

ORIGINAL

**Superior Court of the State of California
For the County of Los Angeles**

**TRANSWESTERN PIPELINE)
COMPANY,)**

Plaintiff,)

vs.)

Case No. BC 026959

**MONSANTO COMPANY and)
DOES 1 through 200, inclusive,)**

Defendant.)

July 9, 1992

**Deposition of JAMES RICHARD SAVAGE, taken on
behalf of Plaintiff.**

GORE REPORTING COMPANY

**Boatmen's Tower, Suite 1175 - 100 North Broadway
St. Louis, Missouri 63102
(314) 241-6750**

1 Superior Court of the State of California
2 For the County of Los Angeles
3

4 TRANSWESTERN PIPELINE)
5 COMPANY,)
6 Plaintiff,)
7)

8 v.) No. BC 026959
9)

10 MONSANTO COMPANY and)
11 DOES 1 through 200,)
12 inclusive,)
13 Defendants.)
14

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18 Deposition of JAMES RICHARD

19 SAVAGE, taken on behalf of Plaintiff, at the
20 offices of Bryan, Cave, McPheeters &
21 McRoberts, 500 North Broadway in the City of
22 St. Louis, State of Missouri, commencing at
23 12:00 p.m. on the 9th day of July, 1992,
24 before J. Bryan Jordan, certified shorthand
25 reporter and notary public.

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1 APPEARANCES:

2
3 FOR THE PLAINTIFF:

4 Ms. Dana K. Welch

5 Shearman & Sterling

6 555 California Street

7 San Francisco California 94111-2514

8 (415) 986-4200

9
10 FOR THE DEFENDANTS:

11 Ms. Janine Simerly

12 Bronson, Bronson & McKinnon

13 505 Montgomery Street

14 San Francisco, California 94111-2514

15 (415) 986-4200

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1 Whereupon. . .

2 JAMES RICHARD SAVAGE,
3 of sound mind, having been first duly sworn
4 to tell the truth, the whole truth, and
5 nothing but the truth in the case aforesaid,
6 testified upon his oath as follows, to-wit:

7 EXAMINATION

8 QUESTIONS BY MS. WELCH:

9 Q. Good afternoon, Mr. Savage. My
10 name is Dana Welch, and I represent
11 Transwestern Pipeline Company.

12 (Discussion off the record.)

13 MS. WELCH: Back on the record.

14 BY MS. WELCH:

15 Q. As I said, I represent
16 Transwestern Pipeline Company and this
17 deposition is being taken in a case in which
18 Transwestern Pipeline Company has sued
19 Monsanto.

20 Have you ever heard of
21 Transwestern Pipeline Company before this
22 case?

23 A. Before the case? No.

24 Q. Okay.

25 A. Not that I recall.

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1 Q. Okay, have you ever been deposed
2 before?

3 A. Yes.

4 Q. And how many cases?

5 A. It appears, three others, although
6 I don't remember them all.

7 Q. Okay, approximately when were
8 those cases?

9 A. Most recent, I guess, two or three
10 years ago. It's not something I have done
11 very much.

12 Q. Okay, did those cases involve
13 products that contained PCBs?

14 A. Yes.

15 Q. When I use the word Aroclors, do
16 you understand that to mean Monsanto's
17 version of PCBs?

18 A. Yes.

19 Q. So I can use those words and
20 you'll understand that?

21 A. Yes.

22 Q. Okay, a few things about the
23 deposition process, in case you need
24 refreshing. We need to be considerate of the
25 court reporter here, so I would like to

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1 complete a question and have you answer that
2 just so that he can get it clearly on the
3 record, and likewise I will wait for you to
4 answer your question before -- answer my
5 question before I ask another one. You
6 understand that you are under oath, and even
7 though this is a casual setting, it's as if
8 you are in a courtroom of law?

9 A. Yes.

10 Q. And so you are obligated to tell
11 the truth. When the deposition transcript is
12 finished, you will have a chance to review it
13 and make any corrections that you deem
14 necessary. I should comment to you now,
15 though, that I or another attorney for
16 Transwestern may take that opportunity to
17 comment on any changes that you make to your
18 transcript, but you will have that
19 opportunity.

20 If you answer a question that I
21 ask, I will assume that you understood the
22 question and I never mean to confuse or
23 obfuscate, so if there's anything that I say
24 that's confusing to you, please ask me to
25 rephrase it and I will.

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1 I want your best recollection of
2 the events that happened during the years
3 that I'm going to ask you about. I don't
4 want you to speculate or guess, but I just
5 want to know what you knew, and what you know
6 and what you remember.

7 Is that clear?

8 A. Yes.

9 Q. Okay. So you testified in about
10 three other cases, the first was two or three
11 years ago. Do you recall when the others
12 were?

13 MS. SIMERLY: That
14 mischaracterizes. "The last was two or three
15 years ago," is what he said.

16 A. The last I recall.

17 Q. Do you recall when the others
18 were?

19 A. No. In fact, until we prepared
20 for this yesterday, I didn't remember that
21 there were that many.

22 Q. Okay, and were you represented by
23 counsel in those depositions?

24 A. Yes.

25 Q. Could you please tell me what your

1 educational background is?

2 A. I have a B.S. in chemical
3 engineering from the University of Wisconsin.
4 A little bit of course work after that, but
5 no other degree.

6 Q. And what year did you obtain that
7 degree?

8 A. 1957.

9 Q. And when did you first start to go
10 to work at Monsanto?

11 A. Yes, here in St. Louis.

12 Q. What year was that?

13 A. In 1957.

14 Q. What was your first job?

15 A. My title was assistant engineer.
16 I was at the J. F. Queeny plant on South
17 Second Street.

18 Q. What were your job
19 responsibilities as assistant engineer?

20 A. I was part of a department called
21 Technical Services and our job was to make
22 modest improvements in the processes in the
23 various operations that were in the plant.
24 Larger projects were done by another
25 organization.

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1 Q. What products did J. F. Queeny
2 plant produce?

3 A. At that time, the J. F. Queeny
4 plant was very large and made more than a
5 hundred products. I don't remember what they
6 all were.

7 Q. Did it produce any of the products
8 that contained Aroclors at that time?

9 A. Not to my knowledge.

10 Q. At that time, as assistant
11 engineer did you work on any products that
12 contained Aroclors?

13 A. No.

14 Q. And how long did you spend as
15 assistant engineer?

16 A. I stayed at the Queeny plant for
17 just over a year and was transferred to the
18 Anniston plant at that time, with the same
19 title.

20 Q. Did the Anniston plant at that
21 time, which I assume was 1958, produce any
22 products that contained Aroclors?

23 A. Yes, Anniston produced Aroclors.

24 Q. Did it produce all of the products
25 that contained Aroclors at that time?

1 A. Yes.

2 Q. What was your --

3 A. Excuse me. Anniston produced each
4 of the Aroclor products but was not the only
5 producing site. It didn't make all the
6 Aroclor.

7 Q. Which other plant made Aroclors?

8 A. The Krummrich plant.

9 Q. Any others?

10 A. Yes. We had a plant at Newport in
11 Wales.

12 Q. That's in Great Britain?

13 A. Yes.

14 Q. Any others?

15 A. I think those were the only ones.

16 Q. And this was in 1958, all three
17 plants were involved in the production of
18 Aroclors?

19 A. Yes.

20 Q. What were your job
21 responsibilities at that time?

22 A. I was working in the Parathion
23 Department, which was on the opposite side of
24 the plant from Aroclors, doing process
25 improvement work.

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1 Q. Do Parathion, does Parathion
2 contain Aroclors?

3 A. No.

4 Q. How long did you stay on that job?

5 A. Three years in that responsibility
6 in the Parathion Department.

7 Q. That takes us up to approximately
8 1961; is that correct?

9 A. That's right.

10 Q. Okay, what happened in 1961?

11 A. I was transferred to the
12 production department, running -- as
13 production supervisor for the Chlorine
14 Department.

15 Q. At the Anniston plant?

16 A. At the Anniston plant.

17 Q. What was the chlorine that you
18 produced used for?

19 A. It was all transferred by pipeline
20 to the Aroclor department.

21 Q. Any other uses for the chlorine?

22 A. Chlorine was also consumed in
23 making Parathion but nearly all of that was
24 purchased chlorine.

25 Q. Who did you report to?

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1 A. As a production supervisor, I
2 first reported to Carl Edelblut. Later, Carl
3 transferred and was replaced by Bob Moody.

4 Q. Do you know what year that was?

5 A. No.

6 Q. What were your job
7 responsibilities as production supervisor?

8 A. I was responsible for the
9 production of chlorine, caustic soda, caustic
10 potash, for worker safety, supervision of the
11 workforce, quality control. The full span of
12 first-line production supervision.

13 Q. How long did you stay as
14 production supervisor?

15 A. I was production supervisor for a
16 total of two years.

17 Q. At the time that you were
18 production supervisor at the Anniston plant,
19 that's in Alabama?

20 A. Right.

21 Q. Were you told anything about
22 Aroclors?

23 A. Well, yes. For the first year,
24 they were my customer. After that, I had
25 more direct responsibility.

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1 Q. Were you told that Aroclors could
2 be toxic? And we're talking about the time
3 period of 1961 to 1963.

4 A. I think that we were, we were told
5 that Aroclor was an industrial chemical which
6 would be treated in the way that industrial
7 chemicals are normally handled.

8 Q. Which is what?

9 A. There was not -- there was no
10 highlight that it was, had any particular
11 unusual toxicity.

12 Q. And when you say that it should be
13 treated as industrial chemicals should
14 normally be treated, what does that include?

15 A. Well, ordinarily, one avoids
16 getting those materials on the skin or
17 inhaling vapors, avoids unnecessary contact.

18 Q. Were you told the contact with
19 Aroclor may cause chloracne?

20 A. No.

21 Q. Were you told that contact with
22 Aroclor may cause liver damage?

23 A. No.

24 Q. Were you told that contact with
25 Aroclor may cause liver atrophy?

1 A. Well, your questions are leading
2 in a, into a kind of strange context, because
3 there was no formal forum in which I would be
4 told such things. As a supervisor, I had
5 responsibility to find out those things about
6 the chemicals that I worked with, and there
7 were materials available for me to find those
8 things out.

9 Q. When you first --

10 MS. SIMERLY: Let me interject an
11 objection. I assume we are reserving all
12 objections except as to the form of the
13 question until the use at trial; is that a
14 fair assumption?

15 MS. WELCH: Yes.

16 MS. SIMERLY: Okay.

17 BY MS. WELCH:

18 Q. Was there a normal training course
19 that you took when you became production
20 supervisor that introduced you to the
21 products that you were working with?

22 A. No.

23 Q. So any information that you
24 gathered about the products, including the
25 Aroclor, would be from your own

1 investigation; is that correct?

2 A. It was readily available in the
3 files that were given to me when I took over
4 the shop.

5 Q. But nobody took you aside and said
6 you've got to be careful around this material
7 because it may cause chloracne, for instance?

8 A. No.

9 Q. Were you, at this time,
10 responsible for, or let me back up. Was
11 there any particular concern at that time,
12 and this is '61 to '63, about pollution
13 control with respect to the Aroclors?

14 A. Nothing special.

15 Q. Was there any concern about the
16 effluent from the plant, at this time?

17 MS. SIMERLY: With reference to
18 PCBs?

19 MS. WELCH: Yeah, the Aroclors.

20 A. Well, there was a general concern
21 about effluents from the plant. Each
22 operating department had its own
23 characteristic effluents, and it was expected
24 that there would be suitable control measures
25 nor any, any of them.

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1 BY MS. WELCH:

2 Q. What did those control measures
3 consist of? Again, talking about the time
4 period '61 to '63.

5 A. Well, they were specific to each
6 product.

7 Q. Were they specific to each
8 Aroclor?

9 A. Oh, no.

10 Q. For instance, what were -- I'm
11 focusing on the Aroclors. Were there
12 specific concerns about effluent or Aroclor
13 effluent?

14 A. Yes. The main effluent from the
15 Aroclor department was a waste water stream
16 which had to be handled properly.

17 Q. How did the Aroclors get into the
18 waste water stream?

19 A. I didn't say there was Aroclors in
20 the waste water, I said there was an effluent
21 stream. It was a water stream whose main
22 contaminant was HCl.

23 Q. Were Aroclors also in that stream?

24 MS. SIMERLY: Are you asking him
25 if at the time, he knew if there were

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1 Aroclors in that stream, or if, with
2 present-day knowledge in 1992, he understands
3 that there were Aroclors in addition to the
4 HCl in that stream?

5 MS. WELCH: I'm restricting the
6 time period. I think we'll walk through each
7 of the time periods so to be clear, from '61
8 to '63.

9 A. To my recollection, we didn't
10 know.

11 BY MS. WELCH:

12 Q. You didn't know that at the time?

13 A. We didn't consider it an issue at
14 the time.

15 Q. Did that become an issue at some
16 time in the future?

17 A. Oh, sure.

18 Q. Approximately when did that become
19 an issue?

20 A. Oh, approximately 1968 or '69.

21 Q. And at the time that that became
22 an issue in '68 or '69 that was with
23 reference to the Anniston plant?

24 A. Well, I was not at the Anniston
25 plant at that time, and in fact, had very

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1 little involvement with, with Aroclors at
2 that time, but it's my understanding that
3 that's when the concern arose.

4 Q. Do you know how the Aroclors got
5 into the waste water stream, and people
6 became aware of it?

7 A. Based upon later knowledge, yes.

8 Q. Can you explain that to me?

9 A. There's a by-product from making
10 Aroclor, a by-product -- the immediate
11 by-product is HCl gas, and the normal
12 disposition of the HCl gas was to absorb it
13 in water, which forms muriatic acid, which is
14 an article of commerce and we would sell that
15 muriatic acid. Its absorption was not
16 perfect, and so there was a small amount of
17 HCl left in tail gas from absorption. That
18 water was scrubbed with water (sic) and that
19 water was discharged to the sewer. There
20 was, it turns out, a small amount of Aroclor
21 in that tail gas stream.

22 Q. So that was in the normal course
23 of business that that occurred or the normal
24 course of production that those kind of
25 things occurred?

1 A. Yes.

2 Q. Did any leaks in the equipment
3 cause Aroclors to get into the waste water
4 stream?

5 A. Not directly. If equipment
6 leaked, it would leak on to the floor, of
7 course. Aroclors are very viscous liquids,
8 some of them are solids at room temperature
9 and they simply make a sticky mess on the
10 floor, they don't flow to a sewer, so that
11 the -- if any did get to a waste water stream
12 it would be because of rain before we were
13 able to clean it up. And even then that
14 would be very small because it's not very
15 soluble in water.

16 Q. Back to the time period of '61 to
17 '63, did you have any understanding relevant
18 to that time that you should be concerned
19 that PCBs got outside the plant?

20 A. I'm not sure -- well, we shipped
21 it all.

22 Q. I'm talking about effluent.
23 Should you be concerned about PCB effluent at
24 that point?

25 A. Nothing specific to PCBs. It was

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1 generally known that one should minimize the
2 loss of materials to the sewer.

3 Q. Okay, what happened in 1963? What
4 was your next job?

5 A. I was transferred to the Krummrich
6 plant in Illinois.

7 Q. What was your job there?

8 A. My first assignment was as a
9 supervising engineer in the Technical
10 Services Department.

11 Q. What were your job
12 responsibilities?

13 A. I had a small group of engineers
14 and we were responsible for process
15 improvements in a certain group of assigned
16 departments.

17 Q. Did you work with Aroclors at that
18 point?

19 A. Yes, during my time at the
20 Krummrich plant.

21 Q. How long were you at the Krummrich
22 plant?

23 A. Two years, I think.

24 Q. What do you mean by process
25 improvement?

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1 A. Let me, let me think about that
2 for a second. No, it was longer than that;
3 it was three or four years.

4 Q. So until approximately 1966?

5 A. '67, I think.

6 Q. '64 to '67?

7 A. Something like that.

8 Q. What did you mean when you said
9 process improvement?

10 A. We would make improvements in
11 production capacity, product quality, various
12 economic things like raw material
13 consumption, some projects in pollution
14 control.

15 Q. Could you give me an example of
16 what an improvement in process capacity would
17 include?

18 A. Typically, the plant, plant
19 projects for improving capacity would be
20 so-called debottlenecking projects; that is,
21 finding the restriction that held back the
22 capacity and making a small engineering
23 change to do something about that.

24 Q. So in other words, making the
25 plant more efficient?

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1 A. Right.

2 Q. Okay. When you mentioned
3 pollution control, what were your
4 responsibilities in that area?

5 A. We worked on an assignment basis
6 where the production people would propose
7 projects for improvements to meet whatever
8 particular goals they had so that if there
9 was a pollution problem in one of the
10 operating departments, they would write up a
11 work request and we would study the problem
12 and propose changes to the plant to, to
13 correct the problem.

14 Q. Were you particularly concerned at
15 this time about pollution from Aroclors, '64
16 to '67?

17 A. No. There was -- I don't remember
18 from that time any specific emphasis on
19 Aroclor pollution.

20 Q. During this time, '64 to '67 at
21 the Krummrich plant, were you or did you ever
22 gain any knowledge that exposure to Aroclors
23 could lead to chloracne?

24 A. Not that I recall.

25 Q. During this time, did you ever

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1 receive any information that exposure to
2 Aroclors could lead to liver damage?

3 A. No.

4 Q. Did you ever receive any
5 information that exposure to Aroclors could
6 lead to liver atrophy?

7 A. No.

8 Q. Okay, who did you report to during
9 this period?

10 A. First, Bill Taffee, T-a-f-f-e-e,
11 then, due to various reorganizations, John
12 Mullendore, M-u-l-l-e-n-d-o-r-e, then Bill
13 Wilson, and finally, Homer Carder,
14 C-a-r-d-e-r.

15 Q. What happened in 1967?

16 A. I was transferred to the Queeny
17 plant.

18 Q. Where is the Queeny plant?

19 A. South 2nd Street here in St.
20 Louis.

21 Q. What was your job title?

22 A. I was general superintendent of
23 Technical Services and laboratory.

24 Q. What were your job
25 responsibilities?

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1 A. Part of it was similar to what I
2 had done at the Krummrich plant only with a
3 larger scope. I had a total of about 80
4 engineers, but I also had the analytical
5 laboratory which was responsible for process
6 control analysis.

7 Q. What is process control analysis?

8 A. In operating chemical process,
9 samples are taken to either determine the
10 quality of the finished product or to track
11 the performance of the process. Samples are
12 taken to the laboratory, the laboratory runs
13 an analysis and reports it back to the
14 production department.

15 Q. Do you know if the, the process
16 control or the analytical people had use of a
17 gas chromatography at that time?

18 A. Certainly. It was a standard
19 tool.

20 Q. Are you familiar with one, a gas
21 chromatograph?

22 A. I'm generally familiar with it.

23 Q. When did it first become
24 available, to your knowledge?

25 A. I don't know. At the time, for

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1 instance, that I went to the Anniston plant,
2 gas chromatography was already being used for
3 some things.

4 Q. And what was it being used for?

5 A. All kinds of analysis.

6 Q. Was it used to analyze the
7 Aroclors?

8 A. Not at the time I was at Anniston.

9 Q. Was it at the time you were at
10 Krummrich?

11 A. Probably not. I don't remember.

12 Q. How about when you went to Queeny?

13 A. Well, at Queeny, I had almost
14 nothing to do with Aroclors so I wouldn't
15 know.

16 Q. What were your responsibilities at
17 Queeny? For what products, rather?

18 A. Well, the Queeny plant still had
19 more than a hundred products, and our
20 department had the responsibility for
21 technical improvements in all of those.

22 Q. You say you weren't -- you had no
23 responsibility or little responsibility for
24 Aroclor. Did you have any responsibility for
25 Aroclor during this time at Queeny?

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1 A. Well, Aroclors were processed in
2 one operation at the Queeny plant at that
3 time. We had an operation called central
4 drumming which did blending operations to
5 make a number of different things and some of
6 those were blends that contained Aroclor.

7 Q. Now, I know that there are various
8 Aroclors. For instance, there's Aroclor
9 1221, Aroclor 1232, Aroclor 1242, and then
10 there are products like the Pydrauls, like
11 Turbinol, and my understanding is that they
12 consist of, or the products consist of blends
13 of various Aroclors. Is that correct?

14 MS. SIMERLY: Exclusively, or --

15 MS. WELCH: No, not exclusively,
16 but they consist of --

17 A. That's true, arochlors were sold
18 per se, and also in various blended products.
19 BY MS. WELCH:

20 Q. Okay, where was the blending
21 primarily done? Which plant?

22 A. The blending of products
23 containing Aroclor?

24 Q. Yes. Were they done at all the
25 plants or were they done at one particular

1 plant?

2 A. At I recall it, there were
3 actually four different plants where Aroclors
4 were blended. We did some blends at
5 Anniston, we did some at Krummrich, we did
6 some at Queeny and we did some at Newport.

