

IN THE UNITED STATES DISTRICT COURT
 FOR THE NORTHERN DISTRICT OF ALABAMA
 EASTERN DIVISION

- - - - -X
 :
 WALTER OWENS, et al., :
 : Case No.
 : CV-96-P-0440-E
 Plaintiffs, :
 v. :
 :
 MONSANTO COMPANY, :
 :
 Defendant. :
 :
 - - - - -X

Videotaped Deposition of
 E. SCOTT TUCKER, III, PH.D.
 VOLUME I
 (Taken by Plaintiffs)
 Charlotte, North Carolina
 Tuesday, August 1, 2000
 Reported by: Sydney C. Silva
 Registered Professional Reporter
 Notary Public

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24 Deposition of E. SCOTT TUCKER, III,
25 PH.D., taken by the Plaintiffs at Smith Helms
Mullis & Moore, LLP, 30th Floor,
Interstate/Johnson Lane Building, 201 North Tryon,
Charlotte, North Carolina, on the 1st day of
August, 2000, 10:29 a.m., before Sydney C. Silva,
Registered Professional Reporter and Notary
Public.

1 CONTENTS - VOLUME I

2 THE WITNESS

EXAMINATION

3 E. SCOTT TUCKER, III, PH.D.

4 BY MR. WRIGHT

6

6 EXHIBITS - VOLUME I

7 NUMBER

IDENTIFIED

8 1 Fax from Prater to Prowse (sic) 4
9 7/31/00, with attached Notice
10 of Deposition and Notice to
Produce Documents at Deposition,
8 pages

11 2 Expert Report of E. Scott 6
12 Tucker, III, Ph.D., with
attached curriculum vitae,
10 pages

13 3 "Project: Electrical Fluids - 99
14 Part VI - Air and Water
Pollution Control,
MONS 037992 - 037993

15 4 Documents bearing Bates 144
16 numbers per attached list
17 (Actual documents attached
to original of deposition only
by agreement of counsel)

18 5 Report No. 2970, Final Report 184
19 on Aroclor in Gases, 3/15/54,
DSW 147758 -147781

20 6 Organical Chemicals Division 240
21 R&D Laboratories, St. Louis,
MONS 044289 - 044293

22
23 (Exhibits 1-3, 5 and 6 attached.)
24
25

P R O C E E D I N G S

(Deposition Exhibit No. 1 marked for
identification.)

THE VIDEOGRAPHER: Today's date is
August 1st, 2000. This is the tape number 1
of the video deposition of Dr. E. Scott
Tucker, III, in the matter of Walter Owens et
al versus Monsanto Company in the United
States District Court for the Northern
District of Alabama, Eastern Division, Case
No. CV-96-P-0440-E.

This deposition is being held at the
offices of Smith Helms Mulliss and Moore, 201
North Tryon Street, Charlotte, North
Carolina. We're on the record at 10:29.

Will counsel introduce themselves,
please.

MR. WRIGHT: Larry Wright for the
Plaintiffs.

MR. SHIELDS: Robert Shields for the
Plaintiffs.

MR. PRAUSE: Marsh Prause on behalf of
the Monsanto Company.

THE VIDEOGRAPHER: Will the court
reporter please swear in the witness.

1 (Witness sworn.)

2 MR. WRIGHT: Before the deposition
3 starts, let's set out the ground rules that
4 we talked about before the deposition.

5 And, Mr. Prause, my understanding of our
6 agreement and understanding for this
7 deposition is is that all objections are
8 reserved except for form of the question and
9 responsiveness of the answer. And you
10 indicated that you would like for the doctor
11 to have the opportunity to review and sign
12 the deposition and that's fine. I think we
13 have plenty of time.

14 What's the normal routine in North
15 Carolina, 30 days?

16 THE REPORTER: Two weeks to deliver the
17 order to the attorney, and then the attorney
18 will transmit to their client, and then their
19 client has 30 days.

20 MR. WRIGHT: Okay. That sounds fine to
21 me.

22 MR. PRAUSE: And what she just
23 represented is an accurate depiction or
24 representation of our understanding.

25 MR. WRIGHT: Okay.

1 MR. WRIGHT: Now I have marked as
2 Exhibit 1 notice for the deposition. I don't
3 really think we need to talk about that any
4 more other than to note for the record that
5 you have produced a stack of documents that
6 were reviewed by the doctor prior to the
7 deposition in response to some agreements by
8 counsel and the notice of the deposition.

9 MR. PRAUSE: That's accurate, yes.

10 MR. WRIGHT: The second exhibit is going
11 to be what has been provided to us in this
12 case as Dr. Tucker's report.

13 (Deposition Exhibit No. 2 marked for
14 identification.)

15 MR. WRIGHT: I would like for Dr. Tucker
16 to look at that, please, and make sure, first
17 of all, that that is his report.

18 Whereupon, E. SCOTT TUCKER, III, PH.D., having
19 been duly sworn, was examined and testified as
20 follows:

21 EXAMINATION

22 BY MR. WRIGHT:

23 Q. I believe attached to the report is a
24 CV. And I would like to talk about them
25 separately if we can. I would like for you to

1 look at the report first and then I'm going to ask
2 you some questions about the VC.

3 A. (Witness peruses document.) I have
4 completed looking at it.

5 Q. I'm sorry?

6 A. I say I have completed looking at it as
7 requested.

8 Q. Okay. Is that your most current expert
9 report in this case?

10 A. Yes.

11 Q. Is that the only expert report that you
12 have prepared for this case?

13 A. Yes.

14 Q. Okay. Now you have given testimony, I
15 know, in two other case that is are related to the
16 Anniston situation. And I believe the official
17 names of those are the Dyer case, does that sound
18 familiar.

19 A. Yes.

20 Q. And the, do you remember the name of the
21 other case?

22 A. Not off the top of my head, I'm sorry.

23 MR. PRAUSE: I would be glad to give it
24 to you if you would like.

25 MR. WRIGHT: I think I have got it right

1 here, let me just make sure. Because I want
2 to know that I have got all his depositions.
3 Do you have it off the top of your head?

4 MR. PRAUSE: Yeah, it's the Abernathy
5 case.

6 MR. WRIGHT: Okay.

7 BY MR. WRIGHT:

8 Q. So the Abernathy case, the Dyer case.
9 Were you deposed in the Mars Hill case?

10 A. I don't believe I was.

11 MR. PRAUSE: I think that's correct, I
12 think he was not. And I can confirm that for
13 you if it becomes important.

14 MR. WRIGHT: I would like that to be
15 confirmed.

16 MR. PRAUSE: Sure.

17 MR. WRIGHT: Because I want to make sure
18 that I have all of the depositions that
19 Dr. Tucker has given, period, relating to
20 PCBs; but specifically I want to start that
21 list with all of the depositions that he has
22 given relating to the Anniston situation.

23 MR. PRAUSE: All right. I can have that
24 confirmed for you that he was not deposed in
25 Mars Hill later today.

1 MR. WRIGHT: Okay.

2 BY MR. WRIGHT:

3 Q. But so to the best of your recollection
4 you have given two previous depositions in the
5 Anniston cases, and those are the two we just
6 mentioned?

7 A. Yes, sir.

8 Q. Now I received late yesterday two other
9 depositions that you have given in PCB-related
10 cases. And one of those is the United States
11 versus Outboard Marine and Monsanto, and it says
12 it was taken in April of '82. Do you recall that
13 deposition?

14 A. Yes, I do.

15 Q. Taken in Connecticut, it looks like?

16 A. I believe it was taken in Stamford,
17 Connecticut, if I recall it correctly.

18 Q. Then another deposition that I got late
19 yesterday afternoon is the Transwestern Pipeline
20 Company vs. Monsanto case. And this says that
21 that deposition was taken in Greenville, South
22 Carolina, in June of '92.

23 Do you recall that deposition?

24 A. Yes, I do.

25 Q. Okay. Have you given any other

1 PCB-related depositions other than the ones we
2 have talked about?

3 A. Yes.

4 Q. Okay. Tell me which ones.

5 A. I was afraid you would ask that
6 question. You're going to challenge my memory
7 here. But there are documents available certainly
8 much more accurate than my memory tends to be
9 sometimes.

10 MR. WRIGHT: Well, the problem is they
11 are not available to me.

12 MR. PRAUSE: Well, actually, we supplied
13 you with also the deposition transcript for
14 his deposition in Nevada Power. And it's a
15 thin one, so I think maybe it might be in
16 that box and you may have missed it.

17 MR. WRIGHT: Okay.

18 MR. PRAUSE: If it is not in there, I
19 apologize. But I personally had that box
20 prepared to be brought over to your hotel
21 yesterday afternoon.

22 MR. WRIGHT: So you think it's in there.

23 MR. PRAUSE: I do.

24 MR. WRIGHT: Okay.

25 BY MR. WRIGHT:

1 Q. Besides Nevada Power, any others?

2 A. I believe there's a deposition for the
3 Pennsylvania Attorney General's office in a
4 DOT-related case in a building in Harrisburg. Let
5 me think, there's one more -- but not, no, that's
6 not PCBs. The Harrisburg one is PCBs.

7 Q. When would that have been taken?

8 A. It had to be within the last four years
9 would be my guess.

10 Q. Where was it taken?

11 A. The deposition -- well, it wasn't a
12 deposition, it was an expert report.

13 You're asking specifically about
14 depositions? That's what I'm saying, my memory
15 is?

16 Q. Right now I'm asking about depositions,
17 which is the procedure we're going through here.

18 A. That's fine. I'm sorry I got confused,
19 I apologize for that.

20 Q. Okay. So you think that's all the
21 depositions now?

22 A. It sounds as if that's a fairly complete
23 list, yes.

24 Q. Okay. Now you mentioned the Harrisburg
25 case, which is a PCB case, that you gave a report

1 in?

2 A. I provided an expert report on a PCB
3 situation there, yes.

4 Q. Okay. Was that report any longer than
5 the page-and-a-half report we have in this case?

6 A. The report itself, no. Some of the
7 referenced documents made it longer but the report
8 itself was about the same scope as this.

9 Q. And was that for Monsanto?

10 A. No.

11 Q. Okay, who?

12 A. That was for the Pennsylvania Attorney
13 General's office.

14 Q. Okay. So you were retained by the
15 Pennsylvania Attorney General's office?

16 A. Correct, relative to PCB contamination
17 of a building.

18 Q. Is Monsanto a Defendant in that case?

19 A. Yes.

20 Q. Do you have a copy of that report?

21 A. Do I have a copy of it with me?

22 Q. No, no, no, not with you --

23 A. Okay.

24 Q. -- but I mean in your office or your
25 home or somewhere?

1 A. Yes, copies are available.

2 Q. Okay. To your knowledge, does Monsanto
3 have a copy of that report?

4 A. Not to my knowledge.

5 Q. Okay. The report was provided to the
6 Pennsylvania Attorney General's office pursuant to
7 litigation against Monsanto?

8 A. Ultimately, yes.

9 Q. Okay. Was the report given before the
10 litigation began?

11 A. The report was actually given early on
12 when they asked me some questions and asked me to
13 provide expert opinions on PCBs that were being
14 found in the building, things of that sort. I
15 provided that report. I didn't provide that
16 report specifically for any litigation or anything
17 of that sort; I provided it as informational to
18 the Attorney General's office.

19 Q. I got you. And then later on litigation
20 occurred?

21 A. Yes.

22 Q. And you don't know whether that report
23 was provided to Monsanto or not in the litigation?

24 A. I do not have knowledge of that fact.

25 Q. And you were not deposed in that case?

1 A. That's correct.

2 Q. Generally, what did the report say?

3 A. It dealt with the analytical chemistry
4 of PCBs and the identification of certain ones
5 which I have expertise in.

6 Q. I assume you confirmed the presence of
7 PCBs in samples that you reviewed?

8 A. I reviewed the data that I was provided
9 and I provided them a statement relative to the
10 efficacy of the information and to whether or not
11 it was gathered in an appropriate manner and
12 possibly some scientific conclusions that could be
13 determined from some of the things that were seen.

14 It's typical expert opinions in an area
15 that you are an expert in.

16 Q. I understand. What other cases have you
17 given expert opinions in PCB-related matters? Now
18 actually that's a bad question because it's overly
19 broad.

20 Have you testified either at trial or in
21 deposition in other PCB-related cases other than
22 the Monsanto cases that we have talked about?

23 A. I don't believe I have.

24 Q. Have you given expert reports in
25 litigation relating to PCBs in cases other than

1 the ones that we have already talked about?

2 A. I do not believe that expert reports
3 that were provided had to do with PCBs. I think
4 you've covered them all.

5 Q. Okay. You have consulted in other
6 litigation, in other kinds of litigation?

7 A. Yes, I have.

8 Q. As an expert witness?

9 A. Yes, I have.

10 Q. You have given depositions in other
11 kinds of litigation as an expert witness?

12 A. Yes, I have.

13 Q. Have you ever testified in trial in
14 other kinds of litigation as an expert witness?

15 A. Yes, I have.

16 Q. How many times in trial?

17 A. I believe I have gone -- I have been in
18 trial twice. And by that, where I actually
19 appeared on the stand myself, not where a
20 deposition was given.

21 Q. About how many depositions have you
22 given?

23 A. Since?

24 Q. Ever.

25 A. Okay. I would guess on the order of

1 eight or nine, something like that, total.

2 Q. Just briefly, the other cases that do
3 not relate to PCBs, what did they, what did your,
4 the substance of your testimony relate to?

5 A. Again, it was related to reviewing
6 analytical data that was generated by labs,
7 analyzing the environmental samples, ensuring the
8 client that the laboratory in question generated
9 the information properly and that it met all the
10 Environmental Protection Agency guidelines, and
11 that the information that was produced was
12 defensible and reflective of what it was intended
13 to be.

14 Q. All right. Have you reviewed -- this is
15 taking this a little bit out of order -- but have
16 you reviewed Monsanto's testing information
17 relating to Anniston that has been done in the
18 last three or four years?

19 A. Okay. Have I done that in the last
20 three or four years? Or has the information been
21 accumulated in the last three or four years?

22 Q. Let me explain.

23 A. I'm not trying to be difficult. I just
24 don't understand the question.

25 Q. Let me explain because I want to make

1 sure I understand what you have done so far. And
2 I can probably do it in a better chronological
3 manner but this is the way I'm going to do it.

4 You know, of course, from your
5 involvement in this and the other Anniston cases
6 that there has been a lot of testing and sampling
7 and analytical reporting done relating to PCBs in
8 the Anniston area in the last three or four years,
9 correct?

10 A. I don't have direct knowledge of all of
11 the information that has been generated but it
12 would not surprise me that a lot of sampling and
13 analysis had been done in the area.

14 Q. Yeah. Well, that's what I'm trying to
15 get at?

16 A. That's correct. So I'm sure, the answer
17 to the question --

18 Q. Are you aware --

19 A. -- so I'm sure there is a lot.

20 Q. So you are aware that it has been done?
21 That's the first question.

22 A. Am I aware of all of the sampling and
23 analysis that has been done in the Anniston area
24 relative to PCBs, is that your question?

25 Q. No.

1 A. Okay. I'm sorry.

2 Q. That's all right.

3 A. I want to answer your question but I
4 want to answer it properly.

5 Q. No we'll take our time. That's all
6 right.

7 The question is, are you aware that a
8 significant amount of sampling and analysis of
9 that sampling has been done in the last few years
10 relating to PCBs in the Anniston area around and
11 downstream from the Monsanto Anniston plant?

12 A. Yes.

13 Q. Have you reviewed any of that testing
14 and sampling data for Monsanto?

15 A. I have reviewed some information that
16 was generated by a laboratory, but I don't think
17 it was specific to this particular deposition or
18 the case.

19 Q. Well, it was related to the Anniston
20 situation, correct?

21 A. I'm trying to remember. I'm sure it
22 was.

23 When I review information, I'm not so
24 much concerned about where it comes from or where
25 the samples come from and things of that sort.

1 I'm more concerned about the process by which the
2 materials, once they are received by the
3 laboratory, is handled: Chain of custodies.
4 Whether or not they use appropriate techniques.
5 When they look at the information whether or not
6 they are interpreting it properly and things of
7 that sort. So my focus is not on who, what and
8 where as far as the sampling is concerned; my
9 focus is on the data package itself.

10 So my recollection is that it probably
11 had to do with the Anniston area and that kind of
12 thing but I don't specifically remember where,
13 what or when.

14 Q. Okay. Do you remember who the lab --
15 what the laboratory was?

16 A. I believe the name of the laboratory was
17 Bonner.

18 Q. All right. So you reviewed Dr. Bonner's
19 results, you believe?

20 A. Yes, I reviewed some of Dr. Bonner's
21 results.

22 Q. Right.

23 A. I'm sure I didn't review every PCB
24 analysis he has done.

25 Q. Did you have criticisms of Dr. Bonner's

1 analysis?

2 A. I wouldn't call them criticisms, I'd
3 call them opinions.

4 Q. Well, what opinions did you have
5 relating to Dr. Bonner's analysis that you recall?

6 A. The opinions were that there, the way
7 that the people did the analysis was overall
8 acceptable but there were excursions and there
9 were some indications of lack of experience in
10 terms of interpretation of the data and things of
11 that sort.

12 Q. Was that reduced to a written report?

13 A. It, I think it was, yes.

14 Q. Other than Dr. Bonner's materials, have
15 you been asked by Monsanto to review any other
16 sampling or testing data from Anniston in the past
17 few years?

18 A. I think the Bonner data is primarily
19 what I have been asked to review.

20 Q. You have not reviewed any of the data
21 generated by the EPA?

22 A. I review a lot of data generated by the
23 EPA.

24 Q. Relating to Anniston?

25 A. No, I'm not trying to -- I, I can only

1 answer the question the way you ask it. And I do
2 review a lot of information generated by the EPA
3 in my regular job.

4 Q. Yeah.

5 Hang on?

6 A. In terms of Anniston, no, I don't think
7 so.

8 Q. Okay. For right now all of my questions
9 relate to Monsanto and PCBs downstream from the
10 Monsanto Anniston facility.

11 A. Okay?

12 Q. Okay?

13 A. So specifically we will be discussing
14 things that have to do with one, with Monsanto;
15 two, with Anniston, and, three, downstream and
16 PCBs.

17 Q. Well, I say "downstream," in the
18 vicinity of the Monsanto Anniston plant.

19 MR. PRAUSE: Well, you're not limiting
20 it to the aquatic media?

21 MR. WRIGHT: No.

22 MR. PRAUSE: Okay.

23 BY MR. WRIGHT:

24 Q. And no, that isn't for the rest of our
25 time. That's just for this series of questions.

1 I just want to know what you have done on behalf
2 of Monsanto or in relation to Monsanto in the
3 Anniston situation in the last few years.

4 A. Okay, I'll --

5 Q. We'll go back in history in a little
6 while.

7 A. Okay. I believe so far that that
8 information has been given to you in an accurate
9 manner.

10 Q. Which is --

11 A. I said that --

12 Q. No, let me just --

13 THE REPORTER: One at a time, please,
14 gentlemen.

15 Q. Let me just make sure that we're clear.
16 You mentioned that you have reviewed Dr. Bonner's,
17 some, maybe all of Dr. Bonner's material, and
18 given some opinions relating to that, correct?

19 A. Correct.

20 Q. My next question is, have you reviewed
21 any other testing or sampling results relating to
22 Monsanto and Anniston and PCBs? And that would
23 include some of the testing that I know has
24 occurred. There has been testing and sampling by
25 the EPA; there has been testing and sampling I

1 believe by ADEM, Alabama Department of
2 Environmental Management; there has been testing
3 and sampling by Monsanto's own consultants,
4 including among them Garrity and Miller, I
5 believe, Goldman and Associates --

6 MR. PRAUSE: Objection to the form.

7 Sorry.

8 Q. -- and certain outfits like that.

9 Have you reviewed any other material
10 relating to Monsanto and Anniston and PCBs?

11 MR. PRAUSE: Object to the form of the
12 question.

13 A. Yes.

14 Q. In the last few years?

15 MR. PRAUSE: Object to the form of the
16 question.

17 MR. WRIGHT: Okay. This time I'm going
18 to ask for an explanation. Did I leave
19 somebody out or put somebody in that
20 shouldn't be in?

21 A. I'm glad you asked the last few years.

22 The answer to that question is no.

23 MR. PRAUSE: I think you, well, you
24 mentioned Goldman and Associates; I think
25 it's Golder.

1 MR. WRIGHT: Golder.

2 THE WITNESS: Right.

3 MR. PRAUSE: And, and I, it was a very
4 long question, I wasn't sure if it was a
5 compound question or what.

6 MR. WRIGHT: All right.

7 BY MR. WRIGHT:

8 Q. With the correction and recognizing that
9 it was a long question, the short answer is no,
10 you haven't looked at any of that stuff?

11 A. That is correct. The short answer is
12 no. I said no.

13 Q. All right. Do you anticipate looking at
14 any of that material?

15 A. You mean have I been asked?

16 Q. Yes.

17 A. To look at any of that material?

18 Q. Yes.

19 A. At this point in time?

20 Q. Yes.

21 A. No.

22 Q. Have you discussed with Monsanto
23 reviewing any of the other testing and analysis
24 other than Dr. Bonner's?

25 A. No.

1 Q. So that hadn't come up in any of your
2 discussions with Monsanto?

3 A. I believe I said no to your question.

4 Q. Now is it fair to say then that the only
5 documents that you reviewed in preparation for
6 your deposition testimony today are the documents
7 that were provided to us this morning?

8 A. Yes, that's fair to say.

9 Q. When did you review those documents?

10 A. I reviewed the documents yesterday in
11 this room, as a matter of fact, with Mr. Prause.

12 Q. When did you all start and end your
13 review?

14 A. I think must have been started around
15 9:00, I would imagine. Was it later than that?
16 What time did I get here?

17 I guess the actual real review started
18 after lunch when we came back and we started going
19 through the stack of documents that have been
20 provided you.

21 Q. All right. So you met without looking
22 at the documents before lunch; and then after
23 lunch, you went through the documents themselves?

24 A. Yes, sir.

25 Q. What time did you finish up?

1 A. That I remember, it was 7:00.

2 Q. In the evening?

3 A. Yes.

4 Q. Now obviously this is not the first time
5 that you have met with Mr. Prause, correct?

6 A. Yes.

7 Q. How many other times have you met with
8 Mr. Prause?

9 A. I think, I think it has been twice,
10 possibly three times, before.

11 Q. Okay. I know you met with him at one of
12 the depositions?

13 A. Correct.

14 Q. I know you met with him before that
15 deposition, correct?

16 A. Right. As I said, I believe that it is
17 three. That's my recollection at this point.

18 Q. Okay. Well, what I'm trying to pin down
19 is when and where they were. So one of them was
20 yesterday, you met with him yesterday?

21 A. Let me ask a question, if I may?

22 Q. Sure.

23 A. You are inquiring, you're asking
24 relative to this case? Or are you asking in
25 general?

1 Q. I'm asking ever in your life.

2 A. Okay. And I --

3 Q. Are you his Godfather, or I'm just
4 wondering --

5 MR. PRAUSE: I wish.

6 Q. -- how many times you met with him
7 relating to anything.

8 A. Right. The reason I'm asking is because
9 you have been making things very specific and then
10 converting back to very general.

11 Q. Right. And I'm going to do that.

12 A. And I want to do an honest accurate job
13 answering your questions, so that's why I'm
14 asking. So if you asking me how many times in my
15 life have I met with Mr. Prause, I'm going to go
16 back to around three times.

17 Q. Okay. And just for your, for your
18 benefit, sometimes I'm going to ask general
19 questions and sometimes I'm going to ask real
20 specific questions. And sometimes I'm going to
21 let you know whether I'm being general and
22 specific and sometimes I'm not.

23 So if you have a question, just continue
24 to do as you are doing and ask me to clarify my
25 question and I'll be delighted to do that.

1 Because, obviously, I want to make sure that by
2 the end of this deposition that you have only
3 answered questions that you understand; and it is
4 not to any of our benefit for you to answer
5 questions that you don't understand.

6 A. I appreciate that and it is comforting
7 that you will allow me to clarify it when I don't
8 understand it.

9 Q. Okay. So you met with him yesterday;
10 you met with him the day of the other deposition
11 that he presented you at?

12 A. I believe that was the one in
13 Greenville; is that correct?

14 Q. Yes. You met with him before that in
15 preparation for that deposition?

16 A. I don't know that it was specific for --
17 do you mean the day before the deposition and the
18 day of the deposition? Are those counted as two
19 meetings or one meeting?

20 Q. That's counted as two meetings.

21 A. Yes. That's correct.

22 Q. Okay. Have there ever, have there been
23 any other meetings between you and Mr. Prause?

24 A. I believe I met Mr. Prause one time at
25 another law firm but I, I wouldn't swear to that.

1 Q. What do you mean, "at another law firm"?

2 I'm not sure. When he was working in another law
3 firm, or?

4 A. When he was at another law firm in, at
5 another law firm in Birmingham, Alabama.

6 Q. Okay.

7 A. Not that he worked there --

8 Q. I understand.

9 A. -- he was just there.

10 Q. That's where the meeting took place?

11 A. Yes, that's correct.

12 Q. At another law firm's office in
13 Birmingham, Alabama?

14 A. That's correct.

15 Q. Do you remember about when that meeting
16 was?

17 A. As I stated, I'm not sure we met there
18 for sure. I just -- it just -- My recollection
19 seems to indicate that we may have.

20 Q. Okay. You met with some lawyers
21 relating to the Anniston situation in the
22 Birmingham office?

23 A. Yes.

24 Q. And Mr. Prause may have been there and
25 may not have been there?

1 A. Yes, and I don't recall if he was or not
2 for sure.

3 Q. About when was that meeting?

4 A. Last year sometime.

5 Q. Who do you remember was present at that
6 meetings?

7 A. Mr. Cox. And there were other names but
8 that's good enough.

9 Q. Adam Peck?

10 A. Yeah, Adam Peck was there, too.

11 Q. Harlan Prater?

12 A. Harlan I may have met in the hallway but
13 I don't think he was directly involved. But he
14 may have been. Gordon Lightfoot.

15 Q. Everybody does that. It's Warren
16 Lightfoot.

17 A. Warren? Okay. I'm glad that you know
18 where it is coming from.

19 Q. It's unanimous, everybody has done that.
20 Mike Kelly?

21 A. Yes.

22 Q. David Moore?

23 A. Not in, under these circumstances. I do
24 know David Moore and I have met with him in the
25 past.

1 Q. Was that meeting in Birmingham before or
2 in preparation for one of the other depositions?

3 A. Yes.

4 Q. And how long did that meeting last?

5 A. I believe it was a couple of days.

6 Q. All right. Were you the only expert
7 present at that meeting?

8 A. At the specific meeting that I was at, I
9 was the one that they were talking to, yes.

10 Q. And was the meeting immediately before
11 your deposition or was it some extended period
12 before your deposition?

13 A. We met the day before the deposition.

14 Q. All right. Now I want to go back
15 chronologically and kind of start at the
16 beginning. And if you will hand me your CV?

17 A. Sure.

18 Q. We're not going to go over all this
19 material that has been gone over many times
20 before. But you began your undergraduate career
21 at the University of Michigan, correct?

22 A. That's correct.

23 Q. You graduated from Michigan State
24 University with a Bachelor of Science degree?

25 A. Correct.

1 Q. And then you went to the University of
2 Iowa for your Ph.D.?

3 A. Correct.

4 Q. And you graduated from the University of
5 Iowa with a Ph.D. in February of 1968?

6 A. That's correct, February 3, 1968.

7 Q. Do you recall when you started at
8 Monsanto?

9 A. Yes.

10 Q. What date did you start at Monsanto?

11 A. I don't recall the specific date. The
12 year was 1967. Probably the first quarter or
13 something like that.

14 Q. You think you started towards the
15 beginning of '67?

16 A. That's my recollection, yes.

17 Q. Did you start in the St. Louis office?

18 A. They have multiple offices in the
19 St. Louis area. I started at the Queeny Plant on
20 South Second Street.

21 Q. What was your first job with Monsanto?

22 A. My first job with Monsanto was as a
23 senior research chemist for the Organic Division.

24 Q. And what were your duties?

25 A. My duties were to provide chemistry

1 support in the form of analytical chemistry
2 specifically for the Organics Division.

3 Q. And What did that mean on a day-to-day
4 basis, what kind of analytical support did you
5 provide?

6 A. It meant on a day-to-day basis that I
7 analyzed samples of materials of interest to
8 Monsanto for various constituents so they would
9 know what they were made of, or how much was
10 there, or how much was still there, and that kind
11 of thing.

12 Q. Okay. Right now I'm staying at the
13 beginning, okay? The '67 time frame.

14 A. Uh-huh.

15 Q. How did you analyze those materials?

16 A. Okay. My first assignment at Monsanto
17 when I came there was to look into an area called
18 atomic absorption spectroscopy. What they were
19 interested in was a very new technique at that
20 time that had just come out; and they were
21 interested in acquiring the instrumentation and
22 the equipment and the expertise and the experience
23 to have that analytical technique available to
24 them to analyze their products and their, and to
25 monitor things in their processes.

1 And so they asked me to look into it and
2 see what was the state-of-the-art; determine the
3 appropriate instrumentation that we might be
4 interested in buying; estimate the costs, the
5 timing, and the amount of effort to get the
6 instrumentation installed; and of course what kind
7 of facility would be needed to put the instrument
8 in.

9 And 5Then once that was done, what it
10 would do for us, and to evaluate it and become
11 familiar with it.

12 Q. So that was your specific job?

13 A. That's correct, that was my specific
14 assignment.

15 Q. That's what you were brought in to do
16 and that was -- I just want to know if that was
17 what you were, when you hired on they said,
18 "Dr. Tucker," well, you weren't a doctor then,
19 but, "Mr. Tucker, here's what we want you to do.
20 We want you to get us up to speed on this new
21 technology."

22 A. When they brought me in they wanted me
23 to function as an analytical chemist providing
24 analytical chemistry support for their division.
25 The project that was of most interest to them at

1 the time happened to be atomic absorption
2 spectroscopy, which is method for measuring metal
3 content of things.

4 They could have assigned me to a lot of
5 things but that's what they did when I got there.

6 Q. Right. That's what I'm trying to figure
7 out is that was the first major assignment that
8 you got was to get us up to speed on that
9 particular technology?

10 A. Yes.

11 Q. Did your role or your, the main thrust
12 of your job ever change?

13 A. On what I worked on specifically --

14 Q. Yes.

15 A. -- or as an analytical chemist? Because
16 I have been an analytical chemist for 33 years.

17 Q. No. We talked about your initial main
18 job was to get up to speed on this atomic
19 absorption spectroscopy?

20 A. Yes, sir.

21 Q. Okay. Did you do that?

22 A. Yes, I do.

23 Q. How did you go about doing that?

24 A. As I was indicating in my earlier
25 answer, I looked into the literature, I saw what

1 people were doing, I saw what state-of-the-art
2 was, I saw what the experts who had already worked
3 in the area extensively recommended. And rather
4 than reinventing the wheel, I took advantage of
5 that kind of information, which is what I was
6 supposed to do.

7 Based on the information, I made
8 decisions with regard to what I thought we should
9 acquire to be able to have that expertise
10 available to us on site. And then I made those
11 recommendations formally to my boss, who, in turn,
12 shared them with other people.

13 Then after they were properly reviewed,
14 we came back and made any adjustments that were
15 necessary and then we went ahead and ordered the
16 equipment and began the actual establishment of
17 the technique at the site.

18 Q. Was your boss at that time Mr. Keller?

19 A. Dr. Keller, yes.

20 Q. Dr. Keller. All right. When was that
21 job basically accomplished?

22 A. My guess would be that job was
23 accomplished some time in 1967. It wasn't a long
24 routine. The other thing is is that you don't
25 work on widgets today and nothing else.

