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IN THE CIRCUIT COURT OF MILWAUKEE COUNTY
STATE OF WISCONSIN

STROH DIE CASTING COMPANY,)
)
 Plaintiff,)
)
 vs.)
)
MONSANTO COMPANY,)
)
 Defendant.)

Case No. 639887

DEPOSITION OF WILLIAM B. PAPAGEORGE

Taken on behalf of Plaintiff
August 10 and 11, 1988



Perry Reporting, Inc.

Stenotype Reporters

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	)	
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	)	
vs.	)	Case No. 639887
	)	
MONSANTO COMPANY,	)	
	)	
Defendant.	)	

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DEPOSITION OF WILLIAM B. PAPAGEORGE, produced, sworn and examined on behalf of Plaintiff, August 10 and 11, 1988, between the hours of eight o'clock in the forenoon and five o'clock in the afternoon of that day, at the Paul Brown Building, 818 Olive Street, St. Louis, Missouri 63101, before KATHRYN T. O'NEILL, a Registered Professional Reporter and a Notary Public within and for the State of Missouri.

A P P E A R A N C E S

The Plaintiff was represented by Mr. Donald H. Carlson and Mr. John R. Pendergast, Jr. of the law firm of Messrs. Riordan, Crivello, Carlson & Mentkowski, 710 North Plankinton Avenue, Milwaukee, Wisconsin 53203.

The Defendant and Mr. Papageorge were represented by Mr. James H. Schink of the law firm of Messrs. Kirkland & Ellis, 200 East Randolph Drive, Chicago, Illinois 60601.

1 IT IS HEREBY STIPULATED AND AGREED by and
2 between Counsel for the Plaintiff and Counsel for the
3 Defendant, that this deposition may be taken in shorthand
4 by KATHRYN T. O'NEILL, a Registered Professional Reporter
5 and Notary Public, and afterwards transcribed into
6 typewriting and signed by the Witness.

7
8 o-o-o
9

10 WILLIAM B. PAPAGEORGE,
11 of lawful age, being produced, sworn, and examined on the
12 part of the Plaintiff, deposes and says:

13 DIRECT EXAMINATION

14 QUESTIONS BY MR. CARLSON:

15 Q. Would you be kind enough for our record to
16 state your full name and your home address, please?

17 A. William B. Papageorge, 321 Pebble Valley
18 Drive, Creve Coeur, Missouri 63141.

19 Q. Thank you. As you know, I'm Don Carlson, and
20 I represent Stroh Die Casting in this matter. During the
21 course of the deposition, if any of my questions don't
22 make any sense to you, either grammatically or
23 technically, let me know, and I'll try to rephrase them.
24 If Mr. Schink makes an objection to a question, please
25 wait until we resolve the objection. He may object and

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1 ask you not to respond, and I suspect you'll take his
2 advice, or he may object to the form of question and ask
3 you to respond. Remember, and I'm sure you will, to let
4 me get the complete question set forth before you give
5 your response. I'll try not to ask another question until
6 you complete your answer, and that way we won't be talking
7 at the same time, and the court reporter will get a
8 complete transcript. If you want to make a yes or no
9 answer, use the words rather than a nodding of the head or
10 and "uh-huh" or "uh-uh," again so we have a good
11 transcript. Okay?

12 A. I understand.

13 Q. Okay. Are you currently employed?

14 A. Self-employed.

15 Q. Okay. And do you do business under any
16 business name other than your own name?

17 A. No.

18 Q. Okay. And what is the nature of your
19 self-employment now?

20 A. I help Monsanto Company in matters similar to
21 the one we are discussing today.

22 Q. Okay. And how long have you been
23 self-employed in such a capacity?

24 A. April, 1987.

25 Q. Have you helped any other companies that have

1 been involved in any litigation since April of 1987?

2 A. Indirectly, yes.

3 Q. Can you tell me what companies indirectly you
4 have helped?

5 A. Sangamo Electric Company and Westinghouse
6 Corporation.

7 Q. And what was the nature of the help in just
8 very general terms -- I don't want to go into the
9 specifics of your work -- that indirectly helped Sangamo?

10 A. I was involved in depositions regarding PCB
11 matters, and I was requested by those companies to
12 participate.

13 Q. Okay. That was true for both Sangamo and
14 Westinghouse?

15 A. Yes.

16 Q. Was Monsanto a party to either of the cases
17 in which you were deposed by those companies?

18 A. I believe at one time they were, but not when
19 I was deposed.

20 Q. Okay. By any chance do you have any
21 recollection of how many depositions you have given in
22 litigation in which the subject of PCBs was at issue?

23 A. I don't have an exact record, but it's
24 approaching a couple dozen by now. This is trials and
25 depositions.

1 Q. How many of those would be trials?

2 A. Five of them.

3 Q. In any of the trials that you have testified
4 in, was an issue whether or not PCBs -- strike that. In
5 any of the trials that you testified in, was there at
6 issue whether or not a product containing PCBs was
7 defective and unreasonably dangerous? And I differentiate
8 that between a claim of negligence.

9 A. I have to question -- I'm not totally
10 familiar with the legalistic meanings of some of these
11 words.

12 Q. Sure. I appreciate that.

13 A. As to the product being flawed, not that I --
14 as best as I can determine, no, that was not an
15 allegation.

16 Q. Okay. Have you heard of Section 402(a) of
17 the Restatement of Torts 2nd? Is that a name of a section
18 that means anything to you?

19 A. No.

20 Q. Are you aware of any litigation that has been
21 brought against Monsanto by a die cast company, other than
22 my client, in which the company was seeking to recover
23 damages it had incurred as the result of use or disposal
24 of PCBs?

25 A. Die cast company? No.

1 Q. Just prior to -- I presume it was your
2 retirement at Monsanto?

3 A. Yes.

4 Q. What was your position with the company?

5 A. I was manager, occupational health, for
6 Monsanto Chemical Company, an operating unit of Monsanto
7 Company.

8 Q. And how long had you held that position?

9 A. One year.

10 Q. And prior to that, what position did you
11 hold?

12 A. I was director of environmental operations
13 for Monsanto Industrial Chemicals Company, an operating
14 unit of Monsanto Company.

15 Q. And how long did you hold that position?

16 A. From about 1983, to the end of 1985.

17 Q. And prior to that your position with the
18 company?

19 A. Prior to that I was director of environmental
20 operations for Monsanto Intermediate Chemicals Company, an
21 operating unit of Monsanto Company.

22 Q. And how long did you hold that position?

23 A. From 1977 to 1983.

24 Q. And prior to that position?

25 A. I was manager, product acceptability, for

1 Monsanto Intermediate Chemicals Company.

2 Q. And how long did you hold that position?

3 A. Oh, I held that about a year, late '76 to
4 late '77.

5 Q. Prior to that?

6 A. I was manager, product acceptability, and I
7 believe at that time it was called process chemicals
8 division of Monsanto Industrial Chemicals Company.

9 Q. And how long did you hold that position?

10 A. That was about 1973 to 1976.

11 Q. And prior to that?

12 A. Manager, product acceptability, functional
13 fluids group of the organic chemicals division of Monsanto
14 Company. That was --

15 Q. From what period of time?

16 A. About 1972 to 1973.

17 Q. Prior to that?

18 A. Manager, environmental protection of the same
19 division.

20 Q. And you held that post for how long?

21 A. From about '71 to '72.

22 Q. Okay. Prior to '71?

23 A. I was manager, environmental control from
24 1970 to '71.

25 Q. When did you start with Monsanto?

1 A. 1951.

2 Q. Okay. Going back in time then prior to
3 becoming manager of environmental control in 1970.

4 A. I was plant manager at the Monsanto plant at
5 Anniston, Alabama.

6 Q. How long did you hold that position?

7 A. From 1965 to 1970.

8 Q. Prior to that?

9 A. I was general superintendent in manufacturing
10 at the W. G. Krummrich, K-r-u-m-m-r-i-c-h, plant in
11 Sauget, S-a-u-g-e-t, Illinois, from '63 to -- '64 to '65,
12 I'm sorry, about a year.

13 Q. Okay. And prior to that?

14 A. Prior to that I was at the John F. Queeny
15 plant, Q-u-e-e-n-y, in St. Louis, Missouri, of Monsanto
16 Company.

17 Q. And what was your post there?

18 A. Going backward, I was general superintendent
19 of distribution warehousing, utilities, from about 1962 to
20 1964.

21 Q. Okay. And the other positions there?

22 A. Prior to that I was technical services
23 superintendent at that same plant.

24 Q. And at what time period?

25 A. About 1960 to '62.

- 1 Q. Okay. Prior to that?
- 2 A. Maintenance superintendent at the same plant.
- 3 Q. And what time frame was that?
- 4 A. '58 to '60.
- 5 Q. And prior to that?
- 6 A. Prior to that I was maintenance supervisor.
- 7 Q. And --
- 8 A. That's about 1956 to '58.
- 9 Q. Prior to that time?
- 10 A. Production supervisor, same plant.
- 11 Q. Okay. Time frame?
- 12 A. About '55 to '56.
- 13 Q. And prior to that?
- 14 A. Prior to that, I was design engineer, same
- 15 plant, from my starting date, '51 to '55.
- 16 Q. Okay. Did you have an appointment within
- 17 your profession prior to 1951?
- 18 A. Yes.
- 19 Q. And where were you working?
- 20 A. I was with the Phillips Petroleum Company in
- 21 Bartlesville, Oklahoma.
- 22 Q. And for how long a period of time?
- 23 A. Four years.
- 24 Q. What kind of work were you doing there?
- 25 A. The first two years, '47 through '49, I was

1 in the research department as a research engineer on oil
2 field secondary recovery and in evaluating drilling
3 fluids. From 1949 'til 1951, I was a design engineer in
4 the refining department.

5 Q. Any other employment within your profession
6 prior to that time?

7 A. No.

8 Q. And what degrees do you hold?

9 A. I have a bachelor of science in chemical
10 engineering and a master of science in chemical
11 engineering, both from Washington University in St. Louis.

12 Q. Have you done any work towards a Ph.D?

13 A. I have about 15 credit hours earned at the
14 then Oklahoma A & M. I believe it's now Oklahoma State.

15 Q. Have you taught any courses?

16 A. No.

17 Q. Have you given any seminars to academic
18 groups in any of the areas of your expertise?

19 A. I have given seminars relating to PCBs to
20 groups that included representatives of the academic
21 field.

22 Q. How many seminars do you think you have given
23 on that subject? Lots?

24 A. I have never kept count; three or four.

25 Q. Okay. Were the seminars that you gave

1 sponsored by your employer?

2 A. No.

3 Q. Do you have some recollection of who may have
4 put on these seminars?

5 A. I recall a seminar in the -- let me think, in
6 Lansing, Michigan. I was under the impression it was
7 given by a -- sponsored by the Great Lakes Governor's
8 Conference or some such title.

9 Q. Okay.

10 A. There was another conference in Madison,
11 Wisconsin on the university premises. To this day I don't
12 recall who sponsored it. I just don't remember that, who
13 sponsored it.