7 Q. If I used the product terms MCS
8 153 or Turbinol 153, do you know what I'm
9 talking about?

10 A. Generally.

11 Q. Okay, where was that blended?

12 A. I don't remember.

13 Q. Where was Aroclor 1242 made during
14 this period in the 1960's?

15 A. Both Anniston and Krummrich, and
16 at Newport.

17 Q. How long did you stay at the
18 Queeny plant?

19 A. Three years.

20 Q. In the same position?

21 A. Yes.

22 Q. So that will take us up to about
23 1970?

24 A. Right.

25 Q. And earlier you said that during

1 this time period, you became aware of a
2 concern, a special concern about PCB
3 pollution and PCB effluent?

4 A. That's right.

5 Q. How did you become aware of that
6 concern?

7 A. I'm not sure where I first heard.
8 The only vivid memory I have is an article
9 that appeared in Scientific American Magazine
10 by Dr. Risebrough where he described some
11 work that he had done originally related to
12 DDT but which identified PCB as a problem.

13 Q. What was the problem that was
14 described, as you recall?

15 A. He was studying reproductive
16 problems in peregrine falcons, as I recall.

17 Q. And what do you recall that he
18 found?

19 A. He was analyzing tissue to try to
20 identify the chromatographic fingerprint of
21 DDT. This is a long time ago, but as I
22 recall, what he found instead was a somewhat
23 different fingerprint which he eventually
24 determined was PCB.

25 Q. What was your reaction when you

1 read the article?

2 A. Surprise.

3 Q. Why surprise?

4 A. Well, simply because it was a
5 product that I was somewhat familiar with and
6 had never heard of any, any problem with it
7 before.

8 Q. And did you have any discussions
9 with anybody at Monsanto about this article?

10 A. Well, I did at some time but I
11 don't know whether I immediately had any
12 discussion with anybody.

13 Q. Did Dr. Risebrough's article raise
14 concerns in your mind about what he had
15 found?

16 A. Yes.

17 Q. Why was that?

18 A. Well, of course, on hearing of
19 something like that, a scientific subject for
20 the first time, I wasn't sure whether it was
21 true or not, but if it was true, it obviously
22 had implications for, for the product that we
23 made.

24 Q. Did you bring that article to
25 anybody's attention at the time?

1 A. No, that wasn't necessary. It was
2 well known.

3 Q. Do you subscribe to Scientific
4 American?

5 A. Yes. I have for forty years.

6 Q. So you didn't get it from
7 Monsanto, you got it through a subscription?

8 A. I just happened to read it.

9 Q. Anything else that you can recall
10 from that time period that raised concern for
11 you about PCB effluents or pollution?

12 A. Well, yes. At some, some time
13 during my time at Queeny, we began to get
14 instructions from, from the general office to
15 begin analytical efforts to find out whether
16 we had any PCB effluent from the Queeny
17 plant.

18 Q. Who in the general office gave you
19 those instructions?

20 A. I don't remember.

21 Q. And what did you do when you got
22 those instructions?

23 A. Well, the pollution control people
24 worked for me, so I simply passed it along.

25 Q. Do you know what they did?

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1 A. I don't remember.

2 Q. What happened in 1970?

3 A. I was transferred to the general

4 office, became manufacturing manager.

5 Q. How long did you stay in that

6 position?

7 A. Five years.

8 Q. So from '70 to '75, you were --

9 A. Manufacturing manager.

10 Q. Manufacturing. And did that place

11 you on any management committees at Monsanto?

12 A. Well, I was part of the management

13 team in the Specialty Products Business

14 Group.

15 Q. What did specialty products

16 include?

17 A. Well, Aroclor, Skydrol, which is

18 an aircraft hydraulic fluid, I think part of

19 the time it included paper chemicals, and a

20 number of other products.

21 Q. What were your responsibilities as

22 manufacturing manager?

23 A. It was a staff-type position in

24 that the manufacturing at the plants did not

25 report directly to me, but I had

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1 responsibility for seeing to the
2 manufacturing interests of all the products
3 of the business group.

4 Q. And what did that include?

5 A. Production schedules, capital
6 projects, pollution issues, quality, cost.

7 Q. Did that include assessment of
8 inventories?

9 A. Could you rephrase that? I don't
10 know what you mean by "assessment."

11 Q. Well, were you aware, as a
12 manufacturing manager, of the level of
13 inventory of the various products? Would
14 that be one of your responsibilities?

15 A. It was one of my responsibilities
16 but it was not a matter where I would be
17 intimately aware of or familiar with. There
18 were some other people who saw to the details
19 of inventory.

20 Q. How about production forecasts?
21 Were you responsible for that?

22 A. Yes.

23 Q. For all of the Aroclor products?

24 A. Let me, let me modify that. The
25 production plan was derived from a sales

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1 forecast that came from the marketing
2 department, and we had a group of people
3 whose job was production planning so they
4 would translate the market forecast to a
5 production plan and I was responsible for
6 seeing that the plants carried out the
7 production plan.

8 Q. So you had an oversight
9 responsibility over the production plan?

10 A. Right.

11 Q. And you had a responsibility of
12 interfacing with the plants to make sure that
13 they carried that out?

14 A. That's right.

15 Q. Who did you report to during this
16 time?

17 A. At the beginning, I reported to
18 Fred Holzapfel who was director of
19 manufacturing. That's H-o-l-z-a-p-f-e-l.

20 Q. And did that change later?

21 A. Yes. It was a kind of matrix
22 organization and I, at the beginning, had a
23 dotted line relationship to Howard Bergen who
24 was the business director and then after a
25 couple of years that dotted line was made

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1 solid.

2 Q. Did that last till 1975?

3 A. Right.

4 Q. Who reported to you during this
5 period of time?

6 A. I didn't have any direct reports.
7 It was all dotted-line relationships to
8 various people at the plants.

9 Q. At all of the Monsanto plants?

10 A. At all of the plants that made
11 products for our business group.

12 Q. And which plants were those?

13 A. Anniston, Krummrich, Newport, some
14 operations at some -- Delaware River in New
15 Jersey, there was a plant near Boston, one
16 near Montreal. I'm sure I've skipped some
17 but there were quite a few.

18 Q. Okay.

19 A. Nitro, best Virginia.

20 Q. Which plants made Aroclors?

21 A. Same ones. Anniston, Krummrich,
22 Newport.

23 Q. How about a plant by the name of
24 Sauget?

25 A. Sauget, Illinois, is the name of

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1 the town where the Krummrich plant is
2 located.

3 Q. Okay. Going back to the time when
4 you first became involved with the production
5 of Aroclors, which was, I guess, '61 to '63,
6 is that correct? Were you provided with any
7 information that described the manufacture of
8 Aroclors?

9 A. Certainly.

10 Q. I want to show you a document
11 and --

12 MS. WELCH: Off the record for a
13 minute.

14 (Discussion off the record.)

15 MS. WELCH: I'm going to introduce
16 this exhibit as Exhibit 427. It is a
17 multipage document that is entitled "Monsanto
18 Company, Aroclors, Department 246" process
19 description from the manufacturers of
20 Aroclors dated December 17, 1962 and it says,
21 "Issued 7/20/64." Bates stamp numbers are
22 TRAN 009192 to 009324. And could you please
23 mark this and show it to the witness.

24 (Plaintiff's Deposition

25 Exhibit 427 marked for

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

identification.)

BY MS. WELCH:

Q. Now, I note, here, Mr. Savage, that your name is not on this document, but do you recall ever seeing this document?

A. I've seen lots of such documents. I just don't know as to whether I've seen this particular one, I don't know.

Q. What do you mean by lots of such documents?

A. The standard manufacturing process was a standard format that was used across the entire chemicals division, and it was our policy that we would have such a document for every one of our operations.

Q. The date that this was issued, July 20th, 1964, where were you at that time? What plant, in your job history?

A. I would be, I would be at the Krummrich plant at that time.

Q. Okay, so you may have seen this particular document or a document like it?

A. It's quite possible.

Q. Okay. I'd like you to turn to TRAN 009208. There are numbers at the

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1 bottom.

2 There's a line at the bottom of
3 this page that I'd like to get your insight
4 on.

5 This is a synopsis of process and
6 I assume that it's the process of the
7 manufacture of Aroclor. Is that correct? Am
8 I correct?

9 A. That's correct.

10 Q. Okay, there's a line which says
11 "many isomers are formed."

12 A. Right.

13 Q. Okay. What does that mean?

14 A. Well, you'll observe in the
15 schematic representation below there, a
16 picture of a biphenyl molecule which is two
17 hexagons connected together. There are five
18 corners of each hexagon that are not occupied
19 in this diagram, meaning that there are ten
20 different sites on that molecule that would
21 be chlorinated. And in fact, there is some
22 probability that each one of them will be
23 chlorinated so that when the chlorination
24 proceeds, the first chlorine will go on one
25 of those ten spots, the second will go on

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1 another, and there are actually hundreds of
2 combinations by which the chlorines can
3 occupy the various active sites on the
4 molecule and all of them happen to some
5 extent.

6 Q. Okay. Do the different Aroclors,
7 for instance, the Aroclor 1242 versus the
8 Aroclor 1221, have a different composition of
9 isomers?

10 A. Certainly.

11 Q. Why do you say "certainly"?

12 A. The more chlorines that are added
13 to the molecule, the more possibilities there
14 are for different combinations, and so while
15 comparing 1221, did you say 1221 and --

16 Q. 1242.

17 A. 42? Each one of them would
18 probably contain the same total set of
19 isomers. The relative abundance would
20 drastically change as more chlorine was
21 added.

22 Q. By relative abundance, you mean
23 the abundance of the higher-chlorinated
24 isomers?

25 A. Yes.

1 Q. Okay, by higher-chlorinated, what
2 do you mean by higher -- I said higher-
3 chlorinated. What does that mean to you?

4 A. Well, again with reference to the
5 diagram, just the number of those positions
6 that are occupied, and on the average, 1242
7 has three of those positions occupied.

8 Q. And what does that mean?

9 A. Well, some molecules will have
10 fewer and some will have more, but even with
11 three occupied, there are many possible
12 combinations of those different positions.

13 Q. Okay. Have you ever heard of the
14 term, the terms "pentachlorinated biphenyl"
15 or "hexachlorinated biphenyl," for instance?

16 A. I don't know if I've heard those
17 terms or not, but they mean something.

18 Q. Okay. How about the term five
19 chlorine atoms or six chlorine atoms. Is
20 that with reference to what you are talking
21 about?

22 A. Right, but it's -- if you are
23 referring to a specific Aroclor product,
24 that's just the average. All of the
25 different species are still present.

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1 Q. Okay. So 1221 would include
2 chlorine atoms 1 through 10? But in
3 different percentages than a 1242; is that
4 what you are telling me?

5 A. Yes, but there's a need for a
6 little perspective. The ten chlorinated
7 molecule is very rare and probably would be
8 hard to find analytically, whereas the lower
9 ones are much more common.

10 Q. What do you consider lower
11 chlorinated when you say the lower ones are
12 more common: Six and below, five and below?

13 A. Well, it depends on the Aroclor
14 product. In the case, for instance, of 1242,
15 the three-chlorine predominates, but it's not
16 the only thing there.

17 Q. What else is there?

18 A. Again, all of the possibilities.

19 Q. Okay. Do you know if gas
20 chromatography was being used as of 1964 to
21 analyze the Aroclors?

22 A. No, I don't know.

23 Q. Okay. Were you aware in 1964 when
24 this document was produced, of the existence
25 of various isomers in 1242?

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1 A. Certainly.

2 Q. Were you aware that 1242 contained
3 mostly the three chlorinated isomers at that
4 time?

5 A. Not mostly. There's more of that
6 than anything else, but --

7 Q. Okay.

8 A. But certainly, that was known.

9 Q. Okay. Were you aware at the time
10 that it contained some percentage of
11 five-chlorinated isomers?

12 A. I don't think -- I can't remember
13 that point having been raised, but it's --
14 that's generally the pattern you would
15 expect.

16 Q. Why is that generally the pattern
17 you would expect?

18 A. Because of the nature of this kind
19 of a chlorination, it's just to be expected
20 that all these different isomers will form in
21 some relative abundance, and in fact, the
22 physical properties of the product are what
23 they are because it's a mixture. The fact
24 that it's a mixture is desirable.

25 Q. Okay. Maybe you can explain to me

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1 the nature of the process of making an
2 Aroclor, in terms that even I can understand,
3 if possible.

4 A. It's a very simple process.

5 MS. SIMERLY: If you are a
6 chemical engineer.

7 A. Biphenyl is a waxy solid under
8 room temperature conditions. It's easy to
9 melt, it's reasonably fluid when it's melted,
10 and chlorination takes -- doesn't take place
11 at all anymore but when it did, it took place
12 in vertical tanks which were packed with
13 steel turnings, iron chloride is the
14 catalyst, and the way we insured that there
15 was plenty of iron chloride present was to
16 pack the chlorinator with steel turnings
17 which, in fact, were scrap from a
18 manufacturer of railroad car wheels. So the
19 tank was packed with these iron turnings, the
20 tank would be filled with molten biphenyl to
21 which a small amount of additional ferric
22 chloride had been added, and then chlorine
23 would be bubbled through that mass of
24 biphenyl from the bottom, and we would
25 continue to add chlorine until the average

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1 chlorination level reached the point that we
2 wanted. The reaction proceeded vigorously in
3 the presence of the catalyst. By the time
4 the bubbles got to the top of the
5 chlorinator, they were no longer chlorine,
6 they were CHL (sic). That, the product of
7 that step was crude Aroclor, which then would
8 have to be cleaned up and refined.

9 BY MS. WELCH:

10 Q. Now, earlier you said that the
11 nature of the process leads to the
12 development of many isomers. Am I correctly
13 characterizing what you said?

14 A. That's right.

15 Q. What in the process leads to the
16 development of many isomers?

17 A. That's more difficult.

18 Q. Oh, no. I guess I asked for it.

19 MS. SIMERLY: We're all in trouble
20 now.

21 A. This is Organic Chemistry 101.

22 BY MS. WELCH:

23 Q. I flunked that.

24 A. I nearly did.

25 MS. SIMERLY: I never took it.

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1 MS. WELCH: Off the record.

2 (Discussion off the record.)

3 MS. WELCH: Back on the record.

4 A. In the presence of a ferric
5 chloride catalyst, the, what I've described
6 as the corners in this diagram, the
7 convention in drawing that kind of a picture
8 of a molecule is each corner actually is a
9 carbon atom, and in the presence of that kind
10 of catalyst, those carbon atoms become more
11 reactive, and a chlorine molecule will react
12 with the carbon. Each of those carbons
13 starts out with a hydrogen attached to it,
14 the hydrogen leaves and is replaced by a
15 chlorine. The hydrogen and the other half of
16 the chlorine molecule become HCl. Now, in
17 the presence of catalyst, all ten of those
18 atoms have become activated to where they can
19 react and which one reacts is a matter of
20 probability. Some of them are probable to
21 react because of matters of geometry and
22 where the electrons are, and so forth, but
23 they all have some probability of reacting
24 and so the outcome is entirely a matter of
25 probabilities. Because there are a huge

1 number of molecules involved, it always comes
2 out the same, but it's a matter of
3 probabilities.

4 BY MS. WELCH:

5 Q. Okay, but a 1242 will always, one
6 batch of 1242, would you say, would always
7 have generally the same composition of
8 isomers as the next batch of 1242?

9 A. That's certainly true.

10 Q. And it would have approximately
11 the same percentage of chlorinated biphenyls?

12 A. Yes, from the standpoint of
13 product quality, we try to be very consistent
14 from batch to batch.

15 Q. And how did you test that
16 consistency, at this time?

17 A. There were both in-process
18 controls and laboratory controls. The
19 in-plant controls, in-process controls were
20 relatively simple. We determined the level
21 of chlorination by determining the specific
22 gravity of the crude Aroclor, because the
23 specific gravity increased rapidly as
24 chlorine was added, so we could determine
25 pretty precisely the correct end point. But

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1 then there were, there was a large battery of
2 tests performed in the analytical laboratory
3 to be sure that the product passed the
4 specifications of the customers.

5 Q. And what tests did those include?

6 A. I'm sure I don't remember all of
7 them at this point. The Aroclors were used
8 in different kinds of applications and so
9 there were different specifications for
10 different applications. The most demanding
11 specifications were for the electrical
12 applications, where a very high purity was
13 necessary in order to get good electrical
14 performance from the apparatus that the
15 Aroclor was used in, so we attempted to make
16 all of our product to electrical
17 specifications because we were sure that
18 then, it would also be okay for other
19 applications.

20 Q. Did the end process controls or
21 the lab controls that you describe enable you
22 to determine what percentage of chlorine
23 atoms were in each batch?

24 A. No.

25 Q. Were there any tests that enabled

1 you to determine that at that time that were
2 used?

3 MS. SIMERLY: Are you asking him
4 if he knows what that --

5 THE WITNESS: I'm not sure what
6 time we're talking about.

7 MS. WELCH: We're talking about
8 around '64, I'm talking about around the time
9 period of this document.

10 MS. SIMERLY: And are you asking
11 if he knows if the testing could do that, or
12 if the testing was used for that?

13 MS. WELCH: Let me clear it up.

14 BY MS. WELCH:

15 Q. What I'm asking is, earlier you
16 testified that you knew at this time or it
17 was generally known at this time, and you
18 knew that any particular Aroclor would
19 include a whole range of isomers.

20 A. That's right.

21 Q. And now my question to you is,
22 when you determined the quality of a
23 particular batch of, say, 1242, was part of
24 that to determine the composition of isomers?

25 A. No.

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1 Q. Why not?

2 A. First, because that wasn't subject
3 to direct control. If we ran the process
4 consistently, we could expect that it would
5 come out reasonably the same, but the other
6 reason was simply that that was a very
7 complicated subject. If the chromatographic
8 methods at the time had been applied, it
9 would have come out with such a complex
10 output that it would have been very
11 difficult, from the standpoint of plant
12 control, to attach any meaning to the
13 results.

14 Q. Do you know at what point in time
15 the chromatographic methods became able to
16 analyze the isometric composition of a
17 particular Aroclor?

18 A. No, I don't know.

19 Q. How, then, did you know the
20 particular isometric composition of an
21 Aroclor at that time?

22 A. We didn't, really. We knew that
23 there was a wide variety of isomers present,
24 but we didn't, we didn't ever know precisely
25 what the isomer's distribution was in those

1 days.

2 Q. Did you know which isomers were
3 present?

4 A. Well, again, we were pretty sure
5 they were all present, but some in very small
6 quantities.

7 Q. Okay, earlier you testified that a
8 mixture was desirable in a particular
9 Aroclor. Why is that?

10 A. Because the products were used as
11 fluids, and materials with molecular weights
12 this high would be crystallin if they were
13 pure, and therefore, would not be useful
14 fluids.

15 Q. So is that a matter of viscosity?

16 A. Well, it's more than viscosity.
17 It's -- crystallin means solid chunks.

18 Q. So it's desirable to have the
19 presence of many isomers in order to make the
20 product liquid; is that correct?

21 A. That's correct.

22 Q. Okay. In this document, I'd like
23 you to turn to the page that's stamped TRAN
24 0029291, which is Page 46 of the document.
25 Under Appendix J --

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 MS. WELCH: Are we on the same
2 page?
3 MS. SIMERLY: Yes.
4 BY MS. WELCH:
5 Q. Where it says, "Other hazards"?
6 A. Mm-hmm.
7 Q. Are we on the same page?
8 A. Right.
9 Q. Please read that to yourself, that
10 one paragraph.
11 A. Pardon me?
12 Q. Please read that to yourself, the
13 one paragraph.
14 A. The first paragraph?
15 Q. Yes.
16 A. It says "Other hazards, this
17 material --"
18 Q. Just read it to yourself. I'm
19 going to ask you some questions about it.
20 (Witness peruses said
21 document.)
22 BY MS. WELCH:
23 Q. Do you recall ever seeing this
24 paragraph during that time period?
25 A. No, I don't remember.

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1 Q. So you never read anywhere that
2 the material could cause a dermatitis,
3 systematic poisoning from the fumes or yellow
4 atrophy of the liver?

5 A. I don't remember.

6 Q. In terms of the specific Aroclors,
7 is the 1242 that's used in one product, for
8 example, Pydraul, different from the 1242
9 that's used in another product, for instance,
10 Turbinol?

11 A. No.

12 Q. So the difference comes in with
13 the other materials that it's blended with?

14 A. The difference is the reason that
15 Turbinol is different than other materials is
16 because every what's in the blend. That's
17 right.

18 Q. So the 1242 that's used in
19 dielectrics or in plasticizers is the same
20 1242 that's put into Turbinol, just blended
21 with different materials to produce the
22 product.

23 A. It's made in the same way. The
24 specifications may be a little different.

25 Q. The 1242?

1 A. Right.

2 Q. Which specifications would be
3 different?

4 A. Well, as we mentioned before, the
5 most stringent specifications were those for
6 electrical products. We essentially operated
7 to satisfy the electrical specification so
8 that the material could be used in any of the
9 applications, but those specifications didn't
10 really apply if the material was used in some
11 other way.