1 Q. I understand.

2 A. I mean, you work on widgets and widgets
3 two and three and --

4 Q. I understand.

5 A. Yeah.

6 Q. But what I, my understanding of your
7 earlier testimony was this was the first big job
8 you got from Monsanto, the first big assignment?

9 A. Well, I'm not sure "big" characterizes
10 properly. It was the first technical assignment I
11 was given by the company. And what I did as a
12 Ph.D. was establish the technique. And then once
13 I had established it and it worked properly and I
14 could say it was producing the information it was
15 supposed to, then I trained technicians in the
16 ability to do it and then turned it over to them.
17 And then in the future I simply monitored what
18 they did.

19 Q. All right.

20 A. That was my job.

21 MR. WRIGHT: Okay.

22 MR. PRAUSE: We have been going for
23 about an hour, can we take a quick break?

24 MR. WRIGHT: Yes.

25 THE VIDEOGRAPHER: We're off the record

1 at 11:06.

2 (Recess taken.)

3 THE VIDEOGRAPHER: We're on the record

4 at 11:14.

5 BY MR. WRIGHT:

6 Q. All right. When we left I think we had
7 finished your first what I thought was a major
8 assignment but you didn't like me calling it a big
9 job. But I mean, isn't it fair to say that that
10 was your first major assignment for Monsanto?

11 A. It is fair to say it is simply as it was
12 my first assignment.

13 Q. Okay.

14 A. That would be a way to say it, too.

15 Q. Okay. Well, let's say it that way,
16 then. What was your second assignment?

17 A. The second assignment had a little bit
18 broader scope in the sense that I became involved
19 with all of the wet chemistry techniques that were
20 utilized by the division. And ultimately that led
21 to me becoming the group leader or the supervisor
22 of the wet chemistry group.

23 Q. Now I would like for you to explain the
24 terms a little bit for me a little bit for me if
25 you would. First of all, the first assignment

1 that we discussed, the atomic absorption
2 spectroscopy, did not relate to PCBs?

3 A. That's correct, that would not be a
4 technique that you would use to measure PCBs. You
5 would use that technique to measure metal ions.

6 Q. Fine. Okay. The next assignment that
7 you described, you used the term "wet chemistry."
8 What do you mean by that?

9 A. "Wet chemistry" is generally a, a
10 simplistic analytical chemistry that involves
11 titrations and gravimetric precipitations and not
12 so much instrumentation. It's not a spectroscopy
13 type technique or things of that sort. It
14 involves things like titration of aqueous
15 solutions for cyanides --

16 THE REPORTER: Slow down, please.

17 THE WITNESS: I'm sorry. I'd be very
18 happy to do that for you; I apologize, I do
19 that a lot when I leave my phone number.

20 MR. WRIGHT: "titrations of aqueous
21 solutions..."

22 A. Generally speaking, the sample is either
23 aqueous and you're looking for a constituent in
24 the water sample, or you take a solid matrix and
25 you dissolve it up so that it is in an aqueous

1 sample and you look for a constituent in there.

2 You might be looking for to determine
3 the pH or the hydrogen ion concentration of it.
4 You might be looking for the cyanide
5 concentration. You might be looking for total
6 suspended solids. You might be looking for
7 soluble salts. You might be looking for
8 chloride. You might be looking for, you might be
9 looking for any of those kinds of things.

10 Simplistic chemistry that involves more
11 of the older historical type of analytical
12 techniques, that's generally what is referred to
13 as wet chemistry.

14 Q. Okay. And your specific role in that
15 regard was to do that?

16 A. My specific role was to supervise
17 technicians and also help them develop techniques
18 and make sure they were doing them right and
19 teaching them in a group that provided that kind
20 of support, that analytical support, for the
21 Organic Division chemists and process engineers.

22 Q. And PCBs were part of the Organic
23 Division at that time?

24 A. PCBs are an organic chemical and they
25 were part of the Organic Division, yes.

1 Q. Did your role in supervising the wet
2 chemistry or facilitating helping the wet
3 chemistry setup have any direct relation to PCBs?

4 A. No. None.

5 Q. Okay. About how long did that job take?

6 A. As I had mentioned, jobs worked
7 concurrent --

8 Q. I know, they overlapped.

9 A. -- and all of this really occurred in
10 the latter part of '67 and the earlier part of
11 1968.

12 By the way, I'm just looking at my
13 resume here; and as I said earlier, the date that
14 I actually received my Ph.D. was February 3, 1968.
15 What that would mean is that I really joined
16 Monsanto in about the fourth quarter of 1967.

17 And what had happened was the typist had
18 missed the deadline to get the thesis in; and so I
19 had to, I went ahead and left and I came back for
20 the thesis defense and things of that sort at the
21 next available graduation, which was February 3.

22 Q. Okay. That's what I had assumed?

23 A. Yeah.

24 Q. But I'm glad you clarified on when you
25 started at Monsanto because that --

1 A. Well, what I had said earlier was
2 compressing things to the point to where it was
3 like, "When did I get all these things done," and
4 that kind of thing.

5 Q. Yeah, I was wondering about that.

6 Okay. So you believe that it is more
7 accurate to say you started at Monsanto in the
8 latter part of 1967?

9 A. Yes, sir.

10 Q. Okay. And so the, the completion of
11 your first assignment with regard to the atomic
12 absorption spectroscopy would have been in early
13 '68?

14 A. Yes. And the completion for
15 responsibility goes in phases. The initial set
16 up, the initial evaluation set up and
17 establishment of the technique would have been
18 something that I was involved directly.

19 The next phase would have been to
20 transfer that and to teach it to other people.
21 And then the third phase of that would be to have
22 continuing responsibility as a technical expert
23 for those people and to monitor them to make sure
24 they were doing it correctly so that the data was
25 all right.

1 And if something that they weren't
2 capable of understanding happened to the
3 instrument or to the technique, I would be
4 required to solve that.

5 Q. Let me just ask, is that, again speaking
6 to the atomic absorption spectroscopy, is that
7 something that you had worked with in your
8 graduate education at the University of Iowa?

9 A. It was something that I was aware of and
10 that I had been exposed to, but it wasn't anything
11 specific to my thesis work or my research work.

12 Q. Okay. By the way, what was your thesis?

13 A. My thesis was the, let's see, it was the
14 mono 2-aza aryl hydrazones, and the analytical --
15 I'm sorry.

16 Q. All right, take your time.

17 A. The thesis was, "The Analytical
18 Chemistry of Mono 2-aza Aryl Hydrazones."

19 Q. And how did you analyze that stuff?

20 A. The thesis research really involved more
21 than analysis. It involved synthesis and design
22 of organic molecules that were specific to being
23 able to chelate with metal ions and to produce
24 chelates that were colored and whose color was
25 proportional to the amount of material present

1 when they reacted.

2 And so what was involved was that I had
3 to go to the original literature -- first of all,
4 I had to come up with an idea where I might like
5 to do my research in. Then I went to the original
6 literature and cruised around to see what had been
7 done. Then based on that, I decided that there
8 might be some other things that hadn't been done
9 yet that could be done.

10 And at that point I prepared a proposal
11 that could be the basis for a Ph.D. research; and
12 I put that together with appropriate literature
13 references and things of that sort, then cleared
14 it with my major professor. And then once he
15 agreed that I should go forward, then I went
16 forward with it.

17 In the area that you do original
18 research in, it's called original because it
19 hadn't been done before; otherwise, obviously, it
20 wouldn't be original. And you really start at
21 ground zero.

22 The ligands and the molecular structures
23 that I was interested in were really figments of
24 people's imagination and hadn't been put together
25 specifically to do the job I wanted to do, and so

1 I had to learn how to get the starting materials
2 and put those together and actually make the
3 molecules that I had designed on paper.

4 And then Once I had done that, then I
5 took those molecules and see how they interacted
6 with various transitional metal ions. And then I
7 took, when I found the proper structure that had
8 the right characteristics for these interactions,
9 then I began to develop those and exploit those
10 for analytical chemistry and develop what was
11 called colorimetric procedures for measuring
12 things in aqueous environments.

13 So what you do is if, for example, you
14 had cobalt in solution and you wanted to know how
15 much cobalt was there, you could add this ligand
16 to the solution and it would react with the
17 cobalt; it would turn the solution red; and then
18 you would read the optical density or the color,
19 the density of the color, and that could be
20 related to the concentration of the cobalt.

21 So what I did was I developed the
22 foundation for and the extension of an original
23 technique for doing analytical chemistry,
24 measuring constituents in samples.

25 Q. That would have still been considered

1 wet chemistry?

2 A. Pretty much, yes.

3 Q. Did that have anything at all to do with
4 PCBs or the analysis of PCBs?

5 A. No.

6 Q. Now going back to your early days at
7 Monsanto, when is your best recollection of the
8 first phase of your first job finishing up?

9 A. The first phase of the job would
10 probably be the beginning of '68 would be my
11 guess. Because by the time you ordered the
12 equipment, got it in place and that kind of thing
13 and did that. So I would guess the first part of
14 '68.

15 Q. All right. And then your second
16 assignment, assisting the wet chemistry folks,
17 when did that finish up?

18 A. It probably was initiated concurrent or
19 shortly after the atomic absorption assignment.
20 We worked on more than one thing. And it would
21 probably have continued in parallel with that and
22 probably expanded as I showed the ability to
23 direct other people and to tell them what to do
24 and work with them and get the job done.

25 The transition that occurred was the

1 actual people that I had trained in some of these
2 techniques and that kind of stuff, when I began
3 working with PCBs later down the road, probably
4 went with me because they were familiar with
5 working with me and I moved them right along into
6 the new techniques that were being developed for
7 measuring PCBs in samples.

8 Q. Okay. Well, we'll talk about that in a
9 minute then. I would like right now to get a
10 picture of Monsanto's, what did you call yourself,
11 the Analytical Department?

12 A. We were called the Applied Sciences, if
13 I remember.

14 Q. All right. What did the organization of
15 the Applied Sciences look like. First of all, you
16 were at the Queeny plant?

17 A. Yeah.

18 Q. Is that correct?

19 A. Yes, that's correct.

20 Q. Okay. And this is Applied Sciences for
21 the Organic Chemical Division?

22 A. Correct, the Applied Sciences is a
23 support group for the organic chemistry -- Organic
24 Division chemists and engineers.

25 Q. All right. Give me, if you can, an

1 organizational picture of the Applied Sciences
2 department.

3 A. Okay. Dr. Keller was the head of the
4 Applied Sciences. Then -- and he was, I would
5 say, nominally a manager.

6 Under Dr. Keller were a number of group
7 leaders. And it would be divided somewhat
8 according to discipline, and some analytical
9 chemistry discipline and somewhat according to who
10 had extra resources and that kind of thing.

11 But there was a spectroscopy group,
12 which had to do with atomic absorption
13 spectroscopy. Had to do with other infrared
14 spectroscopy. Emission spectroscopy.

15 I also did, now that you've got me
16 talking about it, I also did a lot of emissions
17 spectroscopy for measuring metals, which is a
18 different technique than atomic absorption, but an
19 instrument that they already had that they needed
20 somebody who knew how to operate it.

21 Then there would be -- they had a gas
22 chromatography group that did nothing but gas
23 chromatography analysis based on that particular
24 technique. Then they had a physical chemistry
25 group. And then I believe they also had a process

1 chemistry group. All of these were analytical.

2 For example, the process chemistry group
3 developed analytical techniques for monitoring
4 processes. The spectroscopy group developed
5 techniques for monitoring anything that could be
6 monitored by a spectroscopic technique. The gas
7 chromatography group monitored anything that could
8 be, was amenable to, gas chromatography.

9 Is that enough?

10 Q. Yes.

11 A. All right.

12 Q. Who was working in the gas
13 chromatography group when you --

14 A. Gosh, what was his name?

15 Q. -- when you started?

16 A. Ed, Dr. Ed Emery was the group leader of
17 the gas chromatography group.

18 Q. How many gas chromatographs did they
19 have when you started?

20 A. My guess is more than one and less than
21 maybe 15?

22 Q. More than one but less than 15?

23 A. In our operation. They could have had
24 as many -- they certainly had one, I can establish
25 that without a problem. Whether or not they had

1 seven, 11, 14 or 16, I don't know. But they could
2 have had as many as, say, somewhere, they might
3 have had 20 at the maximum at that group.

4 I'm trying to think. I think it was
5 less than that at that time.

6 Q. Well, 5How big are these machines?

7 A. About this big; a box about this size
8 (indicating). Let's see, let me relate that,
9 three by three by three.

10 Q. Three feet by 3 feet?

11 A. By 3 feet would be maximum dimensions.

12 Q. Well how big was the gas chromatography
13 section? I mean, were they in the warehouse or a
14 were they in an office?

15 A. I don't understand your question.
16 Because I can multiply 20 times three cubic feet
17 and not come up with a warehouse.

18 Q. Well, this room, for example, appears to
19 me to be about, what, 18 by 15, maybe?

20 A. I could have four chromatographs down
21 this side of the table, four chromatographs down
22 this side of the table, four chromatographs on
23 that wall and four chromatographs on that wall.

24 Q. So four lines of chromatographs in a
25 room this size?

1 A. Right. And if I were designing a
2 laboratory that is probably the way I would kind
3 of set it up. So you could have as many in this
4 room, without making it too difficult for people
5 to work, on probably as many as 16 chromatographs
6 in this room.

7 Q. Was the gas chromatograph section as big
8 as this room?

9 A. And then some. The Queeny, the building
10 on South Second Street associated with the Queeny
11 Plant, was an eight-story building that had
12 been -- that was used for research and development
13 and those kind of things. And we had I think one,
14 close to one full floor of that building just for
15 what we did.

16 Q. The only reason I'm asking you all this
17 is there's a big difference in my mind between one
18 and 15; and, and I know it has been a long time
19 ago but --

20 A. Okay, let me clarify that for you.

21 Q. Yeah.

22 A. What I meant by that. I was trying to
23 answer your question.

24 Q. Okay.

25 A. On a probability basis, whether or not

1 we had 15 or 16 chromatographs there's a probably
2 a 50/50 chance that I might be right or I might be
3 wrong. Okay? But on one, I was damned sure we
4 had one.

5 Q. Okay.

6 A. And my guess -- and the other thing is
7 that we had instruments that we lent out to
8 various operations and might be shipped to other
9 parts of the company that were designed
10 specifically by those folks to monitor processes.

11 Q. Okay.

12 A. So we had other instruments out in the
13 field, too. And then we had instruments that were
14 not necessarily used because they were so specific
15 they had been used for a project in the past but
16 not in the future.

17 So my guess is, is they could have had
18 at least 20 chromatographs there. And that
19 they -- I am trying to remember how many people
20 they had in that group at that time. I think
21 there were probably on the order of four or five
22 people in the group, and so that's a reasonable
23 number of instruments for them.

24 Q. All right. And then the spectroscopy
25 department, who was in charge of that?

1 A. Dr. Martin Dietrich was in charge of
2 that.

3 Q. And then did you work under him in your
4 initial assignment?

5 A. Yes.

6 Q. Would you, is spectroscopy something
7 that that you could or would use to analyze PCBs?

8 A. Yes.

9 Q. Did, when you started, did they use
10 spectroscopy to analyze PCBs?

11 A. No.

12 Q. So the spectroscopy group when you
13 started did not use that technology to analyze
14 PCBs?

15 A. Correct. Yes.

16 Q. Did they analyze PCBs using the gas
17 chromatography when you started?

18 A. Yes.

19 Q. What kind of analysis did they do using
20 the gas chromatography?

21 A. It would be an analysis that would be
22 referred to as production quality control.

23 Q. Okay. What does that mean?

24 A. It means that you take materials that
25 are at or near 100% PCBs in this particular

1 instance which you have chosen and you analyze
2 them to see what percentage they are PCBs, is it
3 99, 98, 97? And you might even go to the extent
4 of fingerprinting them to see that they look the
5 same from a gas chromatographic viewpoint -- which
6 is just simply a way of looking at something --
7 that they look the same from lot to lot to lot.
8 And so you would be analyzing samples that were
9 taken from production.

10 Q. Okay. So these would be basically
11 Aroclor, pure Aroclor samples that they would be
12 running through to make sure that they met
13 production quality control standards?

14 A. That's correct. The only addition I
15 would add to what you said is I would really call
16 it "neat" rather than "pure."

17 Q. All right.

18 A. Because Aroclors are mixtures to begin
19 with.

20 Q. That's right. And I have seen in your
21 writing that you draw that important distinction
22 quite a bit.

23 When you say "neat," you mean what?

24 A. Completely PCBs.

25 Q. All right.

1 A. That's the one extreme. Now it can be,
2 you know, 50% or something like that, but it's
3 pretty well neat.

4 Q. And when you use the term "pure," you
5 would use that only in reference to one of the PCB
6 isomers?

7 A. That would be the purest way to use it.

8 Q. All right. Okay.

9 A. If you forgive the pun.

10 Q. Okay. Now there was no -- well, when
11 did you first get drawn into the PCB analysis
12 area?

13 A. I think that occurred probably mid '68.

14 Q. And what do you recall about that
15 assignment?

16 A. Well, I don't, I wouldn't really call it
17 an assignment at that time.

18 Q. Okay. I guess what --

19 A. I would call it really more of a
20 discussion of what people were saying or thought
21 they might be saying and things of that sort.

22 Q. Okay. Well, 5That's basically I'm just
23 trying to get started.

24 What's the first thing you remember
25 about the discussions relating to PCBs that got

1 you involved in the PCB analysis situation?

2 A. Apparently there had been discussions by
3 Bob Keller, Dr. Keller, with other people within
4 the functional fluids group or whatever; I had no
5 privy to those, didn't even know about them.

6 But at the point in time I became
7 involved, I was aware of the fact we had received
8 a telex, which was a fast way of communicating
9 back in that, in that century. And in that telex
10 we had been notified by our operations in
11 Britain -- in Ruabon, I think specifically,
12 although I'm not sure -- that there were some
13 reports by some scientists in Sweden that they
14 were finding polychlorinated biphenols in the
15 environment.

16 And that's the first appraisal I
17 remember of the discussions and the initiation of
18 discussions on that particular topic.

19 Q. And that would have been in a
20 conversation between you and Dr. Keller, you
21 believe?

22 A. Yes.

23 Q. And that would have been in mid '68 --

24 A. That's my --

25 Q. -- to the best of your recollection?

1 A. -- that's my recollection, yes.

2 Q. Okay. Do you remember whether it was
3 the beginning of mid '68 or the, towards the --
4 what's the best month in '68 that you can?

5 A. Well, mid '68 means like --

6 Q. June?

7 A. -- maybe June, right. Whether or not
8 it's the beginning or the end or maybe even over
9 into July, I don't know. But it certainly wasn't
10 in the beginning of '68. It was, as I said, mid,
11 around mid '68.

12 Q. All right. And what Dr. Keller told you
13 is, is that they had received -- by "they," I mean
14 Monsanto -- had received a telex from a group in?

15 A. From who?

16 Q. From Monsanto in Britain?

17 A. Correct.

18 Q. That somebody in Sweden had found what?

19 A. The report was --

20 Q. Yes.

21 A. -- is that a research group in Sweden
22 had found polychlorinated biphenols in a place
23 where it was surprising.

24 Q. What else do you remember about that
25 initial conversation?

1 A. I think the general consensus was at
2 that point in time that the people that were
3 reviewing this and looking at it were curious as
4 to what it meant, and nobody was really sure what
5 it meant at that point in time. It was just an
6 observation that we had been appraised of and we
7 were being asked, "Does this mean anything to you
8 guys?"

9 Q. Had, had Dr. Keller done any work on it
10 at that point or was he asking you to begin the
11 work?

12 A. Dr. Keller was a manager and as such he
13 didn't work at the bench. So he may have done
14 what he did as work on it.

15 Q. Which is assign it to you?

16 A. Reading, reading about it, determining
17 who was the best individual present in the people
18 he had available to him to do it for whatever
19 reason. Who might be the best, most up-to-date
20 person who could make sense out of something of
21 this sort? That kind of thing. So that was his
22 work.

23 And I'm sure that at that point in time
24 he was being asked, "Well, you're an analytical
25 chemist, what does it mean to find polychlorinated

1 biphenols," I believe it was in eagle feathers, to
2 be real truthful with you, from a museum, if I
3 remember now.

4 And, you know, it was like, "Well, I
5 don't know but I guess we can kind of figure it
6 out. We need more information."

7 Q. Okay. And at that time he asked you to
8 try to gather more information?

9 A. From a technical viewpoint, I believe
10 that was kind of the beginning of the
11 investigation of the issues and what was going on
12 and what was associated with it to establish,
13 "Gee, what does this mean?"

14 Q. Okay. Were you basically in charge of
15 finding out what it meant from that point or at
16 that point?

17 A. Certainly not. I was part of a team.

18 Q. Who was in charge?

19 A. I don't -- I would -- my guess at this
20 point in time would be that it was probably the
21 directors of the functional fluid, the director of
22 the functional fluid product line.

23 Q. Who was that?

24 A. At that time, that was Dr. Bill Richard.
25 And he reported to I believe Howard Bergen.

1 Q. All right. Your initial meeting and
2 conversation was only with Dr. Keller, or was it
3 with more than --

4 A. That's my recollection.

5 Q. Okay.

6 A. And I was simply being asked, "Does this
7 mean anything to you?" I mean, "What do you think
8 of this?"

9 Q. What did you do after that?

10 A. I said, "I don't know what I think of
11 it."

12 But it's like any investigation; when
13 you are asked a question and you don't have an
14 answer, you begin to look for the answer. And I
15 was asked to look for the answer from an
16 analytical viewpoint.

17 Q. Were you given the telex?

18 A. I could have been given a copy of it; I
19 doubt if I had the original. And I don't, I don't
20 really recall. It wouldn't matter. I mean, I
21 would be appraised of what it meant one way or the
22 other.

23 Q. You don't recall whether you saw the --

24 A. No, I saw the original.

25 Q. I'm sorry?

1 A. I saw, I saw a copy of the original.
2 Now whether or not it was given to me, I don't
3 know.

4 Q. At that time you are saying at this very
5 first meeting you believe you saw the original?

6 A. I believe he may have had that in his
7 possession but I don't, I don't know at that very
8 first meeting.

9 But what I said was I saw a copy of it.
10 Now exactly when, I don't know that. That's a
11 different question.

12 Q. All right. Well --

13 A. If you want to ask that, ask it and I'll
14 answer it.

15 Q. Okay. Let me ask that. Do you remember
16 when you saw the telex?

17 A. Some time probably shortly after that
18 but I don't remember specifically.

19 Q. Did you see any other information
20 relating to that subject matter, i.e., the
21 discovery of this substance in Sweden?

22 A. Subsequently I saw information; but it
23 was not immediately forthcoming because there had
24 been no publications, this was all word-of-mouth.

25 As I recall it, it was a, something that

1 was said in passing at a technical meeting in
2 Sweden or some European country at which one of
3 our people was attending, perhaps in the audience.
4 And that caught their ear as to, "Hum, that's
5 interesting, what's that doing there?"

6 And then the question was asked, you
7 know, about polychlorinated biphenols -- which, of
8 course, as you know, I think, is not the proper
9 way to refer to PCBs.

10 Q. Yeah. Just so the court reporter,
11 whenever you say "bi feen ol" you're talking about
12 O-L and when we say "bi feen uls" we're talking
13 about at Y-L?

14 A. I make an attempt to be demonstrative --

15 Q. Yes?

16 A. -- in my pronunciation so that she can
17 differentiate or the court reporter can
18 differentiate. It is a subtle difference --

19 Q. Yes, I understand that.

20 A. -- but it's a big deal.

21 Q. It's important to you scientists?

22 A. No, important to everybody because the
23 molecular structure is a totally different
24 material.

25 Q. All right. And I just want to be clear

1 on what your understanding at the time you got
2 your assignment was, is that, "There had been this
3 comment that's all we know, it's this substance
4 biphenol is what everybody is talking about and
5 can you guys figure out what's going on?"

6 A. Okay. And I don't think it was what
7 everybody was talking about. I think it was one
8 report --

9 Q. All right.

10 A. -- at a technical meeting by a technical
11 person that was heard by one of our
12 representatives at the meeting who in turn began
13 to ask, "Gee, anybody know anything about this?"

14 And I wasn't given an assignment at that
15 time. I was asked if I had any knowledge of that
16 particular compound and why it would be present in
17 eagle feathers or something of that sort?

18 Q. Okay.

19 A. And to be real truthful, I didn't have
20 any idea whatsoever.

21 Q. Now --

22 A. And in fact, as you pointed out kind of,
23 the technical term being used to describe the
24 molecule was incorrect.

25 Q. But that was the term that was given to

1 you?

2 A. That's correct.

3 Q. In your meeting?

4 A. That's correct. So I thought we were
5 dealing with polychlorinated biphenols, which is a
6 different constituent than biphenyls. So I didn't
7 even know the answer to that question.

8 Q. And that's all the information that you
9 were given at the beginning of your hunt
10 basically?

11 A. Yes, sir.

12 Q. Okay. Then what did you do?

13 A. I believe shortly after -- well I want
14 about --

15 Q. Let me ask, let me ask. You indicate
16 you were not given an assignment --

17 A. That's right.

18 Q. -- at that point?

19 A. No. I was going to say I went about my
20 regular functions --

21 Q. Okay.

22 A. -- at that point time.

23 Q. That's just the first time you heard
24 about this --

25 A. That's right.

1 Q. -- PCB situation?

2 A. That's the first time I heard about the
3 polychlorinated biphenols situation.

4 Q. All right. When is the next time you
5 heard about either polychlorinated biphenols or
6 polychlorinated biphenyls?

7 A. I don't recall exactly. Certainly after
8 that occurrence. Probably not very long after
9 that it was clarified they did not mean phenols,
10 P-H-E-N-O-L-S, they meant biphenyls, which of
11 course was more significant to us because it was
12 something we manufactured.

13 Q. About how, about how long after that
14 initial meeting did you all get that information?

15 A. I, I can't, I don't have a good
16 recollection of that.

17 Q. Okay. Is it on the order of weeks? Is
18 it on the order of months?

19 A. Yes.

20 Q. Weeks or months?

21 A. Yes.

22 Q. Okay.

23 A. My suspicion is is that that type of
24 information came back fairly quickly. But you
25 asked me if I recollect specifically and, I'm

1 sorry, I do not.

2 Q. Okay. So a few weeks or months later,
3 whenever --

4 A. I, Let me clarify that.

5 Q. Yeah.

6 A. You just jumped over to months, and I
7 would say a few weeks.

8 Q. Okay. So a few --

9 A. Let's deal with it in a reasonable
10 perspective.

11 Q. So a few weeks later, was it in the fall
12 of '68?

13 A. We're talking about, no, it was, it was,
14 that kind of thing was probably clarified fairly
15 quickly. Whether or not the information was
16 passed along to me fairly quickly, you know, I
17 wasn't assigned to anything at this point. I was
18 simply asked a question.

19 Q. I understand. And I'm just trying to
20 find out when you heard that it was biphenyls
21 instead of biphenols?

22 A. Probably shortly after that. Whether or
23 not I was asked to do anything about that one way
24 or the other except to clarify my understanding of
25 what the question was, probably not.

1 I guess you need -- from my viewpoint,
2 you need to understand the perspective. The
3 perspective was that something had been found or
4 recorded as found at very minute levels in eagle
5 feathers from eagles in a museum by an analytical
6 chemist who was doing pesticide analysis in
7 samples.

8 And it was like, "Okay, what's the
9 significance of that?"

10 The significance was that it was a
11 marble out of place. And whether it had -- how it
12 got there, through contamination by the guy in the
13 laboratory, through inappropriate interpretation
14 of his data, through any of those kinds of things?
15 None of these things were answered yet.

16 He hadn't published the information; he
17 had only spoken about it. It hadn't been peer
18 reviewed; it hadn't been disseminated; nobody
19 understood how he did it. The only thing we
20 understood was that they had detected this
21 molecule which is similar to the ones we
22 manufactured in eagle feathers -- eagle feather.
23 And that was all.

24 So at that point in time my guess is is
25 that Keller and the folks in Europe said, "Hey, we

1 need details. Are you sure its phenols?"

2 Q. I'm trying to pin down so that we can
3 walk through this in an orderly fashion when each
4 of these steps occurred from your perspective.
5 Okay?

6 A. Okay.

7 Q. And my understanding is, is that that
8 information that you just gave me is the
9 information that was given to you in the first
10 conversation; you didn't have an assignment yet;
11 this was just a discussion. Is that fair?

12 A. Yeah. If I can use an example, it's
13 like determining when you got pregnant. Until you
14 are pregnant for a while and have determined you
15 are really pregnant, only then can you figure out
16 when conception occurred.

17 Q. Okay.

18 A. So that's the kind of question you're
19 asking. So if I'm appearing evasive, I'm not
20 doing it intentionally --

21 Q. I understand. I'm just trying to get
22 your best recollection; and your best recollection
23 when you got that information is in the summer of
24 1968?

25 A. Mid 1968.

1 Q. Mid 1968? Okay.

2 A. That's correct, that's absolutely
3 correct.

4 Q. And then after, some period of time
5 after that; we don't know how long, although you
6 say it was relatively shortly. So your best
7 estimate would be weeks instead of months, I
8 assume now?

9 MR. PRAUSE: Objection to the form of
10 the question.

11 A. Okay, my understanding of the
12 question --

13 Q. What's your best estimate, what's your
14 best estimate as to how long it was until you
15 heard again about biphenols or biphenyls in
16 Sweden?

17 MR. PRAUSE: Object to the form of the
18 question.

19 A. I have to allow enough time -- and I'm
20 thinking aloud to myself -- for the people to pass
21 the question back to Europe; for the people in
22 Europe to assess the questions and try to provide
23 the answer; to provide the answer back.

24 And you know how a telex is, it is not
25 like an e-mail or a phone call or anything of the

1 sort. My assumption is, is that the response came
2 back in days. Now whether or not at that point in
3 time the powers that be thought that it was
4 significant enough to come to me, a bench chemist,
5 to get my input on that information, they may have
6 discussed it among themselves for a while.

7 But I certainly was apprised in a
8 reasonable time frame. That's why I objected a
9 little bit to you saying months.

10 Q. Okay.

11 A. Because that really is demonstratively
12 long.

13 Q. Okay. And could --

14 A. A couple weeks probably.

15 Q. All right. Your best recollection or
16 best estimate is that it was a couple of weeks?

17 MR. PRAUSE: Object to the form of the
18 question.

19 A. In that time range.

20 Q. All right.

21 A. That would be, yes, that's acceptable.

22 That's an acceptable --

23 Q. All right.

24 A. -- resolution based on my best
25 recollection.

1 Q. When you got that information, did you
2 get any additional information or was it only the
3 clarification that we're talking about biphenyls
4 and not biphenols?

5 A. I think the initial clarification was
6 simply that. I think ultimately, since the
7 gentleman had mentioned that he had analyzed
8 something and determined it to be there, the
9 ultimate question was, "Gee, how did you analyze
10 it?"

11 Q. Okay.

12 A. And, "What did you really find? Will
13 you share those results? Are you going to publish
14 them soon?"

15 Q. Okay. I'm trying to walk through this
16 in order.

17 A. I understand that.

18 Q. So I just want to clarify. This may
19 be -- you may have answered the question but I
20 want to clarify.

21 In this second conversation now when the
22 specific chemical is clarified, were you given any
23 additional information and is that when you were
24 given your assignment?

25 A. I think at that point in time I might

1 have been appraised of the fact that the original
2 designation was incorrect. And furthermore, I
3 might have been asked, "Well, do you know anything
4 about measuring pesticides and what kind of ways
5 they do that and that kind of thing?"

6 And since I wasn't a pesticide chemist
7 and things of that sort, I probably would have
8 said no. And at that point in time, I probably
9 would have thought, "Well, hum, I don't know that.
10 Maybe I ought to find something out about it."