14 Q. Okay. How about the others? Do you have any
15 recollection?

16 A. Let me see if I can recall them. There was a
17 meeting in Duluth, Minnesota in March of 1970, sponsored
18 by the director of the Federal Water Laboratory there.
19 There were some scientific professors in the audience.

20 There were two meetings in North Carolina, as I
21 recall, about 1971 and again in '73, sponsored by the
22 National Institute of Environmental Health, at which
23 academic people were attending. There was a meeting --
24 the dates escape me. I believe about 1974 -- held in New
25 Orleans, at which there were many academic people,

1 scientists as well as economists and a variety of
2 backgrounds. I've forgotten who sponsored that one. I
3 just don't recall.

4 Q. Any other seminars that you have participated
5 in or given that you recall?

6 A. Well, I suppose this fits under seminars. I
7 have talked before the Federal Interdepartmental Task
8 Force on PCBs. I've participated in the National
9 Symposium on PCBs held in Chicago in November, 1975,
10 sponsored by the EPA.

11 Q. Let me ask you to go back. Do you remember
12 when the meeting was with the Federal Interdepartment Task
13 Force on PCBs?

14 A. There were two occasions. One occurred, as
15 best I remember, in early '71. The second occurred in May
16 of 1972.

17 Q. Any other talks that you have given or
18 presentations that you have made that you would believe
19 would fall into these same categories?

20 A. I have given these presentations before
21 customer and industry groups.

22 Q. Any presentations to the Association of Die
23 Casting, die cast houses?

24 A. No.

25 Q. When was the Lansing, Michigan presentation?

1 A. As best I recall, it was in 1970.

2 Q. And the conference that was apparently on the
3 grounds, anyway, of the University of Wisconsin?

4 A. 1973, '74.

5 Q. Okay. In any of the presentations that you
6 have made, did you as a part of your presentation give out
7 handout material?

8 A. I had handout material at the second session
9 with the Interdepartmental Task Force. I don't recall
10 having handouts at any of the others.

11 Q. Were any of the presentations given from a
12 prepared script?

13 A. Yes.

14 Q. Do you have copies -- strike that. Were each
15 of those from a prepared script?

16 A. I'm sorry?

17 Q. Were each of those presentations from a
18 prepared script?

19 A. Not all of them.

20 Q. Can you tell me which ones were?

21 A. The presentations to the industry and
22 customer groups was made from a prepared script.

23 Q. When was that?

24 A. Those were 1971. I didn't have prepared
25 scripts for the other presentations. I just don't believe

1 I had, no.

2 Q. Okay. Were the presentations to the
3 customers and industry groups sponsored by Monsanto?

4 A. No.

5 Q. Can you tell me who did, which industry
6 groups we're talking about?

7 A. One of them was the National Electrical
8 Manufacturers Association, along with the American
9 National Standards Institute. Another was the PCB Ad Hoc
10 Committee of the Electronic Industries Association.

11 Q. Any others?

12 A. Those two.

13 Q. Okay. When was the presentation to the
14 National Electrical Manufacturers Association?

15 A. As best I recall, that was September, '71.

16 Q. And the presentation to the PCB Ad Hoc
17 Committee?

18 A. I believe that came about either the latter
19 part of '71 or early '72.

20 Q. Okay. Was the prepared script used for
21 giving the presentation to NEMA?

22 A. Yes.

23 Q. Have you written any articles that have been
24 published in any scientific journals or in any other
25 publications that were distributed publically?

1 A. No.

2 Q. Your first contact with PCBs in any working
3 capacity was when?

4 A. It was when I was maintenance supervisor at
5 the St. Louis plant at Monsanto.

6 Q. And what was your -- or how did your job
7 function bring you in contact with PCBs at that time?

8 A. I supervised the electricians in the plant,
9 who on occasion would do maintenance work or install
10 electrical equipment containing PCBs.

11 Q. Was that back beginning in what, 1956?

12 A. Yes.

13 Q. Okay. When you were a production supervisor,
14 you were not involved in the production of PCBs?

15 A. I was not.

16 Q. Okay. Did your position as -- I'm not too
17 sure I have the title down here right -- technical service
18 supervisor or superintendent from 1960 to 1962, bring you
19 in contact with PCBs?

20 A. No.

21 Q. How about when you -- I think there were a
22 number of responsibilities you had as general
23 superintendent of the distribution warehousing utilities
24 back in '62 through '64. Did that bring you in contact
25 with PCBs?

1 A. Yes.

2 Q. And in what respect?

3 A. In two ways. The utilities department, which
4 distributes electrical power throughout the plant, was the
5 unit that operated the electrical equipment that contained
6 PCBs. Also, as part of that assignment, I was responsible
7 for a department that blended different chemicals to make
8 products for Monsanto. Some of that blending involved the
9 production of hydraulic fluids that contained PCBs.

10 Q. Which of the Aroclors were utilized in the
11 production of hydraulic fluid at that time?

12 A. As best I remember, there were Aroclor 1242,
13 Aroclor 1248.

14 Q. Do you remember which of the -- strike that.
15 Was Monsanto marketing under the name Pydraul at that
16 time?

17 A. Yes.

18 Q. Do you remember which of the Pydraul fluids
19 were being blended where you were?

20 A. As best I remember, all of the product line
21 at different times in different amounts.

22 Q. If Pydraul was a 1242, would that mean that
23 1242 was the only isomer that would be present in that
24 particular fluid?

25 A. I'm confused by your use of the word "isomer"

1 to describe Aroclor 1242.

2 Q. Would there be other PCBs present besides
3 1242 in a hydraulic fluid marketed as 1242?

4 MR. SCHINK: Object to the form of the
5 question.

6 A. I'm confused.

7 Q. (BY MR. CARLSON) 1242 is 42 percent
8 chlorine?

9 A. Yes.

10 Q. Would there be PCBs with different
11 percentages of chlorine present in the hydraulic fluid
12 marketed as 1242?

13 MR. SCHINK: Object to the form of the
14 question.

15 A. I think I understand your question. If so,
16 the answer is no. The ingredient that's added is known as
17 Aroclor 1242.

18 Q. (BY MR. CARLSON) Does that mean that is the
19 only PCB that would be present?

20 A. That is correct.

21 Q. When you were at the Krummrich plant in
22 Sauget, did that bring you in contact with PCBs, also?

23 A. No.

24 Q. And you were plant manager in Anniston before
25 that date?

1 A. Yes.

2 Q. Were various Aroclors produced in the
3 Anniston plant?

4 A. Yes.

5 Q. All of them?

6 A. All of them.

7 Q. Was anything else made in the Anniston plant
8 besides PCBs?

9 A. Yes.

10 Q. Just in rough terms, what other kinds of
11 products?

12 A. I'll name a few that I recall.

13 Q. Sure.

14 A. Biphenyl, terphenyls, chlorine, caustic soda,
15 phosphorus penta sulphide, and the pesticide parathion,
16 p-a-r-a-t-h-i-o-n, and a similar material, niran,
17 n-i-r-a-n. We also made chlorinated terphenyls and
18 hydrogenated phenyls.

19 Q. Okay.

20 A. I believe that covers the list.

21 Q. Have you, during the course of your
22 professional life, taken any courses in toxicology?

23 A. No.

24 Q. Have you taken any courses in epidemiology?

25 A. No.

1 Q. Monsanto obtained the right to manufacture
2 PCBs in its purchase of Swan Chemical?

3 A. Yes.

4 Q. Do you know if Swan Chemical had done any
5 either animal or human studies on the potential effects of
6 PCBs prior to Monsanto buying the company?

7 A. It's my understanding they had done the acute
8 animal studies in the late 1930's. I do not recall the
9 laboratory that they used.

10 Q. Do you know if Swan Chemical, prior to
11 Monsanto purchasing the company, did any health surveys of
12 its employees?

13 A. I'm not aware of any such study.

14 Q. Can you tell me the first time that Monsanto
15 did a health survey of its employees that came in contact
16 with PCBs?

17 A. Would you help me define "survey"?

18 Q. Determining whether or not the employees who
19 came in contact with PCBs were experiencing health
20 problems different than what would be generally expected.

21 A. Well, this would be done as part of the
22 annual medical physical examination --

23 Q. Okay.

24 A. -- conducted on all employees in the plant.
25 If any problem unique to each operation would show up, it

1 would be evident to the plant physician.

2 Q. All right. Do you recall whether or not
3 Monsanto at any time specifically looked at the medical
4 records or the results of the examinations of the
5 employees that were in contact with PCBs to determine
6 specifically whether or not they were experiencing any
7 increased health abnormalities?

8 A. Well, my exposure to that activity would
9 indicate that this was an ongoing activity on the part of
10 the plant physician. I'm not aware of any effort of when
11 the files were segregated and Swan sat down and addressed
12 specifically looking for anything. That doesn't mean it
13 didn't happen.

14 Q. Who was your plant physician or who were the
15 plant physicians when you were at Anniston?

16 A. Dr. James Francis.

17 Q. Was he a Monsanto employee?

18 A. No.

19 Q. Do you know if he's still in practice?

20 A. I understand he's retired.

21 Q. Do you know where he lives?

22 A. No, I do not.

23 Q. Do you know what state he lives in or at
24 least where he lived the last time you heard?

25 A. The last time he was in Anniston, Alabama.

1 Q. As the plant physician -- strike that. As
2 the plant physician, was Dr. Francis charged with the
3 responsibility of reviewing the results of the
4 examinations of plant employees to see if there was any
5 increased rate of a particular disease or health problem?

6 A. Yes, sir.

7 Q. Would he issue an annual report or any report
8 on that particular subject?

9 A. I did not see one.

10 Q. Do you have any understanding as to whether
11 or not he did issue such a report, although you may not
12 have been privy to it?

13 A. Dr. Francis reported professionally to the
14 Monsanto medical director, who would make frequent visits
15 to the plant. They communicated in health matters
16 regarding the plant. I was not present at those meetings.
17 I don't know what exchanges took place or what reports
18 were issued from one doctor to the other.

19 Q. Who was the medical director at that time?

20 A. R. E. Kelly.

21 Q. Were there any other plant physicians when
22 you were at Anniston?

23 A. No.

24 Q. When you were at Anniston, did Monsanto
25 monitor any waste water discharge or other plant effluents

1 for the presence of PCBs?

2 A. Yes.

3 Q. Can you tell me when that practice began?

4 A. I'm sorry?

5 Q. When did that practice start?

6 A. I don't know.

7 Q. Was it prior to you being there?

8 A. That is right. Yes.

9 Q. Did they monitor for PCBs and plant effluent
10 at Krummrich as well?

11 A. At what point in time?

12 Q. At any time that you're aware of.

13 A. At any time. Yes, I was aware of it starting
14 in 1970.

15 Q. Do you know if they did it prior to that?

16 A. I was told they did it.

17 Q. Were you told when they started that?

18 A. No. I just don't remember the dates. They
19 had been ongoing for years.

20 Q. More than a decade?

21 A. Yes.

22 Q. What were the detection limits for your
23 monitoring equipment when you were at Anniston?

24 A. I don't recall an exact number, but they were
25 in the high parts per million or tenth of a percent kind

1 of numbers.