12 Q. Okay, but the material would start
13 out the same, then there would be more
14 specifications for the electric applications?

15 A. Well, as I said, there were more
16 specifications for electrical grade but we,
17 our normal procedure was simply run it
18 against electrical specifications so that we
19 didn't have to keep track of different
20 inventories.

21 Q. Okay. To your knowledge, was the
22 manufacturing process for Aroclors a trade
23 secret?

24 A. Yes.

25 Q. Why was that?

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1 A. All of our processes are trade
2 secrets.

3 Q. Was there a patent on the
4 Aroclors?

5 A. No.

6 Q. Do you know why?

7 A. There might have been some patents
8 a long time ago but the product had been made
9 since the Thirties, so they would have
10 expired long before this time.

11 Q. So your understanding, it was
12 because it was in the public domain or just
13 that the patents had expired?

14 A. I'm not sure there ever were any
15 patents.

16 Q. Was Monsanto concerned with
17 competitors getting ahold of the technology
18 to make Aroclors?

19 A. Well, just as a general policy, we
20 were concerned about competitors getting hold
21 of technology to make any product and we
22 would always have security measures.

23 Q. What did those security measures
24 consist of?

25 A. Well, as you can see, this

1 document is marked "Company Confidential."
2 We
3 had some strict procedures which would
4 control the release of any company
5 confidential information to anybody outside
6 the company, we had security measures to
7 control access to the plant and to our
8 offices and laboratories.

9 Q. In terms of 1242, was it used in
10 many products?

11 A. Yes.

12 Q. Was it the predominant kind of
13 Aroclor that was in production during the
14 time period that you are familiar with?

15 A. We made more 1242 than any other
16 Aroclor.

17 Q. Where was 1242 made?

18 A. Anniston, Krummrich and Newport.

19 Q. Where were products that contained
20 1242 blended?

21 A. Anniston, Krummrich, Newport,
22 Queeny.

23 MS. WELCH: I'd like to have this
24 marked as Exhibit 428, and I'm showing a copy
25 to counsel for Monsanto. Exhibit 428 is a

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 one-page document with the identifying figure
2 of TRAN 055800 that's entitled "Work proposal
3 WGK plant Technical Services," and Mr. Savage
4 is cc:'d on this document.

5 (Plaintiff's Deposition
6 Exhibit 428 marked for
7 identification.)

8 (Witness peruses said
9 document.)

10 BY MS. WELCH:

11 Q. Have you read the document?

12 A. Yes.

13 Q. Okay. WGK stand for Krummrich
14 plant?

15 A. Yes.

16 Q. And were you at a Krummrich plant
17 in 1965?

18 A. Yes.

19 Q. Do you remember concern about
20 fumes from Aroclor at this time?

21 MS. SIMERLY: I'm going to object.
22 There is absolutely nothing on -- oh, excuse
23 me. I didn't see the Aroclor designation.
24 Excuse me. I'll withdraw the objection.

25 MS. WELCH: Okay.

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1 BY MS. WELCH:

2 Q. Do you need the question read rack
3 back?

4 A. Pardon me?

5 Q. Do you need the question read
6 back?

7 A. Yes, please.

8 THE COURT REPORTER:

9 "Q. Do you remember concern about
10 fumes from Aroclor at this time?"

11 A. I remember the problem that this
12 document refers to.

13 BY MS. WELCH:

14 Q. Okay, can you describe for me that
15 problem?

16 A. In disposing of still bottoms from
17 the distillation of Aroclor, it was necessary
18 to package the tarry still bottoms and since
19 this material was very hot, some fumes came
20 off which were unpleasant to the people doing
21 the work.

22 Q. I note, here, that it also says
23 "Leaks from pumps"?

24 A. Yes, it says that.

25 Q. Okay, do you remember what pumps

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1 they are talking about, here?

2 A. No.

3 Q. Do you remember what the
4 complaints about the fumes were?

5 A. Not in any, anymore detail than
6 what you see there.

7 Q. What was done to correct the
8 problem?

9 A. We did a small improvement project
10 to make the drumming of the still bottoms
11 easier and more remote from the operators.
12 It did include a fume hood.

13 Q. Have you ever or did you hear in
14 the 1968-1969 time period in addition to the
15 Risebrough report, any reports from Swedish
16 scientists about PCBs in the environment?

17 A. I didn't hear anything during that
18 time period, no.

19 Q. Did you hear later about reports
20 from Swedish scientists about persistence in
21 the environment?

22 A. Yes.

23 Q. What time period, approximately?

24 A. During my time as manufacturing
25 manager. I don't know exactly when.

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1 Q. So after 1970?

2 A. Right.

3 Q. Okay.

4 MS. WELCH: I'd like to have this
5 marked as Exhibit 429. I'm showing a copy to
6 counsel for Monsanto. This is a multipage
7 document that has the identifying stamp of
8 TRAN 058842 to 058845. It's dated 9/22/69
9 and the title of it is "Water Pollution
10 Aroclor Control."

11 (Plaintiff's Deposition
12 Exhibit 429 marked for
13 identification.)

14 MS. SIMERLY: Just for the record,
15 I would note that this document doesn't have
16 a check by Mr. Savage's name, and my
17 understanding is that that would indicate
18 that it was not, in fact, routed to him.

19 MS. WELCH: Well, I want to get
20 his testimony about it, rather than your
21 testimony about it. That's the first
22 question I was going to ask him, which is, --
23 what does the check marks mean by the names?

24 A. This is a standard cover, cover
25 sheet that was used for all progress reports.

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1 This was in 1969, so I was already at the
2 Queeny plant, and so over in the right-hand
3 column, there is a standard distribution for
4 other locations, and I'm -- it's hard to
5 read, but I'm listed under JFQ. If I was to
6 receive a copy, there would have been a check
7 in that box, and there is not.

8 BY MS. WELCH:

9 Q. So it's your belief that you did
10 not receive a copy of this?

11 A. I would not have been included in
12 the original distribution. I have no way of
13 knowing whether I might have later seen it.

14 Q. Okay. I'd like you just to turn
15 to the background page, or the second page,
16 which says "Background," and I want to ask
17 you questions about that paragraph, with it
18 duly noted that you are not checked off on
19 here, so you may not have seen this document.
20 Okay?

21 (Witness peruses said
22 document.)

23 A. Okay.

24 Q. Okay, do you recall concern at
25 this time, which is September 1969, that PCBs

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1 would not degrade?

2 A. Well, by 1969, of course, I had
3 already seen the Risebrough article and we
4 had, also at the Queeny plant, received some
5 instructions from the general office to do
6 some sampling and determine whether we had
7 any, any Aroclor losses at the Queeny plant,
8 so yes, I was aware by then of the
9 sensitivity of the subject.

10 Q. Do you remember, besides the --
11 you testified earlier that you read the
12 Risebrough report. Do you remember other
13 concern that Aroclors would be hazardous to
14 wildlife and birds?

15 A. Not at that time.

16 Q. Were you involved in any meetings
17 about this issue during this time period,
18 September 1969, before you became
19 manufacturing manager?

20 A. Quite possibly, but I don't
21 remember.

22 MS. WELCH: Please mark this as
23 Exhibit 430. I'm showing a copy to counsel
24 for Monsanto. This is a one-page document
25 with the identifying figure of TRAN 059631,

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1 entitled "PR&D Work Plan," dated April 27th,
2 1970. Mr. Savage is cc:'d, along with
3 numerous other people, and this is a document
4 that's authored by somebody by the name of
5 Ishmael Ransaw.

6 THE WITNESS: Right.

7 (Plaintiff's Deposition
8 Exhibit 430 marked for
9 identification.)

10 BY MS. WELCH:

11 Q. Okay, do you recall knowing about
12 this time, which is April 1970, that repeated
13 exposure to Aroclor could cause a condition
14 of chloracne?

15 A. I don't remember.

16 Q. Who is Ishmael Ransaw?

17 A. Ishmael Ransaw was a chemist
18 working at the Anniston plant, process
19 improvements.

20 Q. And process improvements was to
21 increase efficiency in the production
22 process?

23 A. Actually, his main assignment, to
24 my recollection, is the work referred to in
25 this work plan, which was studies on

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1 absorption of Aroclors from waste water.

2 Q. And what does that mean?

3 A. He was attempting to, to work out
4 a waste treatment plant -- excuse me, a waste
5 treatment process which would remove any
6 trace of Aroclor from waste water.

7 Q. Do you know what happened to that
8 study?

9 A. It was carried much further than
10 the implicationss of this, of this plan.
11 This plan only speaks to ten man days, and in
12 fact, he spent a number of months working on
13 it, attempting to scale it up.

14 Q. Do you know what the conclusions
15 were?

16 A. The conclusion was that it was
17 technically feasible to remove Aroclors from
18 waste waters using at least some of these
19 schemes. We were not successful in
20 developing a process that would be considered
21 cost effective.

22 Q. So the process, any process that
23 he developed was never put to use?

24 A. As far as I know, it was never
25 implemented anywhere.

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1 MS. WELCH: Please mark this as
2 Exhibit 431. I'm showing a copy to counsel
3 for Monsanto, and this is, Exhibit 431 is a
4 one-page document with the identifying stamp
5 of TRAN 061773, dated December 7th, 1970. It
6 appears to be a document from
7 W. P. Papageorge to J. R. Savage.

8 (Plaintiff's Deposition
9 Exhibit 431 marked for
10 identification.)

11 A. Okay.

12 BY MS. WELCH:

13 Q. Okay, do you recall seeing this
14 document before?

15 A. I don't remember this specific
16 document.

17 Q. Do you remember the issue that's
18 raised here?

19 A. In general, yes.

20 Q. Okay, can you describe for me what
21 the issue was?

22 A. Well, Mr. Papageorge quotes the
23 waste water targets that had been set, and as
24 of the date of this memo, those targets had
25 not been satisfied, and it was his job, part

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1 of his job to pressure me to get these
2 problems solved as quickly as possible and
3 that's what he does here.

4 Q. What was his job?

5 A. I don't remember his job title,
6 but he was in charge of coordinating all the
7 efforts related to PCB issues.

8 Q. Was this level of detection of
9 PCBs high, to your mind?

10 MS. SIMERLY: Which level are you
11 talking about? Are you talking about the
12 Newport level, the Krummrich level, the
13 average of the levels that are cited in here.

14 BY MS. WELCH:

15 Q. Let's start with Newport. "246
16 ppb," is that parts per billion, "ppb"?

17 A. That's right.

18 Q. Is that a high level, to your
19 mind, for this time?

20 A. Well, 1400 ppb, in fact, is a --
21 excuse me. Is that --

22 Q. I'm looking at 246 first.

23 A. 246. That, in fact, is a very
24 tiny amount. We had set a very tough target,
25 very low concentrations that were, in fact,

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1 very difficult to measure, and as I recall,
2 the issues at this time, which was shortly
3 after I had become manufacturing manager, is
4 we, in fact, were having great difficulty
5 with our measurements and our sampling, the
6 samples that we were taking were not really
7 giving us valid results.

8 Q. Why were you having difficulty
9 measuring?

10 A. It's technically a very
11 challenging thing to do because waste water
12 typically has suspended solids contained in
13 it, and Aroclors are attracted to solids in
14 water, and therefore, to get an adequate
15 measurement, it's necessary to sample in a
16 way that precisely represents the amount of
17 solid present, and that's hard to do.

18 Q. Okay, what instruments were used?

19 A. The taking the samples did not
20 involve instruments, it involved arrangements
21 of tubing in pipes and so forth, so as to get
22 a sample in exactly the right way.

23 Q. But how were you able to measure
24 the level of PCB?

25 A. The samples would be periodically

1 taken to the laboratory and analyzed.

2 Q. And what would they be analyzed
3 with?

4 A. I don't remember; standard tool
5 would be a chromatograph, but I don't
6 remember that as a fact.

7 Q. Mr. Papageorge refers to the,
8 quote, "Seriousness of the PCB problem" in
9 his memo. What was your understanding as of
10 this time, which is December 1970, as to the
11 seriousness of the PCB problem?

12 A. It was the most urgent matter for
13 our business group to deal with, certainly.
14 Because it was clear that the nature of the
15 problem with wildlife was the entrance of
16 Aroclors into waste water streams, which
17 could then be subject to biomagnification to
18 the food chain, that we want to intercept in
19 any way in which Aroclor was getting out into
20 the water streams and the environment, and we
21 set about doing the best we could.

22 Q. Okay, have you ever heard of the
23 concept of vapor transport?

24 A. I'm not sure I know what it means
25 in those terms.

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1 Q. Have you ever heard that the
2 primary transport mechanism of PCBs is in the
3 vapor phase?

4 MS. SIMERLY: In waste streams?

5 MS. WELCH: No, no, I'm not
6 referring to waste streams, I'm just
7 referring to a transport mechanism.

8 A. That doesn't mean anything to me
9 without a context.

10 BY MS. WELCH:

11 Q. Okay, the reason I raise it is
12 that one of the articles that Dr. Risebrough
13 wrote during that time period analyzed the
14 transport mechanisms of PCBs, and he
15 concluded in 1970 that the primary transport
16 mechanism was through the vapor phase, and
17 I'm wondering whether you ever heard that
18 during this time period.

19 A. No.

20 Q. So your primary concern was with
21 waste water at that point?

22 A. That's right.

23 Q. What did you do in response to
24 this memo?

25 A. I don't know specifically. During

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1 all that period, we were working on this, on
2 this issue and continued to work on it.

3 Q. How did you get the level down,
4 how did you try to get the level down?

5 A. We did pretty well. Once we had
6 sampling methods that we could believe, that
7 we could get consistent results, we were then
8 able to continue the sampling program and
9 work our way upstream and identify the
10 sources in the process and correct those.

11 Q. And what were some of those
12 sources?

13 A. I'm sorry, I can't, I can't
14 remember very clearly. It was related to the
15 way we scrubbed off gas streams, but I don't
16 remember the details.

17 MS. WELCH: Okay, why don't we
18 take a break.

19 MS. SIMERLY: Sure.

20 MS. WELCH: Take a five,
21 ten-minute break.

22 (Recess)

23 MS. WELCH: Okay, back on the
24 record.

25 BY MS. WELCH:

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1 Q. Before we get into another
2 document, do you still work for Monsanto Mr.
3 Savage?

4 A. Yes.

5 Q. And what's your position
6 currently?

7 A. I'm called Director, Technology,
8 Licensing and Acquisition.

9 Q. And how long have you had that
10 position?

11 A. I've been in licensing since 1978,
12 although the title has changed from time to
13 time.

14 Q. From 1975 to 1978, what did you
15 do?

16 A. I was on some special assignments
17 involving personnel work.

18 Q. And as director of technology,
19 service and licensing, are you on any
20 management -- are you in a management
21 position at Monsanto?

22 A. That -- yeah, that would be
23 considered a management position.

24 Q. Are you in any management groups?

25 A. Well, I'm in the major subdivision

1 of Monsanto called the Chemical Group which
2 is about half the corporation. I'm inside
3 that group, and within that group there's
4 something called advance performance
5 materials and I'm part of that. My position
6 is the Vice-President, Technology, for the
7 Chemical Group.

8 MS. WELCH: Okay, I'd like to
9 introduce this document as Exhibit 432. This
10 is a three-page document which consists of an
11 excerpt from a deposition of James Richard
12 Savage in the United States of America versus
13 Outboard Marine Corporation.

14 (Plaintiff's Deposition
15 Exhibit 432 marked for
16 identification.)

17 BY MS. WELCH:

18 Q. Please take a few minutes to read
19 the excerpts. There's a two-page excerpt in
20 there.

21 (Witness peruses said
22 document.)

23 THE WITNESS: Okay.

24 BY MS. WELCH:

25 Q. Okay, was this one of the

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1 depositions that you were deposed in or one
2 of the cases you were deposed in, to your
3 recollection?

4 A. Yes, although I didn't recall it
5 until you brought this to my attention.

6 Q. Okay, and it's the United States
7 of America versus Outboard Marine Corporation
8 and Monsanto Company?

9 A. Yes.

10 Q. Okay, I'd like to have you --

11 MS. SIMERLY: Did you say "a
12 Monsanto Company" or "and Monsanto"?

13 MS. WELCH: And Monsanto Company.

14 MS. SIMERLY: I'm sorry, I thought
15 I heard you say "a Monsanto."

16 MS. WELCH: "And Monsanto."

17 BY MS. WELCH:

18 Q. Okay, I'd like to have you turn to
19 the page that's numbered 28 and 29, starting
20 from the question of Mr. Schink, which says,
21 "You are now talking about preventing
22 Aroclors from getting into the waste water,"
23 and the attorney who is asking the question
24 says "Yes," and could you read your response
25 now into the record?

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1 A. "I would say the principal
2 precaution was maintenance of equipment to
3 prevent leaks."

4 Q. And the next question was, "Were
5 there leaks in the equipment?" Your response
6 is "Sometimes," and the next question is,
7 "Would they occur during the normal course of
8 using the equipment," and your response was
9 "Yes."

10 The reason I'm showing you this
11 transcript now is, earlier you were looking
12 at the memo from Mr. Papageorge and you said
13 that you didn't recall what the steps you
14 took consisted of in reducing the possibility
15 of the PCBs getting into the waste water
16 rather, and I'm wondering if this refreshes
17 your recollection of any steps that were
18 taken during that time period.

19 A. Well, I'm sorry, I don't quite
20 understand the context of this excerpt, and I
21 don't know whether it refers to my time at
22 Anniston or later.

23 Q. Okay. Well, let's assume that it
24 refers to Anniston. Would this be an
25 accurate reflection of what steps you would

1 have taken to prevent Aroclors from getting
2 into the waste water?

3 MS. SIMERLY: I need to object.
4 First of all, you are asking him to assume
5 that this testimony relates to Anniston, and
6 I don't know, without checking my deposition
7 transcript, whether it does or not.

8 MS. WELCH: Well, I don't know
9 that it does or not, either. I'm going to
10 ask him about both because I want to know if
11 there was a difference between Anniston and
12 Krummrich.

13 MS. WELCH: Okay, maybe I can
14 clear this up because the next page in the
15 transcript, which I only have one copy of,
16 speaks of the Anniston plant, and I will have
17 this attached as 432-A.

18 You can mark that and show it to
19 the witness.

20 (Plaintiff's Deposition
21 Exhibit 432-A marked for
22 identification.)

23 MS. WELCH: Sorry for that
24 confusion, but I believe that this makes it
25 clear that it's talking about the effluent

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1 from the Anniston plant into the waste water,
2 so that's what the reference of leaks is to,
3 so actually, I'm going back to the Anniston
4 plant, which precedes Mr. Papageorge's memo.

5 MS. SIMERLY: So what you are
6 asking is if this testimony that he gave in
7 1982 with reference to the fact that on
8 occasion PCBs might get into the waste water
9 through leaks in equipment refreshes his
10 recollection as to whether in 1970, when he
11 was supervising attempts to keep PCBs out of
12 the waste water, whether one of the steps
13 that he took would have been with reference
14 to stopping leaks of the equipment?

15 MS. WELCH: That's correct, that's
16 my initial question. Thank you for the
17 clarification.

18 A. Well, I think I can connect this
19 answer to something I said earlier, that
20 Aroclors are very viscous, sticky materials,
21 sometimes solid, and that if there are leaks,
22 they wind up on the floor, they don't just
23 flow into a sewer.

24 BY MS. WELCH:

25 Q. Okay, how does that correspond to

1 this testimony, which says that the principal
2 precaution, as I understand it, and correct
3 me if I'm wrong, the principal precaution to
4 prevent Aroclors from getting into the water
5 waste was the prevention of leaks in
6 equipment?

7 A. Well, good maintenance practices
8 will either prevent leaks altogether or else
9 correct them very quickly and if that's done,
10 then there's nothing to clean up.

11 Q. Okay, but how does it get from
12 leaks on to the floor into the waste water,
13 which is what your testimony was, here.

14 A. Could be from rain or washed down
15 or whatever.

16 Q. Okay, do you agree that I'm
17 correctly characterizing this testimony that
18 you testified that the primary way it got
19 into waste water at the Anniston plant was
20 through leaking, leakage of equipment?

21 MS. SIMERLY: Wait. You are
22 asking, you are asking him to agree with your
23 characterization of his testimony?

24 MS. WELCH: I'm trying to
25 understand how I can reconcile the testimony

1 that came out earlier today about how PCBs
2 primarily got into the waste water, with this
3 testimony.

4 A. To fit this into the context at
5 the time, this represents our understanding
6 at the time that I was supervising the
7 Aroclor department of the Anniston plant
8 which would have been in the early Sixties.
9 Obviously our understanding changed a lot
10 later on, but that's what we understood at
11 the time.

12 BY MS. WELCH:

13 Q. Okay, so you understood at the
14 time in 1962 that it was the leaks that was
15 causing the effluent to get into the waste
16 water?