11 So I might have gone to the library and
12 started looking at the way those people did their
13 analysis, start to figure out what's going on so I
14 could begin to answer my superiors' questions,
15 which seemed to be important to them.

16 Q. All right. Is it your best recollection
17 that you were not specifically asked to do that,
18 that you just did that kind of as an eager young
19 Ph.D.?

20 A. I think that's, that's part of the
21 answer. I think that's half of the answer. The
22 other half is, is that I'm an analytical chemist;
23 my job is to analyze things for things. My job is
24 to understand the techniques and tools that are
25 used by analytical chemists to do this.

1 Soren Jensen was an analytical chemist,
2 he was analyzing something for something. Doing
3 the same thing I was doing. So it was legitimate
4 that they would come to me and ask me what I knew
5 about it.

6 Q. Okay. But what I'm asking you -- and I
7 understand that and I appreciate that information.
8 What I'm trying to find out is, at some point you
9 got an assignment --

10 A. Correct.

11 Q. -- to do some work. And I'm trying to
12 figure out when you got that assignment. Was it
13 in this second conversation that we have just
14 talked about, or was it after you had done some
15 homework on your own that you later got an
16 official assignment to follow it up?

17 A. The question is "an official
18 assignment."

19 Q. I'm sorry?

20 A. The question is "an official
21 assignment." I'm responsible for answers in my
22 area of expertise. And if I'm there to answer
23 questions relative to analytical chemistry, if
24 somebody asks me a question I can't answer, that's
25 an assignment.

1 Q. Okay. What were you asked?

2 A. Actually, I don't know what you mean by
3 "assignment." I think it would help me if you
4 clarify what you mean by "assignment."

5 Q. Okay. Here's what I, let me tell you
6 what I understand and you tell me if it is
7 accurate. This may answer the whole question.

8 What I understand is, is that in this
9 second conversation the specific chemical was
10 clarified and you were asked, "Do you know
11 anything about analyzing pesticides and so forth?"

12 And you said, "No, I don't really know
13 anything about that."

14 I didn't hear you say, "Dr. Tucker, go
15 find out about this." And I'm just asking, were
16 you told to go find out about it at that point, or
17 were you just asked questions that you didn't have
18 the answer to and --

19 A. I would believe about at or about that
20 time they began to say, "Well, you know, look into
21 that and see how they do it."

22 Q. All right.

23 A. And so 5If that's your definition of the
24 assignment, which is my understanding of it now,
25 then I would say at or about that time or shortly

1 thereafter it was evident that they had told me to
2 go look into this and see how we do it so we can
3 understand what's going on.

4 Q. Okay. But you don't have a specific
5 recollection of getting an official assignment
6 by -- from Dr. Keller saying, "I want you,
7 Dr. Tucker, to go investigate and find out what's
8 going on here"?

9 A. Okay. We were all assigned to answering
10 that question. We were all trying to figure it
11 out.

12 If you are saying he said to me, "Gee, I
13 want you to go find out how pesticide chemists
14 analyze samples for PCBs," no, he didn't, he
15 didn't ask me that question at that point in time.

16 These guys weren't analyzing samples for
17 PCBs, they were analyzing them for pesticides.
18 And so I was asked to become familiar about that
19 time with the techniques they employed.

20 Q. Okay. And is that as close as you can
21 get to what you were asked to do?

22 A. Yes.

23 Q. Okay. What did you begin to do?

24 A. I 5Reviewed the literature to see what
25 kind of techniques that were employed by these

1 folks. And determined next whether or not we had
2 any experience within the company, within my scope
3 of the company, with these kinds of techniques so
4 I could ask somebody how they worked --

5 Q. Okay.

6 A. -- things of that sort.

7 Q. Were you provided any literature or were
8 you tasked with going and gathering the
9 literature?

10 A. As far as the techniques used by the
11 folks, it was more I was tasked to go look it up.
12 I mean, it's, there was a lot of publications out
13 there by people who were measuring pesticides in,
14 in environmental samples.

15 Q. What did you find?

16 A. Well, I found out that they used, for
17 these organic molecules, they used gas
18 chromatography and that the primary detective that
19 they employed for this kind of thing was an
20 electron capture detector, referred to as an
21 electron capture detector.

22 Q. Did Monsanto have one of those?

23 A. It just so happened that in the organic
24 chromatography section of the Applied Sciences
25 they did have a detector on the shelf.

1 Q. Okay. Had it been employed yet?

2 A. Not really. They had bought the
3 detector to begin evaluation of it -- not,
4 certainly, for this particular subject, but
5 because the electron capture detector was a new
6 kind of way of detecting things. It was extremely
7 sensitive and fairly specific, and it was a new
8 kind of detector for chromatography systems.

9 And so 5Part of our charge was to keep
10 abreast of new technologies and to acquire those
11 and to see how they could help the company do its
12 job better. And so they had acquired one.

13 When I asked around and I talked to Ed
14 Emery and the folks they had, "Gee, we've got one
15 of those. We've got an electronic capture
16 detector."

17 "And have you used it for anything?"

18 "Well, not really."

19 Q. Then what did you do?

20 A. Specifically, I don't remember exactly
21 what I did. But I know what I -- what would be
22 seem logical to me, and I have developed hundreds
23 of methods.

24 I went about figure out how to get the
25 wherewithal to do what they were doing.

1 Q. By "they," are you talking about the
2 other people who were reporting finding this
3 chemical?

4 A. The only person that we had had report
5 PCBs at that time was Widmark; and that was an
6 unconfirmed observation, verbal, as a matter of
7 fact --

8 Q. All right.

9 A. -- that got garbled in the telex. But
10 there were a lot of people around analyzing
11 environmental samples for DDT and for chlorinated
12 pesticides and they were using gas chromatography
13 and they were using electronic capture detectors.
14 And so that's what I began to become familiar
15 with.

16 There's more than just having the gas
17 chromatograph and the detector. I mean, the
18 material's out there in something; and you've got
19 to isolate the material, clean it up, present it
20 in the proper form to get it through the
21 instrument, through the instrument and then to the
22 detector.

23 And you need to understand how an
24 electronic capture detector works and how a gas
25 chromatograph works. And that's when I began the

1 process.

2 It was just like with the atomic
3 absorption. It was a new technology for them; and
4 I basically was at that point in time starting to
5 do the same thing I did with the atomic absorption
6 with the gas chromatograph and the electron
7 capture detector.

8 Q. All right. And about, does that take us
9 into the fall of '68 now?

10 A. It is getting, yes.

11 Q. All right. And when did you first start
12 working with the electron capture and the gas
13 chromatograph together?

14 A. I would say probably the end of third,
15 beginning of fourth quarter, 1968. Something in
16 that range.

17 Q. All right. Now do you recall the first
18 samples that you tried to analyze yourself?

19 A. Yes.

20 Q. Okay. Tell me about that?

21 A. Okay. I think we require an
22 understanding between you and I as to what a
23 sample is.

24 Q. Yes.

25 A. And so it's probably better if you tell

1 me what you think a sample is and then I answer
2 the question relative to that.

3 Q. Well, in relation to what you had heard
4 about these other guys were doing -- which is,
5 finding PCBs in an eagle feather from a museum,
6 which is all you knew -- my understanding is
7 that's all you knew that had been done, did you go
8 get an eagle feather and in a fall of '68 and try
9 to sample it?

10 A. No.

11 Q. Okay. What's the first thing that you
12 tried to sample?

13 A. Those would be --

14 Q. I'm sorry, to analyze, let's say.

15 A. Yeah. The first, when are you
16 developing a technique, you don't work with
17 unknowns because you don't know what the answer
18 is. So what you want to do is you want to develop
19 a technique that gives you a proper answer.

20 So the only way you can determine a
21 technique that gives you a proper answer is if you
22 have known materials that give you known
23 responses; they're called standards. So the first
24 thing you work with once you get the system set
25 up, and it's a complex system, is standards. You

1 make sure that the system that you are working
2 with gives you the right answers with the
3 standards. And when it gives you the right
4 answers with the standard, then you figure, "Well,
5 you know, at least the system is working
6 properly."

7 So if I deliver the standard, the
8 constituent in question, of a known amount to the
9 instrument in a proper manner and it goes through
10 the chromatograph and then goes through the
11 detector and the detector detects it and tells me
12 if I put in 10, I got 10 out -- or nine, depending
13 upon the recovery -- then I can say, "Well, you
14 know, it's working."

15 Q. Okay. So did you start off -- I'm just
16 trying to figure out what you started off
17 sampling. Did you put a few drops of Aroclor in
18 some water and shake it up and run that through
19 your?

20 A. No.

21 Q. Okay. Well, why don't you tell me what
22 you did? Then I won't try to --

23 A. I will. You have asked the question and
24 I will answer the question best of my ability.

25 The first thing we did after we set up

1 the instrument and made sure that it was
2 functioning properly is we took the manufacturer's
3 standards solutions -- which weren't PCBs, they
4 were pesticides.

5 We took the manufacturer's standard
6 solutions and we ran those through the instrument
7 and made sure that it gave us the appropriate
8 chromatogram, which is, you know, a trace of how
9 it goes through the column in the instrument and
10 separated out and then goes through the detector.
11 It tells you its retention time.

12 It also gives you a peak that has a nice
13 shape associated with it. If it's a nice shape,
14 then it means it is getting through the instrument
15 without being degraded. If the peak is up on this
16 side or up on that side, then something is
17 happening and the thing is not working right.

18 You also may have a known response that
19 you expect in terms of the detector. And so you
20 look at the response you get versus what the
21 manufacturer says it should be; if they agree, you
22 say, "Okay, now at least I can do what the
23 manufacturer did. His instrument meets his
24 specifications." That would be the first thing
25 that's done.

1 Now the pesticides or the compounds that
2 were provided were undoubtedly an hexane, which is
3 a solvent very amenable to gas chromatography.
4 And that's where it starts.

5 And so if you want to refer to that as a
6 sample, I would refer to it as a standard, that
7 would be probably the first thing that was done,
8 to check the specifications of the instrument to
9 meet the manufacturer's specifications, and that's
10 what I did.

11 Q. Okay. About how long did that take, do
12 you think?

13 A. Well, with the -- first of all, the
14 actual instrument that we used, the FM402
15 biomedical chromatograph, had to be order. That,
16 if you rush them, it can be four weeks; but more
17 than likely it is usually quoted six to eight
18 weeks to get the instrument in.

19 During that time, you order the gasses
20 that you need and make sure you setup's there and
21 everything. And then you get the instrument in
22 and set it up and that kind of thing. So it could
23 be anywhere from four to eight weeks before you
24 are even prepared to but that first sample through
25 and make sure the instrument is operating

1 properly.

2 Q. Okay. So after you got the machine set
3 up and you're starting to run these samples, I'm
4 wondering how long that process took?

5 A. Okay. I thought that's what we were
6 talking about. And we said that we ordered the --
7 oh, you mean once I had the instrument in house?

8 Q. Yeah. Once you had the instrument in
9 house, I'm just asking how long a period --

10 A. Probably a couple weeks.

11 Q. Okay. Then what did you do?

12 A. Well, once I had established that the
13 instrument worked according to the manufacturer's
14 specifications, then I decided that we needed to
15 develop the wherewithal of taking a sample, like
16 eagle feathers, and treating it in such a manner
17 that we isolated what we were after and carried it
18 through the cleanup steps and then got it to the
19 right concentration and things of that sort and in
20 the right solvent medium and then injected it into
21 the instrument.

22 So we then had to develop the sample
23 preparation techniques. Okay. The simplest
24 matrix to deal with that these folks were dealing
25 with was water. And so water is undoubtedly where

1 we started.

2 Q. All right.

3 A. And so I had to figure out a way to put
4 a known amount of a PCB into water; run the water
5 through a proposed sample preparation scheme; and
6 then run what I got at the end there, which would
7 be just like the standard only it wasn't a
8 standard this time, through the instrument and
9 have it tell me that I had recovered everything
10 that I had put into the water.

11 That's fairly complicated. Sound simple
12 but you have to -- well, you don't have to
13 understand, but it's helpful if you do -- that
14 PCBs aren't soluble in water --

15 THE REPORTER: I'm sorry, "PCBs" what?

16 MR. WRIGHT: Aren't soluble in water.

17 A. Are not real soluble in water. It's
18 not like taking weighing out a portion of table
19 salt and throwing it in water and dissolving it up
20 in a known amount of water, and then you have got
21 a standard solution.

22 You have a known amount of water that
23 you measured and you have a known amount of
24 soluble chloride in there, which is salt. And
25 you've got a standard.

1 So you can take a aliquot of that and
2 weigh the solids and you're probably going to come
3 up with 100% of the sodium chloride on a weight
4 basis.

5 With the PCB routine, you had to take
6 and introduce the PCB into the water; and you had
7 to worry about it plating out, it liking the
8 vessel -- the walls of the vessel that you had the
9 water in -- better than it liked the water because
10 its hydrophobic. And you had to make sure there
11 was -- those were equilibrated. And then you had
12 to be sure that you take a representative sample
13 out in a manner that you're, again, the walls that
14 you take the sample out with, the pipette, the
15 glass pipette, doesn't pull the PCBs out and make
16 them disappear.

17 And so you have to work your way through
18 all these kind of things.

19 And eventually, it's a reiterative
20 process; it's a step-by-step process; you can't
21 jump, you can't go from 1 to 25, you have got to
22 go 1, 2, 3, 4, 5, 6. Because about the time you
23 skip a step, the number 12 kills it and so then
24 you have to back up and start over again.

25 So you go through this process and you

1 establish that the sample preparation technique
2 works and that you are able to, one, prepare a
3 solution that has with a known quantity of PCBs in
4 it. Two, you are able to carry it through your
5 sample preparation, your extraction, your cleanup,
6 whatever you did. And, three, you get it into a
7 format that you can deliver it to the instrument
8 such that you can take your response on the other
9 end and calculate what's back here.

10 And if it agrees with what you put in,
11 you are happy. And then you can say, "Well, okay,
12 you know, nice, clean, distilled water that I have
13 spiked with PCBs, I can analyze that."

14 Now with PCBs the situation becomes more
15 complicated because there's 209 isomers. Okay?
16 So it's not just a matter of having sodium
17 chloride, which is a single thing, and isolating
18 that; it's a matter of making sure that whatever
19 you do between when you put it in the water and
20 you take it through the instrument doesn't change
21 the ratio of those isomers of the 209 components
22 in that particular PCB. Because if it does, then
23 it don't look like your standard.

24 Q. And so you were involved in working all
25 of that out in the fall of 1968?

1 A. Correct.

2 MR. PRAUSE: Before we transition to the
3 next phase, I would like to request a short
4 break.

5 MR. WRIGHT: Let me, let me ask about
6 three or four questions.

7 MR. PRAUSE: Sure. I just wanted to
8 give you a heads up.

9 MR. WRIGHT: Because I think I am about
10 to a transition point.

11 MR. PRAUSE: Okay.

12 BY MR. WRIGHT:

13 Q. During this period, did you visit any of
14 the laboratories that were doing pesticide
15 analysis to see how they were doing it?

16 A. I'm sure I did.

17 Q. Well, which ones did you visit?

18 A. I don't recall specifically. But there
19 was no -- whether I did during that specific time,
20 I'm not really sure. I visited a lot of
21 laboratories that did pesticide analysis.

22 Q. Eventually?

23 A. That's correct.

24 Q. Okay. But I'm asking: Before you
25 started running samples through your machine, did

1 you visit any laboratories? And if so, which
2 laboratories did you visit?

3 A. All right. I would have to say that I
4 probably did not during the specific period of
5 time that you are referring to.

6 Q. All right.

7 A. I do know that Keller and some folks
8 visited laboratories.

9 Q. Do you know which laboratories
10 Dr. Keller visited?

11 A. Yeah, they went to Europe and visited
12 Soren Jensen and Gunther Widmark in Sweden.

13 Q. Do you know when they --

14 A. I don't know exactly when. But I do
15 remember that I had to get shots to go there and
16 then I didn't get to go.

17 Q. Why didn't you go?

18 A. Well, they already had enough people
19 going to get the information they needed and they
20 wanted me back developing methods and establishing
21 them in our laboratory. So it was a priority
22 about who does what.

23 Q. Did they come back and give you any
24 instruction?

25 A. Yes. They came back and gave me

1 information.

2 Q. What information did they give you?

3 A. They brought back prepublication copies
4 of things and stuff like that. I don't remember
5 specifically what it was; but they brought back
6 all the information that they could get, both
7 verbally and written, with regard to what was
8 going on over there.

9 Q. Well, did they bring back information
10 relating to the way that, that Dr. Jensen and
11 Dr. Widmark had prepared their samples?

12 A. My recollection is, is that at some
13 point, whether it was this specific point or not,
14 we did obtain an unpublished prepublication copy
15 of what they had done and how they had done it.

16 Q. And I'm just asking, was it before you
17 started inventing your process?

18 A. No.

19 Q. Okay. Now do you know if Dr. Keller
20 actually visited the laboratory or simply spoke
21 with Drs. Widmark and Jensen?

22 A. I don't know if they specifically
23 visited the laboratory. My assumption is if he
24 went and talked to them he went over there and
25 talked to them at the laboratory because that's

1 where they were. But I don't know that they did.

2 Q. You don't know that?

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

4 Q. What was the first laboratory that you
5 visited doing this type of analysis other than
6 your own?

7 A. I think the first laboratory I visited
8 was probably in Crevecoeur, it was in our
9 Agricultural Division.

10 Q. I'm sorry?

11 A. I think the first laboratory, one of the
12 first laboratories, that I would have gone to
13 would be out at our Crevecoeur location in
14 St. Louis that -- at the Crevecoeur location --
15 that the agricultural folks familiar with
16 agricultural type samples and things of that sort.
17 And I talked with those people. I don't recall
18 directly.

19 But you're asking what lab that might
20 have some knowledge of those kinds of things did I
21 go to during that period of time? And I would
22 have used my internal resources first --

23 Q. Well, what I --

24 A. -- because they were the most readily
25 available to me.

1 Q. Okay. Okay. I'm afraid that's not
2 responsive to the question I asked.

3 The question that I'm asking is, is what
4 lab that was doing this electron capture gas
5 chromatography analysis did you go to? What was
6 the first lab other than your own that was doing
7 that kind of analysis that you went to?

8 A. I can give you a list of laboratories
9 that I know I have been to. Whether or not I can
10 tell you the very first one at this point in time,
11 we're talking -- I would like to understand that
12 we're talking about 1968 and that this is 2000.

13 Q. Well, I don't know when it was, whether
14 it was '68 or '69?

15 A. It could have been '69, too. But do you
16 agree we're talking about '68 or '69?

17 Q. The very first time that you went to a
18 lab other than your own that was doing gas
19 chromatograph electron capture. And I understand
20 that it was a long time ago.

21 A. I understand the question; and I was
22 attempting to tell you that I can tell you the
23 laboratories I had visited. I cannot specifically
24 tell you the first one because I cannot recollect
25 it because it is just a long time ago.

1 Q. Okay. And I'm just asking --

2 A. I think I have answered the question.

3 Q. Okay. You cannot recall the first
4 laboratory other than your own that was doing that
5 kind of analysis that you went to?

6 A. That's correct.

7 Q. And you can't recall when it was?

8 A. That's correct. You mean in terms of
9 the specific day or month or year?

10 Q. Yes.

11 A. I think I can get the year probably.

12 Q. What's your best estimate of the year?

13 A. Probably in '69 would be my guess --

14 Q. All right.

15 A. -- would be when it happened.

16 Q. And can you tell me approximately how
17 many other labs that were doing that kind of
18 analysis you visited in, say, 1969?

19 A. No, not specifically.

20 Q. Last question, then we'll take our
21 break.

22 Tell me the labs that you recall that
23 you visited, beginning in 1969, that were doing
24 the same type of analysis that we have been
25 talking about, the gas chromatography electron

1 capture.

2 A. The reason I'm smiling is, is that that
3 is a very general, open-ended question. I have
4 been in the business 33 years and I have visited
5 thousands of laboratories.

6 Q. The only reason I ask --

7 A. They all do that kind of work, electron
8 capture work.

9 Q. The only reason I asked you that
10 question is because you told me that's the
11 question you could answer --

12 A. That's right.

13 Q. -- that's the labs you went to --

14 A. I can tell you the labs that I have
15 visited.

16 Q. Okay. Tell me, let me, let me close the
17 end of the question as best I can. Even if you
18 don't remember the first lab you visited, can you
19 tell me some of the first labs --

20 A. Sure.

21 Q. -- that you visited?

22 A. I can tell you the labs that I visited
23 during that period of time or close to it. There
24 was WARF, Wisconsin Alumni Research Foundation, I
25 visited Dr. Francis Coon and the folks there.

1 There was a lab down in Paxtaunt; there was a lab
2 in Escambia; there was a lab in Duluth, Minnesota.
3 There were -- I think, and I had correspondence
4 with a number of places. But there were a lot of
5 them.

6 But I don't, and that's strange, but I
7 don't really recall the very first one I went to.
8 I'm sure a review of the record could establish
9 that, but I don't recall it. But those are some
10 of the labs that I visited; and those were the
11 kind of labs that were primary interested in doing
12 that kind of work in those days. They were
13 primarily government labs and
14 university-associated laboratories.

15 MR. WRIGHT: Okay. Thank you. We can
16 take a break now.

17 THE VIDEOGRAPHER: Off the record at
18 12:19.

19 (Lunch recess taken 12:19 p.m. to 1:18
20 p.m.)

21 THE VIDEOGRAPHER: This is tape two of
22 the deposition of Dr. E. Scott Tucker, III.

23 We're on the record at 1:10 -- excuse me,
24 1:18.

25 BY MR. WRIGHT:

1 Q. Okay. Dr. Tucker, I think when we left
2 off was early 1969 and you were in the process of
3 working out the analytical method for analyzing
4 PCBs using that new equipment. And what was that
5 called again, the equipment?

6 A. Oh, you're asking me? I thought you
7 were --

8 Q. Yes.

9 A. -- asking the reporter. I'm sorry.

10 Q. That's okay.

11 A. Forgive me for daydreaming. The
12 equipment, the new piece of instrumentation that
13 we ordered because the other one that we had
14 wasn't suitable for environmental work was an F&M
15 Model 402 biomedical gas chromatograph.

16 Q. Do you know how long that equipment had
17 been on the market?

18 A. The, are you talking about electron
19 capture detectors, are you talking about gas
20 chromatographs, or are you talking about that
21 particular model?

22 Q. Well, let's start with that particular
23 model.

24 A. Not very long.

25 Q. Okay. How about gas chromatographs?

1 A. Gas chromatography as in one form or the
2 other, certainly to a much less sophisticated
3 extent than it exists today even, has been around
4 a long time.

5 Q. I guess some quantification. For
6 example, was it used in the '50s?

7 A. It was originally called gas vapor
8 chromatography. G, G -- I can't remember what it
9 was. But it's like anything. You know, there is
10 a Model T and then there's a Lexus Q45. They are
11 both cars and cars have been around for a long
12 time but there is a big difference between the
13 Lexus and the Model T.

14 So gas chromatography had been around
15 for a long period of time for uses; and it is a
16 concept was available, but certainly it went
17 through an evolutionary process like everything
18 else.

19 Q. Had electron capture technology been
20 around for a while?

21 A. Not as long as gas chromatography, I
22 don't think. Now you had the fundamental concept
23 of electron capture has been around since the
24 world was invented; but the concept as we're using
25 it here in terms of analytical chemistry --

1 Q. The equipment is what I'm asking you
2 about.

3 A. And not the phenomenon?

4 Q. Right.

5 A. Okay. Now you're talking about electron
6 capture detectors specifically for gas
7 chromatography?

8 Q. Yes.

9 A. Have they be around a long time? Is
10 that your question?

11 Q. Yes.

12 A. Define "long" for me, please.

13 Q. Rather than do that, why don't you just
14 tell me when they came out?

15 A. Let's say that they were in existence
16 when I was at Monsanto, obviously; I ordered one.

17 Q. How long before you ordered one had they
18 been in existence?

19 A. And used for analysis of environmental
20 samples?

21 Q. Yes.

22 A. Probably, gosh, not much more than,
23 let's see, that was 19-, we're talking 1968,
24 correct? So that would be, that's not too much,
25 not too much earlier than that. Several years

1 maybe.

2 Q. Let me ask you, this is one of the
3 documents that I was provided this morning that
4 you reviewed. We'll mark it as Exhibit No. 3.

5 (Deposition Exhibit No. 3 marked for
6 identification.)

7 Q. Can you tell me what that is?

8 A. (Witness peruses document.)

9 Q. It appears to be an excerpt from a
10 report of some sort?

11 A. Did you want me to tell you what I
12 thought it was?

13 Q. Yes.

14 A. Okay, let me look at it and see if I can
15 decide based on what you have shown me here what
16 it is.

17 It looks like Pages 15 and 16 taken from
18 a periodic report that was produced by the
19 Functional Fluids Group in terms of projects they
20 were working on, and specifically electrical
21 fluids.

22 Q. Okay. What was the Functional Fluids
23 Group?

24 A. The Functional Fluids Group was a group
25 of engineers and chemists that made and formulated

1 functional fluids for use in, in industry.

2 Q. Was it a subdivision of the Organic
3 Division?

4 A. Yes.

5 Q. And so the Functional Fluids Division
6 was the division that was responsible for
7 Aroclors?

8 A. Yes.

9 Q. Do you recall who was the head of the
10 Functional Fluids Division at that time?

11 A. You mean the Director of Research or his
12 boss?

13 Q. Well, tell me both.

14 A. I think Howard S. Bergen was higher up;
15 and then I think Bill Richard, Dr. Bill Richard,
16 reported to Howard. And Richard was the Director
17 of Research and Development for the Functional
18 Fluids Group. And I think Bergen was like a
19 Business Director or Vice President or something
20 like that.

21 Q. Okay. And did they, did the Functional
22 Fluids Group -- and I assume all groups at
23 Monsanto -- prepare periodic reports?

24 A. Yes.

25 Q. And those reports were prepared for the

1 management, I assume?

2 A. Yes.

3 Q. Would that have been the kind of report
4 that would have gone to the Executive Committee?

5 A. You have to define what "Executive
6 Committee" means for me.

7 This would be a report that would be
8 certainly written by the folks who were being paid
9 from the job numbers associated with functional
10 fluids and budgeted and that kind of thing. And
11 this report would probably go to Bill Richard and
12 Bill Richard would be responsible for the whole
13 thing. And then it would probably go to Howard
14 Bergen.

15 A higher level than that, I don't know
16 about the distribution; and in fact, there's no
17 distribution evident on this.

18 Q. Well, the problem is it is a partial --

19 A. That's correct, as I stated earlier.

20 Q. -- excerpt.

21 A. So my answer to your question -- and
22 please rephrase your question again and I'll
23 answer it directly.

24 Q. Well, my question is a little bit of a
25 general question.

1 A. I meant the question that you asked. I
2 didn't -- could?

3 Q. The question, what I'm trying to find
4 out is, is who those, who reports like that went
5 to? Okay?

6 A. And I have given you all the knowledge
7 that I have relative to that subject.

8 Q. Okay. As far as you know, a report from
9 the Functional Fluids Division like that would
10 have gone to Mr. Richard; and it may have gone
11 higher, but you don't know?

12 A. That's correct.

13 Q. Okay. You heard me use the term
14 "Executive Committee." Is that the first time you
15 ever heard that term used in relation to Monsanto?

16 A. It may not be, no. It may not be. But
17 the Executive Committee means the Executive
18 Committee and --

19 Q. My understanding of the way Monsanto was
20 organized at the time, and please correct me if
21 I'm wrong, is that Monsanto had a committee that
22 met approximately weekly that was called different
23 things at different times. Sometimes it was
24 called the CDC committee; I can't remember what
25 those initials stand for. Sometimes the CAC. But

1 it was a committee made up of upper level
2 management that was responsible for making the
3 important decisions for the entire company.

4 Did you ever hear of a committee like
5 that during your time at Monsanto?

6 A. Well, Monsanto had 56,000 employees
7 worldwide and I'm certain they had a number of
8 committees that called themselves executive
9 committees. Does that particular term that you
10 brought forward to me mean something specific to
11 me outside of the words themselves? No.

12 Q. Okay. You are not aware of a committee
13 that met in St. Louis on approximately a weekly
14 basis that was responsible for the upper level
15 management decisions of the company?

16 A. You know, I think it's proper to keep in
17 context that I was a senior research analytical
18 chemist working at a bench level in the company.
19 That I was a technical person. And that while I'm
20 sure these things may or may not have existed
21 based on what you are telling me and knowledge
22 that I had directly or indirectly, it wasn't my
23 focus.

24 Whether they met weekly, or whether they
25 were made up of this, or whether they are made up

1 of that, or whether they did this or they did
2 that, that wasn't my venue.

3 Q. Dr. Tucker, I'm not asking you that
4 right now. All I'm asking you is, is are you
5 generally familiar that during your time at
6 Monsanto there was a high-level management
7 committee that went by different names during
8 different periods of time but was made up of
9 high-level managers that met on approximately a
10 weekly basis?

11 MR. PRAUSE: Object to the form of the
12 question.

13 Q. You can answer the question, sir.

14 A. The question from my viewpoint is so
15 general and not clear enough that I couldn't
16 answer it if I wanted to.

17 Q. All right.

18 A. And I'm happy to try to answer questions
19 that I understand and that are focused enough to
20 have an answer to.

21 Q. Okay. Did you ever hear a gentleman
22 named Monte Throhdal?

23 A. Yes.

24 Q. What was Mr. Throhdal's position?

25 A. I don't know his exact title.

1 Q. What was his general title?

2 A. Well, he seemed to be everybody's boss,
3 sort of. I don't, I don't know Monte Throhdal.

4 Q. Well, Mr. Throhdal gave a deposition in
5 a case and he described a committee that he was on
6 from I believe 1966 to when he retired in maybe
7 '84. And he said, quote, "There's always been an
8 Executive Committee of the Board. And an
9 Executive Committee of the board was simply doing
10 the Board's work at the time the Board was not at
11 session. It was called variously different
12 things. There was -- it was the Corporate
13 Development Committee; it was sometimes called the
14 Corporate Administrative Committee; it was
15 sometimes called the Corporate Management
16 Committee."

17 And my question to you, sir, is simply,
18 is today the first time that you have ever heard
19 any of those terms in relation to the concept of a
20 upper level committee of managers and executives
21 at Monsanto?

22 A. No, it is not the first time I have
23 heard what you have gone through.

24 Q. All right. Were reports like the report
25 you have in your hand forwarded to this

1 committee -- whether we're calling it the
2 Executive Committee or the Corporate Development
3 Committee or the Corporate Management Committee or
4 the Corporate Administrative Committee --

5 MR. PRAUSE: Object to the form of the
6 question.

7 A. I would have to answer that I do not
8 know. I'm sure Mr. Throhdal could answer that
9 question for you --

10 Q. All right.

11 A. -- because he was on the committee, I
12 was not.

13 Q. Okay.

14 A. So to be very frank with you, I tried to
15 explain to you earlier that I was a senior
16 research chemist at the bench level at Monsanto.
17 At that time, I had joined Monsanto, what did we
18 say, in 1967, latter part? And I doubt if I had
19 been around long enough to get to that high a
20 level in a company that large.

21 So are you asking me if I have direct
22 knowledge that this report was passed on to a
23 committee that you refer to as the Executive
24 Committee? I do not have that knowledge and I
25 would have to answer, I don't know.

1 Q. Okay. That wasn't my question, but I
2 appreciate your answer.

3 A. Well, then I am obviously having
4 problems understanding --

5 Q. Yes.

6 A. -- your question.

7 Q. We are. My question was, generally do
8 you have knowledge of such a committee? We have
9 now establish that yes, you have knowledge that
10 there was such a committee at Monsanto during the
11 time you were there, correct?