2 Q. Who had responsibility for monitoring at your
3 Anniston plant when you were there?

4 A. Initially it was the responsibility of the
5 quality control chemist in the plant laboratory, and as
6 best I remember, about 1966 or '67, we appointed an
7 environmental engineer who took on that responsibility.

8 Q. Who was the Q.C. chemist when you were there,
9 or who were they if there was more than one?

10 A. His last name was Dunlap, D-u-n-l-a-p. I've
11 forgotten his first name.

12 Q. Okay. Any others that served in that
13 capacity?

14 A. Not while I was there.

15 Q. And who was the environmental engineer that
16 was appointed in '66 or '67?

17 A. His name escapes me. I just don't remember.

18 Q. While you were plant manager at Anniston, at
19 any time did you have to alter manufacturing practice or
20 practices with regard to discharge of plant effluent as
21 the result of PCBs being found in the effluent?

22 A. Yes.

23 Q. Can you tell me when that first occurred, as
24 best you can recall, and what happened?

25 A. Sometime in about 1966 -- I can't recall the

1 exact period -- we changed the way we maintained the
2 limestone pits that were present at the plant for
3 neutralizing the acid water, and we put greater emphasis
4 on keeping the department clean, the floors clean,
5 stairwells.

6 Q. Why was that?

7 A. About 1966, about a year after I arrived.

8 Q. Okay. Why was that effort made?

9 A. We found that more PCBs were ending up in the
10 pits, and the frequency at which the pits were dug up and
11 refurbished wasn't adequate for the additional amount of
12 PCBs that were getting into the pits. So, we increased
13 the frequency and reduced the amount leaving the
14 department.

15 Q. The function of limestone pits was to
16 neutralize the acid water?

17 A. That was one of its functions.

18 Q. And was it also to act as a filter for PCBs?

19 A. It acted as a crude filter as well as a
20 collecting pit, a sump, because they are heavier, will
21 sink to the bottom of the pit.

22 Q. How did Monsanto dispose of PCB's in those
23 years?

24 A. We had a Monsanto operated landfill on
25 Monsanto property.

1 Q. Where was that located?
2 A. At the plant site.
3 Q. Okay. Does Monsanto still own the site?
4 A. Yes.
5 Q. Between 1965 and 1970, did Monsanto have any
6 other landfill sites other than the one at Anniston which
7 received PCBs?
8 A. Yes.
9 Q. And where were they?
10 A. I don't claim to know all of them.
11 Q. Okay.
12 A. I'm positive there was one at the W. G.
13 Krummrich plant, at least one. They may have had several
14 through the years. I cannot speak for all the other 50
15 Monsanto plants. Many of them have their own landfills.
16 Q. Did Monsanto at any time incorporate a
17 program of incinerating its own PCBs?
18 A. Yes.
19 Q. When did it start that?
20 A. They started incinerating in 1971.
21 Q. Was that program ever discontinued?
22 A. Yes.
23 Q. And when was that?
24 A. 1977.
25 Q. Do you know why it was discontinued at that

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1 time?

2 A. Principally because Monsanto terminated the
3 manufacture and sale of PCBs. They used the incinerator
4 to dispose of any residual that was still at the plant
5 site, and the unit had reached the point where it needed
6 extensive maintenance and renewal. It became inefficient
7 and was a good time to dismantle it.

8 Q. Did Monsanto make the incineration facility
9 available to its customers that had been using
10 Monsanto-produced PCB fluids?

11 A. Yes.

12 Q. Did it make it available to all customers?

13 A. Yes.

14 Q. Did Monsanto continue to make the
15 incineration of the facility available to all customers
16 through 1977?

17 A. Yes.

18 Q. Do you know how the customers were made aware
19 of the existence of and their access to this incineration
20 facility?

21 A. I do.

22 Q. And how was that?

23 A. Three different ways that I recall. One is
24 by letters mailed to customers on record. Another is by
25 specific instructions on product labels with telephone

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1 numbers and department designations. Another is via the
2 Monsanto salesmen, who carried copies of these letters
3 with them, as well as special labels that he would leave
4 with the customer to affix to the container before
5 shipping it back to Monsanto.

6 Q. Were the letters mailed to customers of the
7 Monsanto products that utilized all or any of the
8 Aroclors?

9 A. Yes.

10 Q. So a product that had a 1242 Aroclor
11 incorporated in it -- strike that. A customer who
12 purchased a product that had the 1242 Aroclor would get a
13 letter advising that customer that the incinerator was
14 available?

15 A. Yes.

16 Q. Were there -- do you know whether or not
17 there were other incinerators available in the country
18 besides the one at Monsanto?

19 A. At what point in time?

20 Q. I'm sorry. You started that in 1971, '71
21 through '77?

22 A. Yes.

23 Q. Were there any available prior to that?

24 A. Not to my knowledge.

25 Q. Why did Monsanto build the first incinerator

1 for incinerating PCBs?

2 A. Primarily because there were none available
3 commercially that we knew of. In fact, we feel that we
4 helped develop some of the technology in designing the
5 unit, and we felt that this was the best way to destroy
6 the liquid PCBs.

7 Q. Did Monsanto incinerate PCBs for some of its
8 customers at no cost to the customer?

9 A. I believe in some instances, yes.

10 Q. And was there a cost to some of the other
11 customers?

12 A. Yes.

13 Q. Do you know what the criterion was in
14 determining whether or not there would be a cost charged
15 to the customer?

16 A. I don't know the details. It had to do with
17 the purchase of material that was tied in with selling
18 price, a package kind of deal. I really don't know the
19 details.

20 Q. Can you tell me the names of some of the
21 companies that had their PCBs incinerated by Monsanto for
22 free?

23 A. None really comes to mind at the moment.
24 There were a few. I know there were some cases, but the
25 names don't come to mind.

1 Q. Is it your understanding that the
2 availability of the incinerator free of charge to a
3 customer was tied or contingent upon the customer
4 purchasing certain Monsanto products in the future?

5 A. That was my understanding, yes.

6 Q. Does that somewhat go along with the idea
7 that there's really no free lunch?

8 A. One could say that, yes.

9 Q. Okay. Were the products containing PCBs
10 monitored to determine whether or not dioxins were
11 present?

12 A. At what point in time?

13 Q. At any time.

14 A. At any time? As best I recall, in the middle
15 '60s, gas samples were taken off of Monsanto's incinerator
16 checking for the products of combustion, and dioxins were
17 looked for. And if my memory serves me right, this had to
18 do with the Illinois Environmental Protection Agency and
19 the permitting procedure and confirmation that the unit
20 was meeting the permit requirements. As best I recall,
21 also, no dioxins were found.

22 Q. Do you know what the detection limits were at
23 that time?

24 A. In the middle '70s, they were two parts per
25 billion, something like that.

1 Q. Do you know if any time later any dioxins
2 were found?

3 A. At no time do I know of any Monsanto data
4 that showed dioxins were found.

5 Q. Whether or not it's true, I don't want to try
6 to get into that, but have you heard allegations made that
7 dioxins are formed in electrical fires where PCBs are
8 present?

9 A. I've heard that allegation, yes.

10 Q. Have you seen any scientific work that would
11 either confirm or refute that?

12 A. I have seen no work that confirms it, and
13 traditionally, reports are not made for negative results.
14 So, at the same time I have not seen any reports saying it
15 won't happen.

16 Q. Have you seen studies of which the author has
17 claimed it happened?

18 A. Yes, and let me correct my previous answer.
19 There have been allegations of the presence of dioxins in
20 fires in which PCBs were present, but at the same time
21 there were other chemicals present --

22 Q. Okay.

23 A. -- like chlorinated benzene. So, there's a
24 scientific question yet as to what is the source, if in
25 truth the dioxins were discovered.

1 Q. Are there some researchers who have concluded
2 in their own mind, again regardless of whether or not they
3 are right or wrong, it is the combustion of the PCBs which
4 produced the dioxins?

5 A. There are some that claimed that, yes.

6 Q. Do you know the names of some of those
7 researchers?

8 A. Gosh. I'm trying to remember a lady
9 scientist or spokesman for one of the environmental
10 groups.

11 Q. Ellen Silbergeld?

12 A. Ellen Silbergeld, yes. She is convinced that
13 they were formed. I'm sure there are others, but their
14 names don't come to mind now.

15 Q. When is the first time that you had heard
16 that an Aroclor was found in the environment?

17 A. I first heard about it in the summer of '69.

18 Q. What was the source of your knowledge?

19 A. My supervisor.

20 Q. And at that time who was that?

21 A. That was Raymond Stratmeyer,
22 S-t-r-a-t-m-e-y-e-r.

23 Q. And did he indicate to you the source of his
24 knowledge?

25 A. As best I remember, he referred to Monsanto's

1 medical department along with Monsanto's research people
2 and informed them of these findings in the environment of
3 a material that looked like PCBs.

4 Q. Had either the medical department or the
5 research people, to your knowledge, informed Mr.
6 Stratmeyer by that time of the results of the Jensen
7 study?

8 A. I believe that was the topic of discussion.

9 Q. Was the Yusho incident also a topic of
10 discussion at that time, that is, when you first heard
11 about potential for PCBs being in the environment?

12 A. It was not mentioned at that time, not to me.

13 Q. Were you given a copy of the Jensen study?

14 A. No.

15 Q. Were you given any written material at that
16 time which referenced the Jensen study or the findings of
17 anyone else with regard to PCBs in the environment?

18 A. In 1969, we're talking about?

19 Q. Yes.

20 A. No.

21 Q. When were you first given any documents of
22 any sort which referenced PCBs in the environment?

23 A. In January, 1970.

24 Q. And what documents were you given at that
25 time?

1 A. It was a collection of articles in a
2 three-ring notebook that the medical department put
3 together, and most of the articles had to do with DDT, but
4 there were references to PCB. I recall a document
5 referring to the Jensen work. As best I remember, it
6 didn't appear to be a finished document. It appeared to
7 be a rough draft, typewritten, with many typographical
8 errors, spelling errors. I do not know the source of
9 that, but that was my first exposure to the instant work.

10 Q. The rough draft that you were given, was it
11 your understanding that that was a rough draft of the
12 Jensen study, or was that a rough draft of someone else's
13 analysis of the Jensen study, or was it some other study
14 all together?

15 A. I was led to believe it was an English
16 translation of the Swedish work. I do not know who the
17 translator was.

18 Q. Do you have some recollection of what the
19 conclusions were as set forth in that study?

20 A. As best I recall, the authors were convinced
21 that what they saw was not DDT, and they were fairly
22 certain, but not totally certain, that it was
23 polychlorinated biphenyls.