17 A. We were not aware in 1962 that
18 Aroclor was getting into the waste water.
19 Correct pollution precautions were to prevent
20 leaks but we were not aware of Aroclor in
21 waste water at that time.

22 Q. But would you agree with the
23 statement that at that time, that leaks in
24 the equipment would occur during the normal
25 course of using the equipment?

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1 A. There is no perfect equipment, and
2 prevention and correction of leaks is part of
3 good practice in any chemical production
4 operation.

5 Q. Okay, thank you. Now, getting
6 back to the Papageorge memo in 1970, let's
7 turn back to that exhibit, which was Exhibit
8 431. Any recollection at this point of what
9 steps you took to reduce the amount of PCBs
10 that were found in the effluent?

11 A. Well, as I mentioned earlier, the
12 initial effort was to get valid samples and
13 good analysis that we could first find out
14 what the level of losses was and then to work
15 upstream and find the sources, and a, a lot
16 of time has passed, and so I can't say
17 exactly how far we had progressed during the
18 time referred to in this memo, but what we
19 did was to identify the process sources of
20 Aroclor getting into the waste water and then
21 do engineering corrections of those sources.

22 Q. And did that involve correction of
23 leaking equipment?

24 A. That was not the primary issue, it
25 turned out. They were, there were aspects of

1 the process, itself, that it turned out were,
2 were sources of Aroclor getting in the waste
3 water.

4 Q. That the process that you
5 described earlier, of the process of
6 hydrochloric gas?

7 A. I did not describe the entire
8 Aroclor production process at that time, I
9 described the reaction step which actually
10 formed crude Aroclor. After that there were
11 some other steps and those, as I recall, were
12 where we found the losses.

13 Q. Okay. And was this occurring
14 through vapor or was it occurring through a
15 stream of water?

16 A. Well, it was a combination.
17 Obviously, it wound up in waste water, but it
18 was related to scrubbing of some process
19 streams, and that would have been the
20 scrubbing of vapor process streams.

21 Q. Do you recall a decision that was
22 made in approximately the time period of 1969
23 to 1970 to develop a more biodegradable
24 version of Aroclor 1242?

25 A. Yes.

1 Q. Were you involved in making that
2 decision?

3 A. I was not one of the decision
4 makers but I'm sure I provided information
5 that contributed to that decision.

6 Q. Okay, do you know who the decision
7 makers were?

8 A. It would have been Howard Bergen
9 and people he reported to, perhaps Jack
10 Fitzgerald.

11 Q. Who is Jack Fitzgerald?

12 A. Here, I'm not sure I can construct
13 various transfers and so forth that occurred
14 at that time. That -- at the time that I
15 joined the business group, Howard Bergen's
16 boss was -- a guy from England. I can't tell
17 you his name right now. He then was replaced
18 by a man named Wink Corey, C-o-r --

19 Q. Are you talking about John
20 Mason --

21 A. John Mason, that's right.

22 Q. -- was Howard Bergen's boss when
23 you first joined the group?

24 A. Right. After that, a man named
25 Wink, called Wink Corey, I don't remember his

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1 real first name but --

2 MS. SIMERLY: Winthrop. He was
3 called --

4 A. He was called Wink.

5 MS. SIMERLY: Winthrop.

6 A. (Continuing) And then after that,
7 Jack Fitzgerald was in the chain of command.
8 Jack Fitzgerald later became president of the
9 corporation, but he was somewhere in that
10 line of command, and those were the people
11 who made the decisions.

12 BY MS. WELCH:

13 Q. Do you recall when this decision
14 was made?

15 A. No.

16 Q. Okay. You said that you
17 contributed information that would have
18 helped in the decision. What information are
19 you referring to?

20 A. Well, research developed a process
21 for fractionating Aroclor 1242, and as
22 manufacturing manager, I participated in
23 supplying the cost parameters, how much
24 investment would be required to put that
25 process into effect and what it would cost to

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1 operate.

2 Q. What do you mean by fractionating
3 1242?

4 A. Fractionation refers to a
5 multi-stage distillation operation. It's a
6 purification process; well-known.

7 Q. And when did this process become
8 available? Do you know?

9 A. I don't remember.

10 Q. When did Monsanto start using this
11 process?

12 A. I don't remember. It was after
13 1970, because it began after I got there.

14 Q. Okay. What was your understanding
15 of the basis for the decision to develop a
16 biodegradable substitute or alternative to
17 1242?

18 A. Well, I think I need to supply a
19 bit of a definition for the word
20 "biodegradable" because biodegradable
21 popularly means biodegradable in the sense
22 that detergents, and so forth, are supposed
23 to be biodegradable that implies a very short
24 time span of a few hours or a few days. When
25 we use the term "biodegradable" with respect

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1 to Aroclor, we are making distinctions in
2 years.

3 Q. What do you mean by that
4 distinction is in years?

5 A. Biphenyl with three or four
6 chlorines on the molecule biodegrades very
7 slowly, and I don't recall the exact time
8 span, but it's months or years, rather than
9 days. But a biphenyl molecule with more
10 chlorines on it than that, could be a number
11 of years, so I just want to make clear that
12 we're not talking about quick
13 biodegradability in the usual popular sense.

14 Q. Okay, thank you. Okay, with that
15 in mind, I'd like to find out what your
16 understanding was about why the decision was
17 made to develop a biodegradable substitute
18 for 1242.

19 MS. SIMERLY: Okay, and at that
20 point I want to object. I think it
21 mischaracterizes his testimony in that I'm
22 not sure that the decision was ever made to
23 develop. I think a decision was made to look
24 into developing, and that might seem like a,
25 a minor distinction, but I'm not sure that a

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1 biodegradable 1242 was ever developed.

2 MS. WELCH: Okay. Well, that's
3 fine. I mean, it's not material to my
4 question.

5 MS. SIMERLY: Okay.

6 MS. WELCH: So that's fine.

7 BY MS. WELCH:

8 Q. With that understanding, when was
9 the decision made to start developing, or
10 investigating, or thinking about a
11 biodegradable?

12 A. Aroclor? I don't know. It
13 probably was about the time that I joined the
14 business group, but I don't know.

15 Q. Excuse me. My question was, what
16 was your understanding of why the decision
17 was made?

18 A. Why the decision was made --

19 Q. Mm-hmm.

20 A. -- to pursue that topic? It was
21 evident from the earliest work, even, of Dr.
22 Risebrough, that the more highly chlorinated
23 isomers survived in the environment longer
24 than the lower-chlorinated materials, so it
25 seemed possible, by fractionation, to make a

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1 product that contained less of the materials
2 that survived longer.

3 Q. Okay, did 1242 contain those
4 higher isomers?

5 A. As I mentioned before, every
6 Aroclor contained all of them in some degree
7 and so yes, 1242 had some of those higher
8 materials.

9 Q. Do you know if, in the '69-'70
10 time period, Monsanto was using gas
11 chromatography to analyze 1242?

12 A. Yes, we were.

13 MS. WELCH: This is Exhibit 433.
14 I'm showing a copy to counsel for Monsanto.
15 Exhibit 433 is a two-page document with the
16 identifying figure of TRAN 007185 to 007186,
17 dated April 6, 1970, from R. L. Neary to a
18 number of people and Mr. Savage is cc:'d
19 along with others.

20 (Plaintiff's Deposition
21 Exhibit 433 marked for
22 identification.)

23 (Witness peruses said
24 document.)

25 THE WITNESS: Okay.

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1 BY MS. WELCH:

2 Q. Okay. What, first of all, in
3 terms of names, who is Mr. Neary?

4 A. I don't remember. I recognize the
5 name but I don't know.

6 Q. Okay, who is Mr. Kountz?

7 A. Bob Kountz was engineer manager
8 for our group.

9 Q. And what group is that?

10 A. The Specialty Products Group. Let
11 me comment on the date of this memo, this is
12 almost precisely when I joined the Business
13 Group.

14 Q. What month did you join the
15 Business Group?

16 A. In April 1970.

17 Q. Are all of those people who are
18 cc:'d in the Business Group, as far as you
19 know?

20 A. Howard Bergen was, of course, the
21 director of the Business Group. R. E. Howard
22 was Bob Kountz's direct boss in Engineering.
23 You know who Papageorge and Richard are.

24 Q. Okay. How about Mr. Bernhardt?

25 A. I don't know.

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1 Q. Mr. Bright?

2 A. Jim Bright was a -- he had some

3 kind of engineering management position. I

4 think he did an economic evaluation at that

5 time.

6 Q. Mr. Mueller?

7 A. That's Dr. Norm Mueller. He was

8 in research.

9 Q. What kind of research?

10 A. I don't -- he was in Research, but

11 I don't know exactly what his responsibility

12 was.

13 Q. How about Mr. Silver?

14 A. Mr. Silver was a specialist in

15 distillation, but I don't remember his

16 organization affiliation at the time.

17 Q. Was he a chemist?

18 A. Pardon me.

19 Q. A chemist?

20 A. I don't know.

21 Q. What is 1142?

22 A. 1142 is a designation for crude

23 Aroclor that is processed later to make 1242.

24 Q. So it's one of the steps in the

25 production of 1242?

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1 A. Just part of our standard
2 nomenclature, 11 referred to crude and 12
3 referred to finished goods.

4 Q. Okay is this the
5 fractionization -- fractionation work that
6 you were referring to?

7 A. Yes.

8 Q. Under the, next to the number 4,
9 it refers to the higher boiling isomers.
10 What's a higher boiling isomer?

11 A. That corresponds to more
12 highly-chlorinated materials.

13 Q. And --

14 A. The boiling point is raised by
15 addition of chlorine.

16 Q. So that would be, for instance,
17 the five-chlorine, the six-chlorine or
18 higher? Would those be considered higher
19 boiling isomers?

20 A. Yes.

21 Q. Okay. What does the Column
22 bottoms" refer to? Is that part of the gas
23 chromatography?

24 A. No..

25 Q. What is that?

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1 A. The, the column referred to in
2 this case is a fractionation column, and
3 column bottoms means the higher boiling
4 materials that leave the bottom of the
5 column. The nature of a fractionator is such
6 a lower boiling materials go out the top and
7 higher boiling materials go out the bottom.

8 Q. So there's actually an instrument
9 that's called a fractionator?

10 A. No, a fractionator is a process
11 device. The term "fractionator" and term
12 "distillation column" mean the same thing.

13 Q. What does it mean that the higher
14 boiling isomers will be taken as a side
15 stream and processed to Aroclors 1254 and
16 1260?

17 A. Aroclor 1254 and 1260 are more
18 highly chlorinated materials. Corresponding,
19 I think, to the five and six-chlorine levels,
20 and so the idea was that the higher boiling
21 materials could be utilized in, in the
22 products 1254 and 1260 which were, in turn,
23 used for transformer blends.

24 Q. Okay. Paragraph 5, it says, "The
25 project will be based on blocked operation at

1 one plant." What is your understanding of
2 what blocked operation of one plant means?

3 A. Well, one plant simply means that
4 we won't duplicate facilities at Anniston,
5 and Krummrich, and so forth, we'll simply
6 select one location. Blocked operation
7 usually refers to an operation whereby
8 equipment is utilized for only a portion of
9 the time and for other portions of the time
10 something else is going on.

11 Q. What does the next sentence mean
12 to you, "No provisions are planned for
13 co-product manufacture of 1242 and 1242-B"?

14 MS. SIMERLY: I want to object to
15 the extent that you are asking this witness
16 to explain a sentence that was written by Mr.
17 Neary.

18 MS. WELCH: I don't want him to
19 explain the sentence. I guess I should
20 rephrase my question as, what is your
21 understanding of -- well, let me phrase it
22 this way.

23 BY MS. WELCH:

24 Q. Was 1242 being produced at the
25 same time that 1242-B was being produced?

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1 A. What this sentence means to me is
2 that engineering is describing the scope of a
3 possible product -- project and that they
4 will not provide for simultaneously making
5 both products, but rather, for blocked
6 operation.

7 Q. So does that mean that there was
8 no more production of 1242 as of this date?

9 A. No, it would mean that sometimes
10 you'd make one and sometimes you would make
11 the other but you wouldn't make them
12 simultaneously.

13 Q. So there would be more alternate
14 production dates?

15 A. Right.

16 Q. Okay. Where was the existing
17 plant 1242 unit?

18 A. Well, at this time we were making
19 Aroclor 1242 in all three of those places
20 that I mentioned before: Anniston, Krummrich
21 and Newport.

22 MS. WELCH: Please mark this as
23 Exhibit 434.

24 (Plaintiff's Deposition

25 Exhibit 434 marked for

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 identification.)

2 MS. WELCH: Exhibit 434 is a
3 one-page document bearing the stamp TRAN
4 005572. It appears to be a memorandum from
5 Mr. J. R. Savage to Mr. Bergen, dated May
6 4th, 1970.

7 (Witness peruses said
8 document.)

9 BY MS. WELCH:

10 Q. Okay, do you recall authoring this
11 document?

12 A. No.

13 Q. Looking at the initials "md," Are
14 those the initials of your secretary on the
15 bottom left-hand corner?

16 A. Well, that's what that normally
17 means, but --

18 Q. It doesn't bring to mind a
19 secretary you had during the time period?

20 A. No.

21 Q. Okay. Is this your --

22 A. But I'm sure that's what it is.

23 Q. Is this your handwriting, this
24 marginalia here?

25 A. At the top? It looks like Howard

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1 Bergen's handwriting. I can't be sure.

2 Q. Was Mr. Bergen your boss at this
3 time?

4 A. He was the source of business
5 direction; it was a dotted line relationship,
6 but I considered him one of my bosses. He
7 later became my direct boss.

8 Q. Do you have any doubt that you
9 authored this memorandum?

10 A. No.

11 Q. Do you recall what this memorandum
12 was written in response to, if anything?

13 A. No. From the context, it just
14 seems to be a brainstorming document of some
15 ideas.

16 Q. Okay. Why did you recommend that
17 Monsanto release production figures?

18 A. Pardon me?

19 Q. Why did you recommend that
20 Monsanto release to the scientific community
21 an estimate of production figures?

22 MS. SIMERLY: Well, I think, in
23 fairness, you need to take that entire
24 sentence, "An estimate of production figures
25 along with the percentage in contained sealed

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1 applications."

2 MS. WELCH: That's fine.

3 BY MS. WELCH:

4 Q. Why did you make the
5 recommendation in the first paragraph? How
6 about that?

7 A. I really have to just interpret it
8 from reading it. I don't remember.

9 Q. You have no recollection? Do you
10 have any recollection of what the response
11 was to this recommendation at this time in
12 1970?

13 A. No. I don't know if we ever did
14 that.

15 Q. Okay, do you remember that being a
16 source of a lot of debate within Monsanto,
17 this issue?

18 MS. SIMERLY: You are talking
19 about the issue of releasing production
20 figures?

21 MS. WELCH: Yes.

22 A. I don't remember any particular
23 debate about it.

24 BY MS. WELCH:

25 Q. Reading the marginalia that you

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1 said looks like Howard Bergen's handwriting,
2 it appears to me that part of it says, "After
3 CMC presentation."

4 A. Yes, and there's a date there.

5 Q. 5/1 presentation. Were you
6 present at the CMC 511 presentation?

7 A. No, I think "CMC" stood for
8 "Corporate Management Committee." It would
9 be a very high level meeting that I would
10 normally not have attended.

11 Q. What does "HT" stand for?

12 A. Heat transfer. Where's the
13 context?

14 Q. The second paragraph.

15 A. Yes, heat transfer.

16 Q. Were alternatives to heat transfer
17 products being developed at this time?

18 A. This is a fairly early date. I
19 think they were being considered, but I don't
20 know if they were being developed at the
21 time. Obviously, my comment is fairly
22 light-hearted.

23 Q. Which comment?

24 MS. SIMERLY: Facetious.

25 A. Naming it "BFR" for barely fire

1 resistant.

2 BY MS. WELCH:

3 Q. I see. I took that seriously.

4 What was the normal Aroclor that
5 was used in heat transfer fluids at this
6 time?

7 A. We had three grades which we
8 called FR-1, and FR-2 and FR-3. FR-1, as I
9 recall, was Aroclor 1242 and was by far the
10 most popular. FR-2, I think, was 1248, and
11 so forth, but I don't remember for sure.

12 Q. So the most widely sold was the
13 FR-1?

14 A. That's my recollection.

15 Q. Why were you concerned that the
16 five and six-chlorine atoms appear -- appear
17 in the fire resistant Therminol at that time,
18 if that's an accurate characterization of
19 Paragraph 2?

20 A. Well, I propose here that we make
21 something called Aroclor 1237. There was no
22 such product, of course, but that implies a
23 somewhat lower level of chlorination which
24 would be, as I imply here, less fire
25 resistant, but since the incidence of the

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1 higher chlorinated materials increases as the
2 average a chlorination level is increased,
3 there should be a substantial difference in
4 the amount of such things.

5 Q. Is the idea was to lower the
6 incidence of the higher-chlorinated isomers?

7 A. That was the objective. We never
8 did that.

9 Q. Why did you never do that?

10 A. It probably wasn't a very good
11 idea.

12 Q. Why not?

13 A. I can only speculate. What we
14 really did, of course, is stop selling any
15 kind of chlorinated material for heat
16 transfer fluid, to avoid any issue at all,
17 and that, that was a better decision.

18 Q. Do you recall when that, you
19 stopped selling?

20 A. No.

21 Q. In the sentence, it says, "Also
22 used is a blend stock in 1232 instead of
23 1242." Was 1242 used as a blend stock in
24 1242?

25 A. Yes, 1232 could not be made

1 directly so, we made it by blending 1242 and
2 1221. That was only because 1232 made
3 directly would have crystalline materials in
4 it.

5 Q. Okay, why did you recommend
6 reclamation disposal, a reclamation disposal
7 process?

8 MS. SIMERLY: And at this point,
9 are you asking him what his recollection is
10 or are you simply asking him to interpret the
11 document.

12 MS. WELCH: No, I'm asking for his
13 best recollection, and --

14 A. I really cannot interpret the
15 document, because I don't remember writing
16 it, but the idea of a reclamation service
17 would simply be that that would make sure
18 that, that used or contaminated materials
19 that customers had was not improperly
20 disposed of.

21 BY MS. WELCH:

22 Q. And do you know what happened with
23 any of these recommendations?

24 A. I don't know whether any of the
25 actions we took were as a result of my

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1 recommendation, but we did begin to take
2 some, some fluid back from some of our
3 customers.

4 Q. Do you know which customers?

5 A. The electrical customers. We
6 already had reclamation programs in place for
7 hydraulic fluids.

8 Q. Okay. Have you ever heard of
9 Texas Eastern Transmission Company,
10 Corporation?

11 A. I've heard of it.

12 Q. Prior to this case?

13 A. I don't know.

14 Q. Okay, do you know if a fluid was
15 taken back from them?

16 A. I have no idea.

17 MS. WELCH: Please mark this as
18 Exhibit 435. I'm showing a copy to counsel
19 for Monsanto. This is Bates stamped number
20 TRAN 005571. It's from H. S. Bergen to W. R.
21 Richard and Mr. Savage is cc:'d. It's
22 entitled "Aroclor 1232 Replacement," dated
23 May 20th, 1970.

24 (Plaintiff's Deposition
25 Exhibit 435 marked for

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

identification.)

(Witness peruses said
document.)

BY MS. WELCH:

Q. Okay, were there concerns about
the biodegradability of 1232 in 1970?

A. I don't remember anything specific
to 1232, but just as part of our general
concern, I would think so.

Q. And was that because of the
presence in 1232 of the 1242?

A. Well, it was because of the
presence of higher chlorinated materials
which mostly got there from 1242 but some
would have got there from the 1221.

Q. Okay, and this reference to
crystallization is what you referred to
earlier; is that correct?

A. Right.

Q. What happened to the development
of an alternative to 1232, as far as you
know?

A. I don't know if we ever did this
or anything.

Q. Are you aware of the

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1 biodegradation studies that were conducted
2 both at RUE-a-bon and St. Louis in 1969-1970?

3 A. Rue-AW-bon.

4 Q. Ruabon?

5 A. Ruabon. Would you state the
6 question again, please?

7 MS. SIMERLY: Are you aware of the
8 biodegradation studies going on at Ruabon --

9 MS. WELCH: You did it wrong, too.

10 A. North Wales. Yes, I became aware
11 of them at some time. Whether or not I was
12 aware in 1970, I'm not sure.

13 Q. Do you have any idea when they
14 commenced?

15 A. No, I don't.

16 Q. Do you know the purpose of those
17 studies?

18 A. Yes, we wanted some controlled
19 information, information developed in a
20 controlled way on the rate of degradation of
21 various isomers.

22 Q. When you say controlled way, what
23 do you mean?

24 A. Where we knew the time, the time
25 parameters and so forth so that we had data

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1 that could be reproduced and later on used to
2 interpret other information.