12 A. That is correct.

13 Q. All right. My second question is: Were
14 reports like the one that you have there in your
15 hand, reports of divisions of the company, passed
16 to the Executive Committee? That's the question.

17 MR. PRAUSE: Object to the form of the
18 question.

19 A. That question has been asked and
20 answered and I'll answer it again.

21 I don't have any direct knowledge of the
22 subject that you are talking about. I do not
23 know, did I ever witness or see any indications
24 that these reports were passed forward to them.

25 I don't doubt that what you are telling

1 me may be true. But on the other hand, you're
2 asking if I have direct knowledge and can testify
3 to to the fact that it was done, and I can't.

4 Q. Well, with all due respect, sir, I'm not
5 asking you whether you saw the report get handed
6 to a member of the Executive Committee. I'm just
7 asking you, during the years that you were at
8 Monsanto, were you made aware that reports like
9 the one you have in your hand were forwarded to
10 the Executive Committee?

11 A. No.

12 Q. I mean --

13 A. No.

14 Q. -- Dr. Keller ever tell you, "Look,
15 guys, we need to write this up, we need to send it
16 to the Executive Committee, they're going to be
17 considering this next week"?

18 MR. PRAUSE: Object to the form of the
19 question.

20 Q. Anything, or anything like that?

21 A. Absolutely not. He would say, "This
22 report is for Bill Richard." And what Bill
23 Richard did with it outside of discussing it with
24 us is what Bill Richard did with it. So
25 absolutely not.

1 Q. Did you ever at your time at Monsanto
2 ever make a presentation to the Executive
3 Committee?

4 A. I think at some point in time I was
5 asked to make a presentation that would fit the
6 description of the Executive Committee that you
7 have been telling me about.

8 Q. Okay. Do you remember when that was?

9 A. No. I'm sure it's documented but I
10 don't remember specifically.

11 Q. It related to PCBs, obviously?

12 A. I would assume that it did, yes.

13 Q. Did you only make one such presentation
14 to the Executive Committee?

15 A. That would be, that would be my guess,
16 yeah.

17 Q. Is it your testimony, Dr. Tucker, that
18 it wasn't a memorable experience to someone in
19 your position to make a presentation to the Board
20 of the corporation?

21 A. It is my testimony that the period of
22 time that we are talking about is 32 or 33 years
23 ago and I have been around long enough to have
24 many memorable occasions in my career. And while
25 I'm sure that that was a memorable occasion, I'm

1 also quite sure it was part of my job and that I
2 was asked to do it and at the level I was at in
3 Monsanto I probably wasn't asked very frequently
4 to do it. And that I probably wouldn't even know
5 who that committee was or what their objective
6 was.

7 I would probably just simply know that I
8 had to go and discuss what I was doing because
9 somebody like Bill Richard had asked me to because
10 they didn't speak the technical language well
11 enough and they wanted to show that they wanted to
12 present something where I was at or something.

13 Q. So it's your --

14 A. So I don't doubt it.

15 Q. So it is your testimony when you gave
16 your presentation to the Executive Committee you
17 didn't know you were giving your presentation to
18 the Executive Committee?

19 A. I don't recall it as being, as their
20 saying to me, "Okay, you're giving a presentation
21 to the Executive Committee," or something of that
22 sort.

23 You yourself called it several different
24 things, so. But that's fine.

25 Q. Well I'm asking you any of those

1 things --

2 A. And I'm answering your questions --

3 Q. Yeah.

4 A. -- and I think I have done that, so we
5 can continue.

6 Q. Do you have a recollection of giving a
7 presentation on PCBs?

8 Well, you have already indicated that
9 you have a recollection that you probably gave
10 such a presentation at some point to a committee
11 like the committee that I described?

12 A. I recall being asked to give -- at one
13 time being asked to give a report on the status of
14 what I was doing to rather high level people in
15 Monsanto. But to be real truthful with you, I'm a
16 senior research scientist and a chemist and, you
17 know, that's fine, that was good for those folks
18 and that's what they did. I did what I did.

19 Q. And you don't remember when that was?

20 A. Not specifically, no.

21 Q. Do you remember what the presentation
22 that you gave was about?

23 A. I think we have already established that
24 it was probably about PCBs.

25 Q. Do you remember it in any more detail?

1 A. Again, I'm going to, I'm going to try to
2 make this clear and I'll continue to say it again
3 and again. And that is, is that we're talking
4 about a subject that was 32 years ago; and you're
5 asking me very specific dates and times and things
6 of that sort, and I'm trying to recollect those to
7 the best of my ability and I think I'm doing that.

8 But I'll tell you very frankly, in 32
9 years ago, I don't know what I did almost on any
10 specific date specifically. And that's the way it
11 is.

12 Q. Okay. Let me object, nonresponsive.

13 My question is simply, do you recall
14 anything more about your presentation to the
15 Executive Committee than the general subject
16 matters of PCBs?

17 A. No.

18 Q. Do you remember anything more about when
19 this presentation was other than it was some time
20 during your tenure at Monsanto?

21 A. No.

22 Q. Now could I have Exhibit No. 3 again for
23 a moment?

24 A. Certainly.

25 Q. There's a project described in Exhibit

1 No. 3; and just for the record, what is that
2 project?

3 A. The pages given me it is stated on
4 Page 15 at the top, "Project." And then it says,
5 "Electrical Fluids - Part V - Air and Water
6 Pollution Control."

7 Q. And there's a date on that excerpt, is
8 there not?

9 A. There is a, in the upper right-hand
10 corner there's something that says "FLU," which I
11 assume means fluids, "-030 Part V." And then in
12 parentheses there's "(7/68)," which I would assume
13 is July of 1968.

14 Q. Okay. Look at the next page.

15 A. That's Page 16?

16 Q. Yes.

17 A. Okay.

18 Q. And is there a date down at the bottom?

19 A. Yes. It says July 18, 1968.

20 Q. Okay. And it, this project, air and
21 water pollution control, the first objective
22 indicates, "Follow developments in analytical
23 chemistry leading to more sensitive and specific
24 methods for identifying Aroclors in our
25 environment.

1 "2. Keep in touch with laboratories
2 doing research on environmental contamination by
3 Aroclors including university, FDA, USDA, Fish and
4 Wildlife Service.

5 "3. Study present methods for disposal
6 of Aroclors and if necessary develop safer ones.

7 "4. Assess possible toxic effects on
8 humans."

9 Did I read the objectives correctly?

10 A. Yes, you did.

11 Q. Okay. And then for the justification --
12 I'm going to paraphrase -- it indicates that,
13 well, the first sentence, "During studies of the
14 fate of chlorinated organics insecticides,
15 biochemists have isolated unknown chlorinated
16 hydrocarbons which they have tentatively
17 identified as chlorinated biphenyls. These have
18 been shown to be present in some fish, birds and
19 wild animals in certain areas at concentrations of
20 the parts per million range."

21 And then it talks about public health
22 authorities being interested and that Monsanto may
23 need to cooperate in developing disposal
24 procedures and so forth in order to avoid
25 restrictive legislation. Correct?

1 A. Is your paraphrasing correct?

2 Q. Yes.

3 A. It's, it's, yeah, it's fine. I mean,
4 your paraphrasing is probably as long as the
5 statement.

6 Q. Okay. Well then, so that we have a nice
7 clear record, let me ask you, Dr. Tucker, to read
8 the justification section that follows the
9 objectives section that we just discussed.

10 A. Okay. Be happy to do that.

11 "Justification: During studies of the
12 fate of chlorinated organic insecticides
13 biochemists have isolated unknown chlorinated
14 hydrocarbons which have been tentatively
15 identified as chlorinated biphenyls. These have
16 been shown to be present in some fish, birds and
17 wild animals from certain areas at concentrations
18 in the part per million range. Public health
19 authorities have therefore felt that it was
20 necessary to determine whether or not
21 environmental contamination by chlorinated
22 biphenyls is a hazard to human life or health. It
23 is vital that we cooperate in these studies so
24 that we can be sure that the results are valid and
25 know that we can assess the impact of the findings

1 of the on the Aroclor business. We may need to
2 cooperate with -- we may need to cooperate in
3 developing disposal procedures which will not
4 result in harmful contamination in order to avoid
5 restrictive legislation."

6 Q. Then would you read the status section?

7 A. "Status: At present, we are collecting
8 all available information on this problem. The
9 medical department is following the toxicity --
10 toxicology and will start a test program at
11 Calandra Labs to determine biological effects of
12 trace Aroclor. The research will evaluate the
13 validity of published analytical identification.
14 Samples of Aroclor, and in some cases of pure
15 chlorinated biphenyl isomers are being made
16 available to government and university
17 laboratories working on this problem for use as
18 calibration standards."

19 Q. And then the next section is entitled
20 "Plans." Correct?

21 A. Yes.

22 Q. And there are some initials next to the
23 responsibilities?

24 A. Uh-huh.

25 Q. Correct?

1 A. Yes.

2 Q. The first item is what, sir?

3 A. And I assume you're talking to the first
4 item under "Job"?

5 Q. Right.

6 A. And it is, "Assess validity of
7 analytical methods used by workers in this field."

8 Q. And who is tasked to do that?

9 A. The persons tasked with that
10 responsibility are Dr. Robert Keller and Dr. Scott
11 Tucker.

12 Q. Your initials ST, standing for Scott
13 Tucker, correct?

14 A. That's correct.

15 Q. And then a target date of March 1969?

16 A. That's correct.

17 Q. Is the handwriting on this page yours?

18 A. It looks to be my handwriting, yes.

19 Q. Can you --

20 A. My copy is not very clear, but I would
21 say based on the clarity that I have here that it
22 probably is my handwriting.

23 Q. My copy is not very clear, either.

24 My question is, there's some handwritten
25 modifications to the first job. It says "Assess

1 validity of," and it says, "analytical methods" in
2 the typewritten text. Can you tell what is
3 handwritten?

4 A. No, I can't. Can you? And I'm not
5 being, that's not challenge, I can't read it.

6 Q. I can read the last two words, I can't
7 read the first. It says "other workers" and I
8 can't read what the first word is.

9 A. I can recognize that it could be "of the
10 workers" or "other workers," either one.

11 Q. Okay.

12 A. And I'm honestly not sure what that --
13 well, I'm not sure what that first word is either.

14 Q. Okay. And that appears to have gotten
15 the handwritten 2 and a circle next to it,
16 correct?

17 A. Uh-huh.

18 Q. And then the one right below it says,
19 "Collect information on all work being done by
20 others in this field." And that got a handwritten
21 circle and a 1 next to it, correct?

22 A. Yes.

23 Q. And you're one of the three people
24 tasked with that, correct?

25 A. Yes.

1 Q. The others being WRR, which is
2 Mr. Richard?

3 A. That would refer to Dr. Richard, yes,
4 that's correct, Bill Richard.

5 Q. EW, Elmer Wheeler?

6 A. Right.

7 Q. He's in the medical department?

8 A. That's correct.

9 Q. And yourself, Scott Tucker?

10 A. Correct.

11 Q. I assume that it was your job to get the
12 information being done by other analytical
13 chemists?

14 A. Correct.

15 Q. And it was Elmer Wheeler's job to get
16 the information relating to, of a medical nature?

17 A. Yes.

18 Q. And Mr. Richard's job to basically
19 oversee both of those tasks?

20 A. And gather information from the people
21 he knew in the business, too. I mean, we all had,
22 were tasked with the same thing at different
23 levels and in different areas.

24 Q. What information do you recall
25 Mr. Richard ever gathering?

1 A. In terms of functional fluids?

2 Q. Yes.

3 A. Certainly he would know -- and I don't
4 know that he knew, but my guess is, is that he
5 knew who they were being sold to and what kind of
6 work those people were doing on the fluids and
7 things of that sort so...

8 And I know that, for example, Bill
9 Richard went to Europe and talked with Widmark and
10 Jensen. He had a Ph.D. in chemistry, he wasn't
11 not technical.

12 Q. And that's the meeting we already talked
13 about and the information that you got back from
14 that meeting we already talked about it?

15 A. That's correct, we talked about that
16 earlier.

17 Q. Now I'm going to skip the third task,
18 since you're not, "Determine present disposal
19 methods for Aroclors," you're not tasked with
20 that.

21 The fourth job is, "Toxicology Review
22 with government agencies, research institutes and
23 then start outside test program." And you are one
24 of the people tasked with that, correct?

25 A. That's correct.

1 Q. And then you have numbered, "Review with
2 government agencies, research institutes," you
3 have numbered that 3, correct?

4 A. Uh-huh.

5 Q. And then "Start outside test program,"
6 you have numbered that 4, correct?

7 A. That's correct.

8 Q. And then you hand-wrote in number 5,
9 which says, "Source." Do you recall what you were
10 referring to when you did that?

11 A. When I did what?

12 Q. When you wrote "Source" as job number 5.

13 A. Yeah, I think there was, at that point
14 in time, there was significant questions as to
15 what was the source of the PCBs that had been seen
16 by the few people who had seen them.

17 Q. Okay. And so that was one of the jobs
18 that you were assigned?

19 A. It was one of the jobs that I was
20 assigned to contribute to. It wasn't specifically
21 assigned to me, as you have pointed out.

22 Q. Well you were the only analytical
23 chemist involved in this project, correct?

24 A. That's correct. And that means that I
25 would be charged with responsibility for the

1 analytical chemists associated with each of these
2 items.

3 Q. And what that means specifically with
4 job number 1, you were the only person that was in
5 charge of -- well, you and your boss, Dr. Keller,
6 who we have talked about his contributions -- were
7 assigned with assessing the validity of the
8 analytical methods used by the workers in the
9 field, correct?

10 A. That's correct. By the way, Dr. Keller
11 did have a Ph.D. in analytical chemistry.

12 Q. I understand. You have given me the
13 information that he gave you, though, correct?

14 A. Uh-huh.

15 Q. Can you answer out loud?

16 A. Yes. If we are referring to an earlier
17 question?

18 Q. Yes, I'm referring to the discussion
19 this morning.

20 A. Okay.

21 Q. I asked you to give me all of the
22 information that he gave you about this project.
23 Do you recall that?

24 A. To the point that we pursued it, yes.

25 Q. Yes.

1 A. And to the point where you had asked me
2 if what he had told me about the polychlorinated
3 biphenyls and the text and things of that sort and
4 his visit to Europe.

5 Q. Right We've gone through the spring of
6 '69, I thought?

7 A. Sure. I thought I got the feeling we
8 were talking about something else for some reason.

9 Q. No. You told me everything that he gave
10 to you through the spring of 69, correct? If not,
11 I would like to know what else he told you.

12 A. I believe I have relayed to you in
13 answers to your earlier questions the answers to
14 those questions.

15 Q. Okay. That's what I thought.

16 A. If you are going somewhere we haven't
17 been, you know, just let me know and I'll try to
18 answer your question.

19 Q. No. I'm asking you to tell me what
20 other information Dr. Keller passed on to you
21 about this project other than the information that
22 we have already talked about?

23 MR. PRAUSE: When?

24 Q. Through the spring of 1969.

25 A. Yeah. That's fine.

1 Yes, I have related that to you.

2 Q. Now with respect to job number, the
3 second job the page, which you have marked as job
4 number 1, "Collect information on all work being
5 done by others in this field," we have talked
6 about your job was to collect all of the
7 analytical chemistry being done by all of the
8 other analytical chemists in the field, correct?

9 A. Yes.

10 Q. And you were the only person who had
11 that duty other than perhaps Mr. Richard through
12 his contacts in the business?

13 A. And his contacts in Europe and his
14 contacts with government people and things of that
15 sort.

16 My prime responsibility was to be a
17 focus for the collection and evaluation of that
18 information. If any of these other members that
19 had responsibilities associated with it obtained
20 information of that sort, they passed it to me.

21 Q. Okay. And my question right now
22 specifically is, is did Mr. Richard through the
23 spring of 1969 pass any information to you about
24 analytical chemistry?

25 A. He could have.

1 Q. Do you remember any?

2 A. Not specifically.

3 Q. Do you remember any generally?

4 A. If -- all I can say relative to that
5 question, yes, I remember generally.

6 Q. Okay. What do you remember generally
7 that he passed to you?

8 A. That Bill was tasked with the fact that
9 if he received any prepublications or any
10 information relative to analytical chemistry that
11 he should pass it on to me to be evaluated. So my
12 assumption is whatever he received under that
13 period of time he passed on to me. What it is
14 specifically, I do not recollect.

15 Q. Well, and my question is: Do you
16 recollect that he passed anything on to you?

17 A. Oh, yeah.

18 Q. You just don't recall what it was or
19 what it related?

20 A. Very specific, yes. I do -- now wait a
21 minute.

22 You asked me if I recall specifically
23 what it was. The answer to that question has been
24 answered no.

25 What it related to is what we're

1 discussing. It related to analytical chemistry
2 and any information he obtained from whatever
3 source, and he would pass that on to me to be
4 evaluated. So that's what it related to.

5 Q. Then you have no better recollection
6 than that --

7 MR. PRAUSE: Object to the form.

8 Q. -- about anything Mr. Richard passed on
9 to you through the spring of 1969?

10 MR. PRAUSE: Argumentative.

11 A. Yes.

12 Q. I'm not arguing with you, I'm just
13 trying to ask you --

14 A. I didn't say you are arguing with me.

15 Q. I understand.

16 A. I'm on the record here and I did not say
17 that.

18 Q. I understand?

19 A. Yes, I believe is the answer to your
20 question.

21 Q. And just so that the record is clear,
22 you don't have any better recollection of anything
23 that Mr. Richard passed on to you through the
24 spring of 1969 other than what we just talked
25 about?

1 A. Yes.

2 Q. And then the other tasks that you were
3 involved in that -- the one that you have numbered
4 3, "Review with government agencies and research
5 institutes," you were the only analytical chemist
6 who had any responsibility for that?

7 A. No, I, I believe that if we are talking
8 about the fourth item in the job list that
9 Dr. Keller's name or his initials, at least, are
10 there, indicating he had responsibilities
11 associated with that. And he was an analytical
12 chemist --

13 Q. Okay. Well --

14 A. -- as we discovered earlier.

15 Q. -- I understand that. But I thought,
16 other than what we have talked about already with
17 regard to Dr. Keller, you were the person at
18 Monsanto who was in charge and who did what you
19 have numbered as item number 3, i.e., "Review with
20 government agencies, research institutes
21 relating," and I'm adding now, relating to
22 analytical chemistry issues.

23 A. Dr. Keller had contacts with government
24 agencies, he had contacts with other laboratories.
25 He had contacts with other researchers. He was an

1 analytical chemist; he knew other analytical
2 chemists.

3 So it stands to reason that he also had
4 contacts with those people; and that he would be
5 concerned about the same things that I was; and
6 that he would receive information of that sort;
7 and when he did, he would pass it on to me.

8 Q. Let me object, nonresponsive.

9 I understand that, that you're assuming
10 that he passed on information on to you? My
11 question to you is --

12 A. No, I'm not assuming that he passed
13 information on to me. I recollect that
14 information was passed on. That's the way it
15 worked. What specifically, I don't recollect.

16 Q. What information did Dr. Keller pass on
17 to you relating to any review with government
18 agencies or research institutes relating to
19 analytical chemistry?

20 A. I'm sure we established earlier that he
21 passed on information from Dr. Widmark --

22 Q. Right. So --

23 A. -- so that's an example.

24 THE REPORTER: Gentlemen, on at a time,
25 please.

1 Q. Other than what we already talked about,
2 you don't recall any other information from
3 Dr. Keller relating to this job number 3?

4 A. Not specifically.

5 Q. Okay.

6 A. What about generally?

7 Q. Other than what we have already talked
8 about?

9 A. If, in general, if Dr. Keller obtained
10 information relative to analytical techniques that
11 were being used or information from any of his
12 contacts, he would pass it on to me. In that
13 context, I assume we have already talked about
14 that; so that's what you're talking about I
15 already talked about?

16 Q. Let me object, nonresponsive.

17 A. Okay.

18 Q. You have indicated that you don't have
19 any specific recollection of any information that
20 Dr. Keller passed on to you?

21 A. No more specific than the fact that it
22 had to do with the subject that we're talking
23 about.

24 Q. Do you have any general recollection of
25 any information that he passed on to you relating

1 to any reviews with government agencies or
2 research institutes?

3 A. In general, he was tasked to share that
4 information with me. What it is specifically, I
5 don't recollect.

6 Q. Then item number 4, "Start outside test
7 program." What did that relate to?

8 A. My recollection at this point is that
9 referred to the industrial biotests exposure of
10 animals for toxicology purposes.

11 Q. And you were involved in the analytical
12 chemistry of that project?

13 A. Yes.

14 Q. Correct? Was anybody else or were you
15 in charge of the analytical chemistry part of that
16 industrial biotest program?

17 A. Yes.

18 Q. And then 5, "Determining the source of
19 the PCBs," were you the one that was primarily in
20 charge of that task?

21 A. Within my area of responsibility, yes.

22 Q. Now and as far as you are aware, this
23 is, this July 18, 1968, is the first time this
24 project was initiated?

25 A. No.

1 Q. I'm sorry?

2 A. You asked me if I had direct knowledge
3 that this document indicates that this was when
4 this project was started? I have no direct
5 knowledge of what this document says.

6 Q. I'm saying -- let me object, not
7 responsive.

8 I'm saying as far as you know, as far as
9 Dr. Tucker knows, this is when the project was
10 initiated, July 18, 1968?

11 A. The project in question is what we read
12 earlier --

13 Q. Air and water pollution --

14 A. -- Electrical Fluids - Part IV - Air and
15 Water Pollution Control.

16 Q. Yes.

17 A. No.

18 Q. Are you aware that it was continuing
19 before that --

20 A. I am --

21 Q. -- or that it was existing before that?

22 A. You asked me if I had any specific
23 recollection that it couldn't have had, there
24 couldn't have been a report like this before.

25 Q. No, that's not --

1 A. I haven't the faintest idea.

2 Q. No, sir. Let me object, nonresponsive.

3 That's not my question.

4 A. I don't understand your question.

5 Q. My question is: To the best of your
6 knowledge, this is the first time that you were
7 made aware of this project, Electrical Fluids -
8 Part VI - Air and Water Pollution Control?

9 MR. PRAUSE: Object to the form of the
10 question.

11 A. That's a compound question and we need
12 to break it down into parts so I can answer the
13 parts or not.

14 Q. No, the question is real simple. It is:
15 To the best of your knowledge, this is the first
16 time that you became aware of this project? I've
17 rephrased it to make it a little bit easier, I
18 think.

19 A. No.

20 Q. Okay. When had you become aware of the
21 project before July 18, 1968?

22 A. The initial information was at or about
23 that time. But aspects and portions of this --
24 for example, what are polychlorinated biphenols
25 and what are they doing in the environment and

1 does that measurement measure that thing and that
2 sort -- those questions were asked at or about
3 this time and they could have been asked before.
4 So you're asking me to categorically say based on
5 my knowledge I know that they were not asked
6 before that.

7 And I think we discussed that aspects
8 associated with these things were asked before
9 that. So that's why I'm having difficulty giving
10 you the answer you apparently want.

11 Q. Let me object, nonresponsive.

12 You were not aware of this project
13 existing before about the time that the document
14 indicates. Is that fair?

15 A. Yes.

16 Q. All right. And after this period of
17 time -- after this time, July of 1968, you, is
18 when you began work on this, the jobs that we have
19 discussed, correct?

20 A. Yes.

21 Q. And we have already discussed to some
22 extent what you did, particularly in relation to
23 beginning to develop an analytical method for
24 evaluating PCBs. Have we already discussed
25 everything you did regarding collecting

1 information on all the work being done by others
2 in the field?

3 A. Yes. To both of those questions.

4 Q. Okay. Have we discussed everything you
5 did with regard to reviewing with government
6 agencies and research institutes?

7 A. Yes.

8 Q. I don't believe we have discussed what
9 you did with regard to starting an outside test
10 program. So would you tell me what you did with
11 regard to the job that you numbered as number 4,
12 "Start outside test program."

13 A. Yes. As we had covered earlier, I
14 think, there had been statements with regard to
15 evaluating in more detail toxicology information
16 associated with PCBs. The information up to that
17 point in time was certainly everything everybody
18 wanted; but with the advent of them potentially
19 being places where people were surprised, they
20 decided they wanted to learn more about the
21 information.

22 In general, toxicological studies do not
23 involve tissue residue analysis or any effort to
24 establish actual feed concentrations or to do any
25 sort of a material balance in the biological

1 systems that are being exposed to the food that's
2 intentionally contaminated with what is being
3 tested at known concentrations.

4 In this particular instance, since the
5 materials were thought to be found as residues in
6 biological samples, eagle feathers, it was felt
7 that the toxicological program should include
8 provisions for the collection of tissues and
9 fluids and organs and things of that sort from the
10 animals that were exposed to the Aroclors for
11 toxicity purposes.

12 In order to make sure that these studies
13 had the appropriate number of animals and that
14 could generate enough material for us to analyze
15 and those kinds of logistics, I was included to
16 provide what I would need or the group I was
17 working with would need to do the analysis and to
18 determine the distribution of these materials in
19 the biological systems; and in some essences,
20 essence the fate of the materials -- what happened
21 to them as they went through the biological
22 system.

23 I hope that answered your question.

24 Q. It did. When did you begin that?

25 A. My guess would be on or about July '68.

1 Q. Do you recall when the industrial
2 biotest program was begun?

3 A. Not specifically.

4 Q. When did you determine that -- well, how
5 did you assess the validity of the analytical
6 methods used by workers in the field?

7 A. Well, first of all, the analytical
8 methods being used by workers in the field were
9 not designed for PCBs, they were designed for
10 pesticides. It was just an ancillary event that
11 made a mutant begin to think or discover that some
12 of the peaks that they were seeing could be due to
13 something else besides what they were specifically
14 looking for.

15 And the way they did that was they took
16 a portion of an extract and used a technique to
17 qualitatively identify the molecular structure of
18 the component -- not necessarily how much was
19 there or where it came from or any of that kind of
20 thing -- but, "Gee, what was this peak that
21 doesn't fit any of the pesticides or things we're
22 looking for?"

23 And in doing that, they identified the
24 molecule as being a higher chlorinated,
25 specifically higher chlorinated group of PCBs.

1 So the methods that were in the
2 literature were not specifically designed for PCBs
3 and it wasn't known whether they worked in a
4 quantitative fashion. It wasn't known that they
5 weren't subject to a multitude of interferences.
6 It wasn't known that they could be used to
7 actually quantitate the measurement or decide
8 which PCBs were present, or any of those kinds of
9 things.

10 So in order to establish the validity of
11 those procedures and in some instances modify them
12 so they would work for the analysis of PCBs if
13 they happened to be present and determine that, we
14 had to look at what they were doing; we had to see
15 how they did it; and we had to take PCBs through
16 that methodology and where necessary modify it so
17 that it worked.

18 Q. When did you determine that you agreed
19 that it was in fact PCBs that were being found?
20 Or did you ever doubt it? Let me ask that
21 question first.

22 A. Oh, certainly. Absolutely. It was, it
23 was, I think everybody doubted it. Nobody
24 understood any of the transfer mechanisms or any
25 of that kind of stuff. It just wasn't the

1 state-of-the-art at that time. Everybody had the
2 same questions as to where could they potentially
3 be coming from?

4 And as it turns out, they could and did
5 come from multiple sources.

6 Q. So you are saying that in the late
7 summer of 1968 everybody doubted that it was in
8 fact PCBs that were being found?

9 A. Well late 1968, I think we're talking
10 about one verbal response from a scientist in
11 Sweden who found PCBs in eagle feathers.

12 Q. That was your understanding of what --

13 A. No, it was my knowledge.

14 Q. -- the state of the, the state of the
15 knowledge as of late 1968?

16 A. Late 1968? That was close, yes.

17 Q. And so having only that report available
18 to you, you doubted that what he had found was in
19 fact PCBs?

20 A. It wasn't my job to doubt, it was my job
21 to confirm. And so I kind of object to being
22 characterized as doubting. So I would like to
23 clarify that and say my job was to confirm that
24 they hadn't made a mistake; that, indeed, their
25 scientific interpretation of the theoretical

1 information and the new information they had was
2 correct in my opinion as an expert in the area.
3 And so that's what I did.

4 Q. And when did you confirm that?

5 A. When did I confirm that Soren Jensen's
6 work was correct?

7 Q. No. Well, okay, let's start with that
8 question. When did you first confirm that
9 Dr. Jensen's work was correct?

10 A. The confirmation of Dr. Jensen's work
11 was confirmed at the stage of the game where
12 evaluation of the technique showed they could do
13 what they do.

14 We had no reason to doubt his integrity
15 and that he wouldn't do what he -- do it correctly
16 and things of that sort. So I don't think there
17 was necessarily for a period of time a question
18 that these were actually biphenyls; I mean, that
19 was settled early on. The source of those
20 materials was indeed a question. And whether or
21 not they were being accurately measured was indeed
22 a question.

23 And since GC mass spec was the only way
24 of absolutely -- since GC mass spec was the only
25 way of absolutely identifying PCBs and since these

1 were the only people that did it and with just a
2 few samples, a handful of samples, I mean, all the
3 other things that were bandied around as
4 potentially being PCBs were just that, they were
5 conjecture. They weren't reality yet.

6 Now your question to me is when did I
7 determine that PCBs were real?

8 Q. No. No, that's not the question.

9 When did you form the opinion that
10 Dr. Jensen's work was valid to the extent that he
11 had found PCBs in the materials that he said that
12 he had found them in?

13 A. About the time that I had completed
14 establishing the methodology in our laboratory and
15 was satisfied that it worked and was actually
16 beginning to analyze environmental samples of our
17 own was when I began to really understand that
18 what he had done was correct.

19 Q. And when was that?

20 A. Well, I think that would have to be in
21 '69.

22 Q. Do you know when in '69?

23 A. I'm trying to remember. It would have
24 to be early in '69. It would be when we first --

25 This isn't a, a black-or-white question

1 or a yes-or-no question. This is an understanding
2 of what has been done in the assimilation of the
3 information so that a pattern creates and then you
4 can set the pattern.

5 And we had to verify in our own
6 laboratory that what he was doing was correct and
7 that we got the same kind of results. Not the
8 same exact results; we never exchanged samples
9 with him.

10 My guess is in 1969, first quarter,
11 second quarter, in that range.

12 Q. Why didn't you exchange samples with
13 him?

14 A. First of all, we weren't -- they were
15 the first people in the world to connect a mass
16 spectrometer to a GC and they did it in
17 conjunction with LKV, which was a European
18 manufacturer of mass specs. And it was a
19 one-of-a-kind instrument that had just been hooked
20 together and done once; it was a major
21 breakthrough.

22 The gas chromatograph and the mass
23 spectrometer operate at different ends of the
24 spectrum. A gas chromatograph operates under
25 pressure; a mass spec operates under a vacuum.

1 The wherewithal for connecting the two had to be
2 developed so you could run the sample through the
3 chromatograph and into the mass spec. So there
4 were a lot of technical breakthroughs required to
5 do that; and, frankly, they were the only people
6 capable of it. That's why they did it first.

7 Q. And that's why you didn't share samples
8 with them?

9 A. I could share samples with them. Why
10 would I -- I mean, we did actually provide
11 standards and things of that sort of thing through
12 in Britain with the folks over there. But there
13 wouldn't be any sense in exchanging samples, we
14 hadn't established the techniques in our
15 laboratory at that point in time.

16 Q. I thought you said you didn't provide
17 samples to Dr. Jensen and Dr. Widmark?

18 A. We did not provide samples; we provided
19 standards. It turned out that Monsanto provided
20 everybody in the world standards for PCBs because
21 we made the materials and we were the sole U.S.
22 manufacturer of them.

23 MR. PRAUSE: When you get to a good
24 point I'd like to break. We've gone for an
25 hour. If this isn't it, and you want to go

1 for another five minutes or so, that's fine.