24 Q. Did the company -- did they come to any
25 conclusion or offer any opinions as to the source of the

1 PCBs if, in fact, that's what they were?

2 A. No.

3 Q. When is the first time Monsanto did any work
4 to your knowledge on the biodegradability of PCBs?

5 A. I believe they started in 1969.

6 Q. Prior to -- strike that. Are you aware of
7 any studies appearing in scientific literature addressing
8 the question of whether or not PCBs were biodegrading
9 prior to the beginning of Monsanto's work in 1969?

10 A. I'm not aware of any.

11 Q. Do you know why Monsanto in 1969 looked at
12 the subject or began a study of biodegradability of PCBs?

13 A. I think I do, yeah.

14 Q. Why was that?

15 A. The reports up to that point kept referring
16 to what Monsanto called Aroclor 1254 and 1260 as being
17 found in the environment. This was puzzling to Monsanto
18 because those two materials, although they were not sold
19 in -- they were not the large volume products. There were
20 greater volumes of 1232, 1242, 1248. The puzzling part
21 was why weren't these being reported? So then again, the
22 scientists began some scientific speculation as to could
23 they be degrading? If so, what's the mechanism? What
24 creates this loss or this disappearance? So in order to
25 establish that in truth degradation was taking place, they

1 went to the laboratory and conducted these tests or
2 started to conduct the tests at that time.

3 Q. Which of the Aroclors did they look at at
4 that time?

5 A. Oh, they looked at 1242, 1248, 1254 and 1260.

6 Q. And do you know who developed the test
7 protocol?

8 A. The test protocol was developed by the
9 detergent industry. At the time there was a scientific
10 dispute about, you may recall, hard detergents and soft
11 detergents. So, that detergent protocol was taken and
12 used on PCBs.

13 Q. Was the study completed with regard to any or
14 all of the various Aroclors?

15 A. The work was eventually terminated, but it
16 was established that some of the PCBs do disappear.

17 Q. Which ones?

18 A. The monochlorals, the dichlorals, many of the
19 trichlorals, some of the four chlorines, but very few of
20 the 5, 6 and higher.

21 Q. With regard to the 1242 and 1248, were they
22 biodegradable or found to be biodegrading?

23 A. Members within that group?

24 Q. Within that group.

25 A. Yes, they were degrading.

1 Q. I see. Were members within the group not
2 biodegrading?

3 A. That is correct. Yes.

4 Q. Prior to 1969, did Monsanto have reason to
5 believe or did the company believe to your knowledge that
6 various Aroclors were under some circumstances escaping
7 into the environment?

8 A. Yes.

9 Q. Was it the thought of the company prior to
10 1969, that those that were escaping to the environment
11 were biodegraded?

12 A. No.

13 Q. Can you tell me what the company's thought
14 was prior to 1969, as to what was occurring with regard to
15 Aroclors that were escaping to the environment?

16 A. They were perceived to be so stable
17 chemically and biologically and every other measure
18 available at that time, that they were perceived to be, if
19 I can use an expression, like pebbles on the beach.
20 They're there, but nothing happens. That was the common
21 understanding of these chemicals.

22 Q. When did Monsanto first -- strike that.
23 Prior to 1969, did Monsanto understand that or believe
24 that various Aroclors were getting into the food chain?

25 A. No.

1 Q. It may not be a particularly good analogy.
2 If it's so far-fetched that it doesn't make any sense, let
3 me know. We'll try again. With regard to lead shot and
4 shotgun shells and ducks ending up getting lead poisoning,
5 if PCBs were present in the environment like pebbles on
6 the beach, why didn't Monsanto think it would get into the
7 food chain or was getting into the food chain?

8 MR. SCHINK: I object to the form of the
9 question. It implies that the frequency of PCBs in the
10 environment was equivalent to either shot in birds or the
11 number of pebbles on the beach. I don't think there's
12 been any indication of that, particularly given the kind
13 of product that it was and its intended use.

14 Q. (BY MR. CARLSON) You can answer the
15 question.

16 A. Well, again, it goes back to the
17 understanding that these are so inert, and if they do
18 enter the environment in quantities, they just sit in the
19 soil if they are spilled; and the chances of moving from
20 that point into the food chain were perceived to be so
21 remote, that problems in getting into a food chain were
22 just inconceivable.

23 Q. Prior to 1969, how did Aroclors get into the
24 environment?

25 A. How did they?

1 Q. Yes.

2 A. Primarily through accidental spills.

3 Q. Okay. And secondarily?

4 A. Secondarily, I guess, since there was no way
5 to measure in very, very low amounts at that time, it's
6 conceivable that they could have gotten into the
7 environment, because it was assumed that there were none
8 there in the water stream, for example. If it was
9 analyzed from a plant, for example, it analyzed and found
10 no PCBs, and they would discharge it.

11 Q. I guess I'm not looking right now at whether
12 or not anybody should have found them. What I'm just
13 looking at with hindsight, how did the PCBs get into the
14 environment at that time, by effluent?

15 A. That's one way it could happen. It could be
16 in plant effluent, but nobody knew then.

17 Q. I'm not saying they did, and I'm not trying
18 to imply that they did. I'm just saying that one of the
19 ways, that one way it's possible, and years later you
20 could go out and with the fine tuned instruments, you see
21 it. In your opinion, did that occur prior to 1969?

22 MR. SCHINK: Did what occur?

23 Q. (BY MR. CARLSON) Did PCBs get into the
24 environment as a result of discharge of plant effluent?

25 A. Yes.

1 Q. Has Monsanto ever established its own
2 criterion? Forget about DPA and Ellen Silbergeld and lots
3 of others, but has Monsanto ever established its own
4 criterion as to what the company will use as a safe level
5 of PCBs in the environment to be?

6 A. Monsanto established early on a goal of 10
7 parts per billion in waste water leaving its plant that
8 was considered to be environmentally acceptable.

9 Q. When was that established?

10 A. When?

11 Q. Yes.

12 A. About 1970, early 1970.

13 Q. Did Monsanto ever change that goal?

14 A. I'm not aware of a change in that target, but
15 I do know they better than achieved it. They did better
16 than that, but as a goal, that still seemed to be a
17 responsible one to Monsanto.

18 Q. Do you know what work that goal was based on?

19 A. Several things. One is the medical
20 department's opinion that at those levels, the probability
21 of health risks was acceptable. Another is the ability of
22 most laboratories to be able to take samples and analyze
23 for that level and do it consistently so the numbers have
24 true meaning. And the third one was the engineering
25 feasibility of systems that could treat waste waters to

1 reach such a level; and then, of course, engineering
2 feasibility is coupled with economic feasibility.

3 Q. What potential or possible health risks did
4 the medical department think may occur if the target was
5 not reached?

6 A. Well, I can't speak for Dr. Kelly and his
7 staff personally, but I had many discussions with them.
8 They were concerned with entering into the food chain in
9 the '70s, early '70s, and building up via what is known as
10 bioaccumulation and biomagnification up the food chain.
11 Examples given were such as fish caught by fishermen and
12 consumed, and by that time, as best I recall, Dr. Kelly
13 had reached the conclusion that based on the information
14 he had at the time, that 10 parts per billion is all
15 right. I don't know what else he thought professionally
16 or medically.

17 Q. Did he share with you the particular health
18 risks that he thought may occur if the accumulation was
19 greater -- strike that, if there was an abnormally high
20 accumulation of PCB's in the chain?

21 A. He just reminded me of the previous
22 discussions we had about chloracne at certain levels,
23 which varied again from person to person. That's the skin
24 symptom. And he also reminded me if you get enough of
25 these, you get liver damage, and if that liver is damaged

1 severely, it could result in death. That was not new
2 information. It was just reaffirmation of what was well
3 known.

4 Q. Was it your understanding that chloracne
5 would occur if someone were consuming food high in PCB
6 content?

7 A. It's possible if it's high enough and long
8 enough.

9 Q. Did Dr. Kelly share with you his thoughts as
10 to any criterion that one could look to to determine how
11 much PCBs would have to be present in order to induce
12 liver damage?

13 A. Not that type of criteria, no. He just told
14 me about what he called the early warning symptoms that
15 were noticeable long before the liver was damaged.

16 Q. What were some of those symptoms?

17 A. As far as skin exposure was concerned, time
18 and time again he said look for redness of skin. If
19 you've got that, you're getting too much. That's long
20 before the liver has been damaged. If you continue that
21 chapped skin, red skin, you're going to next see
22 chloracne. That's another warning.

23 As far as breathing too many approximate PCBs, you
24 were cautioned to look for the breathing respiratory
25 symptoms, which were described to me as resembling severe

1 chest cold, painful, difficulty breathing, irritated. If
2 you reach that point, you're breathing too much. Step
3 back and get away from that exposure. These were
4 considered to be very good indicators to avoid the
5 exposure, whether by skin or breathing or ingestion,
6 before you get to the point where liver is threatened.

7 Q. Are you aware of anyone, have you ever been
8 told of anyone ever developing chloracne as a result of
9 eating foods high in PCB content?

10 A. No. Let me correct that. I have an
11 understanding that the Japanese rice bran oil incident,
12 there were reports of chloracne, observed chloracne, which
13 was attributed to this ingestion of the contaminated oil.

14 Q. Has Monsanto formed any opinions within the
15 company or does it hold company opinions with regard to
16 safe levels of PCBs in fish?

17 MR. SCHINK: Currently? He's not employed by
18 Monsanto.

19 Q. (BY MR. CARLSON) Whatever you know.

20 A. I don't really know what their current
21 position is.

22 Q. When you left the company, did you know what
23 their position was?

24 A. At that time we were concurring with the FDA
25 approach.

1 Q. Do you remember what the acceptable level was
2 at that point?

3 A. As I remember, it was five parts per million
4 in the edible filets.

5 Q. And can you tell me why Monsanto thought or
6 concurred with the EPA that more than that would be
7 inappropriate?

8 A. No, I can't.

9 Q. Are there PCBs in the American environment
10 that didn't come from Monsanto?

11 A. I personally suspect yes.

12 Q. Do you have some suspicion as to where they
13 may have come from?

14 A. I suspect they came from all over the world
15 carried by wind currents, Japanese sources, European
16 sources.

17 Q. Have there been any works that you have seen
18 addressing that particular issue?

19 A. No.

20 Q. Were PCBs manufactured in Japan, at any time
21 manufactured pursuant to an agreement between the Japanese
22 company and Monsanto?

23 A. Yes.

24 Q. How about for PCBs manufactured in Europe?
25 Were some of those manufactured by companies who did not

1 have agreements with Monsanto?

2 MR. SCHINK: Excuse me. Could you clarify
3 what you mean by "agreement"?

4 Q. (BY MR. CARLSON) Either a licensing
5 agreement, royalties are paid, or just an informal
6 agreement that Monsanto would share technology.

7 A. There were manufacturers in Europe that were
8 producing PCBs independent of Monsanto.

9 Q. Have you done any work in the area of how die
10 cast companies may have added to the PCBs in the
11 environment?

12 A. Have I personally?

13 Q. Yes. Have you done any work on that subject
14 to determine what it is about die cast operations which
15 may result in PCBs getting into the environment?