3 Q. So in other words, this would be
4 in contrast to Risebrough's studies where he
5 just looked in the environment at large?

6 A. Yes. That's after-the-fact
7 information, and so it's difficult to
8 interpret how long those materials had been
9 in the environment or how long it took them
10 to come through the food chain.

11 Q. Okay. Do you know who headed
12 those studies?

13 A. I don't remember.

14 Q. Do you remember who was
15 responsible or who worked on them?

16 A. No.

17 Q. Okay. Can you generally
18 characterize for me the results of the
19 studies?

20 A. Just in broad, general terms that
21 we confirmed that biodegradation rates were
22 very slow and that the lower isomers
23 biodegraded more high rapidly than the higher
24 ones, but I can't remember any more detail
25 than that.

1 Q. Well, that's fine. Would you say
2 that this confirmed what people suspected, or
3 was it new information?

4 A. It was not, not a surprising
5 result. I think the important point is that
6 by having some numbers to attach to
7 biodegradation rates, it was possible to
8 interpret other data that -- and understand
9 other data that was taken in less controlled
10 ways.

11 Q. What do you mean by some numbers
12 attached? Are you referring to time periods
13 or amounts?

14 A. Yes. Yes.

15 Q. Anything else that you mean by
16 "some numbers"?

17 A. No.

18 MS. WELCH: Okay, please mark this
19 as Exhibit 436.

20 (Plaintiff's Deposition
21 Exhibit 436 marked for
22 identification.)

23 BY MS. WELCH:

24 Q. Exhibit 436 is a one-page document
25 with the identifying stamp of TRAN 008623

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1 from Mr. Benignus to D. A. Olson.

2 A. Right.

3 Q. And Mr. Savage is amongst the
4 recipients.

5 (Witness peruses said
6 document.)

7 BY MS. WELCH:

8 Q. Okay?

9 A. Okay.

10 Q. Do you recall that Aroclor 1242-B
11 was at some point changed into MCS 1016?

12 A. Yes.

13 Q. The nomenclature was changed,
14 rather?

15 A. Yes.

16 Q. Do you know why that nomenclature
17 was changed?

18 A. I can't tell you from
19 recollection. I can infer it from the
20 meaning of the words, that's all.

21 Q. Why was it referred to as
22 capacitor Aroclor 1242?

23 A. Because it was the product that
24 was sold to, to the electric equipment
25 manufacturers for making electrical products.

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1 Q. Okay, 1242 was used in various
2 applications; is that correct?

3 A. Yes, and it was all made the same
4 way.

5 Q. Do you have any idea or do you
6 know whether 1016 was ever used or sold to
7 anybody other than electrical manufacturers?

8 A. I don't remember.

9 MS. WELCH: This is Exhibit 437.

10 (Plaintiff's Deposition
11 Exhibit 437 marked for
12 identification.)

13 BY MS. WELCH:

14 Q. Okay, Exhibit 437 has the
15 identifying stamp of TRAN 037172 through 4,
16 dated July 17th, 1970, from W. P. Papageorge
17 to Mr. Bergen, with a number of people cc:'d,
18 including Mr. Savage, and please take a few
19 minutes to read this document.

20 (Witness peruses said
21 document.)

22 THE WITNESS: Okay.

23 BY MS. WELCH:

24 Q. Okay. Do you recall a meeting you
25 had with Mr. Papageorge on the biodegradation

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 studies?

2 A. No.

3 Q. Okay, who is Mr. Emory?

4 A. Ed Emory was in research.

5 Q. Research of what what?

6 A. I'd almost be guessing. I know
7 he's in Research, but I don't remember.

8 Q. I don't want you to guess.

9 Referring to the first paragraph,
10 what are homologs?

11 A. Oh, that's a way of grouping
12 isomers, and the group of isomers that
13 represent three chlorines would be one
14 homolog, the next homolog up would be the
15 group of isomers that have four chlorines per
16 molecule, and so forth, so it's a kind of
17 simplified way of categorizing isomers,
18 because there are hundreds of isomers but
19 only a few homolog levels.

20 Q. Okay, for purpose of the lay
21 person, would it be another way of saying a
22 group of isomers?

23 A. Sure.

24 Q. Okay, what are river die-away
25 studies?

1 A. A river die-away study is a
2 particular kind of biodegradation test. The
3 meaning is kind of evident in the words. The
4 ideal would be that one would analyze an
5 effluent stream going into a river and then
6 measure at various points downstream and it
7 would disappear over a certain distance.
8 That's what's meant by die-away.

9 Q. So it's not that the material in
10 the river all dies?

11 A. No.

12 Q. So it apparently wasn't evident.
13 So do you recall knowing that the river
14 die-away studies indicated that while Aroclor
15 1221 disappeared, Aroclors 1242, 1248 and
16 1254 were undegraded?

17 A. I don't remember that detail. A
18 river die-away test, of course, is to measure
19 rapid biodegradation, so the findings here
20 are consistent with my general understanding,
21 but I don't remember the specifics.

22 Q. Okay. In the second paragraph
23 under number 1, it refers to peaks normally
24 present in Aroclor 1221, and 1242 and 1248.

25 A. By "peak," it's, the readout from

1 a chromatograph is a chart with a bunch of
2 peaks on it, and each peak represents a
3 specific isomer, and so if a peak disappears,
4 it implies that that isomer has been
5 biodegraded.

6 Q. By isomer, you would mean a three-
7 chlorine atom, or four-chlorine atom, or a
8 five-chlorine atom?

9 A. Yes. Well, more specific than
10 that; specific instructional isomer.

11 Q. What do you mean by "specific
12 instructional isomer"?

13 A. One of these hundreds of different
14 forms. It doesn't refer to a homolog, it
15 refers to a particular chemical compound
16 which is an isomer.

17 Q. Okay. In a broad categorization,
18 could that be fit into the category of three
19 chlorines, or four chlorines, or five
20 chlorines?

21 A. Well, that's broadly true except
22 that the point that's being made is that
23 certain ones are biodegraded and others are
24 not even at the same chlorination level.

25 Q. And what do you mean by that?

1 A. That certain isomers are
2 disappearing and others are not, and that it
3 is specific to the isomer and only generally
4 related to the chlorination level.

5 Q. Okay. My understanding was
6 that -- and correct me if I'm wrong, but my
7 understanding was that the biodegradation
8 studies showed that chlorine atoms with four
9 or less generally degraded and with five or
10 more did not generally degrade?

11 A. That's broadly true as a trend.

12 Q. Okay.

13 A. But at the detailed isomer level,
14 there are exceptions to that.

15 Q. Okay, but the trend is,
16 nonetheless, true?

17 A. Right.

18 Q. Okay, under Paragraph 2, "Monsanto
19 U.K. Studies," I see some figures that have
20 "2,4," et cetera. What do those figures
21 refer to?

22 A. That's the nomenclature to
23 describe a specific isomer.

24 Q. Okay, in the terms that you were
25 just talking about?

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1 A. Yes.

2 Q. I see.

3 A. The numbers refer to positions on

4 the rings.

5 Q. Okay. What is Aroclor 1130?

6 A. It's a crude Aroclor, but it

7 doesn't relate -- I don't remember any

8 relationship to a commercial product.

9 Q. Okay, so it's the same as we

10 discussed, 1142 is crude Aroclor for 1242.

11 The nomenclature implies crude Aroclor

12 chlorinated to 30 percent.

13 Q. Okay, the isomers that are

14 referred to in Paragraph 2, are those isomers

15 that are generally found in 1242?

16 A. Yes.

17 Q. Let me rephrase that. They refer

18 to some isomers that degrade radially. Are

19 those isomers found on 1242?

20 A. Well, again they're all found on

21 all of them.

22 Q. Okay.

23 A. But for -- if you see three

24 numbers like 2,2,3 or 2,3,4, that implies

25 that there are three chlorines on each

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1 molecule, so that would be characteristic of
2 1242.

3 Q. But the ones that are referred to
4 in the sentence where it says "Do not
5 degrade," are those also found in 1242?

6 A. Yes, but it happens each of those
7 is a dichlor, so it's a lower-chlorinated
8 material.

9 Q. What is a dichlor?

10 A. Two chlorines per molecule.

11 Q. Do you know which peaks had
12 persisted in biodegradation tests with 1242?

13 A. I don't know. I don't know if I
14 ever knew, but I certainly don't know now.

15 Q. Okay. Turning to the paragraph
16 which says MCS 1016 --

17 MS. SIMERLY: The next page.

18 BY MS. WELCH:

19 Q. Page 2.

20 A. Okay.

21 Q. Okay, the last sentence says, "We
22 must establish if the less controllable
23 hydraulic fluids applications can materially
24 benefit from the use of MCS 1016." First of
25 all, why were hydraulic fluids less

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1 controllable than capacitor fluids, if you
2 have an understanding of that?

3 A. Yes, I -- the electrical
4 applications, transformers and capacitors
5 were sealed pieces of equipment, and one
6 would expect that whatever inventory of, of
7 fluid was put in them at the time they were
8 manufactured would remain there for the
9 useful life of the piece of equipment, and
10 hydraulic systems are controlled in the sense
11 that the direct use of the fluid doesn't
12 place it in the environment, but on the other
13 hand, they are active systems that can leak,
14 and where some fluid makeup is common.

15 Q. What do you mean by fluid makeup?

16 A. I mean that we would continue to
17 supply the customer with additional
18 quantities of fluid after his initial fill.

19 Q. Okay, and that's not generally the
20 case with capacitor customers?

21 A. Certainly not.

22 Q. So that in that case, there would
23 be one sale, and it would be put inside the
24 capacitor, and that would be it?

25 MS. SIMERLY: Well, with reference

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1 to that lot of capacitors, but there would be
2 continuing sales for new capacitors.

3 MS. WELCH: Of course.

4 A. But the way a capacitor is made,
5 it's sealed, and the fluid that's in it, when
6 it's sealed up and the manufacture is
7 completed, that's, that's it.

8 BY MS. WELCH:

9 Q. Okay, so if you see production
10 figures and continuing sales over a course of
11 time and no new equipment being produced,
12 would the conclusion you would draw as a
13 manufacturing manager be that it's because
14 there is some, as you characterize, makeup of
15 the fluid?

16 MS. SIMERLY: I'm going to object.
17 That question assumes that he, as the
18 chemical manufacturer, knows if there is new
19 equipment being manufactured that's using
20 this fluid. That assumes a fact that's not
21 in evidence. The question lacks foundation.

22 BY MS. WELCH:

23 Q. You can go ahead and answer the
24 question. Do you remember it?

25 A. Our hydraulic fluid customers were

1 people like die casters, and so forth, and we
2 would continue to supply them fluid on a
3 regular basis.

4 Q. And from that, you concluded that
5 they were needing makeup fluid?

6 A. Yes.

7 Q. Do you know whatever happened to
8 the proposal or the question of establishing
9 if the less-controllable hydraulic fluids
10 applications could materially benefit from
11 the use of MCS 1016?

12 A. I don't think we ever did that.

13 Q. Do you know why not?

14 A. Because we reformulated the fluids
15 to take the biphenyl-based Aroclors out of
16 them entirely.

17 Q. And you are speaking of the
18 Pydrauls?

19 A. Yes.

20 Q. Do you have any idea if MCS 1016
21 could have worked in the hydraulic system?

22 A. I don't know of any reason why
23 not, but I'm not an expert on formulating
24 fluids.

25 Q. Okay. Did it have the same

1 properties as 1242, as far as you know?

2 A. Not exactly.

3 Q. What were the differences?

4 A. Just differences in physical
5 properties. I don't remember exact, but
6 since it was a mixture of a somewhat
7 different set of isomers, it was not
8 precisely the same.

9 Q. Was it materially different?

10 A. That would depend on what one
11 intended to do with it. For the application
12 in electrical equipment, which is what it was
13 designed for, it, it was, performed
14 substantially the same as 1242.

15 Q. Do you have any recollection of
16 what products or what new products were being
17 tested at this time, which is July 1970? And
18 by "new products," I'm referring to
19 replacement products for the, for the
20 Aroclors.

21 A. It's been a long time, and I
22 cannot tell you when I was aware of work on
23 replacement products, but during the time
24 that I was manufacturing manager, there was
25 intense activity on replacement products for

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1 essentially all of that time, but whether I
2 was aware of it exactly at this time, I'm not
3 sure.

4 MS. WELCH: Okay. This is Exhibit
5 438. I'm showing a copy to counsel for
6 Monsanto.

7 (Plaintiff's Deposition
8 Exhibit 438 marked for
9 identification.)

10 BY MS. WELCH:

11 Q. Exhibit 438 is a one-page document
12 with the identifying stamp of TRAN 037811,
13 dated August 6, 1970, from Mr. Heinze,
14 H-e-i-n-z-e -- Hines (Phonetic)?

15 A. Hines (Phonetic), I think.

16 MS. WELCH: To three people,
17 including Mr. Savage.

18 (Witness peruses said
19 document.)

20 THE WITNESS: Okay.

21 BY MS. WELCH:

22 Q. Okay, who is Mr. Heinze?

23 A. Mr. Heinze was in Engineering.

24 Q. Do you know what his
25 responsibility was?

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1 A. No, I don't remember.

2 Q. How about Mr. McCutcheon?

3 A. Bob McCutcheon at that time was
4 the production supervisor at the Krummrich
5 plant.

6 Q. How about Bill Young?

7 A. I don't know.

8 Q. Bailey Williams?

9 A. I think the Bailey Williams was at
10 the Anniston plant, but I don't remember what
11 his job was.

12 Q. Chuck Devine?

13 A. I don't know.

14 Q. What is a Scope report?

15 A. That's a formal document produced
16 by Engineering that's circulated to get
17 concurrence of everybody involved with the
18 project that we all agree that that's what's
19 to be done.

20 Q. So it's a document that's
21 circulated before a product is put into
22 production?

23 A. Before an engineering project is
24 commenced.

25 Q. So does this indicate to you that

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1 1016 is in its beginning stages as of this
2 date?

3 A. Before a project, before a Scope
4 report can be properly written, the process
5 has to be reasonably well defined, so the
6 existence of a Scope report implies a certain
7 stage, but clearly, nothing yet has been
8 designed in detail or built.

9 Q. By "a certain stage," what do you
10 mean? Do you mean that it's beyond the
11 brainstorming stage, or it's beyond, or it's
12 fairly well along, or it's in the beginning
13 stage?

14 A. Well, certainly beyond
15 brainstorming.

16 Q. Is it near to final initiation of
17 production?

18 A. No. It's quite a long time before
19 production, because the Scope report is
20 written to get agreement on what will be
21 built, and it then has to be designed and
22 built before production can begin.

23 Q. Do you recognize this handwriting?

24 A. No. It's not mine.

25 Q. Okay. As far as you know, does

1 this accurately describe the process for the
2 production of MCS 1016, the handwriting?

3 MS. SIMERLY: You are talking
4 about the handwritten --

5 MS. WELCH: The handwritten note.

6 A. It's generally descriptive of what
7 I recall.

8 BY MS. WELCH:

9 Q. Do you know if, by this time, the
10 process for the production of MCS 1016 had
11 been developed?

12 A. I can't state it for a fact.
13 That's -- it was at some point, but whether,
14 whether the Scope report was based on a
15 complete process definition or whether it was
16 a bit prophetic is hard to tell. It was a
17 crash project that we tried to move very
18 rapidly, so it could be that a Scope report
19 was prepared earlier, and that would be
20 normal.

21 Q. Why was it a crash project that
22 you decided to move quickly?

23 A. Because everything related to the
24 12 -- excuse me, to the Ar -- to the PCB
25 issue was urgent.

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1 Q. Why was that?

2 A. Because we recognized it as a
3 problem that had to be solved quickly.

4 Q. And why was that?

5 A. It was an environmental issue, and
6 we expected concern from regulatory agencies,
7 and we just generally recognized that any
8 product that had an adverse effect on
9 wildlife was -- had to be corrected.

10 Q. Do you disagree with this
11 handwritten statement, here, which says that
12 there is no direct evidence of the
13 biodegradability of any of the PCBs?

14 A. Well, that's, that's a fairly
15 careless characterization, I would say. I'm
16 not no -- since I don't know who wrote it, I
17 don't know how well informed that person
18 might have been.

19 Q. Why is it careless?

20 A. Pardon me?

21 Q. Why is it careless?

22 A. Well, because at that time, there
23 was evidence that some isomers were
24 biodegradable, and of course, more evidence
25 developed later on.

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1 Q. Okay, were you involved in the
2 decision in 1970 to reformulate the Pydrauls?

3 A. Yes.

4 Q. How were you involved in it?

5 A. The research people were
6 developing new formulations, and doing fire
7 testing, and so forth. As they came up with
8 new formulations, they would communicate the
9 new formulations to me and I would provide
10 cost estimates and comment on any particular
11 difficulty in carrying out that particular
12 reformulation. It was a matter of providing
13 guidance in the reformulation activity.

14 Q. What are you referring to when you
15 talk about the difficulties in the process?

16 A. Some of these formulations are
17 fairly complicated, with a long list of
18 ingredients, and in the case of the Pydraul
19 blend, the only real issue would be whether
20 some ingredient was proposed which was not
21 readily available.

22 Q. So you were familiar with the
23 ingredients and could make recommendations on
24 that basis?

25 A. Well, I, either I was already

1 familiar with the proposed ingredients or if
2 I wasn't, I'd have to find out.

3 Q. What was your understanding of why
4 the decision was made to reformulate the
5 Pydrauls?

6 A. Because they were not considered
7 to be totally sealed, used in totally sealed
8 systems, and therefore, we wanted to, to get
9 rid of the components in the Pydrauls that
10 were not, not biodegradable.

11 Q. Okay, is there any system that's
12 totally sealed, to your knowledge?

13 A. Well, beyond the philosophic point
14 that no system is perfect, a capacitor comes
15 close, in that a capacitor is, is literally
16 sealed, and until it finishes its useful life
17 and is destroyed in some way, it remains
18 sealed.

19 Q. Why was more biodegradable 1242-B
20 developed for capacitors if it was a
21 fundamentally sealed system?

22 A. Well, that was in the early days
23 of thinking about products the way we
24 routinely think about them now, but we were
25 thinking about the ultimate fate of a used

1 capacitor which might wind up in a landfill
2 or something, and the concern was that the
3 Aroclor that was in the capacitor should
4 sooner or later biodegrade.

5 Q. Because it might ultimately end up
6 in a landfill?

7 A. Yes. We were thinking about the,
8 the fate of the capacitor after it had ended
9 its useful life.

10 Q. Are you familiar with gas
11 compressors?

12 A. As a generality.

13 Q. Would you consider that a closed
14 system?

15 A. I don't think I can make a very
16 general answer. My familiarity with gas
17 compressors is small reciprocating
18 compressors that are used in chemical plants,
19 and those I would describe as, as a closed
20 system, but I, I'm not familiar with other
21 kinds of compressors.

22 Q. Okay. Where were the small
23 reciprocating compressors that you had
24 contact with? Which plants?

25 A. Typically, air compressors, and so

1 forth, used in plants to provide a utility
2 service of compressed air on the plant.

3 Q. So these are air compressors,
4 rather than gas compressors?

5 A. Well, air is gas.

6 Q. True, and in your experience, did
7 these air compressors ever leak?

8 A. Well, they leaked air, but no, not
9 in terms of any lubricant that was in them or
10 anything like that.

11 Q. Earlier, you testified that there
12 is no perfect machinery, there is no perfect
13 equipment that --

14 A. That was a philosophical
15 statement, not a technical one.

16 Q. Well, everything has its bearing
17 in the real world; agreed?

18 A. I suppose.

19 (Discussion of the record and
20 short break.)

21 MS. WELCH: Okay, back on the
22 record.

23 BY MS. WELCH:

24 Q. We were talking about the
25 reformulation of the Pydrauls in 1970. Do

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1 you know what was in the formulation of the
2 Pydrauls in 1970?

3 A. The reformulated Pydrauls.

4 Q. Yes, what was in the reformulated
5 Pydrauls.

6 A. They were similar to, to the
7 previous Pydrauls except that the chlorinated
8 material was chlorinated terphenyl, rather
9 than chlorinated biphenyl.

10 Q. Was there a second reformulation?

11 A. Yes.

12 Q. And what did the second
13 reformulation involve?

14 A. That involved getting rid of
15 chlorinated materials entirely and making
16 products based on phosphate esters.

17 Q. Why was the second reformulation
18 carried out?

19 A. The first reformulation
20 represented something that we could do very
21 quickly, and the testing was very simple.
22 The second reformulation required, required
23 us to develop a new, a new basic raw
24 material, a new phosphate ester. Developing
25 a process for it took longer.

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1 Q. Were you planning to do the second
2 reformulation at the time there was the first
3 reformulation?

4 A. I don't think we were specifically
5 planning it. We were studying the
6 possibility of all phosphate ester fluids,
7 but we took the decisions one at a time.