2 MR. WRIGHT: Yeah, I would like to
3 finish up this point.

4 MR. PRAUSE: Sure.

5 MR. WRIGHT: We can take a break if you
6 would like.

7 MR. PRAUSE: If it's good for you.

8 MR. WRIGHT: It's all right.

9 MR. PRAUSE: Okay, thanks.

10 THE VIDEOGRAPHER: We're off the record
11 at 2:18.

12 (Recess taken.)

13 THE VIDEOGRAPHER: We're on the record
14 at 2:38 -- I'm sorry, 2:30.

15 MR. WRIGHT: I tell you what we can do,
16 though, is rather than all of us getting a
17 copy of this, we'll just have, that will be
18 the original and stay with the original
19 deposition. And then we can just get a list
20 of the numbers from you, from Ms. Court
21 Reporter, rather than you making three or
22 four sets of all of these documents.

23 Do you understand what I'm talking
24 about?

25 THE REPORTER: Yes, sir, exhibit number

1 what?

2 MR. PRAUSE: Okay. So this stack of
3 documents with the exception of the one you
4 have been talking about will be Exhibit 4?

5 MR. WRIGHT: Exactly. Yes.

6 MR. PRAUSE: So with the exception of
7 MONS 037992 through 037993, the remainder of
8 the documents that Dr. Tucker reviewed will
9 be designated as Exhibit EST4.

10 MR. WRIGHT: Yes. So let's make sure
11 that we get it on the record.

12 (Deposition Exhibit No. 4 marked for
13 identification.)

14 BY MR. WRIGHT:

15 Q. Dr. Tucker, we have talked about Exhibit
16 No. 3, which is a document out of the stack of
17 documents that you reviewed before your deposition
18 today and brought -- and the attorney that is
19 representing Monsanto brought to the deposition
20 today, correct?

21 A. Yes.

22 Q. Okay. Exhibit No. 4 is the remainder of
23 the documents that you reviewed in preparation for
24 the deposition and which were provided to you by
25 the attorney from Monsanto, correct?

1 A. Yes.

2 MR. WRIGHT: And we have agreed,
3 Mr. Prause, that, rather than each of us
4 getting a copy of this entire stack of
5 documents, that what the court reporter can
6 do is compile a list of Bates numbers and
7 append that to the deposition as Exhibit
8 No. 4?

9 MR. PRAUSE: Yes.

10 MR. WRIGHT: And whoever maintains the
11 original will just maintain the original
12 stack of documents as Exhibit No. 4.

13 MR. PRAUSE: That's acceptable.

14 MR. WRIGHT: Okay.

15 MR. PRAUSE: I guess we should also
16 clarify, these represent the documents that
17 Dr. Tucker has specifically reviewed in
18 preparation for this deposition. He is also
19 relying, though, of course, as an expert and
20 factual witness on his background, his
21 academic work.

22 I just don't mean to represent to you
23 that everything he is saying is based on this
24 stack of documents; but those are all of the
25 documents that he specifically reviewed in

1 preparation for this deposition.

2 MR. WRIGHT: I understand that.

3 MR. PRAUSE: Okay.

4 MR. WRIGHT: That is what I had
5 understood.

6 MR. PRAUSE: Right. Great.

7 BY MR. WRIGHT:

8 Q. And by the way, these documents were
9 provided to you by the attorney for Monsanto for
10 your review, correct?

11 A. Yes.

12 Q. Okay. Are there any documents in this
13 stack that you specifically requested Monsanto
14 provide you?

15 A. No.

16 Q. Now a question that I asked you earlier
17 related to how you read chromatograms. In other
18 words, what that means. And I believe in this
19 stack is the method that you worked out, your
20 analytical method, correct?

21 A. There are a number of analytical methods
22 that were worked out in there and a number of
23 special studies and a number of other things.

24 MR. PRAUSE: This may be the one you
25 have in mind.

1 A. Can you review the earlier question that
2 you are referring to relative to the
3 chromatograms, or was that off the record?

4 Q. Well, it was kind of at the end of our
5 morning session where I told you that I was going
6 to ask you to explain how you read a chromatogram.

7 A. But that was off the record?

8 Q. Okay.

9 A. That was not a question that you asked
10 me --

11 Q. I'm not arguing with you.

12 A. I'm not arguing with you, either. I'm
13 just trying to establish where we were at in terms
14 of was that a question that was asked earlier
15 while we were on the record? If it was, I don't
16 recall it. If it was the one that was asked as we
17 broke after we went off the record, then I recall
18 it. That's why I --

19 Q. It was the one that was asked as we
20 broke.

21 A. I just want to understand the question.

22 Q. Yeah, it was the one that was asked as
23 we broke. And what I'm trying to find is the
24 first official analytical method that you...

25 All right. Let me hand you what's

1 marked as MONS number 079347 and ask you what that
2 document is.

3 A. Do you want the last number, too?

4 Q. The ending number, yes, go ahead and
5 give us the ending number.

6 A. The ending number on this document is
7 MONS 079383. The document I have been handed is
8 "Analytical Chemistry Method 71-35." It is a
9 consolidated revision of earlier analytical
10 chemistry method 69-13 and 70-1, according to the
11 statement on the cover. And it's entitled,
12 "Analysis of Environmental Materials for
13 Polychlorinated Biphenyls."

14 Q. Is that something that you wrote?

15 A. Yes.

16 Q. Or prepared?

17 A. Yes.

18 Q. Okay. When was that prepared?

19 A. Well, the clues that I have on the front
20 page are 71-35. So this particular document would
21 be the 35th document, 35th analytical chemistry
22 method in 1971. It is a consolidated revision of
23 analytical chemistry methods 69-13 and 70-1, which
24 would in turn indicate that it was in some way
25 derived from method, analytical chemistry method

1 13 in 1969 and analytical chemistry method
2 number 1 in 1970. And from the best of my
3 recollection that's what I recall the way the
4 numbering system went at that time.

5 Q. Okay.

6 A. I don't -- I can look but I don't see
7 any other specific dates on this document or this
8 copy of the document.

9 Q. Okay. Well, what I would like to focus
10 on is if you could walk us through the way your
11 method worked.

12 A. Okay. It's the way the method worked.
13 And in essence, this is the kind of document that
14 would be handed to an individual who wanted to
15 know, "How did we do the analysis?" And in turn,
16 might, indeed, want to know how they should do the
17 analysis.

18 And actually contains enough information
19 that they should be able to read this, provided
20 they are educated in this skill, and be able to
21 reproduce it and set it up in their own laboratory
22 and do exactly what we did and get the same
23 results.

24 It is one of the ways that analytical
25 chemists communicate with each other in terms of

1 how to do things; they are called standard
2 operating procedures today. At this point in time
3 it was before we had EPA and things of that sort
4 and we didn't have standard operating procedures;
5 but it would be today called a standard operating
6 procedure, and it would be a standard method.

7 So it starts out with the title that we
8 have already talked about. Then it goes into the
9 scope of what the method is is intended, kind of
10 like a background. And then it discusses the
11 principles upon which the method is based.

12 And then it discusses an item called
13 reagents, which are the chemicals basically and
14 solutions prepared from chemicals, which are what
15 reagents are, that will be required to perform
16 what is in this particular standard operating
17 procedure.

18 The next section discusses a thing
19 called apparatus. And in the apparatus section
20 are the physical vessels and analytical type
21 tools, just like if you were a mechanic, that
22 would be required to manipulate the sample in
23 question that you are analyzing and the standards
24 and the quality control samples and things of that
25 sort through the procedure and obtain the final

1 results from the instrument.

2 The last -- the next section talks about
3 procedures and it has sampling. And then it talks
4 about the matrix, which in this particular
5 instance is water, and the extraction of the water
6 samples.

7 In other words, how do you treat the
8 water sample to get out of it what you want and to
9 get it out in such a fashion that it can be
10 presented to the next step or to the actual
11 instrument and determine what's in it in the way
12 you have decided to do that?

13 It talks about the extraction of water
14 samples; it talks about sediment and soil, the
15 extraction of the sediment and soil samples. The
16 first step obviously at this point is that you
17 need to take a sample itself and get the material
18 that you're interested in out of it quantitative
19 or as quantitative as you can without altering it
20 in any way, shape or form and get it into a form
21 that then can be taken to the next step in the
22 procedure.

23 It talks about whole animal, poultry,
24 fish, individual tissues. And by that it means
25 muscle, liver, fat, kidney, heart, spleen, lungs,

1 et cetera. It talks about extraction of these
2 tissue samples. And then it talks about milk and
3 it talks about, in the case after milk, it talks
4 about sample cleanup procedures.

5 Some samples, depending upon what the
6 bulk of the matrix is made up of, require special
7 treatment to ensure that the materials in question
8 are isolated in their entirety and also to
9 eliminate any interferences and leave those
10 behind. And we use sample cleanup methods to do
11 that.

12 And the sample cleanup methods called
13 out in this particular procedure are designated as
14 DMF/hexane partition; and that's
15 dimethylformamide, which is a, a means solvent,
16 hexane partition, and a chemical treatment.
17 Chemical treatment involving things like --

18 THE REPORTER: I'm sorry, "involving
19 things like..."?

20 A. I am sorry, I completely forgot about
21 your, about going too fast for you and I
22 apologize. Wouldn't you like to be a student in a
23 class I was lecturing to?

24 Saponification with alcoholic potassium
25 hydroxide and extraction with sulfuric acid. And

1 those are types of cleanup procedures.

2 Another type of cleanup procedure that
3 is used to remove --

4 Q. Why don't we kind of shot cut through
5 the cleanup procedures and go straight to assuming
6 you have a clean sample ready to go, what do you
7 do?

8 MR. PRAUSE: Do you mean concentrated
9 already, too? Or just clean?

10 Q. Yeah. After you, after you clean up the
11 sample then you have to concentrate it?

12 A. Very timely. The next thing was
13 liquid/solid chromatographic cleanup, which is the
14 last cleanup procedure. And then there are
15 evaporative concentration procedures which are
16 used because the solvents, you know, end up with
17 an unspecified large volume of an organic solvent
18 with the materials of importance in it.

19 And those have to be evaporated down to
20 a known volume that you want, so that it
21 concentrates the sample so that you have enough of
22 the material to analyze for it and you have to do
23 it without losing it, that's the step that -- the
24 last step before you are ready to run it through
25 the electron capture gas chromatograph and

1 determine whether or not these steps will work for
2 you.

3 Q. Okay.

4 A. Sometimes these steps need to be
5 repeated if it is a particularly difficult matrix
6 and that kind of thing.

7 At this point in the methodology it
8 describes the electron capture gas chromatograph
9 instrument being used. That's the important thing
10 for other people; if you don't know what kind of
11 instrument they're using, then it's hard sometimes
12 to reproduce what they're doing, at least at the
13 state-of-the-art in the 1960s. Today that is not
14 the case necessarily.

15 The instrument used in this particular
16 instance was a Hewlett-Packard 5750; that's a
17 designation of the company that manufactures it.
18 It was termed a research chromatograph and/or a
19 402 high efficiency gas chromatograph. And I
20 believe you have heard the 402 terminology
21 earlier.

22 Q. Yes, you mentioned that.

23 A. All right. The next specifies the
24 detection system used with the chromatograph. And
25 in this particular instance and in all the

1 instances in our work we used high temperature
2 nickel 63 electron capture cells.

3 Next it specifies the column that was
4 used in the instrument, a glass, spiral; and it
5 also specifies the packing in the column and the
6 liquid phased on the packing that's used to effect
7 the separation of the materials that are injected
8 into it.

9 Next it describes the column temperature
10 conditions which are used, which is another
11 important parameter that is used to define how a
12 chromatography is done. Next it specifies the
13 temperature range that the detector is held at;
14 and there are important reasons for that, too.

15 It also specifies the injection port
16 temperature. It also specifies the pulse rate
17 that is used with the, with the electron capture
18 detector.

19 It also specifies the flow rate for the
20 carrier gas; and the carrier gas is what
21 effectively carries what you want to separate
22 through the instrument column and into the
23 detector.

24 And then because the electron capture
25 detectors have unusual properties, there is a

1 requirement for a purge gas, which is an argon
2 methane gas mixture.

3 And that basically is what is required
4 to define the electron capture gas chromatographic
5 system that is used to make final measurement on
6 the samples that we prepared.

7 The next section describes quantitation.
8 And in a sense, as we have alluded to earlier,
9 PCBs are not a single entity and are a very
10 complex mixtures with varying ratios of each of
11 the isomers, of which there are 209.

12 Quantitation requires special
13 consideration and special definition so that
14 others who are doing what you are doing can
15 reproduce what you are doing. And each analytical
16 chemist at this point of the game tried to use a
17 system that would best exactly tell what you is
18 there or try to quantitate correctly the amount of
19 PCBs present in the sample.

20 This is further -- the difficulty here
21 is further complicated by the fact that samples,
22 the PCBs in real world samples can be altered
23 biologically or selectively through absorption
24 processes, through UV degradation, through a
25 variety of processes, and it changes the PCB

1 distribution. In other words, by that I mean type
2 and kind.

3 Once that is changed, then of course the
4 commercial product which has -- is manufactured to
5 have a specific isomer distribution of type and
6 kind no longer is a perfect standard. And so you
7 get into what's the best way to estimate the level
8 of PCBs in the sample.

9 Q. What did you determine was the best way
10 to estimate?

11 A. At this point in time, which was in
12 1971, the recommended quantitation procedure,
13 which was the best where we were at that time --
14 and the reason we documented it so well was so
15 that we knew that it might change and there might
16 be better ways that would come along.

17 But we also knew that people needed to
18 know exactly how we were doing it so they could
19 verify our results and take what we were doing and
20 do it with other things.

21 And basically it says, "Quantitative
22 determinations employing the electron capture
23 detector are non-stoichiometric measurements made
24 by compare peak heights or areas for known
25 concentrations with those for unknown

1 compositions. Four variations of the peak height
2 or area quantitation procedures have been
3 employed."

4 And it lists four cases: There's the
5 case where the electron capture gas chromatogram
6 of the PCB unknown is unchanged with respect to
7 the standard PCB with no evidence of
8 interferences.

9 Q. How do you tell that?

10 A. The detector -- Okay. The way the gas
11 chromatograph works, and I need to tell you this,
12 so bear with me so that you will understand how do
13 you tell that? My answer to your question, "How
14 do you tell that?"

15 In a plug flow basis you deliver a known
16 volume of solvent with PCBs in it and maybe other
17 things from a sample -- because nothing is perfect
18 in terms of cleanup procedures -- into the
19 instrument, into the injection port.

20 The injection port is heated at a much
21 hotter temperature than the column which is
22 attached to the injection port. When the solvent
23 and the PCBs go into the injection port, they're
24 flash vaporized. They are immediately converted
25 from a liquid form into a vapor form and they go

1 directly on the packing in the column.

2 The column is a glass column that just
3 is a spiral, sometimes, or a U; and it goes from
4 the injector port to the detector. The column is
5 sealed; and the way you get the sample in is by
6 sticking a fine needle through a septum, which is
7 a rubber or a synthetic-type rubber device that's
8 self-sealing.

9 So when you put the syringe through,
10 inject the sample in, it flash vaporizes and you
11 pull the syringe back out and the septa seals. So
12 the sample is swept by the carrier gas which flows
13 through the column in through the packing.

14 As the carrier gas -- and the column is
15 kept at a temperature, a specified temperature,
16 that's a little less than the injection
17 temperature sometimes but also less than the
18 detector temperature.

19 Because if the detector temperature is
20 less than the highest column, temperature then the
21 material can coalesce in the detector is a liquid
22 and ruin the detector and the, and the
23 determination.

24 So the material goes through the column.
25 And as it goes through the solid absorbent that's

1 coated with a known liquid that's not volatile,
2 the PCBs and other molecules present in the vapor
3 phase partition back and forth; in other words,
4 they go into the liquid phase and they come out of
5 the liquid phase; they go into the liquid phase
6 and they come out of the liquid phase.

7 Depending upon how well, how compatible
8 the liquid phase is with the organic molecule in
9 question, it will either be held back or allowed
10 to go through more quickly.

11 If the liquid phase likes the molecule,
12 it holds it back; it holds on to it because they
13 like to be associated with each other. If the
14 liquid phase does not like the molecule, then
15 molecule shoots right through; and that's what
16 causes the separation.

17 Each individual PCB has its own specific
18 molecular characteristics, as does any other
19 organic material that's in that sample that can be
20 volatized and run through a chromatograph.

21 The boiling point is reflective of this.
22 If it's a low boiling material, it shoots through
23 the instrument unless it's held up for some other
24 reason. If it's high boiling material, it takes
25 much longer to go through the instrument.

1 If it's a very polar material and you
2 have a very polar support, then it takes a long
3 time for it to go through because they like each
4 other. If it's not very polar and the support's
5 very polar and it goes through, it goes through
6 more quickly because they don't like -- opposites
7 don't necessarily attract as much.

8 Well, I'm not sure I said that
9 correctly, but I think you get the drift of what
10 I'm saying.

11 So what comes out is you put the PCAB in
12 as a, as a group. And the instrument does -- it
13 separates them into components. Doesn't do a
14 perfect job, but it separates them to the best of
15 its ability. Different columns have different
16 resolutions in terms of being ability to separate
17 these components and different types of columns,
18 support-coded open tubular columns, capillary
19 columns --

20 Q. Sorry, say the one that you --

21 A. SCOT columns, SCOT, support-coded open
22 tubular columns, do a better job, have a higher
23 resolution than packed columns. But you've got to
24 only put so much sample in them.

25 And then capillary columns, which are

1 the ones that are used today, even have higher
2 resolution. So where you might put in 209
3 components for the PCB and separate it into 12
4 peaks for the packed column, 12 groups, with a
5 capillary column you might separate it into 100
6 peaks.

7 Q. How many do you get with the SCOT?

8 A. The SCOT columns?

9 Q. Yes.

10 A. The SCOT columns were a precursor to the
11 capillary columns, so they were the first attempt
12 at producing capillary columns. And you get
13 hundreds of peaks or 50 peaks or 25 peaks. You
14 get more than you do with the packed column --

15 Q. What were you --

16 A. -- a higher resolution.

17 Q. -- what were you using in the?

18 A. Packed columns.

19 Q. '71 method? Okay.

20 A. Packed columns. So lowest resolution
21 columns were what were available at that time.

22 Q. When were the SCOT columns introduced?

23 A. At some point after we had developed
24 this methodology we had some new support-coated
25 open tubular columns that were being evaluated for

1 other purposes. They were really intended for --
2 these columns were intended of QC analysis of neat
3 materials where there isn't any sensitivity
4 problems or things of that sort. And you put it
5 in there and you'd get a very good fingerprint and
6 it separates, maybe if you had 209 components, it
7 might give you 53 groups; whereas the packed
8 column would only give you 12.

9 They were a precursor to the capillary
10 columns which we have today, which do a much finer
11 job. You might get 125 -- you might separate them
12 to 125 groups. None of them separate them
13 completely.

14 The point is, is that it separates them
15 into groups. The point is it separates them into
16 groups and that those groups come out the other
17 end and they are detected by the detector. And so
18 what you end up with as a function of time on the
19 X axis is the detector response going up and down
20 as these separated components come out, okay?

21 If you put in Aroclor 1242, and this is
22 hypothetical, you would end up, say, let us say
23 that you would end up with 11 peaks; and they
24 would be in a certain intensity ratio such that
25 the major components would be here and then it

1 would come back down. That's call a gas
2 chromatograph -- gas chromatogram. That's the
3 output of the instrument.

4 Q. That's just a plain ordinary gas
5 chromatograph?

6 A. All the outputs from any GC is called a
7 gas chromatograph.

8 Q. Okay.

9 A. It doesn't matter whether it is electron
10 capture, flame ionization, microcolorimetric.

11 Q. Okay. So, well, go ahead and finish and
12 then I have a question I need to ask you.

13 A. The unique thing that you have is that
14 every time you injected a Aroclor 1242 standard,
15 if you're running your system correctly and you're
16 staying within the ranges of your system so that
17 everything is linear and things of that sort, you
18 end up with the same pattern every time with the
19 peaks in the same ratio.

20 The first peak might be less than the
21 second peak, which is greater than the third peak
22 but which is less than the fourth peak, and it is
23 in the same ratio. So you get a fingerprint
24 that's characteristic of that Aroclor.

25 It is also characteristic of the system

1 that you are running it through. If you use a
2 different column, if you change the system
3 temperatures, if you change the carrier flow rate,
4 change the attenuation on the detector, then the
5 fingerprint changes.

6 Q. But if you run Aroclor 1242 through once
7 the machine has been calibrated, and then you run
8 a second sample of Aroclor 1242 through, the peaks
9 should match?

10 A. Yes.

11 Q. Okay.

12 A. Under situations where there are no
13 interferences present, where there have been no
14 physical and/or chemical and/or biological
15 alteration of the isomers present in that
16 material.

17 So yes. It is like everything in the
18 world: If you have an unchanged Aroclor and you
19 put it in once and you put it in again, you should
20 see the same thing. This is what it's all about.

21 Q. Right. That's right.

22 A. That's how you know deductively --

23 Q. Okay.

24 A. -- that you're dealing with an Aroclor.

25 There's another aspect to it, too. The

1 reason you use an electron capture detector is
2 because it is a specific kind of system and only a
3 certain class of molecules are sensitively
4 detected by an electronic capture detector. The
5 molecule needs to have the propensity to be a
6 high, have a high capture rate for electrons;
7 that's why it is called electron capture.

8 A nickel 63 electron capture detector is
9 basically a nickel -- a tube with radioactive
10 nickel in it; and nickel 63 is a radioactive
11 isotope of nickel. It produces a beta particle
12 continuously as it decays in that source. And a
13 beta particle is basically an electron.

14 Q. Are we talking about what you used now?

15 A. As a detector. Yes, sir.

16 Q. Okay.

17 A. Yes, sir. And the nickel source has a
18 long half life so it is always constant in terms
19 of the amount of electrons that are coming out.

20 You have collector electrode above that.
21 The collector electrode collects the electrons and
22 measures them and gives you a certain output
23 signal. And as long as nothing is attenuating the
24 electron beam, as long as nothing is capturing the
25 electrons as you pass it through, then you always

1 get the same signal; you get a nice flat baseline.

2 Now when you pass a molecule through
3 that doesn't have, that's not electron capture
4 active, the baseline continues to be straight
5 because none of the electrons are captured by that
6 molecule and they don't cause it to be changed.

7 When you pass a compound that has,
8 that's highly electron capture active, such as
9 PCBs, chlorinated naphthalene, DDT, lindane,
10 toxaphene, et cetera, et cetera, through it, those
11 molecules capture electrons well and they
12 attenuate the beam.

13 So what you really see is you see the
14 current fall because it is changing the standing
15 current. And then, of course, as the molecule
16 passes through, it goes back up again. Okay.

17 Well, people don't like to see a
18 negative things, so we flip it over and we give
19 you a peak like this, even though it is an
20 attenuation versus an accentuation of the beam.
21 So that's what gives you your chromatograph.

22 So the detector is critical in the sense
23 that it doesn't detect a lot of things. It
24 detects a lot of things but it doesn't detect
25 everything. It's not a universal detector. So it

1 gives you some selectivity; so some things you
2 don't have to worry about causing interferences.

3 And that's how the whole system works.
4 So if I run 1242 through the system correctly -- a
5 standard, for example, not through all the sample
6 preparation portion but I run it through and I get
7 a nice --

8 THE REPORTER: I'm sorry, "through the
9 system..."

10 THE WITNESS: Through the system.

11 THE REPORTER: "not..."

12 MR. WRIGHT: Not a sample.

13 THE WITNESS: Not, it's a standard.

14 A. And I get a nice fingerprint that, say,
15 gives me 12 peaks that looks like it is supposed
16 to.

17 Then I take another one and I run that
18 through again, I should get the same exact thing.
19 Not only do the peaks agree with each other on a
20 retention time basis -- in other words, the time
21 at which they elude from the instrument and see
22 the detector, but they also agree in the intensity
23 in terms of how much is there.

24 So the two standards need to agree with
25 each other.

1 Q. Okay. Let me ask you this, now. Before
2 the electron capture devices were paired with the
3 gas chromatograph, you still, if you just had a
4 plain old gas chromatograph, the principle would
5 be the same: You would put Aroclor 1242 in, for
6 example, and you would get peaks --

7 A. No.

8 Q. -- that --

9 A. You have to have a detector. And that's
10 why I took the time to explain that the electron
11 capture detector added a uniqueness to the system.

12 The first detection systems for
13 chromatographs were really what were called
14 thermal conductivity detectors. They are just a
15 heated wire inside this instrument and it has a
16 current passing through it that heats it. When
17 you passed a molecule over it in that little
18 cavity, it would cool the wire, depending upon how
19 much of it was there and what it was. And you
20 would measure that signal.

21 Now, obviously, almost anything that
22 went across that wire cooled the wire to some
23 degree or another so that thermal conductivity
24 detector was universal. If you had petroleum
25 hydrocarbons, if you had benzene, if you had ethyl

1 alcohol, anything you put in there gave you a
2 signal.

3 Q. So when you said Monsanto had 15 or so
4 gas chromatographs, that's what you were
5 describing?

6 A. Correct. None of the gas chromatographs
7 that Monsanto had at that time were intended for
8 environmental analysis. They were all intended
9 for product quality control. And to be real
10 truthful with you, the first electron capture
11 instrument that I -- the detector and the
12 instrument that I used that I had at Monsanto
13 there was so highly contaminated because it had
14 neat materials put into it that the only thing I
15 could do was get familiar with the equipment and
16 how it worked and things of that sort.

17 It never was able to achieve the
18 sensitivity needed to measure PCBs in the
19 environmental samples. And the reason was is, is
20 that at some point in that instrument's career it
21 had probably seen 100% Aroclors. And so the
22 electron capture detector is a million times more
23 sensitive than the detectors they were using; so
24 even if there was just a millionth of the material
25 that they put in there hanging around in that

1 instrument somewhere, each time you protubated it,
2 you would get a signal with that very, very
3 sensitive detector.

4 So that's why we had to go to the
5 biomedical chromatograph detection system, which
6 this next one we talked about.

7 Q. Okay.

8 A. Now if that original system had never
9 seen neat materials, we could have used it. But
10 it is just a whole different world.

11 Q. Okay. I guess what I'm trying to
12 determine is: Before the pairing of the electron
13 capture with the gas chromatograph, what level of
14 detection could you achieve? For example, could
15 you achieve 100 parts per million?

16 A. Yep. 100 parts per million is 100th of
17 a percent, and that would be down toward the lower
18 limit on those particular instruments, right.

19 But everything else under the sun caused
20 a response, too. And everything else under the
21 sun is at -- is present usually at a million times
22 the concentration you find PCBs in the
23 environment. PCBs are at the part per billion,
24 part per trillion level.

25 Q. Yeah. But right now I'm not talking

1 about that.

2 A. I know. But I'm going -- I'm trying to
3 make sure that I'm not taking you a place that I
4 shouldn't because I don't give you enough
5 information.

6 The TC detector could never be used to
7 monitor environmental PCBs, period.

8 Q. What is the TC detector?

9 A. Thermal conductivity. That's kind of
10 like the first GC detector.

11 Q. That's the ones you are saying that
12 Monsanto had when you showed up?

13 A. That's the ones that Monsanto and a lots
14 of other people had when I first showed up and
15 they have them today.

16 Q. Okay.

17 A. They still have them today.

18 Q. Okay.

19 A. It's a universal detection system.

20 Q. But it could detect PCBs to a 100 part
21 per million level?

22 A. Pure, unadulterated, not contaminated
23 with, standards, yes.

24 Q. Why couldn't it detect fresh Aroclor
25 1242?

1 A. It could by itself at down to about
2 100th of a percent or 100 parts per million.

3 Q. 100 parts per million?

4 A. Yes.

5 Q. All right. Same with Aroclor 1254?

6 A. Yes.

7 Q. 1260, 1268?

8 A. Right.

9 Q. All of those?

10 A. And I'd like to -- 100th of a part per,
11 100th of a percent was the limit. It wasn't an
12 optimal working range; it's like down at the
13 bottom. Okay? A 10th of a percent would be a lot
14 better.

15 Because, again, you're dealing with 209
16 components. And if you separate them, each
17 component becomes less of the percentage, so
18 you're not really dealing with the whole.

19 Q. Okay. Now is it your testimony that the
20 only machine that could go below 100 parts per
21 million was this new machine that you acquired for
22 Monsanto?

23 A. Yeah, that's basically it from a layman
24 viewpoint, yes.

25 Q. There was no other technology between

1 the chromatograph that you mentioned and the
2 medical electron capture machine?

3 A. Okay. I need to clarify something here.
4 In my life, the words "any" and "all" don't exist.

5 Q. Well --

6 A. And if you say "all," that precludes any
7 exception whatsoever. And I can't live with that
8 because that's not the real world. And when you
9 say "any," you do the same thing.

10 Q. What I'm asking you, doctor, --

11 A. So I'm stumbling on your questions --

12 Q. Okay.

13 A. -- because you're asking me to give you
14 100% answers which don't exist.

15 Q. Let me rephrase it.

16 If you had not had electron capture
17 technology in 196-, late 1968 when you started
18 working in this area, if you had not had that
19 machine, is there another method that you could
20 have used to measure PCBs below 100 parts per
21 million?

22 A. Not in environmental samples and not
23 definitively, no.

24 May I reverse the situation and have you
25 understand that the people that began to detect

1 these things began to detect these things because
2 they were using electron capture -- gas
3 chromatographs with electron capture detectors.

4 Q. Well, they weren't looking for PCBs?

5 A. That's correct. But they saw them
6 anyway.

7 Q. That's right.

8 A. And other people were using the other
9 kinds of detectors that you're talking about for a
10 long time ago, I wonder why didn't they discover
11 the PCBs?

12 Q. And what I'm asking -- let me object,
13 not responsive.

14 What I'm asking you, sir, is a
15 completely different question. The question that
16 I'm asking you as a scientist and as an expert
17 witness for Monsanto is, is it your testimony that
18 in 1968 there was no technology available to
19 detect PCBs below the 100 part per million level
20 other than electron capture technology?

21 A. No.

22 Q. Okay. What other technologies existed
23 in 1968 and 1969 to detect PCBs below 100 parts
24 per million?

25 A. Well, you could use infrared

1 spectroscopy. You could use ultraviolet and/or
2 visible spectroscopy. You could successfully
3 tweak and adjust conditions such with great
4 difficulty that other systems that weren't so
5 sensitive could possibly see it.

6 Q. Okay. What other systems?

7 A. Well, you could take the sample and
8 concentrate it 100-fold times so that you were
9 delivering more, more absolute material to the
10 instrument and you would see something.

11 Would you know what it is? No.

12 Could you say it was a PCB? Not unless
13 you put it in there and knew you put it in there.

14 Q. So your testimony is that if you were
15 looking for PCBs there is no other method
16 available to detect PCBs?

17 A. You're asking me if I was looking for it
18 and then you're asking me if there's no other
19 method available?

20 Q. Yeah, let me -- hang on --

21 A. You're asking me if I were looking for
22 PCBs, what technique would I use? And I will tell
23 you the technique I would use would be gas
24 chromatography either coupled with an electron
25 capture detector or a mass spectrometer. That's

1 what I would tell you.

2 Now the next question was?

3 Q. Yes. I understand your answer to that
4 question because that's what you did use and
5 eventually got very good at it.

6 A. It's not, it's not what I -- what I just
7 used, it's what the entire worldwide international
8 community including everyone in the United States
9 used eventually.

10 Q. Yes, I understand that. My question is
11 much simpler than that. My question is: Before
12 that technology came along, if you wanted to
13 determine the existence of PCBs in a sample at a
14 level less than 100 parts per million, could you
15 have used existing technology and done so, to the
16 best of your knowledge?