16 A. I attempted to get familiar with that type of
17 operation by talking to Monsanto individuals whose job it
18 was to be familiar. These are primarily the marketing
19 people and the applications research people. And I was
20 made aware of some of the conditions that existed at the
21 die cast plants, of course, the high temperatures
22 associated with molten metals, the equipment that is
23 operated to perform the various tasks required, the fact
24 that this equipment is under pressure. And like all
25 industrial equipment, it will fail occasionally, and you

1 will get the leaks, and it's a question then of coping
2 with that leak, whether you shut down the line and repair,
3 or you capture the spillage, whatever is appropriate for
4 the particular operation. I was aware that cooling waters
5 are involved, and there's always the threat of water and
6 PCBs being mixed, which always causes problems because
7 they are difficult to separate. I don't know how else to
8 answer the question.

9 Q. I can appreciate that. At some point in time
10 did you form an understanding as to whether or not
11 discharge of cooling water by die cast companies absent
12 PCBs would be permissible?

13 A. Yes.

14 Q. Did Monsanto embark on a program to educate
15 customers using products containing PCBs -- I'm talking
16 about die cast companies now -- on the necessity of
17 containing cooling water which may contain PCBs?

18 A. Yes.

19 Q. And when did it do that?

20 MR. SCHINK: I object to the form of the
21 prior question. You say embark upon a program. It
22 implies that there was no prior program.

23 Q. (BY MR. CARLSON) Okay. Sometime in the life
24 of the product I suspect there was no prior program. Go
25 ahead. I guess I was trying to find out when Monsanto

1 started to tell customers utilizing Pydraul in die cast
2 machines of ways to contain -- strike that. What I was
3 looking at, I guess, was when Monsanto began to advise die
4 cast companies utilizing Pydraul with PCBs that waste
5 water that could have PCBs in it should be contained.

6 A. Well, there was always a reference to keeping
7 an industrial chemical like Pydraul out of water. This is
8 pretty general, even if the oil would have been mineral
9 oil. So, that kind of advice existed from the first pound
10 sold --

11 Q. Okay.

12 A. -- as a replacement for a mineral oil in a
13 unit or whatever was used at the time. Beginning in 1970,
14 when it was well established that PCBs were being found in
15 the environment, there was additional emphasis made
16 centering on PCBs, per se, and that took place. That took
17 many forms. The primary one was proper disposal such that
18 it doesn't get into the environment, which is a very broad
19 sentence or statement, but it's an attempt to cover any
20 possible condition of use. So, it's up to the user to
21 decide if his practices will lead to environmental escape,
22 because Monsanto could not be in a position of knowing
23 what its thousands of customers were doing with a material
24 and write the right paragraph to cover them all.

25 Then that branched out into a little more specifics

1 in terms of it's recommended that you curb any area that
2 contained a spill, direct the spill to some controllable
3 pit, or capture it in some absorbent material like sawdust
4 or clay or something that can be easily managed, rather
5 than get away from you down sewer. Now, that evolved
6 through the years.

7 Q. Okay. Do you recall when Monsanto advised
8 its customers using Pydraul in die cast machines to curb
9 areas and to direct spills to a controllable pit?

10 A. That was taking place in 1970, as best I
11 remember.

12 Q. Okay. Prior to 1970, did Monsanto understand
13 that spills were occurring and hydraulic leaks were
14 occurring which resulted in, on occasion, Pydraul getting
15 into the sewer?

16 MR. SCHINK: Now, you're saying into the
17 sewer, not into the environment, but into a sewer that
18 might go into a treatment plant?

19 MR. CARLSON: That's right.

20 A. I did understood that incidents like that
21 were noted, yes.

22 Q. (BY MR. CARLSON) And you understood, too,
23 that incidents like that were understood to occur in the
24 die cast industry?

25 A. Yes.

1 Q. Was there some belief or understanding on
2 Monsanto's part that PCBs that would get into a sewer
3 system would not get into the environment?

4 MR. SCHINK: By sewer system, you're
5 referring to a collection system of some sort; is that
6 right, Mr. Carlson? I object to the form of the question
7 unless you clarify.

8 Q. (BY MR. CARLSON) Go ahead.

9 A. It was Monsanto's understanding that the
10 frequency of this happening was not so great that it was
11 intolerable.

12 Q. Okay.

13 A. It was happening. The amount it was getting
14 out was acceptable. The impact on the environment was not
15 known, but it was assumed that the materials were so inert
16 that that impact would be difficult to measure.

17 It was also believed at that time that when it went
18 to systems such as municipal waste treatment, waste water
19 treatment systems, that the PCBs, being heavy, would end
20 up in sludges, and the sludges in turn would be properly
21 disposed of. Even though the amounts were probably very
22 erratic, it wouldn't happen every day, and the amounts
23 would also be rather small, relatively speaking. So, it
24 was never perceived to be a problem that required any
25 specific and particular attention.

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1 Q. What work did Monsanto do to determine that
2 the frequency of such events and the amount getting out
3 was not intolerable?

4 A. This was primarily -- in fact, the only
5 source, really, was the personal contact by Monsanto
6 representatives with the customer, with the user.

7 Q. Is that particular subject something that
8 Monsanto's salespeople would report on to the company?

9 A. This was a judgment call on the part of the
10 representative of Monsanto. If he perceived it to be
11 noteworthy, he would call his supervisor, or he would put
12 it in what Monsanto calls a call report or trip report.

13 Q. Sure.

14 A. It was not mandated that each and every one
15 of these be reported. It was a judgment call on the part
16 of the Monsanto representative, whether to discuss it or
17 whether just talk to the customer and resolve it there, or
18 whether it was so small that he didn't feel it was an
19 issue.

20 Q. Did the trip reports or sales call reports
21 have a particular section designated for them to report on
22 unusual spillages or leakages of hydraulic fluid?

23 A. No.

24 Q. Were the salespeople directed to determine
25 the frequency that die cast companies were experiencing

1 hydraulic leaks and having spills?

2 A. I'm not aware of any direction of that kind,
3 that specific kind. I don't know.

4 Q. Is it your understanding that almost all die
5 cast machines experience some leakage during the course of
6 a week of the hydraulic fluid?

7 A. Yes.

8 Q. Was there ever an attempt made prior to 1970,
9 to quantify the amount of leakage from any die cast house
10 prior to 19 -- let's start over. At any time prior to
11 1970, was there ever an attempt by Monsanto to quantify
12 the amount of leakage?

13 A. I'm not aware of any such attempt.

14 Q. Was there any study performed by Monsanto to
15 determine where the Pydraul would end up that did leak
16 from a die cast machine or as a result of a spillage?

17 A. I'm not aware of any study that addressed
18 that, no.

19 Q. Prior to 1970, did Monsanto conduct any
20 studies to determine what the impact would be of Pydraul
21 being discharged from a die cast company that previously
22 had leaked from a die cast machine or had leaked as a
23 result of spillage?

24 A. I'm not aware of any study like that.

25 Q. Did Monsanto pay for any studies to be

1 conducted by others on that particular subject prior to
2 1970?

3 A. I do not know.

4 Q. Did Monsanto at any time ever own any
5 companies whose principal business was conducting either
6 health tests on animals, either human or animal tests or
7 environmental studies?

8 A. No.

9 Q. If the PCBs ended up in the sludge in a
10 municipal waste water treatment system as the company
11 believed, how were the municipalities disposing of that
12 sludge?

13 A. It's my understanding that they ended up in
14 landfills.

15 Q. Do you know whether or not that sludge has
16 ever been used as a fertilizer?

17 A. Yes. In a few instances, yes.

18 Q. Do you know when it was first started to be
19 used as a fertilizer?

20 A. No.

21 Q. Do you know whether or not it was being used
22 as a fertilizer in the mid-1960's?

23 A. I suspect it was. Now, we're talking about
24 sludges from municipal sewage treatment plants --

25 Q. That's correct.

1 A. -- which may or may not have hydraulic fluids
2 in them?

3 Q. That's right.

4 A. All right.

5 Q. I'm not saying they do. I just want to know,
6 you know --

7 A. Okay.

8 Q. Okay. Do you know, were they being used in
9 the 1960's? Was sludge being used in the 1960's as
10 fertilizer?

11 A. I'm aware, for example, of Milorganite, but I
12 don't know what year that was introduced to the
13 marketplace. I just don't know the dates.

14 Q. To your knowledge, did Monsanto, prior to
15 1969, actually go through that thought process? Now, I
16 appreciate that Monsanto's got a lot of employees, and you
17 can't be responsible for knowing what everybody is
18 thinking about, and I'm not trying to impose that
19 responsibility on you, but to your knowledge, were there
20 people at Monsanto that actually sat down and thought out
21 the process of where spillage of hydraulic fluid in die
22 cast houses ended up?

23 MR. SCHINK: Are you talking about spillage
24 that was not properly collected in Wisconsin, or are you
25 talking about spillage that was properly collected by

1 using the means he discussed?

2 Q. Can you answer the question as it's phrased?

3 MR. SCHINK: I object to the question.

4 Q. (BY MR. CARLSON) Secondly, do you remember
5 the question?

6 A. I believe I do.

7 Q. Okay.

8 A. There were individuals in Monsanto that sat
9 down, as you say, and thought about it.

10 Q. Okay. Can you tell me --

11 A. They addressed those cases where control was
12 appropriate, the use of sawdust and clay and proper burial
13 and the proper kinds. And there were instances where they
14 were aware it was permitted to enter a municipal sewage
15 system, and they could speculate as to where that might
16 end up. They had no hard data to work from.

17 There were other instances where they frankly
18 didn't know. That went through their thought process.
19 They could come up with examples of excellent control and
20 to the other extreme of sloppy control. And so to answer
21 your question, yes, there were people in Monsanto that
22 went through this thought process, and this is really what
23 led to the conclusion that although most of the customers
24 are doing a good job, there are those few that can't or
25 won't lead us to replace that product.

1 Q. Okay. I'm not saying you didn't answer my
2 question, but I want to refresh my own recollection.

3 Would you read my question back for me.

4 (Reporter read from record as directed.)

5 A. I have a correction to make in that last
6 answer. You mentioned 1969 and prior to. I would suggest
7 that starting in 1969, those thoughts were addressed.

8 Q. (BY MR. CARLSON) Okay. I thought that's
9 what you meant to say, but I wanted to be sure.

10 A. Yes.

11 Q. Okay. Starting in 1969 then, who did go
12 through that effort in the company?

13 A. I can recall individuals that were involved.
14 There's Howard Bergen, the director of the business group.

15 Q. I'm sorry. His last name is?

16 A. Bergen, B-e-r-g-e-n.

17 Q. I keep calling it Bergen, so now I will
18 pronounce it right.

19 A. He preferred Bergen, soft "g." A Norman
20 Johnson, who was the marketing manager for the hydraulic
21 fluids; a Bill Richard, the director of research for those
22 fluids.

23 Q. Were those fluids generally categorized as
24 functional fluids?

25 A. They were part of the functional fluids,

1 which included hydraulic fluids as one category.