8 Q. Do you recall when Monsanto first
9 started working on the phosphate esters?

10 A. Monsanto's experience with
11 phosphate ester fluids goes back many years,
12 because we had made hydraulic fluid for
13 aircraft, the Skydrol products, for a long
14 long time, and those are based on, on
15 phosphate esters.

16 Q. How long is a long, long time?
17 1950's, 1940's?

18 A. Before the Fifties.

19 Q. Skydrol is based on phosphate
20 esters?

21 A. Right.

22 Q. So what was -- what were the new
23 developments that were necessary or were
24 there new developments that were necessary to
25 develop the phosphate esters to replace the

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1 Pydrauls?

2 A. The phosphate esters that are used
3 in aircraft hydraulic fluid are not
4 appropriate to industrial hydraulic fluids,
5 because of physical properties. It was
6 necessary to develop a new phosphate ester
7 that had the appropriate physical properties.

8 Q. Do you have any recollection of
9 when that process began?

10 A. I don't remember.

11 Q. Introducing Exhibit 439, I'm
12 showing a copy to counsel for Monsanto.

13 (Plaintiff's Deposition
14 Exhibit 439 marked for
15 identification.)

16 BY MS. WELCH:

17 Q. Exhibit 439 is a multipage
18 document bearing Bates stamp TRAN 039104
19 through 111, dated August 18th, 1970, from
20 W. P. Papageorge to a number of people,
21 including Mr. Savage, and I'm going to ask
22 you questions about isolated paragraphs in
23 here, so the first question I have is,
24 simply, what is Pydraul F9A

25 A. I don't remember. It's just -- we

1 had at least a dozen Pydrauls at that time,
2 and I don't remember which one that is.

3 Q. Okay. Do you know if it was one
4 of the Pydraul -- reformulated Pydrauls?

5 A. The "A" implies that it is, but I
6 don't know that.

7 Q. Okay, page 2, under "MCS 1016
8 Distillation," please read that paragraph.

9 (Witness peruses said
10 document.)

11 A. Yes.

12 Q. Okay, is this the project, same
13 Project Scope or the same thing that we were
14 talking about before?

15 A. Yes.

16 Q. Okay. Do you know if 1016 was
17 then in production at this time in August
18 1970?

19 A. No. Just on the face of this
20 paragraph, the preparation of preliminary
21 Project Scope is the same thing we were
22 talking about in the earlier document.

23 Q. Okay. Page 4 of the document,
24 "Aroclor 1242 replacement for NCR," what was
25 the Aroclor 1242 replacement for NCR?

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1 A. There were two. One referred to
2 here is monoisopropyl biphenyl, which we did
3 manufacture for a period of time, not
4 internally, but through a contract
5 manufacturer, and then later on, there was
6 another one.

7 Q. And what was the next one, the
8 second one?

9 A. The second product provided to
10 NCR, the second replacement was called
11 Santisol 100. It was a hydrocarbon product
12 that was specifically designed for that
13 purpose.

14 Q. Did either of those products,
15 either the MIPB or the Santisol 100 contain
16 PCBs?

17 A. No.

18 Q. Okay, turning to the paragraph of
19 MCS 1016, the bottom of the page, please read
20 that paragraph to yourself.

21 (Witness peruses said
22 document.)

23 Q. Okay, does this paragraph imply to
24 you that there were test runs being done of
25 MCS 1016 at this time?

1 A. Yes.

2 Q. Okay. Would you agree with the
3 statement that, in this paragraph, that the
4 electrical properties of MCS are
5 indistinguishable from those of Aroclor 1242
6 and there are only minor differences in other
7 properties?

8 A. Yes, that proved to be so.

9 Q. The next page, page 5, I think we
10 have our answer, here, about Pydraul F9A,
11 that it was reformulated to reduce, avoid the
12 use of chlorinated biphenyl. Do you know if
13 this was the formulation that included the
14 terphenyl?

15 A. Given the time of this, I would
16 say that's likely to be so.

17 Q. Okay. What was the N-C phosphate
18 ester being developed for?

19 A. The NC was a special phosphate
20 ester that we were attempting to develop to
21 make an all-phosphate ester fluid.

22 Q. And do you know if this was being
23 developed for all industrial fluids, or just
24 simply for Pydrauls?

25 A. Well, I -- to me, the term

1 "industrial fluid" and Pydraul are more or
2 less synonymous.

3 Q. Do you consider Turbinol a
4 Pydraul?

5 A. Certainly, from a manufacturing
6 standpoint, it was just a special case of
7 Pydraul.

8 Q. And why is that so?

9 A. We made it and blended it in the
10 same way we made Pydraul, from very similar
11 materials. It happened to go into a
12 different kind of application.

13 Q. Okay, so in your mind, if somebody
14 talks about industrial fluids, it includes
15 Pydrauls which could also include Turbinols?
16 Is that correct?

17 MS. SIMERLY: I'm going to object.
18 He said that from a manufacturing standpoint.
19 BY MS. WELCH:

20 Q. From a manufacturing standpoint,
21 that's fair?

22 A. From my viewpoint, I wouldn't make
23 any market distinction.

24 Q. Between Pydraul and Turbinol?

25 A. Right.

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1 Q. So did you know whether the N-C
2 phosphate ester was being developed for the
3 application for which Turbinol was being
4 used?

5 A. No.

6 Q. Namely, the gas compressor?

7 A. I don't know whether we had ever
8 attempted that or not.

9 Q. Page 6, under the
10 "Biodegradation - Ruabon," what is HB-40?

11 A. HB-40 is a product that we made at
12 both Anniston and at Newport by hydrogenating
13 terphenyl. We still make it.

14 Q. Okay, what's the application?

15 A. HB-40 is sold under several
16 different names for different purposes.
17 HB-40 is sold as Therminol 66, which is a
18 heat transfer fluid. It, from time to time,
19 has been sold as a plasticizer. I don't
20 remember what other uses, but I think there
21 was more than one.

22 Q. Does it contain Aroclors?

23 A. No.

24 Q. What is Pyralene 1500?

25 A. No idea.

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1 Q. What is a more refined -- or, was
2 a more refined GLC analytical technique ever
3 developed, to your knowledge?

4 A. Pardon me, I --

5 MS. SIMERLY: Where are you?

6 MS. WELCH: Under
7 "Biodegradation -- Ruabon," where it says,
8 "Priority has been given to the development
9 of more refined GLC analytical techniques."

10 A. I don't know.

11 MS. WELCH: This is Exhibit 440.

12 (Plaintiff's Deposition
13 Exhibit 440 marked for
14 identification.)

15 MS. WELCH: Exhibit 440 is
16 identified with a stamp TRAN 036358. It
17 appears to be a memo from J. R. Savage to Mr.
18 A. E. Peterson of the J. F. Queeny plant.

19 (Witness peruses said
20 document.)

21 THE WITNESS: Yes.

22 BY MS. WELCH:

23 Q. Do you recall authoring this
24 document?

25 A. No, but I'm sure it's authentic.

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1 Q. You are sure it's --

2 A. I'm sure it's authentic. I don't
3 remember writing it.

4 Q. Do you recall anyone issuing an
5 edict to eliminate all PCBs from industrial
6 fluid?

7 A. This is me speaking to the plant,
8 and I'm speaking in rather dictatorial terms.
9 It was a decision we had made.

10 Q. Okay, do you know who made the
11 edict, or do you consider yourself --

12 A. It was a decision made at Howard
13 Bergen's level and probably higher.

14 Q. Were you told anything at that
15 time about eliminating PCBs from Turbinol,
16 September 1970?

17 A. I don't remember.

18 Q. What is TSCl?

19 A. TSCl is toluenesulphonyl chloride.
20 That's a department that we, at that time,
21 had at the Queeny plant.

22 Q. And why did you want to convert to
23 1221, rather than 1232?

24 A. Well, again, I don't remember the
25 memo, so I can only interpret what I've said

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1 here, and it would have to stand on its face,
2 I guess.

3 Q. But you had an understanding that
4 1232 contained a certain percentage of 1242
5 which contained the persistent isomers; is
6 that correct?

7 A. Yes. We discussed that earlier.

8 MS. WELCH: Okay. This is Exhibit
9 441.

10 (Plaintiff's Deposition
11 Exhibit 441 marked for
12 identification.)

13 MS. WELCH: I'm showing a copy to
14 counsel for Monsanto. Exhibit 441 is a
15 multipage document bearing the stamp TRAN
16 036828 through 036837, dated December 29th,
17 1970. It's from the J. F. Queeny plant to
18 several people, including Mr. Savage.

19 BY MS. WELCH:

20 Q. I'm going to ask you a few
21 questions about the document, so you don't
22 need to, unless you want to, you are
23 certainly welcome to read the document,
24 but --

25 A. Go ahead.

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1 Q. Okay. On Page 2 of the document,
2 it says, "Priority one, TSC1 Nash pump." Do
3 you know what the TSC1 Nash pump was?

4 A. A Nash pump is a notary compressor
5 which uses a seal fluid.

6 Q. What is a seal fluid?

7 A. A Nash pump is what's called a
8 liquid drain compressor, where fluid moves up
9 and down in a chamber, and in moving up and
10 down, compresses a gas, and the seal fluid is
11 the liquid that's used for that purpose.

12 Q. It's used for the purpose of
13 sealing?

14 A. It's called a seal fluid, but it's
15 actually the motion of the liquid that
16 compresses the gas. Its acts like a piston.

17 Q. Okay. Here, it says the source of
18 the loss is the seal fluid. Do you have any
19 understanding why the seal fluid could have
20 been a source of loss?

21 A. I'm not familiar with this
22 particular application of a Nash pump. I
23 know about Nash pumps, but I don't know about
24 this particular application.

25 Q. Well, let's talk about your

1 general understanding of Nash pumps. Do you
2 have an understanding of how a seal fluid
3 could be a source of a loss?

4 A. The seal fluid continuously enters
5 the Nash pump and leaves it downstream of a
6 Nash pump. There's a gas liquid separator,
7 and the liquid that is separated from the gas
8 is then returned to the intake of the Nash
9 pump.

10 Q. And how does that contribute to
11 loss?

12 A. Well, if the separator is not
13 working at 100 percent efficiency, then there
14 will be some seal fluid in the discharge from
15 the separator.

16 Q. And where does the discharge go?

17 A. That depends on the process.

18 Q. Okay.

19 A. I've just described the system
20 that a Nash pump represents.

21 Q. What is "Sep. and demist. drains"?
22 Do you know what that means?

23 MS. SIMERLY: Does it mean
24 anything to you, under "Seal fluid"?

25 A. Take the line before that: "Seal

1 fluid separator and demister drains.

2 BY MS. WELCH:

3 Q. That's all together, then?

4 A. That's one expression.

5 Q. Can you tell me what that means?

6 A. Well, the separator is that gas
7 liquid separator described earlier.
8 Demister, again, I don't know this particular
9 application, but in the application of a Nash
10 pump, it would be fairly normal to have a
11 demister as part of the separator, to
12 increase its efficiency.

13 Q. Was, were any Aroclors used in
14 Nash pumps?

15 A. Well, obviously, from the context
16 of this report, it was used in that one, but
17 that would be unusual.

18 Q. That would be unusual?

19 A. Yes.

20 Q. What's normally used as a
21 lubricant in a Nash pump?

22 A. It's a seal fluid. It's not a
23 lubricant. It's entirely specific to the
24 application. My personal experience was in
25 compressing chlorine; in that case, sulphuric

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1 acid was used as a seal fluid.

2 Q. Going down to line 4, where it
3 says "Vapors and pump leaks phthalyl
4 chloride" -- am I pronounceing that right?

5 A. fe-THAL-il chloride, very good.

6 Q. Do you know what -- were there
7 pumps that were used in the process of
8 phthalyl chloride production?

9 A. No. I don't know the process. I
10 don't know.

11 Q. Okay. The next page, in priority
12 6, W Building yard unit, it talks about the
13 source of the losses from vapors, pump leaks
14 and steam out of jackets, do you know what
15 pumps existed in the W Building yard unit?

16 A. I don't know about the pump. The
17 W Building yard unit was a heat transfer
18 unit. Just a heater.

19 Q. Was there a pump in that heat
20 transfer unit?

21 A. There usually would be a pump in
22 such a system. I don't know anything
23 specific.

24 Q. Number 7, where it says "CLHS --

25 A. That was another name for central

1 drumming. I think it stood for central
2 liquid handling system.

3 Q. Okay, it states here, "Possible
4 actions," "PCB containing Aroclors will be
5 eliminated from all blends by 4/1/71," and it
6 refers to your memo which we saw earlier of
7 9/23/70. What products were manufactured in
8 the drumming unit?

9 A. That facility did -- made blends
10 of, for plasticizers, Skydrol, Pydraul, and
11 possibly some other things I don't remember,
12 but those were the principal ones.

13 Q. Okay, do you know if Turbinol was
14 blended there?

15 A. It might have been, but I don't
16 know.

17 Q. Okay, page 6, under "TSCl," the
18 "Nash Compressor - HCl system," where it
19 says, "Aroclor 1232 is used as a sealing
20 fluid for the Nash compressor in the HCl
21 system. Losses are estimated at 6,000 pounds
22 annually," is that a large amount of loss for
23 a Nash compressor, as far as you are
24 concerned?

25 A. I guess I don't know. My

1 experience was with much larger compressors
2 that were sealed with sulphuric acid, and
3 there were, there were losses in that days,
4 but for probably different reasons.

5 Q. Why do you say for different
6 reasons?

7 A. It's just a totally different
8 application.

9 Q. Were the losses as large as 6,000
10 pounds annually?

11 A. I don't know.

12 Q. But did you have any familiarity
13 with this compressor?

14 A. No.

15 MS. WELCH: Please mark this as
16 Exhibit 442.

17 (Plaintiff's Deposition
18 Exhibit 442 marked for
19 identification.)

20 MS. WELCH: I'm showing a copy to
21 counsel for Monsanto, and this is marked as
22 TRAN 039080 to 090. It's dated December 7th,
23 1970, from W. F. Papageorge to a list of
24 recipients, including Mr. Savage.

25 (Witness peruses said

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document.)

BY MS. WELCH:

Q. Okay, again I'm going to ask you a very few specific questions. Page 2, under "MCS 1016 - Krummrich," the document says, "Customer trials of the pilot plant product indicated an undesirable high level of low boilers." What are low boilers?

A. Well, low boiler in general, when referring to a fractionated product, means materials that have a lower boiling point than the average of the mixture.

Q. Does this refer to the lower-chlorinated isomers?

A. In this context, those would be lower chlorinated.

Q. Why would it be undesirable to have a high level of those?

A. I don't know.

Q. Is there any concern as to the biodegradability, or do you think there's some other concern?

A. Probably not biodegradability, because the lower ones typically were more biodegradable. It must have been some other

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1 reason having to do with the application.

2 Q. Okay.

3 Under the paragraph "N-C
4 phosphate, Queeny" --

5 A. Yes.

6 Q. -- do you know if N-C phosphate
7 was being developed at the Queeny plant?

8 A. N-C phosphate was being developed
9 for later production at the Queeny plant.
10 Queeny is in there as a designation to
11 indicate that that's the, eventually, home of
12 the product, but the work wasn't being done
13 at Queeny.

14 Q. What does a pilot plant study
15 mean?

16 A. Pilot plant, a pilot plant is
17 typically a very small-scale production unit
18 where a product is made in small quantities,
19 primarily to develop process data, rather
20 than to, than to make a significant number,
21 amount of product.

22 Q. Okay, so this indicates to you
23 that the development of N-C phosphate is
24 somewhere in its early stages?

25 A. Out of the lab and into scale-up,

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1 is what that means.

2 Q. What's the next stage after
3 scale-up?

4 A. As I recall, the next step in this
5 case, after pilot plant, was a trial run in
6 the plant production equipment, but I don't
7 remember when that was done.

8 Q. Okay, how long does that usually
9 take, or how long did it take in this case?
10 Do you recall?

11 A. To actually carry out a test run
12 in the Queeny plant phosphate ester facility
13 would be a matter of four or five days, I
14 suppose, but the preparation for it would go
15 on for considerably longer than that.

16 Q. How much longer?

17 A. Well, in this particular case, to
18 make a trial run making N-C phosphate, the
19 preparation was to get some special raw
20 materials made. N-C phosphate required a raw
21 material that was not commercially available,
22 small P-cumyl phenol. That was a special raw
23 material that was needed to get the physical
24 properties that we wanted in N-C phosphate.
25 It was not an article of commerce, so I had

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1 to arrange to have it made in, by a contract
2 manufacturer.

3 Q. Was that same product used in the
4 Skydrol?

5 A. No.

6 Q. It was different because of
7 different applications?

8 A. Right.

9 Q. Have you ever heard of Stauffer's
10 phosphate ester called Fyrquel?

11 A. Yes.

12 Q. Okay, do you know if they used
13 that product in the Fyrquel?

14 A. No.

15 Q. No, they don't?

16 A. N-C phosphate was a product that
17 we invented for this purpose and was, as far
18 as I know, never used for anything else.

19 Q. Okay, so it's a different,
20 different composition, as far as you know,
21 than the Fyrquel?

22 A. Yes.

23 Q. And when did you get to the trial
24 run? Do you know?

25 A. I don't remember.

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1 Q. What's the step after the trial
2 run?

3 A. If it's successful, then
4 continuous production or continuing
5 production.

6 Q. Do you need to have tests with
7 customers before you get into continuing
8 production?

9 A. Well, certainly.

10 Q. So you have a trial run, then you
11 take it out for testing with customers, and
12 then you have a production run?

13 A. Well, the hydraulic fluids were a
14 somewhat different case, in the sense that we
15 have a fairly large number of different
16 customers for Pydraul, and we would attempt
17 to establish that the, that the products
18 would perform well by doing pump testing and
19 fire testing of our own and then perhaps
20 trying it out with one or two large
21 customers. We wouldn't try it with all the
22 customers before we made a decision to go
23 commercial.

24 Q. Okay, were you ever aware that
25 phosphate ester was developed as an

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1 alternative to Turbinol 153?

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

4 Q. Okay, turn to Page 4 of the
5 document. Under "Biodegradation testing -
6 St. Louis," the sentence reads, "The percent
7 disappearance rates, based on a feed level of
8 1 milligram/cycle, were as follows:" And
9 then it refers to a number of products. MCS
10 1043, what's MCS 1043?

11 A. The "MCS" designation is simply a
12 long series of research identifications, and
13 1043 is just somewhere in the sequence. It
14 could have been anything, really.

15 Q. Okay, does --

16 A. I know what 1016 is, obviously,
17 because of its special significance, but I
18 don't remember what 1043 was.

19 Q. Does this sequence indicate to you
20 that 1043 is the most biodegradable of the
21 products that are listed?

22 A. This data indicates that, yes.

23 Q. And the next most biodegradable,
24 according to here, would be Aroclor 1242?

25 A. That's what this says.

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1 MS. SIMERLY: You might read the
2 next sentence before you comment on that.

3 (Witness peruses document.)

4 BY MS. WELCH:

5 Q. The next sentence says, "However,
6 the observed degradation rates are still
7 highly scattered, indicating that the units
8 have not reached a steady state yet."

9 A. Yeah, this data is inconsistent
10 with our later understanding.

11 Q. What was that later understanding?

12 A. That MCS 1016 was considerably
13 more biodegradable than 1242.

14 Q. Okay. Okay, on Page 6, please
15 read the section to yourself, which says,
16 "Environmental Studies -- Ruabon." Just the
17 environmental studies, Ruabon, not the
18 biodegradation.

19 A. Oh, excuse me.

20 (Witness peruses said
21 document.)

22 BY MS. WELCH:

23 Q. Okay, what is your understanding
24 of how feeding 1242 to pidgeons and quails
25 could end up with residues that resembled

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1 1254 and 1260?

2 A. Well, the only plausible
3 interpretation of that is that the lower
4 isomers, lower-chlorinated isomers of 1242
5 had been metabolized in some way and that
6 what's left looks like 1254 and 1260.

7 Q. Were you aware of that at the time
8 of this finding?

9 A. Not this particular one.

10 Q. Is this consistent with your
11 general understanding of this time?

12 A. Yes.

13 Q. Okay, page 7, there's a list of
14 products that starts with MCS 1016. Do you
15 know what MCS 717 is?

16 A. No.

17 Q. How about MCS 762?

18 A. No.

19 Q. Page 8. What is Turbinol 153-A?

20 A. The "A" implies it's a
21 reformulation, but I don't know what it is.

22 Q. Why does the "A" imply to you that
23 it's a reformulation?

24 A. That was simply a way that we
25 distinguished the earlier products from the

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1 later ones, tacking the "A" on.