17 MR. PRAUSE: Do you mean an
18 environmental sample as opposed to?

19 MR. WRIGHT: Yeah. By "environmental,"
20 I'm talking about either dirt or water or
21 fat.

22 MR. PRAUSE: Okay.

23 MR. WRIGHT: I assume that's what you
24 mean by "environmental."

25 MR. PRAUSE: "Sample" can be also what

1 Scott calls a neat Aroclor, which, and
2 there's a difference.

3 MR. WRIGHT: Yeah. I don't want to get
4 into an argument.

5 MR. PRAUSE: I want to make sure his
6 answers are clear.

7 MR. WRIGHT: Yeah Let me rephrase the
8 question. Don't answer, let me ask a
9 question, okay?

10 THE WITNESS: Okay. That will be the
11 last time you say that, right? (Laughter)

12 BY MR. WRIGHT:

13 Q. The question is very simply, doctor:
14 Are you aware of any technology that was available
15 before this electron capture technology came on
16 the scene that could have identified PCBs in, say,
17 a sample of water at levels below 100 million -- I
18 mean 100 parts per million?

19 A. No.

20 Q. Are you aware of any technology that
21 could have identified or detected PCBs in lipids
22 at a level below 100 parts per million?

23 A. No.

24 Q. Are you aware of any technology that
25 could have detected PCBs in air at levels below

1 100 parts per million?

2 A. Yes.

3 Q. Okay. Describe that technology for me,
4 sir.

5 A. The reason I answered no to the initial
6 questions and yes to the last question is there is
7 a difference between "detect" and "identify."
8 There are many ways to detect things; there are
9 few ways to identify them.

10 So the initial three questions you asked
11 me if I could detect and identify, identify and
12 detect. I could detect probably but not identify.
13 The last question, for whatever reason, you chose
14 to alter it and asked me if I could detect but you
15 didn't ask me if I could identify it as a PCB; and
16 so the answer to the last question was yes.

17 I'm not being a smarty person. I'm
18 trying to say that this is not as simplistic a
19 routine as we would like to reduce sometimes. So
20 the answers to those questions are no, no -- and I
21 believe there were only three of them -- yes.

22 Q. Okay. Now let me ask you a fourth
23 question. Without the use of this electron
24 capture technology that you began using in
25 1968/'69, was there a way for a scientist such as

1 yourself to detect the presence of PCBs at levels
2 below 100 parts per million in water?

3 A. Sometimes, but not identify.

4 Q. So if you were a scientist, you -- and
5 you were looking for PCBs, you could have detected
6 their presence but you couldn't have determined
7 exactly what isomers they were? Is that what you
8 are saying?

9 A. No.

10 Q. If you were a scientist and you were
11 looking for the presence of PCBs in a sample of
12 water, for example, could you have determined the
13 presence of PCBs at levels at less than 100 parts
14 per million?

15 A. No.

16 Q. Are we having a semantic problem between
17 my use of the word "determine" and your use of the
18 word "detected"? Because I don't understand how
19 that question and answer is any different than
20 what we went through a few minutes ago.

21 A. And what I'm trying to do is what you
22 are asking me to do, and that is answer your
23 question. And so I am answering the question.

24 Q. All right.

25 A. Is the question appropriate? Well, from

1 a scientific viewpoint -- I'm sure it is
2 appropriate from your viewpoint and I don't have
3 any opinion on that one way or the other.

4 Q. If it's --

5 A. But you are asking me if I could detect
6 PCBs. And the answer to that question is I don't
7 know whether it is PCBs or not. I could detect
8 something but it could be, it could be gasoline.
9 It could be mineral oil. Because those detection
10 systems would see mineral oils just as easily as
11 they would see PCBs and they would look the same
12 and you wouldn't be able to tell.

13 So I would be able to detect it but I
14 wouldn't be able to tell you what it is.

15 Electronic capture has the unique
16 property of only being absorbed molecules that
17 capture electrons, of which PCB is a member.
18 Mineral oil is not. So you can mix PCBs with
19 mineral oil and you can put them in an electron
20 capture instrument and it will ignore the mineral
21 oil and it will see the PCBs.

22 You take that same mixture and put it in
23 the systems that were available -- flame
24 ionization, thermal conductivity -- and you run
25 them through, it will see them both and you can't

1 tell what's there. You have no, you haven't a
2 clue whether it is a PCB unless you made the
3 solution up.

4 Q. Okay. So just to clarify, then, your
5 testimony is you could not have quantified PCBs in
6 air, for example, before 1969 or '68?

7 A. Correct.

8 Q. Okay. You're aware of no technology
9 that could have quantified PCBs in water or in fat
10 or in soil or in any other, or air, or any other
11 environmental media below the level of 100 parts
12 per million?

13 A. Correct.

14 Q. And so if Monsanto or anyone else had
15 asked you, "Dr. Tucker, can you tell me how much
16 PCB is in the air in this room," you could not
17 have done so in 1968?

18 A. Correct.

19 Q. And you're not aware of any scientist in
20 the world that could have done so?

21 A. Correct.

22 Q. And the method that you developed you
23 believe was the first method that could accurately
24 do something like that?

25 A. Well, first of all, for the record, I

1 didn't develop the technique. There were a lot of
2 people that developed the technique.

3 What I did was I use an existing
4 methodology and applied it specifically to PCBs
5 and showed that it be could be applied with PCBs
6 with the same results that were obtained with
7 other chlorinated hydrocarbons or pesticides, so
8 be it.

9 So I didn't invent anything. I took
10 existing technologies and put them together in a
11 fashion and choose to them and optimize them for
12 what they were intended to study chlorinated
13 hydrocarbons.

14 So, you know, there's not any invention
15 or anything of the sort here. Does that?

16 Q. Yes. All I'm trying to clarify is, in
17 your scientific opinion before that method was
18 developed by whoever it was developed by there was
19 no other way to quantify PCBs in environmental
20 media?

21 A. That's correct.

22 Q. Okay. Now let's mark this as Exhibit
23 No. 5.

24 (Deposition Exhibit No. 5 marked for
25 identification.)

1 Q. I'm going to hand you a document --

2 A. Are we done with?

3 Q. Not yet, just sit it off to the side, if
4 you would.

5 A. Okay. That's fine, I'm happy to do
6 that. Actually, I'll make sure we do.

7 Q. Exhibit No. 5 is marked DSW 147758, and
8 it is through 147781. And it is entitled, "Report
9 No. 2970, Final Report on Aroclor in Gases." And
10 it is by the Research Department, Phosphate
11 Division.

12 MR. PRAUSE: Do you have another copy of
13 that.

14 MR. WRIGHT: No.

15 MR. PRAUSE: Since it is not a document
16 I showed Dr. Tucker?

17 MR. WRIGHT: I don't have another copy
18 of that. I'm asking him to look at it.

19 MR. PRAUSE: I would like to be able to
20 look at it, too.

21 MR. WRIGHT: Why don't you and he look
22 at it together?

23 THE WITNESS: We can do that.

24 MR. PRAUSE: Okay.

25 THE WITNESS: All right.

1 BY MR. WRIGHT:

2 Q. Have you ever seen that report before?

3 A. I don't recall seeing it before.

4 Q. Basically it was a report done by --

5 A. I would like to look at it and read it
6 if you're asking me to do something, unless you
7 would like to explain it to me first.

8 Q. I'll explain it to you and then you can
9 tell me whether I'm right or not. Basically --

10 MR. PRAUSE: I'll object to you making
11 statements on the record. If you are going
12 to present a question to the witness, that's
13 fine; but you testifying is not what we're
14 here for today.

15 Q. Okay the question is: Is that report a
16 report that was prepared by someone who worked in
17 a similar position to you in the year 19 --

18 MR. PRAUSE: 53.

19 Q. -- 53?

20 A. I don't know.

21 Q. Can you check and see?

22 A. Now you want me to check to see whether
23 the gentleman writing this report was a Ph.D.
24 analytical chemist, is that what you want me to
25 check? Or would you like me to read this report

1 and see what it says.

2 THE VIDEOGRAPHER: Excuse me,
3 Dr. Tucker, you lost your mike there.

4 THE WITNESS: Oh, I'm sorry. It
5 happened when I moved over next to Marsh.
6 You got me on a short leash here. Am I
7 coming in clear now?

8 THE VIDEOGRAPHER: Yes, thank you.

9 THE WITNESS: I was afraid of that. I
10 was kind of keeping an eye on it.

11 BY MR. WRIGHT:

12 Q. I read the title of the report; and you
13 and I together can read some additional
14 information about it, and then I'll see if you can
15 answer my question. The report is entitled, as I
16 stated, "Final Report on Aroclor in Gases,"
17 correct?

18 A. You're asking me if this is what the
19 title says?

20 Q. Yes.

21 A. Not what the report is?

22 Q. Yes.

23 A. Okay. The title states as you read it.

24 Q. Okay. And it states that it was for the
25 "Research Department, Phosphate Division,

1 Anniston, Alabama," correct?

2 A. Correct.

3 Q. Work started May 8, 1953, correct?

4 A. Correct.

5 Q. Work completed October 16, 1953?

6 A. Correct.

7 Q. Correct? Report submitted March 15,

8 1954?

9 A. Correct.

10 Q. And it was prepared by H.B. Richards,

11 Jr., correct?

12 A. Correct.

13 Q. Did you know Mr. Richards?

14 A. And there is also A.M. Ellenburg?

15 Q. Yeah. Chemists, underneath that,

16 chemists?

17 A. No.

18 Q. A.M. Ellenburg --

19 A. Not to my knowledge.

20 Q. -- and H.B Richards, Jr.

21 A. And the question is did I know --

22 Q. Did you know either of those gentlemen?

23 A. No.

24 Q. Okay.

25 A. I didn't even know they were gentlemen.

1 They could be females, for all I know.

2 Q. All right. It says, "18 copies of this
3 report were distributed as follows." One to the
4 file in the St. Louis library. You're familiar
5 with the St. Louis library, correct?

6 A. Out at Crevecoeur, that is correct.

7 Q. Okay. In fact, that's one of the places
8 where you went to try to assist you in preparing
9 your methodology, correct?

10 A. Yes, I did.

11 Q. Copy went to A.M. Ellenburg. Copy went
12 to H. K. Mason. Copy went to the Research
13 Library, Anniston. Copy went to England.

14 Copy went to P. G. Benignus, you knew
15 him, didn't you?

16 A. Paul Benignus, yes, I did.

17 Q. Copy went to Emmett Kelly. You knew
18 him, didn't you?

19 A. Yes, I did.

20 Q. Copy went to H.L. Hubbard. Did you know
21 H.L. Hubbard?

22 A. Name sounds familiar but I don't think
23 so.

24 Q. Okay. Did you know anybody else on the
25 list of recipients?

1 A. Nope.

2 Q. Okay. The report is marked as
3 confidential, correct?

4 A. Yes.

5 Q. Shows a contents page, correct?

6 A. Yes.

7 Q. There's an introduction. And it said,
8 "Dow Chemical Company is interested in using
9 Aroclor as a plasticizer in manufacturer of their
10 Saran, (vinyl-) --

11 A. Vinylidene.

12 A. Vinylidene plastics?

13 A. Correct.

14 Q. "(vinylidene chloride) plastics, but is
15 hesitant for fear that the Aroclor vapor might
16 produce toxic affects upon the personnel in their
17 plant.

18 "At the request of the sales department
19 this work was undertaken to determine the Aroclor
20 vapor concentration in the Anniston plant under
21 usual working conditions."

22 Is Aroclor vapor concentration
23 attempting to determine the amount of Aroclor in a
24 sample of air?

25 A. Yes.

1 THE VIDEOGRAPHER: Counselor, I'm about
2 to run out of tape, if we could change the
3 tape real quick.

4 MR. WRIGHT: Okay.

5 THE VIDEOGRAPHER: Off the record at
6 3:29 to change tape.

7 (Recess taken.)

8 THE VIDEOGRAPHER: On the record at
9 3:33.

10 A. I have reviewed the document and --

11 Q. Well, wait, let me ask you a question.

12 A. Okay, fine, thank you.

13 Q. All right. Doctor, we took a break and
14 you have had the opportunity to review Exhibit
15 No. 5; is that correct?

16 A. Yes, sir, it is.

17 Q. And let me ask you some questions about
18 it.

19 In this document, these scientists did
20 quantify the amount of Aroclor in several samples
21 of air, correct?

22 A. No. Incorrect.

23 Q. On Page 4, Table I, it's entitled,
24 "Aroclor 1242 Vapor Concentration in the Plant."
25 Correct?

1 A. That's what it is entitled.

2 Q. And they give a test number, which in
3 this, looking at the top one is 10. Position
4 number 5; presumably, that's a position in the
5 plant but I guess we don't know that unless we
6 read the entire report.

7 From your review, can you confirm that
8 that's what they are talking about?

9 A. I, it could be. No, I can't, and I
10 don't think the sampling position is relevant to
11 our discussion.

12 Q. All right. They give a concentration of
13 chlorine?

14 A. May I ask you a question?

15 Q. Right now, I'm just going over the
16 results.

17 A. Sure.

18 Q. And then I'm going to ask you questions
19 about the results.

20 A. All right.

21 Q. They give "Concentration, Chlorine" and
22 they state that as .14, correct?

23 A. Yes, sir.

24 Q. And then they give MG/CU.M. You as a
25 scientist know that that means milligram per cubic

1 meter, correct?

2 A. That's correct.

3 Q. Of Aroclor, correct? And they give an
4 amount at .33, correct?

5 A. Yes, sir.

6 Q. Okay. So they are saying that in that
7 sample there is .33 milligrams per cubic meter of
8 Aroclor 1242 in that sample of air?

9 A. No, sir, that's not what they are
10 saying.

11 Q. Okay. What are they, what do you
12 believe they are saying?

13 A. May I have the document, please?

14 Q. Yes.

15 A. Thank you. What they are saying is that
16 they are using a technique that takes everything
17 in the air through a heated furnace which
18 decomposes everything to hydrochloric acid if
19 there happens to be a chlorine carbon bond
20 present.

21 The hydrochloric acid is then captured
22 and the chloride ion derived from that combustion
23 technique is then reported, and that's what they
24 are saying "Concentration, Chlorine" is.

25 They then take the chlorine -- which

1 could be from any source, any molecule that
2 contains a carbon chlorine bond -- and they for
3 the purposes of this study, since they are only
4 concerned about maximum numbers that could be
5 Aroclors and they are working in an environment
6 where they know Aroclors is the predominant thing
7 used, they convert that into a value that is
8 representative of perhaps the amount of Aroclor
9 that could be present.

10 And if -- and this is why I don't, I try
11 not to be a lawyer. If you read the study later
12 on and if you honestly look at what, how they
13 specify what they are measuring, it clearly states
14 that they are not measuring PCBs and that any
15 number of other materials could contribute to it,
16 and that they are not identifying these as PCBs.

17 And I think it's a little unfair from my
18 viewpoint to extract portions of a 20-page
19 document and not go to the qualifications that the
20 scientists themselves put on the information.

21 And they state very clearly in the
22 discussion that the comparative determinations of
23 total chlorine in the air -- well, first they say.

24 "The conditions of the tests and the
25 limitations of apparatus are not such that

1 absolute determinations of chlorinated
2 hydrocarbons are not -- that absolute
3 determinations of chlorinated hydrocarbons are not
4 possible. Comparative determinations of total
5 chlorine in the air during any specific tests can
6 be made. The chlorine detected by this apparatus
7 can be attributed to three sources:

8 "1. Chlorinated hydrocarbons in the
9 air, Aroclors, or any other chlorinated
10 hydrocarbon.

11 "2. Chlorine in the air as free
12 chlorine or as HCL.

13 "3. Chlorine ion present in the
14 absorption solution and the wash water."

15 So they clearly state to a person
16 knowledgeable in the subject that the method is
17 not specific and is only reflective and only can
18 be used under certain circumstances with certain
19 qualifications.

20 This method would never be adopted to
21 analyze an unknown sample at the levels we're
22 talking about for polychlorinated biphenyls.

23 Q. Let me object, nonresponsive.

24 Doctor, you will agree that the intent
25 of this research was to quantify the amount of

1 Aroclor in the air in the Anniston plant, correct?

2 A. Yes.

3 Q. And that's what the scientists were

4 attempting to do, correct?

5 A. Yes.

6 Q. And they reported results quantifying
7 the amount of Aroclor in the air with a discussion
8 of their methodology and the parameters that they
9 were using, correct?

10 A. Yes.

11 Q. And they reported total chlorine,
12 correct?

13 A. Correct.

14 Q. And then they used an assumption to say
15 that the chlorine in the Aroclor plant was
16 Aroclor, correct?

17 A. No.

18 Q. If we turn to Page 11, the conclusions,
19 item one says, "No absolute determinations of
20 Aroclor vapor concentrations can be made by the
21 method used, due to presence of unknown quantities
22 of chlorine and hydrochloric acid in the air."
23 Correct?

24 A. I can't see the document from where you
25 have it, I'm not reading it. So it could possibly

1 be correct, I have no reason to doubt it.

2 It says, "No absolute determinations of
3 Aroclor vapor concentration can be made by the
4 method used, due to presence of unknown quantities
5 of chlorine and HCL in the air. The assumptions
6 made permit simplified evaluation of the data."

7 Q. Okay. So even in 1954 they were able to
8 make measurements that, if they were looking for
9 PCBs in this environmental matrix, they could
10 quantify it at least to the
11 half-a-milligram-per-cubic-meter level?

12 A. No, they are not. And I know the point
13 eludes you, and they simply are not. And in this
14 point, I'm an expert.

15 Q. Well, you'll agree that that's, that was
16 the purpose of their inquiry, correct?

17 A. The purpose of their inquiry was to make
18 a derivative measurement that could be used to
19 indicate what might be there. And what these
20 gentlemen are doing is okay and they qualify it
21 very well and they stated exactly what their
22 purpose is.

23 Q. And you --

24 A. If you take this same technique and go
25 anywhere else than they were and apply it, you

1 would not know nor could you assume that the
2 material present might even be derived from PCBs.

3 This is an inappropriate method except
4 under the specific conditions and with the
5 exceptions noted by the chemists present.

6 Q. And that's because they were in an
7 Aroclor manufacturing plant and were looking for
8 Aroclor in the air?

9 A. No. It is because of the method used
10 and the specifications that the method should be
11 used for and the characteristics associated with
12 it.

13 Q. The, you are aware, of course, doctor,
14 at this point that back in this period of time
15 there were standards by which workers were not
16 supposed to be exposed to more than a certain
17 concentration of Aroclor in the air, correct?

18 A. This is in 1953?

19 Q. Yes.

20 A. I'm not aware.

21 Q. You're not aware of that?

22 A. Of the standards in 1953, no, sir.

23 Q. Okay.

24 A. I'm not a toxicologist.

25 Q. Okay.

1 A. I'm an analytical chemist, which is what
2 we were talking about.

3 Q. Okay. And I take it you are completely
4 unaware then of the studies done in the 1930s of
5 concentrations of Aroclor and PCBs in the air and
6 their effect on rodents? Is that true?

7 A. I'm aware that studies of the sort may
8 have been done. I'm not aware of the specifics.
9 I haven't read them, I haven't seen them.

10 Q. Is it your testimony that all of those
11 studies -- or that any study that attempted to
12 quantify Aroclor or PCBs in the air before 1968
13 are necessarily invalid?

14 A. No, sir. And I, I don't believe that,
15 that it is fair to put those kinds of words in my
16 mouth. And I would like to state what I said.

17 What I said was that the method they
18 used measured chlorine in the air. And
19 furthermore, they used a derivative procedure
20 whereby they took the air with whatever was in it
21 and ran it through a furnace and burned it. And
22 then they collected any residual chlorine.

23 They looked at that and they said,
24 "Well, if that chlorine were solely derived from
25 Aroclor then there would be this much Aroclor in

1 the air."

2 And then further in their discussion
3 they clearly defined the exceptions and they
4 clearly defined that the information they were
5 generating was relative and only in certain
6 circumstances could even be considered maximums.

7 Q. One thing --

8 A. It is not an acceptable manner to
9 measure PCBs.

10 Q. Let me object, nonresponsive.

11 Have you ever heard the term MAC as an
12 analytical chemist?

13 A. The acronym doesn't jump out at me, and
14 most things I read have acronyms.

15 Q. "Maximum allowable concentration"?

16 A. It could stand for that, yes.

17 Q. And you're aware -- well, you may not be
18 aware, but this document states that there was a
19 MAC, there's a MAC, and I'll just represent to you
20 that stands for "maximum allowable concentration."

21 It says, "Based on the present MAC,
22 maximum allowable concentration, of 1 milligram
23 per cubic meter, it appears advisable to wear a
24 mask or respirator if concentrations of Aroclor
25 are high enough to be irritable to the nasal

1 membrane."

2 Did I read that correctly?

3 A. You read it correctly.

4 Q. "Since the room painted with Lustrex
5 Latex Paint contains Aroclor 1248 definitely has
6 an odor of Aroclor for several days after
7 painting, caution should be exercised in
8 recommending Aroclor for this use."

9 Did I read that correctly?

10 A. Yes, you did.

11 Q. And Item No. 2 in their conclusion -- we
12 went through Item No. 1 a moment ago -- Item No. 2
13 in their conclusions is, "The apparent Aroclor
14 concentration in the plant varies greatly from .5
15 to 1 milligram per cubic meter under mild
16 conditions up to 5 to 8 milligrams per cubic meter
17 under the most severe conditions."

18 Did I read that correctly?

19 A. Yes, you did.

20 Q. Okay. Is it your testimony that Aroclor
21 was not being measured in the tests that they did
22 in 1954?

23 A. It is my testimony, and it is as stated
24 by the people who did the study, that they were
25 not measuring Aroclors. They state very clearly

1 that they are measuring chlorine, and that from
2 the chlorine number they are making assumptions
3 and deriving an Aroclor number that they report.

4 So the answer to your question is they
5 are not measuring PCBs; they are not measuring
6 Aroclors; they are measuring chlorine.

7 Q. Now so does it continue to be your
8 testimony or is it your testimony that prior to
9 1968 or '69 there was no method available for
10 closely approximating PCB levels in environmental
11 samples below 100 parts per million?

12 A. Yes.

13 Q. Let me just make sure that I'm clear in
14 my understanding about what you mean by that.

15 Without the use of electron capture and
16 I had an environmental sample, air or water or
17 fat, I could identify PCBs and quantify them; but
18 whether it was 300 parts per million or 100 parts
19 per million, I couldn't tell?

20 MR. PRAUSE: Object to the form of the
21 question.

22 A. No.

23 Q. That is not correct?

24 A. That's not correct.

25 Q. Okay. So you couldn't tell within 100

1 parts per million how much PCB is in a sample
2 before the use of the electron capture?

3 A. Let me say the following. The first
4 question that you have asked had an "or" in it.
5 The second question reduced that question to a
6 specific matrix versus the environmental matrix
7 that you talked about to begin with.

8 I'm willing to answer the original
9 question, which I answered. Now the second
10 question is a different question and I would like
11 you to state that one again for me, please.

12 Q. Well, doctor, with all due respect, you
13 have baffled me and I need to object,
14 nonresponsive.

15 Because what was the original question
16 that you think I asked and that you think you
17 answered?

18 A. I would suggest we have the reporter
19 read the record so we can both be accurate.

20 MR. WRIGHT: Okay.

21 Q. Actually, I would rather have her read
22 the last question and have you, without
23 editorializing, just answer my question. Can you
24 do that ma'am?

25 MR. PRAUSE: Object to the gratuitous

1 statement on the record.

2 (Record read.)

3 THE WITNESS: Read it again.

4 (Record read.)

5 THE WITNESS: Yes.

6 BY MR. WRIGHT:

7 Q. Okay, now, let's go back to the
8 method -- hand me back, if you would, Exhibit
9 No. 5 -- let's go back to the method that we were
10 discussing earlier. And I was going to ask you to
11 explain the quantification of the chromatographs
12 or the quantification procedure used.

13 And it strikes me that the best way to
14 explain that is by letting us look at a
15 chromatograph and you tell us what it means.

16 A. Is that the way you would like to do it?

17 Q. Is that the way you think would be best
18 to do it?

19 A. No.

20 Q. Okay. How do you think it would be best
21 to explain how PCBs are quantified using this
22 process?

23 A. There's a section in here that's called
24 quantitation and that describes quantitative
25 determination employing the electron capture

1 detector.

2 Q. It was my understanding from reading
3 that that you had to have a chromatograph with a
4 peak so that you could look at the peak and
5 measure the area and so forth. Is that true or
6 not true?

7 A. Yes.

8 Q. In order to quantify?

9 A. Yes.

10 Q. Okay. So why don't we look at a peak?

11 MR. PRAUSE: If that's what you want to
12 do.

13 A. Which peak would you like to look at?

14 Q. You pick one that you think shows --
15 well, that would allow you to explain the
16 quantification procedure. I think, the reason I
17 picked this document is I think there are examples
18 of several chromatographs in the back part of it
19 and so if you could just pick one?

20 A. You would like me to pick one?

21 Q. If you would, since you're the expert.

22 A. Absolutely, thank you. I appreciate
23 that.

24 Q. If you would pick one.

25 A. This theoretical peak probably will

1 explain -- help me at least explain to you in a
2 fashion that I think we can understand how
3 quantitation occurs.

4 MR. PRAUSE: Just so the record is
5 clear, we're looking at Dr. Tucker is
6 describing what appears on Page MONS 079362
7 of the document that is the analytical
8 chemistry method 71-35.

9 MR. WRIGHT: Yes.

10 A. If the component that we are looking at
11 and we run through the instrument is a single
12 component or a fairly single component, when it
13 comes out the instrument on the other end we get a
14 peak with a good Gaussian shape.

15 Q. What do you mean by Gaussian?

16 A. Gaussian shape means that it has an
17 equivalent distribution, a fairly equivalent
18 distribution, on either side of the center. If
19 you look, there's about as much area on this side
20 of the peak as there is on the left side of the
21 peak.

22 Q. Why don't you show that? I think the
23 camera can get in. Hold that up.

24 A. Can you see that?

25 THE VIDEOGRAPHER: Yes.

1 Q. Show that you are talking about there is
2 about the same amount of area on either side of
3 the center of the peak?

4 A. This is a peak and this is the center
5 line on the peak. A nice Gaussian distribution --
6 which means you are getting a decent peak and that
7 kind of stuff -- means the shape is regular. And
8 the shape means that it has symmetry around the
9 center point.

10 So it means that about as much area is
11 on the left as on the right. That's a nice, nicer
12 situation.

13 What happens is that you, and if you
14 look at this closely, I'm not sure the camera can
15 get that close.

16 THE VIDEOGRAPHER: I got it.

17 A. Says here "Injection." And as we had
18 discussed earlier, this is where the sample is
19 introduced into the injection port of the
20 chromatograph.

21 And the sample is usually introduced in
22 a fairly volatile liquid that shoots through the
23 instrument very quickly. And then that leaves the
24 material that you are interested in, plus other
25 things, on the front of the column where it begins

1 with temperature and with the carrier gas to move
2 through the system.

3 The X axis here shows is basically time.
4 So if we move along the X axis while the material
5 is moving through the column, it hasn't yet
6 reached the detector yet. And as we go down the
7 road here on some arbitrary time scale, at some
8 point it passes completely through the column and
9 the first portion of it comes out of the column
10 and go through the detector.

11 As it goes through the detector, because
12 of the properties associated with that and the
13 detector, the detector begins to sense it as being
14 there. And in the electron capture detector, what
15 happens is that it attenuates the electron beam;
16 so rather than having a continuous standing
17 current, it starts to change that and it decreases
18 the standing current. Which means that we begin
19 to get a response.

20 Now as I said, it's flipped. So the
21 response shows that as more and more of the
22 compound comes off, more and more of the beam is
23 attenuated and the peak get bigger and bigger and
24 bigger and bigger. At some point you reach where
25 most of material has come off and it starts to go

1 down.

2 So this whole peak is reflective of the
3 material that came off the chromatograph from the
4 start to the finish.

5 Most chromatographs either mechanically
6 or electronically measure the area under this
7 peak. And if you know the concentration because
8 you put in a standard, then you take the
9 concentration and you get a response factor. So
10 every unit of area is equivalent to a certain
11 concentration or amount of the compound in
12 question.

13 So you measure the area or the peak
14 height -- peak height is a nice way to measure,
15 too, anything that's indicative and proportional.
16 And you take that and you multiply it times your
17 response factor and that tells you how much is,
18 how much is in that peak if it were the compound
19 in question that you are measuring that as.

20 Q. Okay. now what happens -- well, real
21 quickly, the peaks represent groups of chlorinated
22 isomers when you are talking about PCBs, correct?

23 A. Yes. When you are talking about PCBs,
24 the peaks on these types of columns are more
25 frequently than not multiple components. Because

1 the isomers of same chlorine number are so close
2 in their properties, the resolution of the system
3 is not such that it can separate it. So in that
4 group, a peak like this might represent two or
5 three compounds. It might.

6 Q. Now let's look at, I think you have a
7 real world sample in there.

8 A. These are electron capture chromatograms
9 under equivalent conditions of the different
10 Aroclors.

11 Q. Okay.

12 A. And it ranges from the 12 to 21%
13 chlorinated biphenyls all the way up to I believe
14 it's 60%. I'm having trouble reading it from the
15 side.

16 And the intermediate range, for example,
17 this chromatogram here is what you would see
18 typically for 1242, this would be 1248, this would
19 be 1254, and this would be 1260 run under the same
20 conditions. These are standards.

21 MR. PRAUSE: Dr. Tucker, could you read
22 the number appearing in the lower right-hand
23 corner of the page we're talking about for
24 the record?

25 THE WITNESS: MONS 079365.

1 Q. Now are, so those would be what we would
2 consider or what you would call a neat Aroclor
3 sample?

4 A. No, they would actually be standards but
5 they are standard Aroclors. They are really very
6 low levels of known Aroclors; they're known,
7 they're standards dissolved in hexene. So
8 they're, so they're not really --

9 Q. So that would not be from production --

10 A. No, that wouldn't be --

11 Q. -- Aroclor?

12 A. No. Well, it would be from production
13 but it wouldn't be a production sample.

14 When you do quality control on the
15 production sample you take a portion of the
16 material you're producing and you measure what's
17 in it. Okay?

18 In this particular instance, we're
19 taking a portion of the production material, using
20 it as a standard, and we're taking a very small
21 amount and dissolving it in a large amount of
22 hexene.

23 Q. Yeah, but that's --

24 A. So it is not neat.

25 Q. -- that's a production sample that is

1 from a known lot and batch, correct?

2 A. These are taken, yes, these are PCBs
3 that are obtained from known production batches
4 and that are being used after dilution as
5 standards for, in this case, environmental
6 analysis.

7 Q. Okay. Do you have in that document a
8 sample of an environmental analysis?

9 A. Yes. In fact, there are a number of
10 them and we can choose any one you wish to look
11 at.

12 Q. Yeah, I thought there were a number of
13 them. But if this is as good as any, let's just
14 look at MONS 079372. And this is from albino rat
15 muscle extract, correct?

16 A. The center chromatogram is of Aroclor --

17 Q. Okay.

18 A. -- that was obtained from the extraction
19 of --

20 Q. I apologize.

21 A. Nothing to apologize about, it's just
22 that these other two are standards.

23 Q. Three separate chromatograms on that
24 page?

25 A. That's correct.

1 Q. And the middle one is an environmental
2 sample. The other two are what you are calling
3 the standards, correct?

4 A. Correct.

5 Q. Okay. And obviously the middle one
6 doesn't match either of either the top or the
7 bottom.

8 A. The, I think it would be more accurate
9 to say that the middle one does not exactly match
10 either the top or the bottom but there are
11 matches --

12 Q. Okay.

13 A. -- in terms of retention times.

14 Q. Tell me how you determine that that's
15 one part per million of the Aroclor 1242?

16 A. First of all, this one part per million
17 doesn't refer to what's in the sample; it refers
18 to the exposure level of the animal. The animals
19 in this particular instance were being fed a chow
20 that contained one part per million of Aroclor
21 1242 intentionally put in it.