2 Q. Okay. Was Bill Richard director of research
3 for the hydraulic fluids?

4 A. For functional fluids.

5 Q. For functional fluids.

6 A. Now, working for Dr. Richard were individuals
7 like Lou Stark. I remember Mr. Stark was involved. So,
8 the names I have given you represent the business
9 function, the marketing function, the research function.

10 Q. Okay. Prior to 1970, was it generally
11 permissible -- and every time I use "generally," I'm going
12 to catch an objection, so I'll stipulate it will help me
13 into the subject. Was it generally permissible for
14 spilled hydraulic fluids to be flushed down storm sewer
15 drains?

16 MR. SCHINK: I object to the form of the
17 question. Are you talking about was it lawful in terms of
18 the Refuse Act, you're saying?

19 MR. CARLSON: Yes.

20 MR. SCHINK: You're asking for a legal
21 conclusion. I don't think he's qualified to give one.

22 A. It's my understanding prior to '70, before
23 EPA, states had statutes which described the kinds of
24 material permitted into public waterways in the states.
25 Industrial chemicals as a group were generally outlawed

1 throughout the 48 states at a time, so a material like a
2 hydraulic fluid would be an industrial chemical that just
3 shouldn't be flushed down the sewer.

4 Q. (BY MR. CARLSON) Okay.

5 A. Generally.

6 Q. Did you have -- strike that. Do you have an
7 understanding of acceptable separation techniques used in
8 the die cast company to separate hydraulic oils from waste
9 water?

10 MR. SCHINK: When?

11 Q. (BY MR. CARLSON) Any time prior to 1970.

12 A. The only technique I'm aware of prior to
13 1970, was gravitation where the heavier fluid would sink
14 to the bottom and have a water layer on top, and you
15 separate the two that way.

16 Q. Prior to 1970, did Monsanto recommend to its
17 customers utilizing a secondary or other separation
18 technique to separate PCBs from the water?

19 A. I'm not aware of any.

20 Q. In those circumstances where there's a
21 mixture of kinds of oil that have, as a result of leakage
22 or spillage, worked their way into the waste water of a
23 plant, and there's an attempt to separate by skimming,
24 would the PCBs stay with the water?

25 A. To a degree. Some PCBs are in the water

1 layer, in the parts per billion range, but they would not
2 be visible to the naked eye.

3 Q. PCBs are heavier than water?

4 A. Yes.

5 Q. Would some of the PCBs be suspended in oil?

6 A. If there's -- you're talking now mineral oil?

7 Q. Yes.

8 A. If there's mineral oil, they would be very
9 much in the oil. They blend very perfectly.

10 Q. Okay. Who was responsible for marketing of
11 Pydraul F-9 and Pydraul 312 from '65 through '71?

12 A. The only individual I know was Norman
13 Johnson. I do not know who his predecessor was.

14 Q. Without going into the details, it may become
15 of interest to me later on, but right now were there other
16 fluids utilizing PCBs other than the hydraulic fluids --
17 strike that. Prior to 1969, were there customers of
18 Monsanto using fluids utilizing PCBs which were given
19 specific directions with regard to cleanup -- strike that.
20 The question is never going to come out right. I'll try
21 one more time. Well, let me approach it this way. What
22 are some of the other liquids Monsanto manufactured which
23 utilized PCBs prior to '69?

24 A. Well, there were liquids used in turbines,
25 gas turbines, liquids used in vacuum pumps, liquids used

1 in electrical equipment, as well as liquids used in heat
2 transfer assistance. I believe I've covered them all.

3 Q. Okay. Were the liquids with PCBs utilized in
4 gas turbines prior to 1969, to your knowledge, did
5 Monsanto conduct studies as to whether or not the PCBs
6 used in that circumstance would potentially get out into
7 the environment?

8 A. I don't know of any formal study other than
9 the precautions about skin and breathing and the like that
10 called for responsible handling and use and disposal.

11 Q. Okay.

12 A. I don't know if that's what you had in mind.

13 Q. That's close. Is that answer also true with
14 regard to liquids used in heat transfer systems?

15 A. Yes.

16 Q. And the same would be true with regard to
17 vacuum pumps?

18 A. Yes.

19 Q. And electrical equipment?

20 A. Correct.

21 Q. Prior to 1969, and for lack of a better way
22 of approaching it, when you use the terminology that you
23 had used earlier, I think it was sloppy controls and very
24 tight controls. The terminology is fine. What would
25 Monsanto's criterion be as to what would be an acceptably

1 tight control versus one which was unacceptable? We're
2 talking about now with regard to PCBs that get into the
3 waste water system.

4 A. I don't know that Monsanto had any
5 quantifiable criteria in mind in terms of so many pounds
6 or what have you, and Monsanto was never in a position to
7 know all of the circumstances that surrounded each
8 customer's particular situation. So it would be very
9 difficult to come up with a Monsanto concept of what's
10 acceptable. It depends on the total situation.

11 If the customer, as an example, had an agreement
12 with the local sewage treatment plant to discharge a given
13 amount of waste, and the local treatment plant handled it
14 properly, used the proper landfills or whatever, that
15 would be one set of circumstances that would call for "X"
16 pounds of material could go into the system. In another
17 situation where there just was no such agreement or the
18 local treatment plant could not tolerate it for reasons
19 that are unique to them, a much lesser amount would have
20 to serve as acceptable. So, it's a long way of going
21 around saying that I'm not aware of Monsanto, first of
22 all, being in a position to quantify it. So, no such
23 number ever evolved.

24 Q. Okay. Each case would have to be judged
25 independently?

1 A. Correct. Yes.

2 Q. Are there die cast companies, other than my
3 client, that you're aware of, that you have heard about,
4 which have had to remove soil from around the premises
5 because of PCB content?

6 A. This is the first one I've heard of and the
7 only one I've heard of.

8 Q. Okay. Are there any die cast companies
9 you're aware of, manufacturers who are using die cast
10 systems as a part of the manufacturing operation which
11 have incurred liability to either a state or to the
12 Federal Government as the result of discharge of PCBs?

13 MR. SCHINK: Are you talking about deliberate
14 discharges like the one involved in this case, deliberate
15 or accidental? Otherwise, I object to the form of the
16 question.

17 MR. CARLSON: You can make your objection to
18 the form of the question, and the question stands as it's
19 phrased.

20 MR. SCHINK: He wants to know either a
21 deliberate discharge or an accidental discharge.

22 Maybe you want to read the question back.

23 (Reporter read from record as directed.)

24 MR. SCHINK: I don't know whether he knows
25 whether you incurred liability.

1 MR. CARLSON: Yeah, I know. I appreciate
2 that.

3 A. I'm kind of fuzzy.

4 Q. (BY MR. CARLSON) You can ask me. I'll
5 rephrase the question if you've got a problem, and I'm
6 willing to admit the phrasing of that question isn't the
7 greatest, but --

8 A. All right. I'm not aware of all the details
9 of the Milwaukee Harbor situation.

10 Q. That's an example where there was a problem?

11 A. There were some cleanup possibilities talked
12 about. I don't know whether they had a die casting
13 operation inside that operation, so I'm kind of fuzzy in
14 terms of answering your question. Other than that, I
15 don't know of any other die casting related situation.

16 Q. Would it be more correct to say you don't
17 know with regard to my client what its responsibilities or
18 liabilities have been in the past, do you?

19 MR. SCHINK: You have to answer audibly.

20 Q. (BY MR. CARLSON) You have to answer yes or
21 no.

22 A. I'm sorry. No, I don't.

23 Q. So when you say, "I'm not aware of any other
24 situation," actually what you're saying is, "I'm not aware
25 of any situation where a die cast company has incurred

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1 liability to either a state or to a governmental agency as
2 a result of discharge of PCB's?

3 A. That's correct.

4 Q. Okay. Other than the translation of the
5 Jensen study, have you reviewed any other studies which
6 addressed the question of potential adverse health effects
7 of PCB's? Strike that. Have you reviewed any studies
8 addressing the question of potential adverse health
9 effects of PCB's?

10 A. Yes, I have.

11 Q. Okay. Can you tell me of those that you have
12 read?

13 A. There's a report that was issued by Dr.
14 Risebrough, University of California at Berkeley, in which
15 he claimed that his study showed that the brown pelicans
16 off the southern coast of California were being affected
17 by PCBs. There was a report issued out of Cornell
18 University by Dr. Peacall, P-e-a-c-a-l-l. As I remember
19 there, he was alleging that the PCBs were harming wild
20 birds, as I remember, the peregrine falcon in particular.

21 There were reports that came out of an incident
22 that occurred in the North Sea up near Great Britain
23 involving seals and sea birds, sea fowl. There was a
24 report issued out of the Commercial Fisheries Laboratory
25 in Gulf Breeze, Florida, in which they reported that the

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1 juvenile shrimp were extremely sensitive to PCBs. At the
2 moment I can't think of any more.

3 Q. Any human health studies that you have
4 reviewed?

5 MR. SCHINK: You're asking now whether they
6 showed adverse effects or no effects?

7 MR. CARLSON: That's right. I'm not looking
8 just for --

9 A. I'm aware of some epidemiology studies made
10 on workers in the electrical equipment industry that were
11 exposed to PCBs in their places of employment. I have to
12 confess I haven't read the reports, per se. I have just
13 heard of these reports. I was informed that they were
14 conducted. I'm aware, of course, of Monsanto's animal
15 studies that were sponsored by Monsanto.

16 Q. (BY MR. CARLSON) Have you read those?

17 A. I'm sorry?

18 Q. Have you read those?

19 A. The Monsanto's?

20 Q. Yes.

21 A. I have read the summaries. I have not read
22 the full technical report.

23 Q. Okay. Any others?

24 A. I can't recall at the moment any other
25 reports that I've seen or have heard of.

1 Q. Has Monsanto, to your knowledge, accepted
2 that the presence of PCBs in the environment has damaged
3 reproduction of certain birds?

4 MR. SCHINK: At what level?

5 MR. CARLSON: At any level.

6 MR. SCHINK: Object; vague.

7 A. Monsanto, because of its leghorn chicken
8 studies and the results from those studies, concluded that
9 birds can have problems with eggs and reproduction when
10 exposed to PCBs. The levels are unknown regarding wild
11 birds.

12 The studies that were reported in early '70s by
13 investigators such as Peacall and Risebrough, I later was
14 informed by Government authorities in Patuxet, Maryland,
15 and they published a report on this, that the problem
16 chemical there was for DDT, not the PCB. So, there is no
17 good, hard data associating PCBs with wild birds, but
18 Monsanto's conclusion based on the chicken study is that
19 it's very likely that wild birds could be harmed.

20 Q. (BY MR. CARLSON) It's hard to find birds
21 that aren't exposed to the DDT alone or the PCBs alone?

22 A. That is correct.

23 Q. Has anybody done any work to determine
24 whether there's a synergistic effect of DDT with PCBs or
25 vice versa?

1 A. I'm not aware of any.

2 Q. Do you know if Monsanto agrees or disagrees
3 with the idea that the gulf shrimp is particularly
4 sensitive to PCBs?