2 Q. That was a general practice at the
3 time?

4 A. Yes. I don't know if it was
5 universal, but it was a general practice.

6 Q. What is MCS 1063?

7 A. I don't know.

8 Q. Do you know who worked on Turbinol
9 153-A or MCS 1063?

10 A. It was in Lou Stark's group, I
11 suppose, but I don't know who worked on it.

12 Q. Why do you say that it was in Lou
13 Stark's group?

14 A. Because industrial fluids were his
15 responsibility.

16 Q. Okay. Do you know what happened
17 to the development of this product?

18 A. No.

19 Q. Do you know if it was ever brought
20 to fruition?

21 A. No. I'm sure that the earlier
22 version was phased out because we
23 reformulated everything, but whether we
24 actually introduced this particular product,
25 I don't know.

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1 Q. Do you have any knowledge of
2 whether an alternative fluid was ever
3 developed for Turbinol 153?

4 A. No, I don't know.

5 MS. WELCH: I'd like to have this
6 marked as Exhibit 443.

7 (Plaintiff's Deposition
8 Exhibit 443 marked for
9 identification.)

10 MS. WELCH: Exhibit 443 is a
11 multipage document bearing the Bates stamp
12 number TRAN 037621 to 037633, and it's
13 entitled "Tentative process for Aroclor 6037
14 (MCS 1057-1.)," and Mr. Savage is listed as,
15 on the distribution list inside the document.
16 BY MS. WELCH:

17 Q. Please turn to the page that has
18 "1" at the top of it, which says
19 "Introduction." What is 5460?

20 A. Aroclor 5460 was a so-called solid
21 Aroclor. It's a terphenyl, chlorinated to 60
22 percent chlorine, and then distilled.

23 Q. So it's different than a
24 polychlorinated biphenyl?

25 A. Yes. The "5" at the beginning

1 implies terphenyl, rather than biphenyl, as
2 the raw material.

3 Q. Do you know why 1242 was being
4 replaced for Radiator Specialty Company?

5 A. Radiator Specialty, as I was told
6 at the time, was making a product that was
7 used in some kind of automotive preparation
8 that was sold for stopping leakage in, in
9 transmissions, and that was considered to be
10 a sort of open application in the sense that
11 a person wouldn't buy it unless the
12 transmission was leaking, and therefore, it
13 didn't seem like a very good idea that
14 Aroclor 1242 be in that product.

15 Q. Okay. So Radiator Specialty
16 Company was actually using the Aroclors in
17 their own product?

18 A. That's what I was told.

19 Q. Do you know whatever happened to
20 this product? Was it developed?

21 A. I don't know whether we ever made
22 it or not. It would have been very easy to
23 make, so we might have, but I don't know.

24 Q. Okay. This document is entitled
25 "Tentative Process for Aroclor 6037." Where

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1 along the chain of getting to final
2 production status would a tentative process
3 plan be or is a tentative process plan?

4 A. The transmittal of a tentative
5 process by Research essentially means
6 Research believes their job is finished and
7 is ready for Engineering or Manufacturing to
8 do whatever is needed to put the process into
9 effect.

10 Q. And what's the next step?

11 A. That would be dependent on the
12 circumstances. This being a simple blend,
13 the next step would only be a decision as to
14 whether it was desirable to make it or not
15 because no, no investment was required to put
16 it into effect.

17 MS. WELCH: This is document 444.
18 (Plaintiff's Deposition
19 Exhibit 444 marked for
20 identification.)

21 MS. WELCH: I'm showing a copy to
22 counsel for Monsanto.

23 BY MS. WELCH:

24 Q. Exhibit 444 is a two-page document
25 bearing the stamp TRAN 043014 to TRAN 043015.

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1 It's dated June 1st, 1971. It's from
2 R. H. Munch to Mr. Savage.

3 (Witness peruses said
4 document.)

5 BY MS. WELCH:

6 Q. Okay, turning to the paragraph
7 which says, "One new specification must be
8 added. That is penta and hexachlorobiphenyl
9 content," is that a specification, to list
10 what the content of the various isomers is?

11 A. Until the introduction of 1016,
12 that was not part of our specifications,
13 because it was not routinely measured. I
14 don't really know whether we normally added
15 the specification, as Ralph proposes here, or
16 not. I don't remember.

17 Q. Was it your understanding that
18 1016 had a content of less than .3 percent of
19 the higher-chlorinated biphenyls?

20 A. I don't remember, remember
21 quantitatively; I just know it was a lot
22 lower than 1242.

23 MS. WELCH: Please mark this as
24 Exhibit 445.

25 (Plaintiff's Deposition

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1 Exhibit 445 marked for
2 identification.)
3 (Witness peruses said
4 document.)

5 MS. WELCH: Exhibit 445 is a
6 one-page document bearing a number of
7 identifying stamps, but I will use the one at
8 the bottom right, which says "300 2628," and
9 it appears to be a memo from W. P. Papageorge
10 to G. Robert SIDE-oh (Phonetic) or SEED-oh
11 (Phonetic), with Mr. Savage as part of the
12 distribution list.

13 BY MS. WELCH:

14 Q. Okay, do you recognize the
15 handwriting on this?

16 A. No. It's not mine.

17 Q. Okay, who is Robert Sido?

18 A. He was in our Shipping-Material
19 Handling Group, responsible for packaging and
20 labels.

21 Q. Were you aware of this label
22 change at the time?

23 A. Yes.

24 Q. Okay. Was this a different label
25 than had been previously used for the

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1 Aroclors?

2 A. It was an additional label.

3 Q. Do you have any recollection of
4 what the previous labels stated?

5 A. We had always had the normal,
6 standard Monsanto label. I don't remember
7 what it said. We decided to put this
8 additional label on.

9 Q. Okay. Do you know if the previous
10 label contained any environmental warnings?

11 A. I don't remember.

12 Q. Okay.

13 A. I remember it was a separate
14 label. I'm not sure it was, but that's the
15 way I remember it.

16 Q. Did all of the products, all of
17 the Aroclor products have the same label?

18 A. To my recollection, this warning
19 label was put on every product that had
20 Aroclor in it, biphenyl-based Aroclor. We,
21 of course, used the name, trade name
22 "Aroclor" for so-called solid Aroclors which
23 were based on terphenyl.

24 Q. Well, I'm -- my questions are
25 restricted only to the polychlorinated

1 biphenyl, rather than terphenyl.

2 A. Yes, it's my recollection that
3 when we decided to use this label, we decided
4 to use it on all products that contained
5 those Aroclors.

6 Q. And including blends?

7 A. Yes.

8 Q. That contained Aroclors?

9 A. Yes.

10 Q. So not only the pure Aroclor?

11 A. Yes.

12 Q. Like the Aroclor 1442, but the
13 Turbinol?

14 A. Yes, because it said it contains
15 polychlorinated biphenyl, not just that it
16 is.

17 MS. WELCH: Okay, this is Exhibit
18 446.

19 (Plaintiff's Deposition
20 Exhibit 446 marked for
21 identification.)

22 MS. WELCH: I'm showing this to
23 counsel for Monsanto.

24 MS. WELCH: Exhibit 446 is
25 identified with a stamp TRAN 060812, and it's

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 a one-page document that appears to be from
2 W. P. Papageorge to Mr. Savage.

3 (Witness peruses said
4 document.)

5 BY MS. WELCH:

6 Q. In this memo to you, Mr.
7 Papageorge asks you to see that the plants
8 order their supply of the labels and
9 immediately begin using them on the new
10 packaged Aroclors. Did you implement his
11 suggestion?

12 A. Yes.

13 Q. Okay, did you put it on all -- did
14 you make sure that you -- the labels appeared
15 on all Aroclor products?

16 A. Well, I gave those instructions.
17 I didn't do it myself.

18 Q. Okay, who did you give the
19 instructions to?

20 A. Well, to the plant people.

21 Q. And who were the plant people?

22 A. Well, I'm not sure I can tell you
23 by name, but it would have been production
24 person, the production person at each plant
25 that was responsible for, for

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1 Aroclor-containing products that were
2 packaged.

3 Q. Do you know if you memorialized
4 those instructions in any writing or were
5 they oral instructions?

6 A. I really don't know.

7 Q. Was your general practice at that
8 time to communicate orally or to issue
9 written instructions?

10 A. No, I -- my general practice would
11 have been to just make xerox copies of this
12 to the plant people and, with a written
13 instruction to let's get on with it.

14 Q. Okay, and that went to all plant
15 people who -- at the plants which produced
16 Aroclors?

17 A. Well, I don't remember the
18 specific memo, so exactly what I did, I don't
19 know, but in some routine way, I'm sure I
20 gave instructions to all the plants.

21 Q. Okay, and did that include the
22 plants that blended the Aroclors, as well,
23 into final products?

24 A. Yes.

25 Q. Do you notice, do you have any

1 idea of what happened after that? Did anyone
2 report back to you on whether this plan had
3 been carried out?

4 A. Well, I observed personally they
5 had been carried out. I'm fairly confident
6 that we did.

7 Q. How did you observe it personally?

8 A. I visited the plants regularly.
9 Just in touring around through the
10 operations, I would observe all kinds of
11 things, including how we're packaging
12 products.

13 Q. So it would be a spot check on
14 your part?

15 A. Yes.

16 Q. Were you confident that this label
17 was put on all final products?

18 A. Yes.

19 Q. Okay. Would it surprise you if I
20 told you that this label didn't appear on the
21 Turbinol product?

22 A. Yes.

23 MS. WELCH: This is Exhibit 447.

24 (Plaintiff's Deposition

25 Exhibit 447 marked for

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

identification.)

BY MS. WELCH:

Q. First, I have one more question,
one last question on the Aroclor labels.

MS. SIMERLY: Yeah, go ahead.

MS. WELCH: I thought you had a
question, too.

MS. SIMERLY: Okay, just pulling
it out.

BY MS. WELCH:

Q. My question is, did you have a
specific time frame on when this was supposed
to be accomplished? This is dated April
30th, 1970.

A. It was to be done immediately; as
soon as the labeled arrived, they should be
used.

Q. Okay, Exhibit 447 is a one-page
document with a date of April 7th, 1970, from
P. G. Benignus to D. A. Olson, and Mr. Savage
is on the distribution list.

(Witness peruses said
document.)

MS. WELCH: The identifying stamp,
amongst others, is T 091821.

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1 (Witness peruses said
2 document.)

3 BY MS. WELCH:

4 Q. Okay, do you recall this meeting
5 with Westinghouse?

6 A. I remember several such meetings
7 with customers on this kind of topic. I
8 don't remember this particular one.

9 Q. Okay, which meetings, which
10 customers do you recall meeting with?

11 A. Well, I remember meeting with
12 General Electric and probably with one or two
13 others, but I, the only one I remember
14 specifically is General Electric.

15 Q. Do you remember when the meeting
16 with General Electric occurred?

17 A. No, but it would have been in the
18 same time frame; within a couple of months, I
19 would say.

20 Q. Do you recall who else from
21 Monsanto attended that meeting?

22 A. Papageorge and Benignus, and some
23 technical people, but I can't be more
24 specific than that.

25 Q. Do you recall what was said about

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 the PCB problem at this meeting with GE? I'm
2 not referring to this document anymore,
3 because you have no recollection of that.

4 A. These were pretty practical
5 working-level meetings. It was, we discussed
6 things like sampling techniques and control
7 procedures.

8 Q. By control procedures, do you mean
9 control of the Aroclors?

10 A. Right.

11 Q. Do you recall if you informed GE
12 at this meeting that the PCB would be
13 withdrawn?

14 A. I wouldn't think so. The decision
15 to withdraw Aroclor from electrical
16 applications was considerably later.

17 Q. Was considerably later?

18 A. Yes.

19 Q. So you wouldn't have informed them
20 at this time because it wasn't a
21 consideration?

22 A. Not that the products would be
23 completely withdrawn from the market, no,
24 because it wasn't done in this time frame.

25 Q. Was GE a user of the -- did they

1 use them for transformers or capacitors?

2 A. Both.

3 Q. Okay, so were they a customer for

4 MCS 1016?

5 A. Yes.

6 Q. Do you recall whether there was

7 discussion of MCS 1016 at this meeting?

8 A. I don't -- no, I don't remember

9 when we first described it to GE. I would

10 not have been involved in telling GE about

11 that, anyway.

12 Q. Why would you have attended a

13 meeting with GE?

14 A. To share some practical experience

15 at the plant, to the degree it might be

16 applicable to their own situation.

17 Q. Did they blend their own products,

18 using the Aroclors?

19 A. I think they did. I don't know it

20 for a fact. Obviously, what we shipped is

21 what we shipped, but I think they did.

22 Q. Okay, do you know what you shipped

23 to them?

24 A. We shipped GE, Aroclor 1242 -- I'm

25 really speaking from Anniston plant

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1 experience when I was a production person --
2 we shipped 1242, 1254. I think 1260.

3 Q. So you didn't ship them a blended
4 product, but rather, the straight Aroclors?

5 A. We made the Pyranols, some of the
6 Pyranols which were General Electric blends,
7 but what exactly we shipped to General
8 Electric, I'm not sure. I suppose we shipped
9 those things to General Electric.

10 Q. What was the primary Aroclor in
11 Pyranol?

12 A. Well, we used the term "Pyranol"
13 to imply blends that were used in
14 transformers, and the Aroclors that were used
15 in those blends were 1254 and 1260, and one
16 of those was predominantly General Electric
17 and one was predominantly Westinghouse, but I
18 don't remember which was which.

19 Q. The predominant Aroclor used in a
20 capacitor was 1242?

21 A. Right. Right, almost exclusively.

22 MS. WELCH: Please mark this as
23 Exhibit 448.

24 (Plaintiff's Deposition

25 Exhibit 448 marked for

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 identification.)

2 MS. WELCH: Exhibit 448 is a
3 multipage document bearing -- it's a
4 handwritten document bearing Bates stamp TRAN
5 066864 to 066870, and first of all, do you
6 recognize this handwriting?

7 A. No. It's not mine.

8 Q. Okay. Have you ever seen this
9 before?

10 A. I don't recognize it.

11 Q. Does this document look familiar
12 to you as a kind of document that you know
13 about?

14 A. No. It seems to be a research
15 document, just because "OR" is used on the
16 designation of the samples, and that means
17 Organic Research.

18 Q. And you are referring to
19 "Subject," where it says "OR 173711"?

20 A. And so forth, yes.

21 Q. And "OR" refers to Organic
22 Research; is that correct, sir? Is that
23 correct?

24 A. That's my recollection.

25 Q. Turning to Page 5 of the document,

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1 which is TRAN 066868, under the date 2-8-71,
2 or across from there is a subject which
3 refers to "Summary of Agway work - part of,"
4 and there is a list, your name is on that
5 list, what is Agway? Do you know?

6 A. It's a company, but I don't know
7 anything about it.

8 Q. Do you know whether it's a company
9 at which some PCBs were found in any
10 material?

11 A. I don't know.

12 Q. No idea; okay.

13 MS. WELCH: This is Exhibit 449.

14 (Plaintiff's Deposition
15 Exhibit 449 marked for
16 identification.)

17 MS. WELCH: Exhibit 449 is a
18 two-page document bearing the stamp TRAN
19 085106, dated September 20th, 1971, from
20 W. R. Richard to C. W. Roos, R-o-o-s, and Mr.
21 Savage is listed as one of the recipients

22 MS. WELCH: I might note for the
23 record that the second page of the document
24 is not Bates stamped in sequence. It's Bates
25 stamped TRAN 0851106789.

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1 THE WITNESS: And it doesn't
2 appear to be the same subject matter, either.

3 MS. WELCH: I don't know --

4 THE WITNESS: I don't understand
5 why these are attached to one another.

6 MS. WELCH: I don't know, either.

7 BY MS. WELCH:

8 Q. Who is Mr. Roos, R-o-o-s?

9 A. Bill Roos was a research director.
10 I think he had some broad oversight
11 responsibility, which included Bill Richard's
12 activities.

13 Q. Do you know if he is still alive?

14 A. I think so, but I don't know.

15 Q. Is he still at Monsanto?

16 A. I don't think so.

17 Q. Were you aware that Turbinol 153
18 was an exception to the reformulation of
19 chlorinated biphenyls from Pydrauls?

20 A. No.

21 Q. So I take from that you have no
22 idea why that exception was made?

23 A. No.

24 Q. On the next page, which, as you
25 said, doesn't seem to bear any relationship

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1 to the first page but is, nonetheless,
2 stapled together, what is this document? Do
3 you know? Is it a familiar document to you?
4 I mean the form of the document.

5 A. It's some kind of shipping
6 document, but it's not anything that I have
7 ever worked with routinely.

8 Q. Okay, do you have any idea why
9 Turbinol 153, which this document seems to
10 refer to, is being shipped to the Saw-GET
11 (Phonetic) plant?

12 A. Saw-JAY (Phonetic).

13 Q. Or the Sauget plant?

14 A. No.

15 Q. Do you have any idea whether there
16 is any transfer of production of this product
17 at this time?

18 A. No. I don't know where -- I don't
19 remember where we blended Turbinol 153. It
20 may have been the Krummrich plant, but I
21 don't know.

22 MS. SIMERLY: There's a date 72.

23 MS. WELCH: Yes, the date appears
24 to be December 25th, 1972.

25 BY MS. WELCH:

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1 Q. Was this, as far as you know,
2 subsequent to the termination of the
3 production of Turbinol 153?

4 A. I think so.

5 Q. And you have no idea why the
6 shipping was taking place?

7 A. I can only speculate. I don't
8 know.

9 Q. I don't want your speculation.

10 MS. WELCH: See, I'm doing your
11 work for you.

12 MS. SIMERLY: I appreciate it,
13 Dana.

14 MS. WELCH: Okay, Exhibit 450.
15 (Plaintiff's Deposition
16 Exhibit 450 marked for
17 identification.)

18 MS. WELCH: Exhibit 450 bears a
19 couple of distinguishing identification
20 marks, including BIR 007996, and the last
21 number is BIR 008008. It's a multipage
22 document from Mr. Papageorge to a number of
23 people including Mr. Savage, dated October 6,
24 1970.

25 MS. SIMERLY: Can I make an

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1 interruption first and make an observation?
2 I think this is, in fact, in sequence. The
3 number 4 --

4 MS. WELCH: What are you referring
5 to?

6 MS. SIMERLY: I'm referring to the
7 second page of document, Exhibit 449. The
8 number 4 in the right lower corner suggests
9 to me that that's the fourth of a series of
10 copies of the identical document, and if you
11 look at TRAN 085106 and 085110, if there had,
12 indeed, been three other carbons of this
13 document, 1, 2, 3 and 4, that could account
14 for the number. It doesn't make a whole lot
15 of sense to me, either, but the 1, 2, 3 and 4
16 would have been absolute duplicates. I don't
17 know.

18 MS. WELCH: Well, if I could
19 request --

20 THE WITNESS: Now you are
21 speculating.

22 MS. WELCH: Yes, that's
23 speculation, and you haven't been sworn, in
24 either.

25 MS. SIMERLY: I'm just trying to

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 help out, Dana.

2 MS. WELCH: I appreciate that, but
3 if I could ask you, Miss Simerly, if you
4 could check why there is missing Bates stamp
5 numbers between 106 and 110, I would
6 appreciate that.

7 MS. SIMERLY: Sure. It's on my
8 notes to myself right there.

9 MS. WELCH: On the list of things
10 to do; good.

11 (Discussion off the record.)

12 MS. WELCH: Okay, back on the
13 record.

14 BY MS. WELCH:

15 Q. Okay, I'm going to ask you a few
16 questions about this document, and again, if
17 you'd like to take the time to read it, if
18 not, we can go through the sentences that are
19 of most interest.

20 A. Go ahead.

21 Q. The first sentence says,
22 "Performance against the PCB plan was
23 reviewed with the CMC on September 14." Were
24 you present at the meeting with the CMC on
25 September 14th?

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1 A. No.

2 Q. Please read to yourself the
3 sentence which begins with "However, it was
4 emphasized" in that paragraph.

5 (Witness peruses said
6 document.)

7 BY MS. WELCH:

8 Q. Okay, did you have any contacts
9 with customers in the normal course of your
10 business?

11 A. Not in the normal course of my
12 responsibilities. It was only in the -- in a
13 special meeting like the one we described
14 earlier with GE.

15 Q. Okay. Were you aware of this
16 general policy of fully documenting warnings
17 to customers at this time?

18 A. I was generally aware of that, but
19 since it was not part of implementing of
20 that, I wouldn't -- I would not have have
21 been involved in a significant way.

22 Q. Okay, in paragraph 2, where it
23 says, "Two variances from the original plan,"
24 at paragraph 2, it says, "It was recognized
25 that good progress is being made in

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1 reformulating industrial hydraulic fluids and
2 that it was not easy to completely replace
3 PCBs with alternate material." What was your
4 understanding of why it was not easy to
5 replace the PCBs with alternate material?

6 A. PCBs are fairly remarkable and
7 unique materials. They are unusual in that
8 they are so stable and fire resistant and yet
9 fluid, decent lubricants. It is very
10 difficult to find another material that has
11 that balance of properties.

12 Q. Do you know if there was any
13 problem with discovering that there were
14 traces of PCBs in the terphenyl reformulated
15 Pydrauls?

