POHL: Subject to our stipulation that we
21 made right after lunch, I'll pass the witness.

22

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	<u>CORRECTIONS</u>			
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SIGNATURE OF WITNESS

I, William Gaffey, solemnly swear or affirm,
under the pains and penalties of perjury, that the
foregoing 120 pages contain a true and correct
transcript of the testimony given by me at the time and
place stated, with the corrections, if any, and the
reasons therefor noted on a separate sheet of paper and
attached hereto, and that I am signing this before a
Notary Public.

William Gaffey

THE STATE OF

Subscribed and sworn to before me, the
undersigned authority, by the said William Gaffey on
this the day of , 1987.

Notary Public in and for
the State of

1 THE STATE OF TEXAS]

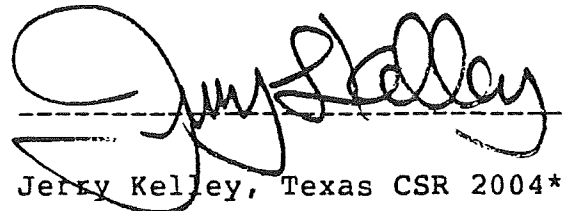
2 CERTIFICATE

3 I, Jerry Kelley, a Certified Shorthand
4 Reporter, hereby certify that the foregoing testimony
5 was given before me after the witness had been duly
6 sworn.

7 I further certify that the foregoing is a
8 true and correct copy of the transcript of the
9 proceedings.

10 I further certify that I am neither
11 attorney for, related to nor employed by any of the
12 parties or any attorney of record in this cause, nor do
13 I have a financial interest in the matter.

14 Witness my hand in Houston, Texas, on June
15 8, 1987.

16
17
18
19
20 
Jerry Kelley, Texas CSR 2004*

21 2900 Smith, Suite 104

22 Houston, Texas 77006

23 713/523-3767

24 *My Certificate Expires

25 December 31, 1988