5 A. Monsanto accepted that study and findings of
6 that study. There's no reason not to.

7 Q. Did the Commercial Fisheries Laboratory study
8 address the effects of PCBs on those shrimp that were
9 sensitive? What were the effects of PCB's?

10 A. Well, it killed them.

11 Q. Okay. In the study which addressed the
12 question of PCBs and seals, apparently looking at what
13 occurred in the North Sea, what was the effect of PCB's on
14 the seals there?

15 A. As I understand it, they found bodies of dead
16 seals washed up on the shores. The seals were emaciated,
17 and there were many pups involved. The tissues were
18 analyzed, and PCBs were found, so PCBs were the suspect.

19 The last I recall is that the authorities in charge
20 of that study concluded that it's very likely that the
21 seals, especially the new mothers, were not getting enough
22 nourishment from wherever their surroundings were; and
23 therefore, they became emaciated, and this is why the pups
24 were in turn affected. They couldn't nurse. And then
25 unfortunately, they found themselves in a violent sea

1 storm. All of those impacts combined killed them. That's
2 my understanding of the final analysis.

3 Q. Was there some relationship thought to exist
4 between the levels of the PCBs and the eventual death?

5 A. No. There was no relationship established,
6 because what had happened, they were so emaciated and lost
7 so much weight, that it was difficult to come up with a
8 number that says so many PCBs were present in the living,
9 healthy animal to start with. They just could not make
10 any good conclusions from their data.

11 Q. Did they make some conclusions, regardless of
12 whether or not they were good?

13 A. Well, like I said earlier, they concluded
14 that it was a lack of food that led to malnutrition, and
15 then the storm came along, and that killed them.

16 Q. Was the lack of food related, at least in the
17 author of the study's mind, to the presence of PCBs?

18 A. No. They didn't associate that with PCBs.

19 Q. Were the presence of the PCBs coincidental to
20 the lack of food? I'm not talking about specifically what
21 happened. What was being reported as happened, though,
22 was that coincidental to what had occurred in the North
23 Sea?

24 A. That's the conclusion, yes.

25 Q. As expressed by those authors?

1 A. Yes.

2 Q. The Monsanto animal studies began when? And
3 let me back up. Monsanto, I presume -- and I know they
4 conducted tests periodically, you know, skin type tests on
5 animals on PCBs.

6 A. Yes.

7 Q. Did Monsanto conduct any studies looking at
8 the long-term effect of exposure to PCBs in the food chain
9 of the animals?

10 A. Yes.

11 Q. And when did they start doing that?

12 A. They started about 1968, with some studies to
13 establish feeding levels for the long-term study.

14 Q. Who actually was doing that work?

15 A. Industrial Bio Test Laboratories, Northbrook,
16 Illinois.

17 Q. Were they doing that on contract to Monsanto?

18 A. Yes.

19 Q. Do you know who owned Industrial Bio Test at
20 that time?

21 A. I believe it was a NALCO company, N-A-L-C-O.

22 Q. Do you know who owned NALCO?

23 A. No, I don't.

24 Q. What was Industrial Bio Test -- strike that.
25 To your knowledge, was there a contract entered into

1 between Monsanto and Industrial Bio Test, a written
2 contract?

3 A. I've never seen one.

4 Q. What is your understanding of specifically
5 what Industrial Bio Test was to do originally when they
6 were first commissioned to do this study? I think you
7 already answered that for me, and if I'm being repetitive,
8 I apologize. I'm looking really what their first charge
9 was.

10 A. Their first charge?

11 Q. Yes.

12 A. Was to treat a small group of animals at as
13 high a dose level as possible without killing the animal
14 to help establish a level that could later be fed to
15 another group of test animals for their lifetime, and have
16 as many survivors as possible to be able to study the
17 effects.

18 Q. Okay. And the specific animal being looked
19 at was the chicken?

20 A. It was the white rat, the beagle dog, and the
21 leghorn chicken.

22 Q. Did Industrial Bio Test determine the amount
23 that could be fed to each of the animals and to the bird
24 without killing them?

25 A. They determined an amount that would give

1 this survival rate that was suitable for a good study.

2 Q. Okay. Do you know about how long it took
3 them to arrive at these numbers?

4 A. That's called a 90-day study. So given a
5 normal follow-up, I would suggest that it took them about
6 four months.

7 Q. Okay. And then what was done with that data?

8 A. That data then was used to establish feeding
9 levels for the two-year rat study and the 18-month dog
10 study, and I believe it was 18 months for the chicken
11 study.

12 Q. Were the results of the original work, that
13 is, the results of the 90-day study, published in a report
14 to Monsanto?

15 A. There is a report to Monsanto, yes.

16 Q. Okay. And do you know, were the two-year,
17 18-month and 18-month studies carried out?

18 A. Yes.

19 Q. And do you know what the results were
20 generally with regard to those studies?

21 A. In the rat studies, the higher chlorinated
22 types of PCBs at the high dose level, which was 100 parts
23 per million in their total daily diet, lifetime diet,
24 produced enlarged livers and decreased gain in weight, and
25 had some reproduction problems in terms of number of pups

1 that were born.

2 In the chicken study, they seemed to tolerate the
3 higher chlorinated PCBs better. The effect was noted with
4 the lower chlorinated PCB, the 1242, and somewhere between
5 the one and 10 part per million feeding level there was an
6 effect on the egg shell thickness and on the hatchability
7 of the eggs. The tests were then rerun, and it was
8 established that at about three parts per million in the
9 diet of the chicken, this effect on eggs was noted. So,
10 it took less than three parts per million to be
11 acceptable.

12 MR. SCHINK: Three parts per million?

13 A. Per million, yes. In the dogs, the dogs
14 seemed to suffer from gastric problems. As I remember,
15 they had at the higher levels bleeding ulcers or the
16 equivalent of that. That's all I remember about the dog
17 study.

18 Q. (BY MR. CARLSON) Do you know if they seemed
19 to tolerate the higher chlorinated or the lower
20 chlorinated Aroclors better?

21 A. I'm sorry?

22 Q. I'm talking about the dogs now. Did they
23 seem to tolerate the higher or the lower chlorinated --

24 A. There didn't seem to be that much difference
25 in the materials tested.

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1 Q. Okay.

2 A. But it was the higher doses that, of course,
3 gave that effect.

4 Q. In response to the results of this study, did
5 Monsanto take any specific action with regard to either
6 continuing or discontinuing sales of PCB products or
7 advice given to customers handling PCB products?

8 A. No. This data confirmed that what we had
9 been saying on the labels and literature and all was still
10 appropriate.

11 Q. Okay. And that study was completed when?

12 A. The final reports were available in '71 or
13 '72.

14 Q. To your knowledge, has any human health
15 researcher opined that exposure to PCBs has or causes any
16 particular form of cancer?

17 A. I've read and heard that allegation. I have
18 seen no formal report supporting that.

19 Q. Where have you read the allegation?

20 A. Mostly in the popular press.

21 Q. The press has an interesting role I'm sure
22 that we're all aware of with regard to industrial
23 chemicals, but do you have some recollection of what
24 studies or what it was that the press was latching on to
25 that they used to -- or the press used to support the

1 stories that there was a cause/effect demonstrated?

2 MR. SCHINK: You're talking now about human
3 health?

4 MR. CARLSON: That's right, human health.

5 A. I don't recall any specific reports or
6 specific person mentioned. It is a belief held by some
7 scientists. They have expressed this belief in meetings.
8 The press picked it up, and it's been my observation that
9 now any time a PCB article appears in the popular press,
10 in the newspapers, it's followed by the word "cancer," the
11 cancer-causing chemical or a probable cancer causer; but
12 anyway, the word "cancer" is associated with PCBs, but I
13 don't recall any scientific report that deals with human
14 cancer and PCBs.

15 Q. (BY MR. CARLSON) Do you recall any case
16 reports in which the author linked exposure to PCBs and
17 cancer?

18 A. Case reports?

19 Q. Do you recall any epidemiological work such
20 as you referenced for me with regard to the electrical
21 workers?

22 A. I don't recall any.

23 Q. Can you give me the names of some of the
24 scientists that you have heard express the opinion or have
25 read that have expressed the opinion that there's a

1 cause-effect relationship between exposure to PCBs and
2 cancer?

3 A. This Mrs. Silbergeld stands out in my mind.
4 There are others, but I really can't remember. Barry
5 Commoner is another name that comes to mind. There are at
6 times, as I remember, some of Mr. Ralph Nader's team that
7 made statements of this type. I've forgotten their names
8 now. I just can't think of them anymore.

9 Q. Do you have some understanding or have you
10 heard what these people are basing their contentions on?

11 A. I don't know what they're basing them on.

12 Q. Other than the -- strike that. Did Biotest
13 do the second stage of the study that you have referenced
14 for me?

15 A. The chicken study?

16 Q. Yes, the chicken, rat and dog.

17 A. They did all those studies, yes.

18 Q. Did all of them. Okay. Has Monsanto
19 commissioned any other animal studies looking at
20 potentially adverse health effects of PCB's?

21 A. I wasn't involved, but I understand that
22 there was a study placed somewhere with Monsanto
23 companies, and that's all I personally know.

24 Q. Was it your understanding that Monsanto paid
25 for the study or did it in-house or --

1 A. No, they did not do it in-house. It was done
2 elsewhere.

3 Q. Any idea what part of the country it was done
4 in, or perhaps what laboratory it was?

5 A. Just east is all I remember.

6 Q. Do you remember when that was?

7 A. It was after 1977, 1980.

8 Q. And have you heard just in general terms what
9 the results of that study were?

10 A. No, I haven't. I don't know either the
11 conditions of the test or the results.

12 Q. At the time Monsanto decided to discontinue
13 manufacturing and sale of Pydraul 312 that contained -- I
14 think it was what, Aroclor 1242, wasn't it?

15 A. Yes.

16 Q. Did you agree with that decision or disagree?

17 A. Yes.

18 Q. Was in part your agreement based on any
19 concerns that you had with regard to the effect of
20 Aroclors on the environment?

21 A. Yes.

22 Q. And was it also in part based on concerns you
23 had about potential or at least possible health effects of
24 the Aroclor?

25 A. Yes.

1 Q. And was the information you had at your
2 disposal at that time that allowed you to come to an
3 opinion, that in this particular case you agreed with
4 Monsanto's action that was developed between 1969 and
5 whenever that decision was made?

6 A. Yes.

7 Q. If Monsanto solely, as the result of the
8 Jensen work in 1966, had decided to discontinue
9 manufacturing and sale of Pydraul 312 with the 1242
10 Aroclor, would you have disagreed with the decision based
11 on that information?

12 A. Yes.

13 Q. You would have thought it appropriate to have
14 more data available before either agreeing or disagreeing?

15 A. Yes.

16 Q. Was Monsanto -- strike that. Do you know
17 when Monsanto was first aware of the Swedish study?

18 A. The Swedish study?

19 Q. Yes, the Jensen study.

20 A. It's my understanding we were first aware of
21 it in late '66, early '67.

22 Q. It may be difficult to pin down, but do you
23 have some idea or do you have some understanding of who it
24 was at Monsanto that first became aware of the study?