22 Q. Okay. I apologize. What is the level
23 of Aroclor 1242 that is reflected by that sample?

24 A. I don't know. That's not the intention
25 of this particular example. The intention of this

1 particular example, if you would like me to
2 continue, I would be happy to do so.

3 Q. All right.

4 A. If not, just say so.

5 Q. All right, go ahead.

6 A. The intention of this particular
7 chromatogram is to show the changes that Aroclor
8 1242 undergoes when it is fed to an animal in its
9 chow.

10 Q. Okay.

11 A. And then isolated from the muscle and as
12 you can see --

13 Q. Let me just stop you.

14 A. Oh, sure.

15 Q. I understand that. What I'm trying to
16 figure out right now is how you quantify it using
17 chromatograms. And maybe, would you see if there
18 is another sample in there that would allow us
19 to -- you to explain how you quantify?

20 A. Yeah. And I would like to exercise my
21 prerogative as an expert in terms of what we are
22 talking about to make sure that the explanation is
23 as I indicated earlier. Because it is not as
24 simplistic as it would be nice if it was.

25 And in our quantitation procedure there

1 are four cases that we consider. And it is where
2 the PCB unknown, which would be the middle
3 chromatogram.

4 Q. Right.

5 A. Is unchanged with respect to the
6 standard PCB with no evidence of interferences.

7 Q. Right.

8 A. Okay. In other words, when you run it,
9 it looks exactly like the standard production
10 material.

11 Q. Right.

12 A. Then there's case two, where the gas
13 chromatogram of the PCB unknown is altered with
14 respect to the UC standard PCB with no evidence of
15 interferences. That's this.

16 Q. Right.

17 A. We know that, from deductive logic, we
18 know the animals weren't exposed to anything
19 except PCBs so we don't expect DDT or anything
20 else. That's case two.

21 Case three, the amount of PCB unknown
22 unchanged with respect to the standard PCB with
23 evidence of interferences, that is not this
24 particular example.

25 And case four, where the UC

1 chromatograph is altered with respect to the
2 standard PCB with evidence of interferences.

3 So in this particular instance it would
4 be probably quantitated as a case two, where the
5 ECB -- where the PCB chromatogram was changed but
6 there was no evidence of interference.

7 Under those circumstances, one of the
8 techniques that is employed and what we would
9 recommend is that you prepare a calibration curve
10 and -- as the original 1242 and get a response
11 factor; and then take this and measure the same
12 area and get a response factor back; and calculate
13 and estimate the PCB level that's there.

14 And what is done nowadays is they would
15 take three of the dominant matching peaks in the
16 most closely -- in the Aroclor distribution that
17 was closest to it and they would use those to
18 quantitate it. That's the EPA procedures used
19 today.

20 So what they would probably take is this
21 peak, that peak, and -- this peak, that peak and
22 that peak and relate it to these peaks and
23 calculate it as Aroclor 1242.

24 Q. Okay. What I would like to know is how
25 you did it in 1970. What quantitation method did

1 you use for environmental samples in 1970?

2 A. In 1970. We in most instances compared
3 it to the closest matching product after looking
4 at the envelope, or products. If it was a
5 long-standing chromatogram and it looked like
6 there might be two different PCBs there, then we
7 chose to two that most represented what was there
8 and then we used those as standards tests to
9 estimate the amount of PCB that was present.

10 Q. Okay. And how did you go about
11 estimating the amount of PCBs?

12 A. We took the PCBs in question, Aroclor
13 1242, for example, or 1254 or 1260; we injected
14 known amounts in the instrument; and we varied
15 that known amount over a specific calibration
16 range.

17 We then calculated the response factor
18 for that PCB over that range and we had a
19 calibration curve.

20 So then we calculated the same response
21 in the same region for the unknown. And then we
22 went on the response and we went over to the
23 calibration curve and went down to the
24 concentration.

25 And that was the way the concentration

1 was estimated in those samples.

2 If there were interferences that were
3 obviously there, then we worked around that peak
4 and used peaks that we could see were not
5 interfered with by the ratios and the intensities
6 associated with them.

7 Q. Okay.

8 A. And we always clearly stated at this
9 stage of the game how we did the estimation so
10 that others would know that's the way we did it.

11 Q. By the way, did you keep laboratory
12 notebooks?

13 A. Yes.

14 Q. Okay. And these were kept in the lab
15 there at the Queeny plant?

16 A. Yes.

17 Q. Did that include the chromatograph
18 strips?

19 A. Chromatographs were kept as their own
20 entity. And most things that dealt with
21 nondevelopment samples or were actually samples,
22 environmental samples and things of that sort,
23 were initialed, dated, documented and retained.

24 Q. Okay. And where were they retained?

25 A. When?

1 Q. '69, '70, '71.

2 A. In '69 and '70 most of them were
3 probably retained, you know, in our laboratory
4 because at that point in time we hadn't generated
5 enough information to exceed the capacity to store
6 it ourselves. And we would be using it on a daily
7 basis because we had lots of questions and we were
8 comparing what we did this day versus what we saw
9 the next day and just trying to learn about
10 things.

11 Q. Right. After that, in later years,
12 where did it go?

13 A. At some point in time I recall that all
14 my documentation and all the records were boxed,
15 inventoried, and were turned over to the Legal
16 Department.

17 Q. And that would include the laboratory
18 notebooks?

19 A. I'm sure it would.

20 Q. And that would include the
21 chromatographs for the samples themselves?

22 A. I'm sure it would.

23 Q. Okay. And that would include any notes
24 or calculations that you made regarding those
25 samples?

1 A. If the notes or calculations were
2 entered in the laboratory notebooks or if the
3 notes or calibrations were entered on the
4 chromatograms or if the notes or calibrations were
5 attached to the chromatograms, yes.

6 Q. Was it normal procedure for calculations
7 to be done on one of those three items?

8 A. Actually there were, there were --

9 Q. In other words, was it normal procedure
10 to either do your calculations in the lab
11 notebook, do your calculations on the strips
12 themselves, or attach the calculations to --

13 A. The normal procedure was to do the
14 calculations in the lab notebook.

15 Q. Okay. Can you describe what the lab
16 notebook looked like or the lab notebooks liked
17 like?

18 A. No.

19 Q. Okay. Well --

20 A. Well, they were --

21 Q. -- I think you can.

22 A. They were this size, about that thick.

23 No, I don't, no, I object to that a
24 little bit. Because I'm telling you that I do not
25 have a definitive memory of the lab books we used

1 at that time. And I have used hundreds of lab
2 books over the years, so.

3 Q. All I'm asking is, is were they -- the
4 lab notebooks that I have seen, and you tell me if
5 this is the kind of lab notebook it would be, are
6 kind of like what you can buy at the drug store, a
7 composition book where the pages are bound, it has
8 a hard cover, you can open it and then you can
9 make entries?

10 A. Yeah, I think there were some like that.
11 I think they were a little bit more companyized.

12 Q. All right. So Monsanto had --

13 A. I mean they were probably produced in
14 quantity for Monsanto.

15 Q. Monsanto had its own specific laboratory
16 notebooks that it issued to you all?

17 A. I'm sure they did. I don't recollect
18 the notebook specifically. I do recollect
19 notebooks.

20 Q. Okay. Now in your St. Louis
21 laboratories did you become proficient and the
22 people that worked with you become proficient at
23 quantifying PCBs in environmental samples?

24 A. Does "proficient" mean "practiced"? By
25 definition.

1 Q. "Proficient" means "good." Did you all
2 become good at it?

3 A. "Practice" means "good." Yes.

4 Q. And were there ways that you could tell
5 whether you were good or not?

6 A. Yes.

7 Q. I assume you had quality assurance
8 methods, correct?

9 A. Right.

10 Q. And can you describe briefly the quality
11 assurance method that you used?

12 A. Sure. We ran standards. We ran blanks.
13 Intermittently with what we ran, we would run a
14 standard to make sure the instrument was still
15 running properly.

16 We ran surrogates. That might be
17 something like a pesticide or a simple, yeah, a
18 simple pesticide that we had a known response for
19 and that we could tell from that whether the
20 instrument was still operating the way it should
21 and things of that sort.

22 So the quality control at that
23 particular point in time wasn't as formalized as
24 it is now in environmental laboratories but it was
25 in the development stages and it was certainly

1 there.

2 Q. At some point did you -- now I know at
3 least initially you were doing all of the
4 environmental samples for Monsanto from all of the
5 plants basically, is that fair? Early on?

6 A. I think it's fair to say that we had the
7 capability at South Second Street facility and
8 that most of the samples that were being analyzed
9 were sent to the South Second facility to be
10 analyzed. It is not necessarily fair to say I was
11 doing it by all, everything myself.

12 Q. No, no, no, I didn't mean yourself --

13 A. But you did say "you."

14 Q. Okay. I apologize. I meant -- and
15 that's a fair clarification. You had staff
16 working with you by the '69/'70 time frame?

17 A. Yes, sir.

18 Q. Is that correct? And I assume you had
19 more than one machine by, let's say, 1970?

20 A. Yes, sir.

21 Q. Okay. And when I said that you became
22 proficient and good at quantifying PCBs and
23 environmental samples, I meant your laboratory
24 there at South Second Street.

25 And by the way, you were the head of

1 that section, I assume?

2 A. Yes.

3 Q. Correct?

4 A. I was the technical, I provided the
5 technical supervision.

6 Q. All right. At some point you brought in
7 people from the other plants and taught them how
8 to do the analysis, correct?

9 A. It was at least one or two instances
10 where that was done.

11 Q. And one of the instances was Anniston,
12 correct?

13 A. Anniston was one of the two plants that
14 we had that manufactured PCBs.

15 Q. And you turned -- well, you assisted the
16 Anniston plant to set up their own PCB analysis
17 capability. Correct?

18 A. Yes.

19 Q. Using the methods that you had
20 documented there at the South Second Street
21 facility?

22 A. Right.

23 Q. And you instructed them how to do that,
24 correct?

25 A. Correct.

1 Q. And my understanding is that they set up
2 a -- they brought in a portable building so that
3 they had a clean facility and set the machinery up
4 in it and began performing the same kind of
5 analysis that you were doing at South Second
6 Street. Is that your understanding?

7 A. Yes. They began performing the analysis
8 in the same manner that we were doing it, yes.

9 Q. Yes. And did you go to Anniston, by the
10 way?

11 A. No.

12 Q. You never went to Anniston?

13 A. Huh-uh.

14 Q. You need to answer out loud.

15 A. I apologize. No, I never went to
16 Anniston.

17 Q. Did anyone from South Second Street go
18 to Anniston?

19 A. I'm sure they did.

20 Q. Do you know of anybody that worked for
21 you that went to Anniston?

22 A. I don't recall specifically, no.

23 Q. Did anybody from Anniston come to
24 St. Louis?

25 A. Yes.

1 Q. Who do you remember from Anniston coming
2 to St. Louis?

3 A. You know, there was a technician that
4 was sent up there, or a chemist, whichever way you
5 want to look at it. He spent several days in our
6 laboratory, where worked with him and made sure he
7 understood what he was doing and introduced him to
8 everybody and to the methods and just made sure he
9 knew what he was doing. And then he went back and
10 set them up down there.

11 Q. How long was he in St. Louis?

12 A. Better part of a week, probably. Could
13 have been more, I don't recall; but I know it took
14 that long to familiarize him with what we were
15 doing.

16 Q. Was his name Turner?

17 A. Yes, that name sounds familiar.

18 Q. Did a Toby Bell come up to St. Louis?

19 A. Yes, I met Toby Bell several times I
20 think.

21 Q. Did you ever meet a Bunky Wright?

22 A. Yes.

23 Q. So all three of those gentlemen at some
24 point came to St. Louis?

25 A. Yes.

1 Q. But you only specifically remember
2 training Mr. Turner?

3 A. Depends on your definition of
4 "training." We trained Mr. Turner to do the
5 methods and how to prepare the samples and how to
6 interpret this and how to quantitate and how to
7 operate the instrumentation and things of that
8 sort.

9 The other gentlemen, if I remember
10 correctly, were more supervisory type folks. And
11 they basically were more interested in, "Gee, what
12 do you need to do? How do you do it? How
13 difficult is it? What's this look like and what's
14 that look like?" And things of that sort.

15 That's my recollection.

16 Q. Now did you become aware at some point
17 that the Anniston plant was having to submit
18 reports to environmental authorities?

19 A. I was aware of it. I'm not, I'm not
20 sure when specifically I became aware of it or how
21 I became aware of it.

22 Q. Okay. Did you -- and by "you," I don't
23 mean you personally, I mean the people in South
24 Second Street -- in let's say by 1970 or so, were
25 you performing analyses that you knew were going

1 to be reported to environmental agencies, either
2 state or federal?

3 A. All of the information that we
4 generated, generated was ultimately shared with
5 government agencies.

6 I want to make sure when you say
7 "environmental agencies" I understand what you are
8 talking about. Because the time frame you are
9 talking about was 1970. Was EPA even formed by
10 that time?

11 Q. All I'm talking about -- that's why I
12 used the term "environmental agencies."

13 A. I just wanted to clarify that.

14 Q. Yeah. I'm talking about some
15 governmental entity, whether it's state or federal
16 or even city or county?

17 A. The results weren't always necessarily
18 generated specifically at the request of those
19 kinds of individuals --

20 Q. But you knew --

21 A. When the -- can I complete my answer,
22 please?

23 Q. Yeah.

24 A. When they shared samples with us or
25 asked us to do things and it was agreed to do them

1 and we did them, the information was shared with
2 them.

3 All the information that was generated
4 in the laboratory ultimately was shared with
5 anybody and everybody, including the agencies as
6 they began to form and get into compliance
7 situations.

8 But initially there were no, there was
9 no EPA, there was, no, it was just interested
10 people.

11 Q. And, yeah, and I'm just asking. I know
12 at the very beginning that's the way it was and
13 eventually it transformed to where various
14 environmental agencies became aware of the
15 situation and concerned about being informed about
16 it.

17 And I just want to know when, if you can
18 recall, your consciousness elevated to the point
19 where you realized that the work you were doing
20 had the potential at least for being submitted to
21 regulatory agencies?

22 A. To be real truthful with you, all of the
23 work that we did had the potential to be submitted
24 to regulatory agencies, to clients, to customers,
25 to international agencies; and none of the

1 information was generated with any more or any
2 less quality than it was required to get the
3 answers in the best manner that we felt we could.

4 And so in the period that you are
5 talking about, especially prior to 1970 and things
6 of that sort, we generated best information that
7 we could and supported it with proper
8 documentation. But as far as being required to
9 hand it over to a government agency or to meet
10 some compliance level or things of that sort, they
11 didn't exist at that time. And that's important
12 that it be realized.

13 Q. Okay. Well, I was specific -- I was
14 specifically talking about the 1970 time frame
15 and. And the reason I'm asking you this is that I
16 believe it was in 1970 that the Anniston plant was
17 required to begin submitting reports to the
18 Alabama Department of Environmental Management.
19 And I --

20 MR. PRAUSE: Object to the form of the
21 question.

22 MR. WRIGHT: What was the wrong with the
23 form of the question?

24 MR. PRAUSE: It is the Alabama Water
25 Improvement Commission.

1 MR. WRIGHT: That later became the
2 Alabama Department of Environmental
3 Management. Okay.

4 BY MR. WRIGHT:

5 Q. Were you aware of that?

6 A. In retrospect, I don't recall being
7 highly consulted or involved in or any of that
8 kind of thing. I recall at some point in time
9 seeing memos and things of that sort that were
10 generated for those purposes.

11 We trained the folks to do it; we
12 exchanged samples with them; satisfied we knew
13 what they were doing. They always had us
14 available to ask questions and to send samples to
15 verify what they were doing. Things of that sort.

16 The specifics of what they did with the
17 state or what they provided the state was
18 certainly not filtered through us in any way,
19 shape or form.

20 Q. Okay. You knew it was obviously
21 important that if information is being transmitted
22 to a governmental agency at that agency's request
23 that that information be as accurate as possible?

24 A. Okay. I, I'm going to have to say to
25 you from a professional viewpoint the information

1 that I generate. Whether it be for a regulatory
2 agency or for any other use, is defensible and it
3 is in line with the expectations and data quality
4 objectives associated with that information.

5 And so if you are implying or you're
6 trying to find out whether I stand on my ear or do
7 something particularly special to produce
8 information for compliance agencies, that's not
9 true. I meet the data quality objectives that I
10 need to and the information is provided. If they
11 have any questions about it or the quality control
12 associated with it, we share that information with
13 them.

14 We understand how to produce the best
15 defensible information that's available.

16 Q. All right. And that's the way you
17 trained your employees and the people from the
18 other plants that you taught, correct?

19 A. That's correct.

20 Q. Okay. And you expected them to do, to
21 adhere to the same high standards that you held
22 yourself and your own laboratory to, correct?

23 A. We hoped they would, yes.

24 Q. Well, did you assure that they would?

25 A. As I indicated earlier, we trained them.

1 Q. Yes.

2 A. Secondly, we exchanged samples with
3 them.

4 Thirdly, we recommended the equipment
5 they buy.

6 And fourthly, we were always available
7 to provide backup either in expertise or analysis
8 if they so deemed they needed it.

9 Q. Do you recall ever changing or telling
10 them that they needed to change their methodology
11 to generate more accurate reports?

12 A. No. If we early on would develop a
13 better way of quantitating or if we generated
14 information with standards that let us understand
15 that if we used, say, 1242 and 1254 as standards
16 and did it this way then it didn't really matter
17 how altered it was, we got a pretty good result --
18 it was maybe plus or minus 10% of what we were
19 doing -- we would communicate that kind of
20 information.

21 But certainly at that stage of the game,
22 as long as the person documented very clearly how
23 they did the calculations and they did them
24 consistently and it was acceptable, that's the way
25 it was done.

1 If we made improvements, we told them
2 about that; and they were, it was up to them and
3 their agreement with whoever they were reporting
4 the information to whether that was the thing they
5 wanted to do.

6 Q. Okay. Let me just ask this. Did
7 they -- did the outlying labs ever get better than
8 you -- and by "you," I mean you personally and
9 your crew there in South St. Louis -- at
10 performing these kind of analyses?

11 MR. PRAUSE: Object to the form of the
12 question. I don't know what you mean by an
13 "outlying lab."

14 Q. Did either Anniston or Chrome Ridge or
15 Ruabon or anybody else in the Monsanto companies
16 ever get better at doing quantitative analysis
17 than you at South Second Street?

18 A. You know, the objective was to produce
19 defensible information that met the data quality
20 objectives, and that's what was done. And that
21 was what was done by the other laboratories. And
22 I don't know "what better" than is.

23 Q. Did they ever get -- did they ever
24 produce more accurate or more defensible, to use
25 your term, information than you did in your lab?

1 A. Not really. It wasn't a contest. This
2 isn't a contest. I mean, it is an effort, a
3 professional effort, to determine to the best of
4 your ability what's there so the information can
5 be used to make appropriate decisions.

6 And so the "better than" implies that
7 there is some sort of contest or something. They
8 became as good as, certainly, and as capable as we
9 were. But I don't think we ever looked at it like
10 there was a contest or graded each other or
11 anything of the sort.

12 When they were first starting up, we
13 would look at how they did things in very much
14 detail to make sure that it made sense and that
15 they were doing it consistently and they
16 understood what the objectives were and things of
17 that sort.

18 But did any lab, did any lab become
19 better than we did? No.

20 Did they become as good as we were?
21 Yes.

22 Did they become as capable as we were?
23 Sure.

24 Q. Now are you aware in 1971 -- well, let
25 me just show you here. For example, page 13145 of

1 the documents that you looked at?

2 A. Is that the same as Exhibit 3? Is that
3 what that is, or what is it?

4 MR. SHIELDS: Exhibit 4.

5 THE WITNESS: It is part of Exhibit 4?

6 MR. WRIGHT: It is part of Exhibit 4.

7 BY MR. WRIGHT:

8 Q. When I say the documents you looked --

9 A. Okay.

10 Q. -- at before the deposition, just from
11 now on --

12 A. Okay.

13 Q. -- you'll know I'm talking about Exhibit
14 No. 4.

15 A. If I'm confused I'll continue to ask
16 questions to clarify it.

17 Q. Yes, sir. Can you state for the record
18 what that is.

19 A. Let me look at it first of all.

20 (Witness peruses document.)

21 Okay, I have had time to look at the
22 two-page document.

23 Q. Okay, what is it?

24 A. It is a memo on Monsanto -- it's a copy
25 of a memo on Monsanto company header indicating

1 that it was produced at Anniston, Alabama, on
2 November 6, 1970. It is written to Mr. J. L.
3 Crockett, Jr., Technical Staff Director, Water
4 Improvement Commission, State Office Building,
5 Montgomery, Alabama.

6 It is written by J. C. Landwehr of the
7 Technical Services -- it says, "Technical Services
8 Supervisor." And on the blind carbon copy it
9 lists G. L. Jessee, F. J. Holzapfel, W. B
10 Papageorge, J. L. Conder, and P. B., I think it's
11 Paul, P. B. Hodges as being sent.

12 And it also shows that there is an
13 attachment; it doesn't specifically say what the
14 attachment is or --

15 Q. Well, isn't there an attachment?

16 A. Then it says, "Attached are data
17 compiled at Anniston," this is in the body of the
18 memo. It says, "Attached are data compiled at
19 Anniston regarding Aroclor content of the plant
20 effluent. As you requested, we shall report this
21 information to you on a monthly basis."

22 Q. All right. And that document is dated
23 when?

24 A. November 6, 1970.

25 Q. Okay. Is it your understanding that

1 they continued to document data like that until
2 some time in 1971?

3 A. They could have. Obviously, from review
4 of this, I'm not, didn't receive a copy, I wasn't
5 on the list. And whatever they were doing was
6 they were doing directly in agreement with and as
7 requested by the technical staff director at the
8 WIC.

9 Q. All right.

10 A. So did I review this information or look
11 at it or anything? Have I ever seen this before
12 back then? No.

13 I have seen it recently, obviously; I
14 went through these documents.

15 Q. Okay. Do you remember seeing reports
16 like that back in the 1970/1971 time frame?

17 A. Not routinely, no.

18 Q. Well, you say, "not routinely."

19 A. Well, in 19- -- yeah, I answered the
20 question too quick. You said the 1970/'71 time
21 frame?

22 Q. Yes.

23 A. No.

24 Q. Did you ever have, to your knowledge,
25 any contact with the Alabama Department of

1 Environmental Management or its predecessor, the
2 Alabama Water Improvement Commission?

3 A. In that time frame, no.

4 Q. Okay. When did you have contact with --

5 A. I was providing air monitoring and
6 quality control/quality assurance support for a
7 thermal operation for Rust a few years ago down in
8 McIntosh, Alabama at the Ciba Geigy plant down
9 there.

10 Q. It didn't have anything to do with --

11 A. Correct.

12 Q. -- the Monsanto plant --

13 A. Correct.

14 Q. Okay.

15 A. But the reason my contact, in answering
16 your question, is relative. And it is called ADEM
17 now, I think. Right?

18 Q. Yes. Okay. Did you ever recommend that
19 anybody ever tell the Alabama regulatory authority
20 anything specific?

21 A. No. Nope.

22 Q. Okay. Let me show you a document that
23 may or may not be contained in Exhibit 4, I
24 haven't had the time to find it. But it is MONS
25 044289. And ask you if you are familiar with

1 that?

2 A. Thank you.

3 MR. PRAUSE: Is that your only copy?

4 MR. WRIGHT: That's my only copy. I'm
5 going to look real quick here and see.

6 MR. PRAUSE: It doesn't look familiar to
7 me.

8 MR. WRIGHT: What's it dated? What's it
9 dated?

10 MR. PRAUSE: Not clear, you can't tell.

11 MR. WRIGHT: It's covered up by the
12 sticky.

13 THE WITNESS: It's February 197. Oh,
14 here it is, no, there's a sticky on top. It
15 says 3/12/71.

16 MR. WRIGHT: Yeah, okay.

17 BY MR. WRIGHT:

18 Q. So February or March of -- the report I
19 think is probably dated February of '71 and the
20 sticky?

21 A. The report is dated some time in
22 February in the '70s, from this copy.

23 Q. All right, okay.

24 A. I can't tell.

25 Q. I don't believe it is in the stack of

1 the things that you were provided in preparation
2 for the deposition.

3 If you look at the -- first of all,
4 you're not unfamiliar with reports of that type,
5 correct?

6 A. Well, I'm nowhere to be found on the
7 distribution. Am I?

8 Q. I bet you are. Let me see it.

9 A. Sure. I might be, I looked fairly
10 quickly, but.

11 MR. PRAUSE: Have we marked that as an
12 exhibit?

13 MR. WRIGHT: No, this will be No. 6. Is
14 that right? Yes.

15 (Deposition Exhibit No. 6 marked for
16 identification.)

17 BY MR. WRIGHT:

18 Q. It's entitled, "Organic Chemicals
19 Division, R&D Laboratories, St. Louis." And it's,
20 the sticky is from W. B. Papageorge. And it says,
21 "Applied Science Staff."

22 Were you part of the Applied Science
23 Staff?

24 A. Myself and about 30 other people, yes.

25 Q. Okay. I'm going to ask you about

1 something that I think you'll be aware of. But
2 perhaps you'll tell me that you weren't aware of
3 this.

4 A. Only time will tell.

5 Q. Yeah. In the one, two, three, fourth
6 paragraph, would you -- let me just read.

7 "Comparative EC/GC," which is the methods we have
8 been talking about, electronic capture gas
9 chromatograph, correct?

10 A. To be real truthful, before I comment on
11 it I would have to read the statement in its
12 entirety.

13 Q. Okay. Why don't you read --

14 A. And I can't see it the way you're moving
15 it.

16 Q. I apologize.

17 A. No. You go ahead and read it and then
18 I'll look at it.

19 Q. No Why don't you read the paragraph out
20 loud and then I'll ask you a question about it.

21 A. Okay.

22 MR. PRAUSE: If you feel more
23 comfortable reading the entire document, that
24 would be --

25 MR. WRIGHT: Yeah. All I'm asking --

1 (Simultaneous conversation.)

2 THE WITNESS: We'll see where we go with
3 it.

4 MR. WRIGHT: All I want to talk about is
5 that paragraph.

6 THE WITNESS: And I thank you --

7 MR. PRAUSE: I would like to look at it,
8 too, Scott, when you get a chance.

9 THE WITNESS: Okay. The paragraph that
10 I have been asked to read is the one, two,
11 three, fourth paragraph on the third page of
12 this fax. And "Speciality Products Aroclor
13 Environmental Program."

14 THE REPORTER: I'm sorry, read loudly.

15 THE WITNESS: Sure, absolutely. Usually
16 they tell me to calm down.

17 "Comparative EC/GC analysis of duplicate
18 Anniston plant effluent samples for PCBs were
19 carried out at Anniston and St. Louis. The
20 levels of PCB found calculated as Aroclor
21 1242 were two to four times greater than
22 those reported by Anniston. The reason for
23 the disagreement lies in the methods used to
24 estimate the PCB level. Anniston uses the
25 peak height technique, while we employ the

1 total area of the envelope. The two
2 techniques produce equivalent results when
3 the isomer distribution of the Aroclor in
4 question is unaltered. The search for a more
5 absolute quantitation will be continued.
6 Additional exchange samples will be analyzed
7 using the total area calibration procedure."

8 BY MR. WRIGHT:

9 Q. Okay. I think you would agree that a
10 200% to 400% undercount is at least significant,
11 correct?

12 A. It is a difference in the range stated
13 for the samples that were exchanged between the
14 two laboratories which were undoubtedly exchanged
15 to establish that so that we could make sure that
16 they were doing what they were supposed to be
17 doing.

18 Q. All right. So a memo or correspondence
19 should have and would have gone out to Anniston to
20 tell them to change their method to make it more
21 accurate?

22 MR. PRAUSE: Object to the form of the
23 question.

24 Q. Correct?

25 A. I think "they should have and would

1 have" is your presumption. I think the fact that
2 it may have happened is a possibility.

3 I think that the communication may not
4 have been directly to Anniston but through our
5 management structure to the plant management
6 structure. But I'm not willing to say it should
7 have or would have. I mean, that depends.

8 Q. Well, I think we established earlier
9 that, that you developed the Monsanto method,
10 correct?

11 A. That's correct.

12 Q. You perfected the Monsanto method,
13 correct?

14 A. We optimized it, yes.

15 Q. And that you in St. Louis were at least
16 as good as any other Monsanto lab and for much of
17 the time better than any other Monsanto lab,
18 correct?

19 MR. PRAUSE: Object to the form.

20 A. I don't, I think we have established
21 that we were able to analyze PCBs and do it as
22 accurately as anybody.

23 Q. All right. And a two-to-four-times
24 lower level than you were finding on the same
25 sample is a significant undercount, will you agree

1 with that?

2 A. It is a measurable difference. And the
3 objective of the measurable difference was to
4 ensure that the laboratory in question was using
5 the appropriate approach for the sample in
6 question.

7 It is obvious, at least from my reading
8 of that particular paragraph, that the peak height
9 technique as applied to that particular sample or
10 samples was not appropriate. And we demonstrated
11 to them and told them they needed to start, now
12 that once they knew it, they needed to understand
13 this.

14 Now whether or not we communicated that
15 in a letter or something like that, or a memo, or
16 whether or not we called them up and had a
17 conference call and talked them through it and
18 then explained to them how to do it and pointed
19 out -- as I pointed out in the method you had me
20 read where it had four different cases in there --
21 that perhaps because of their experience they had
22 mis- -- they had chosen the improper case.

23 Q. Okay. And what I'm asking you is I
24 think you agree with me that they should have
25 corrected their method to more accurately report

1 the data?

2 A. One would assume that they would if we
3 understood their goal.

4 Q. Okay. And you believe that somehow you
5 would have instructed them to change their method?

6 A. No. we probably wouldn't have ordered
7 them to do anything. We would have appraised them
8 of the situation and told them of the differences
9 and let them decide based on their own information
10 what they should do.

11 For all we know, they could have had an
12 agreement with somebody that this is the way they
13 were supposed to calculate it and, before they
14 could change it, they would have to appraise those
15 individuals of that and why they were doing it.
16 And then those individuals would have to say,
17 "Yeah, that sounds good, we'll accept that."

18 And then they also would have to know
19 for sure, well, what impact did it have so the
20 earlier numbers could be related to the newer
21 numbers? And they might even want to go back and
22 look at the earlier numbers and see whether or not
23 case one, two, three or four were the appropriate
24 ones there and whether or not there were issues
25 there, too.

1 So I think there's a quantum jump here
2 that you're asking me to make that I don't make.

3 Q. Let me object, nonresponsive.

4 Let me just ask you whether you
5 recollect ever instructing Anniston to change
6 their method? Do you have a recollection of that?

7 A. I never instructed Anniston to change
8 their method. It was not my position to instruct
9 them to do so.

10 Q. Do you have a recollection of anyone
11 instructing them to change their method?

12 A. Nope, I do not.

13 Q. Do you have a recollection of anyone
14 advising them that in order to be accurate they
15 need to change their method?

16 A. Yes. I think that what we read here
17 advises them of that.

18 Q. Other than what we read, do you have a
19 recollection of anybody ever telling them to
20 change their method to be more accurate?

21 A. Not a specific one. But -- well, no.

22 Q. Do you have a general recollection? All
23 right. Do you know whether or not they changed
24 their method?

25 A. No.

1 Q. All right.

2 MR. PRAUSE: Larry, I would just like to
3 note for the record that the last page this
4 document is not sequentially numbered in
5 order among the MONS documents; it's 0400070,
6 which, whereas the first page is 04289.

7 MR. WRIGHT: Let me see it, I might have
8 stuck two documents together. Yeah. That's
9 the first page of another document.