16 A. Well, we did realize that there
17 was, that there was chlorinated biphenyl in
18 the chlorinated terphenyl, just because there
19 was some biphenyl in the terphenyl.

20 Q. Did you realize that at the time
21 that the Pydrauls were originally
22 reformulated, or did you find that out later?

23 A. It was an interesting issue in
24 that the question was simply not raised. We
25 were in such a hurry to reformulate, to move

1 toward terphenyls, that no one stopped to
2 ask, "Is there any biphenyl at all in it?"
3 Once the question was asked, the answer was
4 readily answered.

5 Q. Did that have anything to do with
6 the decision to reformulate the Pydrauls a
7 second time?

8 A. The decision to reformulate the
9 second time happened for two reasons. One
10 was that the phosphate esters were ready by
11 then, or at least getting ready, and the
12 other was that there was a feeling that if we
13 wanted to be able to say that the products
14 were totally free of PCBs, we were unable to
15 make that, that statement.

16 Q. And when were the phosphate esters
17 ready, approximately?

18 A. Oh, I don't remember. It was
19 another rush project.

20 Q. Okay, turning to the paragraph
21 under "Marketing," the statement is made
22 that, "Our distributors are well on their way
23 to zero inventories of the Aroclors." And
24 that's on Page 2. Excuse me.

25 MS. SIMERLY: Where is that on

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1 Page 2?

2 MS. WELCH: Under the marketing,
3 it's the second sentence under "Marketing,"
4 or the third sentence.

5 THE WITNESS: Oh, okay.

6 (Witness peruses said
7 document.)

8 BY MS. WELCH:

9 Q. Were the blended products made for
10 inventories, or were they produced on a batch
11 basis, as a general rule?

12 A. Yes.

13 Q. Yes? The answer to that is yes.
14 Okay?

15 A. They are made batch-wise, but
16 some, some products, and particularly certain
17 Pydrauls, were used by a number of smaller
18 companies, and it would be impractical to
19 make, to order in, so we would hold an
20 inventory of drum product. Some blends, for
21 instance, transformer for General Electric,
22 were shipped in bulk and would be made to
23 GE's orders.

24 Q. Okay. Do you know what the --
25 whether Turbinol 153 was made to batch?

GORE REPORTING COMPANY - ST. LOUIS, MISSOURI

1 A. I don't remember.

2 Q. Is there any way of ascertaining
3 that?

4 A. Only from inventory records.
5 Turbinol 153 was a relatively small product,
6 and you won't -- it would be hard to find
7 anyone who would remember exactly what our
8 production plant was.

9 Q. Why do you say that it was a
10 relatively small product?

11 A. My recollection is it's a small
12 volume compared to the Pydraul family, which
13 we considered to be the total industrial
14 fluids business.

15 Q. Could you estimate what percentage
16 of the Pydraul business it was?

17 A. I have no idea. I'm sure it's
18 somewhere in our records, but I don't
19 remember.

20 Q. Was there a general practice of,
21 during this period of reformulation when the
22 new products were coming out, for instance,
23 reformulated Pydrauls, to your knowledge, was
24 there a practice of selling out the existing
25 inventory before there was the beginning of

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1 the sale of the new product?

2 A. It was pretty carefully
3 orchestrated, in that we wanted to have a
4 clear ending and beginning, partly because
5 when we introduced the new products, it would
6 be necessary to shut down the equipment for
7 awhile and clean it out to make sure that the
8 new beginning of the new product was very
9 precise and that new product was just the new
10 product and it didn't have any of the old
11 product mixed with it, so we would plan
12 fairly carefully so that the inventory would
13 be down to zero or as close to zero as we
14 could get it when the new production became
15 available, but it wasn't exactly a matter of
16 selling out inventory, it was more a matter
17 of planning. We would set a target date for
18 when we would start the new product and then
19 we would plan production of the old one so
20 that the inventory would run down by then.

21 Q. Turning to Page 3, under "N-C
22 phosphate" --

23 A. Yes.

24 Q. What does this indicate to you
25 where the process was in terms of getting it

1 ready for a production run? And this is
2 in --

3 A. October?

4 Q. October 1970.

5 A. It's not completely consistent
6 with the document we talked about earlier
7 that spoke of pilot plant. Bench scale
8 usually means laboratory, something smaller
9 than pilot plant, but proving it out in the
10 EE Building, the EE Building was the full-
11 scale production plant, and so that
12 represents a full-scale demonstration in a
13 production plant, rather than a pilot plant,
14 so it appears that there's been some switch
15 in nomenclature between the two documents
16 we've talked about, and I don't know which
17 one is right.

18 Q. On Page 5, under "Industrial
19 hydraulics," there is a statement, "The
20 removal of Aroclor 1242 from all Pydrauls
21 will require a reformulation," and there's a
22 variety of products, including MCS 153. Is
23 it your understanding that MCS 153 and
24 Turbinol 153 were different nomenclature for
25 the same product?

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1 A. Yes.

2 Q. Okay. Do you know whatever
3 happened to the reformulation of MCS 153?

4 A. No.

5 Q. The next paragraph --

6 A. My recollection is that we did
7 them all, but I can't tell you anything
8 specific about one product.

9 Q. The next sentence in the first --
10 the first, next paragraph, first sentence,
11 "It will be desirable to make a hydraulic
12 fluid applications into a closed loop
13 system." What does "closed loop system" mean
14 to you?

15 A. Well, closed loop implies that
16 it's a system which, even though it involves
17 some circulation of fluid, there is nothing
18 getting out.

19 Q. Well, the next sentence says, "We
20 cannot expect to stop leaks but we can expect
21 to minimize contamination of water by,"
22 there's a number of suggestions. So does
23 that, looking at that, does that help refresh
24 your recollection about how to make -- about
25 what a closed loop system meant?

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1 A. Well, I think it means basically
2 what it says: It's closed, that there aren't
3 any, any pathways for fluid to routinely
4 leave the system.

5 Q. But the sentence says that, "We
6 cannot expect to stop leaks," so that would
7 mean that it's not a closed system; correct?

8 A. That's a rather pessimistic
9 statement, I guess.

10 Q. Do you disagree with that
11 statement?

12 A. In the abstract, I don't disagree
13 with it, but good practices can certainly
14 minimize leaks.

15 MS. WELCH: This is document 451.
16 I'm showing a copy to counsel for
17 Monsanto.

18 (Plaintiff's Deposition
19 Exhibit 451 marked for
20 identification.)

21 BY MS. WELCH:

22 Q. Document 451 is a multipage
23 document bearing the identifying figure of
24 TRAN 003508 to 11, and it's just, it's dated
25 October 1971 from Howard Bergen to a number

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1 of people, including Mr. Savage, and please
2 turn to the first page of the text, under
3 "Hydraulics and Lubricants," and read to
4 yourself the second paragraph.

5 (Witness peruses said
6 document.)

7 BY MS. WELCH:

8 Q. Were you aware at the time -- and
9 this is October 1971 -- that Monsanto was
10 still actively selling Turbinol 153 that had
11 not been reformulated?

12 A. No, but this is, this is a
13 marketing report for the month, and Tom
14 Gossage is reporting to his boss what our
15 sales were. Since he calls it Turbinol 153,
16 it sounds like it's an unreformulated
17 version, but I don't have any recollections
18 about that.

19 Q. Did you need to know what the
20 sales were in order to project production?

21 A. Not after the fact. I needed a
22 sales forecast. If it had been sold, I must
23 have made it already.

24 MS. WELCH: This is document 452.

25 (Plaintiff's Deposition .

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Exhibit 452 marked for
identification.)

BY MS. WELCH:

Q. Document 452 is a three-page document bearing the identifying figure TRAN 003080 to 082. It's dated 10/4/71, and the title on it is "Department 259," and it appears to be a document about the mix of Turbinol 153.

Does this document look familiar to you?

A. Not really. It's a plant document. It would have been used within the Krummrich plant to record the making of a blend.

MS. SIMERLY: Do you see his name anywhere on this?

MS. WELCH: No, his name is not on it.

MS. SIMERLY: Okay.

MS. WELCH: But it's a production document, so I assume it's a production document.

BY MS. WELCH:

Q. So this reflects the making of a
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1 blend of Turbinol 153?

2 A. Well, number one mix tank was a
3 blend tank at Krummrich that was associated
4 with the Aroclor Department.

5 Q. Can you tell from this document
6 what quantity of Turbinol 153 is being mixed
7 here?

8 A. Well, it would take a bit of
9 interpretation.

10 Q. No, I don't want you to spend a
11 lot of time on it. It's not a very important
12 point.

13 Is there anything on this document
14 which indicates to you that as of October
15 1971, at least, this mix of Turbinol 153 had
16 had the PCBs formulated out of them?

17 A. One of the components that's shown
18 here on the bill of materials is 1242, so
19 presumably, that's Aroclor.

20 Q. So the Aroclor has not been
21 reformulated out of this mix?

22 A. That's what this document tells
23 me.

24 MS. WELCH: This is Exhibit 453.

25 (Plaintiff's Deposition

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Exhibit 453 marked for
identification.)

MS. WELCH: Okay, Exhibit 453 is a
one-page document that bears a stamp TRAN
003085. It's from a Mr. Dykstra --

A. DYKE-stra.

Q. Dykstra to Don Mayer, and it has
Jim Savage's name up in the left-hand corner,
written in handwriting. And at the bottom,
it says "F.Y.I. Earl."

(Witness peruses said
document.)

BY MS. WELCH:

Q. Do you recall seeing this document
before?

A. No.

Q. Who is Earl?

A. Earl is Earl Potter. That's his
handwriting.

Q. What's his position or was his
position?

A. Earl Potter was our production
planner at the general office who gave
instructions on production plans to the
production plan people at the plants, and Don

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1 Mayer was the production planner at the
2 Krummrich plant. Bob Dykstra was the
3 production planner at the Queeny plant.

4 Q. Do you know why production of
5 Turbinol 153 had been transferred to the
6 Krummrich plant at this time?

7 A. I wouldn't know. I didn't even
8 know it was formulated or I didn't remember
9 where it was, where it was blended.

10 Q. Okay. Do you know why this
11 product was still being produced in November
12 1971?

13 MS. SIMERLY: Well, now, I'm going
14 to object. I think that assumes facts not in
15 evidence.

16 BY MS. WELCH:

17 Q. I direct your attention to the
18 last paragraph, which says, "It is also
19 requested that you order this material" --
20 which refers to FH-139, which is an additive
21 in the Turbinol 153 formulation, "to be sent
22 to your plant and retain it for future
23 MCS-153 production." And I direct your
24 attention also to the first paragraph, which
25 says, "Production of Turbinol 153 has been

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1 transferred to the WGK plant," and my
2 question to you is, do you know why --

3 A. Bob, in fact, it's kind of
4 ambiguous in this letter because in the
5 middle paragraph, he says that, "Plan either
6 to blend it off or incinerate it, based on
7 direction from the Business Group," so the
8 destiny of this small inventory apparently
9 had not been decided at that time, which is
10 not exactly consistent with continuing to
11 make it.

12 BY MS. WELCH:

13 Q. Is this a small inventory that is
14 referred to here?

15 A. Yes.

16 Q. Why do you call it a small
17 inventory?

18 A. Well, two drums and six five-
19 gallon -- 55-pound cans, in industrial terms,
20 is not much stuff.

21 Q. Okay. So -- but you have no
22 independent recollection of whether there
23 were plans still to produce the Aroclor --
24 the Turbinol 153 at this time?

25 A. No.

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1 Q. Do you know who was responsible
2 for the development of the phosphate esters?

3 MS. SIMERLY: Do you mean a
4 person, as opposed to a department?

5 BY MS. WELCH:

6 Q. If there was a person who was
7 responsible for the development of phosphate
8 esters.

9 A. Well, in research, that
10 responsibility ultimately was Bill Richard's,
11 but he had two, two group leaders involved.
12 Lou Stark was the expert on, on formulation
13 of fluids in performance testing. John
14 Herber (Phonetic) was responsible for process
15 development, and the development of the
16 process to make the N-C phosphate was done
17 under John Herber.

18 Q. So he would develop the actual
19 implementation of the process?

20 A. Well, the phosphate ester base
21 stock was needed before the new phosphate
22 ester fluids could be developed, so John
23 developed a process to make that base stock,
24 and then Lou Stark developed the blends based
25 on that base stock in the formulations.

1 MS. WELCH: Would you please mark
2 this as Exhibit 454?

3 (Plaintiff's Deposition
4 Exhibit 454 marked for
5 identification.)

6 MS. WELCH: Exhibit 454 is a
7 multipage document bearing the identifying
8 marks of TRAN 002492 to TRAN 002508 dated
9 December 8, 1971, from C. L. Bradford and
10 J. H. Davidson to T. L. Gossage, and Mr.
11 Savage is listed as on the distribution list.
12 BY MS. WELCH:

13 Q. Okay, I'm going to ask you very
14 specific questions, so maybe we can just turn
15 our attention to specific paragraphs.

16 The second paragraph says, "Our
17 position is changing," and then I want to
18 skip to a line which says, "This leaves us
19 with a line of resale water glycol fluids
20 available now, a straight phosphate ester
21 available shortly, and a lower cost
22 oil-phosphate ester blend promised for the
23 first quarter of 1972."

24 What are resale water glycol
25 fluids?

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1 A. There's a completely different
2 kind of industrial hydraulic fluid which is a
3 blend of water and glycols. I think ethylene
4 glycol, it's almost like antifreeze. They're
5 very low cost and they can be fire resistant
6 if they are maintained correctly, but they're
7 more troublesome for a customer at a very low
8 cost, and we did not make those materials
9 ourselves. We bought them from somebody else
10 and put our label on them and sold them.

11 Q. Okay. Does this document refresh
12 your recollection about the state of
13 production of phosphate ester in December
14 1971?

15 A. Well, it helps to define the time
16 parameters.

17 Q. How so?

18 A. Well, just from the context, we
19 had not yet introduced a phosphate ester
20 fluid, but apparently, we were going to do so
21 pretty soon.

22 Q. Okay, and how about the lower cost
23 oil-phosphate ester blend? What is that?

24 A. That was simply formulation, the
25 kind of thing that Lou Stark did.

1 Q. Do you know what applications that
2 was for?

3 A. I don't remember, but we did
4 introduce oil-phosphate ester blends.

5 Q. Page 3. Under "Capacity," do you
6 see that paragraph that says "Capacity"?

7 A. Hmm.

8 Q. There's a reference to the new
9 phosphate ester plant. Do you remember a new
10 phosphate ester plant?

11 A. Well, we never built a new
12 phosphate ester plant.

13 Q. Where was phosphate ester
14 ultimately produced?

15 A. We had existing phosphate ester
16 facilities at the Queeny plant and also at
17 the Delaware River plant in New Jersey. When
18 we, in fact, made the N-C phosphate, we made
19 it by adding some equipment to the phosphate
20 ester plant at Queeny. It was not a new
21 plant.

22 Q. Turning to Appendix F on the page
23 that's stamped TRAN 002504, I note that there
24 are two Appendix F's, but this is the first
25 Appendix F, which says, "1972 Financial

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1 Results," and it says -- are we all on the
2 same page, where it says TRAN 002504? Okay,
3 is this a sales forecast?

4 A. It's a budget. It's -- to be a
5 sales forecast would require a little more
6 detail by month, and so forth. It's kind of
7 a generalized forecast for budget purposes.

8 Q. Okay, would you base your
9 production on figures like this?

10 A. No, I would, I would expect more
11 detail for production purposes.

12 Q. Now, this document is dated
13 December 1971, so this is some kind of sales
14 forecast for 1972; do you agree?

15 A. Yes, or perhaps a summary of the
16 sales forecast.

17 Q. Okay. Directing your attention to
18 about halfway down, it says, "Turbinol 153"
19 and it lists volumes, sales, and gross
20 profit.

21 Does this indicate to you that
22 there's an expectation of production of
23 Turbinol 153 for the coming year?

24 MS. SIMERLY: I'm going to object
25 at this point. This is a document that was

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1 prepared by Jerry Davidson and Larry
2 Bradford. Mr. Bradford, I know, was deposed
3 two days ago. Mr. Savage had absolutely no
4 input into this, and I think asking for his
5 interpretation of Mr. Bradford and Mr.
6 Davidson's inclusion of Turbinol 153 in this
7 list is just inappropriate. He can answer
8 the question, but I do want an objection on
9 the record.

10 BY MS. WELCH:

11 Q. Okay, do you remember the
12 question?

13 A. Maybe you better state it again.

14 MS. SIMERLY: Sorry.

15 MS. WELCH: That's okay. Just
16 doing your job.

17 THE COURT REPORTER:

18 "Q. Okay. Directing your
19 attention to about halfway down, it says,
20 "Turbinol 153" and it lists volumes, sales,
21 and gross profit.

22 "Does this indicate to you that
23 there's an expectation of production of
24 Turbinol 153 for the coming year?"

25 MS. SIMERLY: Same objection.

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1 A. Well, it says the writer is
2 expected to sell something. Presumably, that
3 meant that somebody was going to make
4 something.

5 BY MS. WELCH:

6 Q. Okay.

7 A. But I don't know how to draw any
8 further conclusion than that.

9 MS. WELCH: Okay. This is Exhibit
10 455.

11 (Plandtiff's Deposition
12 Exhibit 455 marked for
13 identification.)

14 MS. WELCH: Exhibit 455
15 is a multipage document bearing the stamp
16 TRAN 003025 to TRAN 003035, and it's from Mr.
17 Papageorge to a number of recipients
18 including Mr. Savage. It's dated February
19 10th, 1972, and it's entitled PCB/PCT Action
20 Plan."

21 I'd like to turn your attention to
22 Page 4 of this document, under the title,
23 "Turbinol."

24 Do you recall being aware that an
25 alternative fluid was being presented to

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1 Texas Eastern on January 31st, 1972?

2 A. I have no idea.

3 Q. Okay. Would that be something
4 that you would know in the normal course of
5 your business?

6 MS. SIMERLY: That he would have
7 known back then?

8 MS. WELCH: Yes, that he would
9 have known back then that would have been
10 important to you to know.

11 A. If a new product introduction was
12 being proposed, I would generally know about
13 it.

14 BY MS. WELCH:

15 Q. Okay. What is Turbinol 30E/50E?
16 Do you know?

17 A. 30E and 50E were used in
18 connection with Pydrauls as designations for
19 grades of all-phosphate ester fluid.

20 Q. So would this be a phosphate
21 fluid?

22 A. I would assume that, from the
23 nomenclature.

24 MS. WELCH: I have no further
25 questions.

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1 MS. SIMERLY: I have none. Off
2 the record.

3 MS. WELCH: I assume that you want
4 him to review and sign.

5 MS. SIMERLY: I do.

6 (Whereupon, at 5:00 p.m., the
7 deposition was concluded.)
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COMES NOW THE WITNESS, JAMES
RICHARD SAVAGE, and having read the foregoing
transcript of the deposition taken on the 9th
day of July, 1992, acknowledges by signature
hereto that it is a true and accurate
transcript of the testimony given on the date
hereinabove mentioned.

JAMES RICHARD SAVAGE

Subscribed and sworn to before me
this _____ day of _____, 1992.

My Commission expires: _____

Notary Public

1 STATE OF MISSOURI)

2 SS:)

3 CITY OF ST. LOUIS)

4 I J. Bryan Jordan, notary public
5 in and for the State of Missouri, duly
6 commissioned, qualified and authorized to
7 administer oaths and to certify depositions,
8 do hereby certify that pursuant to agreement
9 in the civil cause now pending and
10 undetermined in the Superior Court of the
11 State of California, to be used in the trial
12 of said cause in said court, I was attended
13 at the offices of Bryan Cave, in the City of
14 St. Louis, State of Missouri, by the
15 aforesaid witness and by the aforesaid
16 attorneys, on the 9th day of July, 1992.

17 The said witness, being of sound
18 mind and being by me first carefully examined
19 and duly cautioned and sworn to testify the
20 truth, the whole truth, and nothing but the
21 truth in the case aforesaid, thereupon
22 testified as is shown in the foregoing
23 transcript, said testimony being by me
24 reported in shorthand and caused to be
25 transcribed into typewriting, and that the

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1 foregoing pages correctly set forth the
2 testimony of the aforementioned witness,
3 together with the questions propounded by
4 counsel and remarks and objections thereto,
5 and is in all respects a full, true, correct
6 and complete transcript of the questions
7 propounded to and the answers given by said
8 witness; that signature of the deponent was
9 not waived by agreement of counsel.

10 I further certify that I am not of
11 counsel or attorney for either of the parties
12 to said suit, not related to nor interested
13 in any of the parties or their attorneys.

14 Witness my hand and notarial seal
15 at St. Louis, Missouri, this 24th day of
16 July, 1992.

17 My commission expires July 20,
18 1994.

19
20 J. Bryan Jordan

21 J. Bryan Jordan

22 Notary Public in and for the
23 State of Missouri

24
25 GORE REPORTING COMPANY - ST. LOUIS, MISSOURI