10 MR. PRAUSE: I guess we should note for
11 the record that that's being removed from
12 Exhibit 6.

13 MR. WRIGHT: Exhibit 6 is a five-page
14 document sequentially numbered 044289 through
15 044293.

16 MR. PRAUSE: And when you are at a good
17 point I would like to request a quick break,
18 it is coming up on 5:00. We have no problem
19 continuing into the evening, but I would like
20 to get a break.

21 MR. WRIGHT: Why don't we take a break
22 and discuss what we're going to do.

23 MR. PRAUSE: Sure.

24 MR. WRIGHT: Because I still don't know
25 how we're going to do all the things we need

1 to do. So let's go off the record.

2 THE VIDEOGRAPHER: Off the record at
3 4:51.

4 (Recess taken.)

5 (Mr. Shields leaves the deposition)

6 THE VIDEOGRAPHER: We're on the record
7 at 5:15.

8 MR. WRIGHT: While we were off the
9 record we decided that, despite mine and
10 probably everybody else's misgivings, the
11 best thing for us to do is probably continue
12 tomorrow. And I'm, we're going to go a
13 little bit further today and then come back
14 and try to complete tomorrow. And to be
15 honest, I'm not sure we'll complete tomorrow
16 but we'll do the best we can.

17 MR. PRAUSE: Do you want to set a time
18 right now to start tomorrow?

19 MR. WRIGHT: To start?

20 MR. PRAUSE: Or do you want to leave
21 that --

22 MR. WRIGHT: Let's leave that until we
23 see where we get in the next little bit.

24 MR. PRAUSE: Sure.

25 MR. WRIGHT: I do want to --

1 THE WITNESS: I believe that's part of
2 Exhibit 4.

3 MR. WRIGHT: Yes.

4 THE WITNESS: Or it may have come from
5 your records.

6 MR. WRIGHT: We'll put it back through
7 there.

8 THE WITNESS: It may have been one you
9 didn't have time to find. I don't know
10 which.

11 MR. WRIGHT: No, it is from Exhibit 4.
12 It is not one of mine.

13 THE WITNESS: Okay.

14 MR. WRIGHT: The, I just want to say,
15 and for whatever it is worth, I'm concerned
16 about the report, the expert report, in this
17 case. This expert report is a
18 page-and-a-half and in my opinion basically
19 doesn't give any opinions. It simply says
20 what subjects the witness will talk about.

21 BY MR. WRIGHT:

22 Q. I would like to know, Dr. Tucker, what
23 expert opinions do you have that relate to this
24 case?

25 A. That's a question to me?

1 Q. Yes, sir.

2 A. At the moment on the record?

3 Q. Yes, sir.

4 A. The expert opinions I have are based on
5 my expertise; and my expertise in the areas that I
6 can talk to are outlined in a reasonable format I
7 think in the expert report that you have been
8 provided.

9 If you have specific objections, I'm
10 sure we can take it under consideration to do
11 something about it; but at the moment that's kind
12 of how I feel about it.

13 MR. PRAUSE: Obviously, it's a subject
14 you are free to bring up with me or any of
15 the attorneys you want. If you want to ask
16 Scott questions about his report itself,
17 that's fine.

18 MR. WRIGHT: Well --

19 MR. PRAUSE: But I don't think he's the
20 person to resolve the procedural issues.

21 MR. WRIGHT: Here's the problem we've
22 got.

23 MR. PRAUSE: Are you talking to me or
24 Scott?

25 MR. WRIGHT: I'm talking and to him but

1 mostly to you right now.

2 MR. PRAUSE: Okay.

3 MR. WRIGHT: By "you," I don't mean you
4 specifically, I mean you as the lawyers for
5 Monsanto.

6 MR. PRAUSE: Yeah.

7 MR. WRIGHT: Because you and I just met
8 this morning.

9 The only information we have about the
10 expert opinions of Mr. Tucker or Dr. Tucker
11 are contained in the expert report. And the
12 expert report, as I indicated, is a
13 page-and-a-half document, it comprises six
14 paragraphs. The first paragraph tells who he
15 is. The second paragraph tells where he went
16 to college. The third paragraph says he has
17 a lot of experience. The fourth paragraph
18 says he has published numerous papers. The
19 fifth paragraph says, in forming his
20 opinions, he has relied on his education and
21 so forth. And the sixth paragraph says,
22 quote, "I will testify from a scientific and
23 analytical perspective regarding the details
24 of Monsanto's response to the discoveries of
25 the international scientific community in the

1 late 1960 and early '70s regarding the
2 persistence and accumulation of PCBs in the
3 environment."

4 In other words, that says what he is
5 going to talk about.

6 MR. PRAUSE: Right.

7 MR. WRIGHT: Doesn't say what his
8 opinions are.

9 MR. PRAUSE: Right.

10 MR. WRIGHT: The next paragraph says, "I
11 will testify as to my involvement in the
12 development and use of analytical equipment,"
13 blah, blah, blah. Again talks about what he
14 is going to talk about but it doesn't give
15 what his opinions are.

16 MR. PRAUSE: Right.

17 MR. WRIGHT: And then it says, "As
18 necessary, I will also furnish background
19 information regarding analytical techniques
20 and the behavior and properties of PCBs."
21 Again it testifies, it says, I will talk
22 about such-and-such, but it doesn't give any
23 opinions.

24 MR. PRAUSE: Right.

25 MR. WRIGHT: And so to that extent this

1 report gives us no expert opinions, in our
2 opinion.

3 MR. PRAUSE: I completely understand
4 what you are saying.

5 MR. WRIGHT: Okay.

6 MR. PRAUSE: And I think we can
7 supplement that report and it would be
8 appropriate for us to do so at this point.

9 As you know, different levels of detail
10 are required in different jurisdictions in
11 that sort of a report, and I believe that a
12 similar report was used in the Abernathy and
13 Dyer cases.

14 MR. WRIGHT: Frankly, I think it was
15 identical.

16 MR. PRAUSE: Yeah, it very well might
17 have been.

18 MR. WRIGHT: Right.

19 MR. PRAUSE: Now as you know, a lot of
20 what Scott has been talking about today is
21 beyond the ken of the average lay person.

22 MR. WRIGHT: And I recognize that he is
23 a mixed fact and expert witness. My concern
24 and the reason I'm bringing it up at this
25 point --

1 MR. PRAUSE: Yeah.

2 MR. WRIGHT: -- is because I'm taking
3 his deposition presumably as a fact witness
4 and an expert witness.

5 MR. PRAUSE: Right.

6 MR. WRIGHT: And if I'm going to
7 continue tomorrow and he has additional
8 opinions that are not simply historical
9 recitations, I want some advance warning
10 about what they are.

11 MR. PRAUSE: I think that's fair. And I
12 think what we will wind up being able to tell
13 you -- and I can probably confirm this with a
14 phone call -- is that Scott is primarily a
15 fact witness here and we have designated him
16 an expert out of an abundance of caution
17 because the matters that he is testifying
18 about are highly technical.

19 I think that Monsanto has no intention
20 in this case of using Scott to testify about
21 modern-day, present issues as far as analysis
22 of samples in the Anniston area.

23 I think that, if he is going to give any
24 opinion, it would relate exclusively to what
25 happened in the early '60s -- I mean, I'm

1 sorry, in the late '60s and the early 70s; it
2 would be along the lines of commenting on
3 the, you know, that it was very challenging
4 at that time to use the equipment to analyze
5 for trace quantities of PCBs in environmental
6 matrixes.

7 And that, to some extent, because he is
8 personally involved in that, that is factual
9 testimony but it arguably crosses over the
10 border into expert testimony also.

11 MR. WRIGHT: Okay. Will you do this for
12 me then? Will you make that phone call and
13 give me that assurance?

14 MR. PRAUSE: Yes, I will be glad to do
15 that on the record.

16 MR. WRIGHT: Because that's going to
17 determine how I prepare tonight. In other
18 words, do I have to prepare for a history
19 lesson plus new scientific opinions or do I
20 just have to prepare for a history lesson?

21 MR. PRAUSE: Right. I think that's a
22 fair request.

23 MR. WRIGHT: Okay.

24 MR. PRAUSE: And if you want, I can do
25 it after you ask some more questions, or I

1 can go ahead and do it immediately.

2 MR. WRIGHT: Okay. Why don't we do it
3 at the end? Well, are you going to have
4 somebody you can get in touch with?

5 MR. PRAUSE: Most likely, you know, to
6 be completely safe I can go ahead and do it
7 now.

8 MR. WRIGHT: Why don't you do it now
9 just to make sure you get hold of somebody.

10 MR. PRAUSE: Yeah.

11 MR. WRIGHT: The other thing, just so
12 that you know, the other thing that I have a
13 concern about is the documents that were
14 included in the notice. And --

15 MR. PRAUSE: What documents were
16 included with the notice?

17 MR. WRIGHT: Well, the documents
18 provided to the deponent in connection with
19 the above --

20 MR. PRAUSE: You mean the documents
21 requested? I'm sorry.

22 MR. WRIGHT: The documents requested.
23 We got number one, I believe.

24 I assume that Exhibit 4 comprises all of
25 the documents that were provided to you in

1 connection with this case. Is that fair,
2 doctor?

3 THE WITNESS: Yes, I think that's has
4 been asked before and answered before.

5 MR. WRIGHT: I think it has, too.

6 THE WITNESS: But to agree with it, yes.

7 MR. WRIGHT: But because we're dealing
8 with it now.

9 THE WITNESS: No, that's okay.

10 MR. PRAUSE: That's fine. That's
11 consistent with my understanding also.

12 MR. WRIGHT: Yeah. And by the way, I'm
13 reading from Plaintiffs' Exhibit Number 1,
14 which i the Notice to Produce Documents at
15 Deposition.

16 MR. PRAUSE: Right. I will say I
17 believe that Monsanto's attorneys received
18 that for the first time yesterday and it was
19 faxed to me, I hadn't seen it before today.

20 MR. WRIGHT: Yeah. And I don't know
21 whether that's true or not, because it came
22 from Bob's office and whatever it is, it is.
23 Let me just tell you the documents that we
24 don't have.

25 MR. PRAUSE: Sure.

1 MR. WRIGHT: So that tonight you can
2 determine whether or not they exist. I think
3 what you are probably going to tell me is, is
4 that most of them don't exist.

5 MR. PRAUSE: Probably.

6 MR. WRIGHT: But I want to bring it up
7 and give you the opportunity to get them if
8 they do exist.

9 "Any and all documents reviewed by the
10 deponent in reaching his opinions and
11 conclusions." Again, Exhibit No. 4 is that
12 universe plus your general knowledge of PCBs
13 and analytical techniques and so forth,
14 correct?

15 THE WITNESS: Yes.

16 MR. PRAUSE: Yeah. I mean, who knows
17 what he reviewed --

18 MR. WRIGHT: I know.

19 MR. PRAUSE: -- in 1969 and those
20 documents are a part of his background.

21 MR. WRIGHT: I understand.

22 MR. PRAUSE: Okay.

23 MR. WRIGHT: Then number three is, "Any
24 and all documents, specifically including any
25 scientific, medical, engineering or technical

1 publications relied upon you in reaching your
2 opinions and conclusions."

3 I have a little bit of concern about
4 that because I think you may tell me that
5 there are scientific publications that you
6 reviewed years ago that you are relying on in
7 reaching your testimony today. Is that true
8 or not true?

9 THE WITNESS: I'm sure it is, in terms
10 especially for the fact portion of it.

11 MR. WRIGHT: Okay.

12 MR. PRAUSE: And obviously if we could,
13 if we could, if Scott couldn't specifically
14 say, well, this was something, then we can,
15 to the extent it is in the public domain,
16 obviously you are, you have equal access to
17 it. To the extent it is not in public
18 domain --

19 MR. WRIGHT: Yeah, but I don't know what
20 he relied on, see, that's the problem.

21 MR. PRAUSE: I'm saying maybe neither
22 does he. He may not be able to specifically
23 say, "Well, here's what I read." You know
24 that he did read a number of scholarly
25 articles I'm sure in the late '60s and early

1 '70s; but as far as being able to put a
2 finger on one and say, "Yeah, that's one,"
3 you know, to separate it from his collective
4 understanding is maybe something that's not
5 feasible.

6 MR. WRIGHT: Okay. Well --

7 MR. PRAUSE: And if it is, we will
8 certainly endeavor to, if you want, ask him
9 right now; and if he can put his finger on
10 any, we'll endeavor to supply them to you.

11 MR. WRIGHT: Okay. Tell you what, let
12 me go, the last three are going to be the
13 easiest. And then I will come back and I
14 will ask him that question and then can you
15 go back your phone call. Okay?

16 MR. PRAUSE: Okay.

17 MR. WRIGHT: Item number four is, "Any
18 and all correspondence, e-mail, notes,
19 memoranda and other writings, documents or
20 things generated by the witness in connection
21 with his employment as an expert witness or
22 anticipated testimony in this action."

23 MR. PRAUSE: I'm aware of nothing other
24 than what you have.

25 MR. WRIGHT: No correspondence? You all

1 have never sent him a letter, he's never sent
2 you a letter?

3 MR. PRAUSE: We've spoke own the phone a
4 few times, and that's it.

5 MR. WRIGHT: You haven't made any notes?

6 THE WITNESS: No. I have not made any
7 notes.

8 MR. WRIGHT: Okay. "Any and all
9 documents relating to any billing or time
10 records"?

11 THE WITNESS: I haven't billed anything.

12 MR. PRAUSE: We haven't received a bill
13 from Scott for his work on this case.

14 MR. WRIGHT: Okay.

15 BY MR. WRIGHT:

16 Q. Do you anticipate billing Monsanto for
17 your time?

18 A. Yes.

19 Q. At what rate?

20 A. I haven't really billed anybody this
21 year but my previous rate was 250 an hour.

22 MR. PRAUSE: And --

23 A. And I need to qualify that --

24 MR. PRAUSE: Yeah.

25 A. -- to be fair to everybody. The

1 deposition portion of it or the testimony portion
2 of it, I don't bill for. I do bill for time to
3 get there, the time to be there, time to return,
4 costs associated with it.

5 And if there is any preparation work --
6 for example, like yesterday when we sat around and
7 went through documents and things of that sort --
8 I will bill for that. Today, I don't bill for.

9 Q. Okay. Well, other than getting here and
10 the ancillary things you mentioned?

11 A. Correct. And that's what I -- okay, I
12 can do it again to make it clear what I bill for
13 and what I don't bill for.

14 Q. Let's save that for tomorrow.

15 A. That would be fine.

16 MR. PRAUSE: So I think we're in
17 agreement then that there is nothing
18 responsive to, I don't know what the item
19 number of that is but, it is the one asking
20 for his notes and bills and file materials.

21 MR. WRIGHT: Right.

22 BY MR. WRIGHT:

23 Q. And then item six is a catchall. It
24 says, "Any and all documents and things within the
25 deponent's custody and control relating to his

1 employment as an expert witness and anticipated
2 testimony in this case."

3 And based upon your other answers, my
4 assumption is your answer to that is there is
5 nothing else.

6 A. That's correct.

7 MR. PRAUSE: That is correct for mine,
8 too.

9 Q. Okay. And so where we are left with is
10 the scientific, medical, engineering or technical
11 publications relied upon by Dr. Tucker in reaching
12 his opinions and conclusions in this matter.

13 Is there anything specific that you can
14 think of right now that is not contained in
15 Exhibit 4?

16 A. You know, it is hard to condense all the
17 experiences and things of that sort that form the
18 portion of the knowledge base and say that they
19 are all in Exhibit 4.

20 Which items I particularly rely on, most
21 of -- a lot of those are in there, the methods
22 that I wrote, the, there's some publications that
23 I published.

24 I believe also associated with the
25 expert report was a curriculum vitae.

1 Q. Yes.

2 A. And in that curriculum vitae there is a
3 publication list. And I would say certainly in
4 the past, I didn't take the CV and look up all the
5 publications and review them for this particular
6 deposition.

7 Q. Those are publications that you wrote?

8 A. That's correct.

9 Q. And I understand that you may rely on
10 the things that you wrote. But really what this
11 is getting at is things that other people wrote
12 that you are relying on. And so I'm just
13 wondering if there is anything specific that you
14 can think of that's not included in Exhibit No. 4?

15 A. No.

16 MR. PRAUSE: I might volunteer, for
17 instance, I think that articles, some of the
18 early articles that were published obviously
19 Holmes and Tatton, Simmons, you know, those
20 things that he has even been questioned about
21 and that are referred to in some of these
22 documents, clearly he read them. You know.

23 If you wanted to go through and compile
24 a list of those we would cooperate with you
25 in getting copies of them for you.

1 THE WITNESS: But in terms of going
2 specifically back and reviewing
3 prepublications copies of Riesborough's
4 information, which I know I got --

5 MR. WRIGHT: Yeah.

6 THE WITNESS: -- and read very
7 carefully, point-by-point and
8 letter-by-letter. I mean, it was important.
9 I did not do that for this. But to say that
10 opinions I have, expert or otherwise, are not
11 based partially on that?

12 BY MR. WRIGHT:

13 Q. Well --

14 A. The expert opinions that, that are
15 expert opinions when they occur really have a lot
16 to do with analytical chemistry, which is what I
17 am.

18 Q. I understand.

19 MR. PRAUSE: I guess it is a little
20 unusual to have an expert who formed his
21 opinions a long time ago.

22 A. Yeah. I, in other words, I've not been
23 presented for specific issues to say like happens
24 that an expert --

25 MR. WRIGHT: Why don't you go confirm

1 that he's not going to talk about anything
2 else?

3 MR. PRAUSE: Right.

4 MR. WRIGHT: And in the meantime let me
5 try to think up a solution to the resolution
6 of this --

7 MR. PRAUSE: Sure.

8 MR. WRIGHT: -- problem that is raised
9 by item number three.

10 MR. PRAUSE: That's fine. I think maybe
11 the easiest way to do it is the cutoff date
12 for his employment, which I think he worked
13 for Monsanto until 1978.

14 MR. WRIGHT: Right.

15 MR. PRAUSE: We might be able to
16 stipulate on the record that he won't testify
17 about anything as an expert that happened
18 after he left the employment at Monsanto for
19 instance. Then you would have a very bright
20 line date.

21 MR. WRIGHT: Why don't you go and check
22 on that and we'll see?

23 THE VIDEOGRAPHER: Going off the record
24 at 5:33.

25 (Deposition resumed on the written

1 record but not utilizing the video tape:)

2 MR. WRIGHT: For the record, we have
3 asked the videographer to turn off because we
4 don't need him right now.

5 What I'm going to do -- we're waiting on
6 a phone call from somewhere. And what I'm
7 going to do while we're doing that is I'm
8 going to read into the record the beginning
9 Bates numbers of the documents that are
10 marked as Exhibit No. 4 so that we'll have a
11 record of them and then I'm going to request
12 that I be allowed to take the documents
13 tonight to look at them.

14 What's the matter? He wants the ending
15 Bates numbers as well?

16 MR. PRAUSE: Yeah, I mean, as long as we
17 have time to kill.

18 MR. WRIGHT: Well, The problem is --

19 MR. PRAUSE: It's your call, it's your
20 record.

21 MR. WRIGHT: I would rather just do
22 the --

23 MR. PRAUSE: Yeah, I just wanted to
24 through that out there.

25 MR. WRIGHT: -- beginning Bates numbers

1 because I think --

2 THE WITNESS: When you get into some of
3 the documents they are quite thick so it is
4 going to go fast.

5 MR. WRIGHT: Let me try. I'll try
6 beginning and ending. Okay.

7 MONS 097069, one page. DSW 014582, one
8 page document. MONS 035902 through 035920.

9 And, Ms. Court Reporter, instead of
10 saying MONS or DSW, I'll just say M or D and
11 you will know that M means MONS and D means
12 DSW, okay?

13 THE REPORTER: Yes, sir.

14 MR. WRIGHT: Okay. MONS 097458 is a
15 one-paged document. DSW 013946 is a one-page
16 document. MONS 097836 is a one page
17 document. DSW 014282 and 283. MONS 097058.
18 MONS 096517. DSW 147839. DSW 014094.
19 MONS 090103. DSW 147840. DSW 015043 through
20 45. MONS 097053 through 57. MONS 096512
21 through 514.

22 DSW 014271 through 275. MONS 096491.
23 MONS 057607 through 618. DSW 014247 through
24 248. DSW 014003 through 006.

25 DSW 006369 through 6372. MONS 096500.

MONS 096470. MONS 096469. MONS 098645 and
646. MONS 096454 and 55. MONS 098142.
MONS 096614 and 615.

DSW 023541 through 543.

DSW 013747. DSW 013629 and 013630
D014237 through 40. DSW 014236.
MONS 097270. DSW 013502 and 503. DSW 014536
through 538.

Where are they going to call, Marsh?

MR. PRAUSE: Right here.

MR. WRIGHT: MONS 096520 and 21.

MONS 098680 and 81. DSW 014007. MONS 034570
through 596.

MR. PRAUSE: If you want a break, I'll
be glad to take over for you if you want to
pass the stack over.

MR. WRIGHT: I kind of have a rhythm
going.

MR. PRAUSE: Okay.

MR. WRIGHT: DSW 013804 and 805.
DSW 014098 and 99. MONS 088096. DSW 013504
through 506. DSW 013568 and 69. DSW 006368
through 6372. DSW 039232. DSW 013566. MONS
079347 through 079383. DSW 013145 and 146.
MONS 099200 through 202. DSW 038724.

MONS 098700. MONS 098699. MONS 096529 and
30. DSW 013625. MSW 100085 through 100120.
MONS 057469 through 478. MONS 059732
through 750. MONS 030667 through 669.
MONS 028738 through 755. MONS 099871 and 72.

MONS 043806 through -- it's a good thing
you had me do this because I found a mistake.
The beginning number is MONS 043806 and it
appears to go sequentially through to 875 but
then stapled on to it is a letter dated, I
mean a letter numbered as MONS 093497.

Do you want me to tear that off?

MR. PRAUSE: Yeah, might as well. It is
fine with me if you do. That's clearly a
mistake.

MR. WRIGHT: Okay. So the page we tore
off is 093497.

Next document, MONS 082646 through 654.
MONS 093254 through 61. MONS 072421 through
482. MONS 098676. MONS 021827 through 861.
MONS 066790 through 822. MONS 021815 through
826. MONS 067645 through 653. MONS 021462
through 480. MONS 021424 through 448.
MONS 067499 through 518. MONS 021384 through
394. MONS 036053 through 135. MONS 057433

1 through 441. MONS 034162 through 189.

2 MONS 042235 through 274.

3 And that I believe completes the stack.
4 Everything that was pulled out and not marked
5 was put back in and I believe the only thing
6 that was pulled out and marked is Exhibit
7 No. 3.

8 MR. PRAUSE: Yes.

9 MR. WRIGHT: So 3 and 4, with 4
10 comprising the numbers that I just read off,
11 are all of the documents that were presented
12 this morning.

13 MR. PRAUSE: Correct. Off the record.

14 MR. WRIGHT: Let's go off the record.

15 (Recess taken.)

16 MR. WRIGHT: We're going back on the
17 record now after Mr. Prause has had a
18 discussion with some of his colleagues. And,
19 Mr. Prause, you have a statement about what
20 kind of testimony Dr. Tucker is going to be
21 asked to give?

22 MR. PRAUSE: That's correct, Mr. Wright.

23 You had concerns an the scope of
24 Dr. Tucker's expert testimony. And Monsanto
25 is willing to stipulate that Dr. Tucker will

1 not critique any of the ongoing or
2 modern-day, you know, I don't want to just
3 say present because obviously the work at
4 Anniston goes back into the early 1990s.

5 He will not critique any of the
6 analytical chemistry associated with the
7 present-day or, you know, in the 1990s or
8 1980s any of the remediation work, any of the
9 sampling, any of the litigation-related
10 sampling, blood sampling, environmental
11 sampling. He will not apply his analytical
12 chemistry expertise to critique or evaluate
13 those efforts.

14 MR. WRIGHT: Well, that takes a lot off
15 the table but I'm not sure that it tells me
16 what --

17 MR. PRAUSE: What he will do?

18 MR. WRIGHT: What he will do, yes.

19 MR. PRAUSE: I can attempt to fill you
20 in on that if you would like.

21 MR. WRIGHT: Okay.

22 MR. PRAUSE: Obviously, Scott will
23 testify as an expert about historical
24 state-of-the-art and events that happened in
25 the late '60s and early 70s. We also are

1 proffering him as an expert concerning
2 modern-day state-of-the-art for the analysis
3 of environmental samples for trace quantities
4 of various contaminants, primarily PCBs.

5 However, he will not apply that
6 knowledge or that expertise to critique any
7 of the analytical work associated with the
8 Anniston plant litigation or the Anniston
9 plant-related remediation.

10 So, for instance, Dr. Tucker might offer
11 an opinion about, you know, at present day
12 the theoretical challenges associated with
13 analyzing for contaminants in the
14 environment. But he won't take a piece of
15 data that has been generated in conjunction
16 with the Anniston plant remediation or the
17 Anniston plant litigation and say, "Here,
18 this data is good because of X or this data
19 is bad because of X."

20 MR. WRIGHT: Okay. Let me tell you what
21 my position is going to be.

22 I anticipated and in all fairness I have
23 awareness of his historical opinions.
24 Because even though they are not set out in
25 the expert report, there is a lot of material

1 that has been provided that, that generally
2 tells me what his opinions were in the late
3 '60s and '70s and presumably still are
4 regarding that.

5 I have no hint whatsoever about what his
6 opinion is about today's methodology and
7 standards. And so to that extent, I think
8 we're going to object to him giving that kind
9 of testimony because we haven't been apprised
10 of it before his deposition.

11 MR. PRAUSE: Well, you are, of course,
12 entitled to lodge that objection. I think
13 Monsanto is -- obviously, you are also
14 entitled to ask Scott questions about his
15 more modern-day, you know, these modern-day
16 issues during this deposition to flesh it out
17 further.

18 I'm sure that Monsanto would also be
19 willing if you wanted to discuss
20 supplementing his expert report if you think
21 it's inadequate along those lines.

22 MR. WRIGHT: Let me ask the witness this
23 question; because, frankly, it is the
24 witness' knowledge that, I mean the witness'
25 testimony that we are talking about.

1 BY MR. WRIGHT:

2 Q. What opinions, if any, do you have about
3 modern-day analytical chemistry that relate to
4 this litigation but that do not relate to specific
5 samples and tests that have been done? If any.

6 A. I think the environmental type analysis
7 that is done today is a lot more sophisticated, a
8 lot more extensive, and a lot more practiced than
9 it ever was in the past. I also think that it is
10 done in a much more structured fashion in the
11 sense that it is required to do so because of the
12 regulatory and legal issues associated with it.

13 And so my opinion is, is that we are
14 really into a realm where we are dealing with
15 compliance versus science; and that at this point
16 in time in terms of regulatory procedures and
17 things of that sort, compliance wins.

18 So today, current practice is to use
19 standard operating procedures which are very
20 uniform and to ensure that the method helps
21 dictate the equivalency of the data from lab to
22 lab and the quality associated with it. And that
23 enough provisions are included in the information
24 that is generated for outside verification and/or
25 validation of that information.

1 I think more recently that that is
2 changing in the sense that the EPA is beginning to
3 embrace performance-based-based methodology. And
4 really what we did back in the area that I did
5 this type of analysis was performance-based versus
6 compliance-driven.

7 So I think the type of methods that are
8 used today are different; I think they are more
9 definitive; I think they are more standardized,
10 and I think they are more comparable. And I think
11 the conclusions that are drawn from the
12 information today after it has been evaluated and
13 verified are more conclusive and of more utility
14 to the legal community.

15 So that's kind of, I don't know if that
16 goes where you want me to go or?

17 Q. Well, no. Where I want you to go is I
18 want to know your opinions about modern-day
19 science, modern-day expertise that's within your
20 field that relates to this litigation. I need to
21 know your opinions now at the time of your
22 deposition. I object that I haven't been provided
23 your opinions before the deposition, and so now is
24 my opportunity: I'm asking you to tell me your
25 opinions.

1 A. Okay.

2 Q. Tomorrow we're going to talk about the
3 opinions that I was aware of. And, and, you know,
4 they will be, the half fact/half expert opinions
5 that we having talking about earlier.

6 But right now, if there are going to be
7 any new modern-day opinions, I would like to know
8 what they are. So if you have covered them in
9 your statement, then we're done. If there are
10 more that you need to add, then let's add them.

11 MR. PRAUSE: Let me interject and say I
12 think there's a little confusion now because
13 again Scott is a fact witness and an expert
14 witness in this case. And some of what we
15 are talking about isn't really so much a
16 matter of opinion; while arguably it is
17 knowledge, it is not opinion.

18 For instance, Monsanto would reserve the
19 right for Scott to testify generally about
20 how PCBs are analyzed for today. The nuts
21 and bolts. That is a matter not of opinion
22 but of knowledge. And I want to clarify that
23 for you.

24 MR. WRIGHT: No, that is expert
25 testimony, Marsh --

1 MR. PRAUSE: I did not say it was not
2 expert testimony. But I say it is expert
3 testimony based on knowledge, not opinion.
4 So I just want to make sure we're on the same
5 page and I'm basically trying to give you
6 more disclosure about the way that Monsanto
7 intends to use Scott in this case.

8 I understood the position that you're in
9 and we're not trying to ambush you and I
10 think we're willing to agree that if you need
11 to schedule another deposition session with
12 Scott in the future to explore these opinions
13 that you were not prepared for that pertain
14 to modern-day general knowledge of the
15 analysis for PCBs then we're willing to do
16 that.

17 MR. WRIGHT: I really don't want to do
18 that. And the reason I don't want to do that
19 is, is because I have had his report for some
20 time; I have anticipated the historical
21 opinions that are reflected in his report; I
22 didn't see anything about any other opinions
23 in the modern-day in his report.

24 I'm staying another day at great expense
25 to myself. And if he has got modern-day

1 opinions -- first of all, I object to them
2 even now -- but I want to know what
3 modern-day opinions he has.

4 He mentioned a couple of paragraphs
5 worth of opinions. You have mentioned in
6 addition to that that you may ask him the
7 nuts and bolts of how samples are analyzed
8 today.

9 MR. PRAUSE: Yes.

10 MR. WRIGHT: Is there anything else in
11 addition to that?

12 MR. PRAUSE: I mean, I do think, too, I
13 agree that this is not an extensive expert
14 report. But I think implicit in discussing
15 the history of analytical chemistry is a
16 comparison of the past to the present.
17 Obviously, if you want to talk about how
18 something has evolved --

19 MR. WRIGHT: Well, he has already talked
20 about that. He has already told me about how
21 the present compares to the past. And in
22 addition to that, you have mentioned the nuts
23 an bolts of the procedures.

24 MR. PRAUSE: Correct.

25 BY MR. WRIGHT:

1 Q. Is there anything else in addition to
2 that, Dr. Tucker?

3 A. I'm sorry, you were talking to me?

4 Q. Yes, sir.

5 A. Okay, you guys were having, I apologize.

6 No, specifically analytical chemistry,
7 nothing outside my known area of expertise.

8 Q. Well, I don't know what all is within
9 your area of expertise. We have talked about two
10 things relating to modern-day: The matters that
11 you have mentioned, comparing modern-day to the
12 olden days, and we have talked about the nuts and
13 bolts of how samples are analyzed in the modern
14 day today.

15 Is there anything else other than those
16 two areas that relate to the modern day that you
17 are going to testify about in this case?

18 A. I think it sounds like that adequately
19 covers.

20 MR. WRIGHT: All right. I will see you
21 in the morning then.

22 MR. PRAUSE: Yes. Off the record.

23 (Thereupon, the deposition adjourned at
24 6:45 p.m., to reconvene at 9:30 a.m.,
25 Wednesday, August 2, 2000, at the same

1 address.)

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