25 A. I have an understanding.

1 Q. Who was it?

2 A. The best I recall, there was a Monsanto
3 representative in the United Kingdom named Don Cameron,
4 who was marketing sales representative, heard about a
5 report from somewhere -- I don't know where -- that
6 referred to chlorinated biphenol, spelled p-h-e-n-o-l
7 instead of p-h-e-n-y-l. And at first the thought was that
8 this is an entirely different chemical than the one we
9 were selling, but as I understood it, Mr. Cameron then
10 arranged through the Swedish Monsanto representative to
11 get a copy of that report, which in turn was translated,
12 and this is the report I mentioned earlier. It finally
13 got to Monsanto-St. Louis, like I said, late '66, early
14 '67.

15 Q. Okay.

16 THE WITNESS: Can we take a break?

17 MR. CARLSON: Oh, sure. This is not an
18 endurance contest. I didn't mean to imply that it was.

19 (A brief recess was taken.)

20 Q. (BY MR. CARLSON) When we were discussing
21 PCBs found in the environment, found in the food chain, I
22 guess one of the questions that comes to my mind is how do
23 birds end up with PCBs in their tissue? In other words,
24 are they eating foods that have PCBs in them, or are they
25 getting it from the dirt? Do you have some understanding?

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1 A. I'll give you my understanding.

2 Q. Okay.

3 A. The birds that seem to have the most trouble
4 with PCBs or chemicals like PCBs are the fish-eating
5 birds, falcons and the like, and the pelicans. And the
6 way this happens is that PCB, once it finds its way into
7 waterways, is, of course, present in that water. Then you
8 have the different species of aquatic life from the water
9 on up to the big fish. The big fish eat the little fish.
10 The little fish eat the smaller ones. Each one has some
11 PCBs in it started from the water flea, which is the
12 daphnea. You may have heard of it.

13 Anyway, the PCB accumulates in each creature and
14 concentrates in the fatty tissue of that creature such
15 that when it's eaten, all the PCBs go into the next
16 creature. So by the time you get to the top of the food
17 chain, the PCBs have been concentrated, sometimes quite
18 dramatically. They have found -- some studies show that
19 75,000 times more PCBs are in the fish than there was in
20 the water that the fish lived in.

21 So, that fish now has the PCBs in it. It's eaten
22 by the bird, pelican or falcon or hawk. It in turn builds
23 it up in its tissues. Some of it is eliminated. Some of
24 it is retained. Some of it is metabolized, and it then
25 begins to affect its reproduction, its ability to use

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1 calcium properly to make the egg shells and so on. That's
2 my understanding of how it can happen in the food chain.

3 Q. Okay.

4 A. If it is dirt, as you indicated earlier, it's
5 really a dirt particle that gets into the water and is
6 suspended in the water, gets into the fish gills, and the
7 PCB off of that dirt then is extracted by the fish gill,
8 gets into the bloodstream that way, in addition to the
9 eating process.

10 Q. Okay. PCBs aren't being picked up by plant
11 roots, are they?

12 A. I haven't heard of any plants that pick up
13 PCBs, except that they were found in the pine needles in
14 Sweden, which many investigators suspect were from fallout
15 rather than from the soil.

16 Q. Has Monsanto undertaken some studies to
17 determine either where in the world or where in this
18 country most of the PCB problem is?

19 A. No.

20 MR. SCHINK: What do you mean by "problem,"
21 the presence?

22 Q. (BY MR. CARLSON) When we were talking about
23 a target of 10 parts per billion in discharge of waste
24 water as being an acceptable limit, first of all, am I
25 correctly stating Monsanto's position at the time you were

1 with the company?

2 A. Yeah, where discharged. It's not into the
3 environment. It's into a sewer system, leaving the plant
4 in the sewer system.

5 Q. All right. Leaving the plant in the sewer
6 system. Is there or was there an expectation that
7 further, after the material left the plant, it would then
8 result in the PCBs either being filtered out or breaking
9 down?

10 A. Yes. Those thoughts were considered, yes.

11 Q. We get into the subject of the municipal or
12 treatment of municipal sewage.

13 A. Correct.

14 Q. Okay. Has there been work done which shows
15 that this does or does not occur?

16 A. What doesn't occur?

17 Q. That treatment of municipal sewage will cause
18 biodegradation of PCBs.

19 A. Yes.

20 Q. All right. And does it?

21 A. Yes.

22 Q. Okay. When was that determined?

23 A. The biodegradation studies that Monsanto
24 conducted simulated in the laboratory what happens in a
25 municipal treatment plant that uses bacteria to digest the

1 sludge. In fact, the culture for these studies was
2 obtained from the St. Louis municipal sewage plant, taken
3 to the laboratory, and inoculated each of the test stands
4 for each of the products, and that demonstrated that yes,
5 bacteria from the treatment plant do digest some of the
6 PCBs. And also, they demonstrated during the analyses
7 that the PCBs had adhered to the particles in that test
8 system.

9 Q. Do the remainder of the PCBs, those that were
10 not digested, adhere to the particles?

11 A. Yes.

12 Q. And when was that done? When was the work
13 completed on that?

14 A. It was completed in early '72.

15 Q. From this could I infer that if companies
16 using the PCB hydraulic fluid had a waste water treatment
17 plant on their premises comparable to a municipal plant,
18 and could contain PCBs and treat them as the
19 municipalities were doing, that Pydraul with the PCBs
20 would still be a viable product today?

21 A. I suspect not, because the PCBs that are not
22 degraded would still be detectable with the analytical
23 methods now available, and as long as they are detected,
24 that just doesn't seem to be acceptable anymore. PCBs are
25 just not desirable.

1 Q. Okay. Because of the potential impact on the
2 environment?

3 A. That's the probability of an impact, is
4 really the thought that controls this undesirability of
5 PCB's.

6 Q. Prior to 1969, did Monsanto think that all
7 die cast waste water discharge was going into a sewer
8 system where there would be municipal treatment of the
9 water?

10 A. No. Many did, but there are others that did
11 not.

12 Q. What were the other -- I hate to use the word
13 "acceptable," but I guess I will, either acceptable or
14 common ways that the waste was being discharged by die
15 cast companies prior to '69?

16 A. Well, I understand that some companies had
17 their own discharge system before they discharged to a
18 local stream, and some thought that they controlled the
19 losses to the point where the water that did get away
20 could be discharged without any further treatment. Just
21 release it to the nearest creek bed and so on. And then
22 there were some that, as I said earlier, either could not
23 or did not understand the need to be careful, and they
24 would discharge.

25 Q. For a die cast company that was skimming off

1 oil, okay, mineral oil from the water, from waste water,
2 and then seeing if one saw the remaining water in the
3 tank, if it's relatively clear, typically would that,
4 prior to 1969, be thought to be waste water which could be
5 discharged into a local ditch or a stream bed?

6 MR. SCHINK: Now, is this a die caster using
7 Pydraul or not?

8 MR. CARLSON: Yeah, Pydraul 312.

9 MR. SCHINK: Along with mineral oil?

10 MR. CARLSON: No, not along with, but mineral
11 oils in the plants that have gotten into that same waste
12 water.

13 MR. SCHINK: And is this an open tank?
14 What's the depth of the tank? I object to the form of the
15 question.

16 Q. (BY MR. CARLSON) Go ahead.

17 A. Prior to 1969?

18 Q. Yes.

19 A. Any PCB type fluids that were with water
20 would be visible, because it would form a separate layer,
21 and the two would be separated. In fact, there was
22 literature that told the customer how to reclaim that
23 hydraulic fluid at the bottom of the water and reuse it to
24 save himself some money.

25 Q. Okay.

1 A. Now, there's an oil machine that you
2 mentioned. Mineral oil would float. You remove that, and
3 if you looked at the water and didn't see a bottom layer,
4 that would tell you that there were no heavy PCB hydraulic
5 fluids present. There was none present.

6 Q. And if you saw that bottom layer?

7 A. If you saw that bottom layer, you better be
8 careful. It very likely has PCB because it is heavy,
9 unless it's a mud or metal waste or some other types of
10 material. You have to determine that.

11 Q. Did Monsanto, prior to '69, know the various
12 methods that die cast companies were using to treat their
13 waste water?

14 A. In most cases, the Monsanto sales
15 representative knew quite a bit about the operation,
16 because they have -- that was a responsibility. "Know
17 your customers and his operations so you can help them
18 better to use your product, continue to use our product,"
19 that sort of thing. So, most of them were quite familiar
20 with the operation. Now, this does not mean that he knew
21 every minute of the day what was taking place.

22 Q. Oh, no. But he knew generally how the plant
23 plant worked?

24 A. Yes. Yes.

25 Q. And if a plant had a procedure for separating

1 mineral oils from waste water, but didn't have a separate
2 procedure for separating waste water from Pydraul, would
3 that salesman then recommend that another separation
4 system be employed?

5 A. Very likely, yes, sir, because that fluid
6 that was being lost was higher cost than that oil that
7 they were recovering. It would behoove them to recover
8 that heavier layer.

9 Q. Okay. And in some of your earlier literature
10 with Pydraul, that's set out?

11 A. Yes.

12 Q. Would it be recommended to the customer as a
13 cost savings measure that you could reclaim that Pydraul
14 fluid and reuse it in your system?

15 A. Oh, yes, because Pydrauls are more expensive
16 than other competitive fluids. This is one way to balance
17 out the costs.

18 Q. Would the recommendation have been made for
19 any other reason?

20 A. Well, it's the overriding reason, "Don't put
21 industrial chemicals down the sewer."

22 Q. Do you know if, in fact, your salespeople
23 calling on customers did make those recommendations to die
24 cast companies?

25 A. Yeah.

1 Q. Are you aware of any particular instance
2 where that occurred?

3 A. It was throughout the industry. There is no
4 one case that stands out.

5 Q. I appreciate that, and that may have been.
6 I'm not saying it wasn't. I'm just wondering if you can
7 point me to a situation where you know, in fact, that
8 occurred?

9 A. No. I don't remember any salesman telling me
10 specifically a customer by name, no. This was sort of
11 like breathing. They do it all the time.

12 Q. Were salesmen directed to tell their
13 customers this?

14 A. Yes. That's part of their training, to sell
15 this product.

16 Q. And they were directed to tell the customers
17 to put in a separation system which would draw out the
18 Pydraul that had been lost through leakage or spillage
19 from the waste water?

20 A. They were directed to discuss with the
21 customer the advantages of doing so and sharing with them
22 some ideas, but let the customer design his system,
23 depending on his factory, and the layout, and his
24 resources, what have you.

25 Q. In situations where salespeople were calling

1 on new customers, but old plants, that you were able to
2 pick up from, you know, your salesman was able to get in
3 there and sell Pydraul as a replacement hydraulic fluid
4 for something made by one of your competitors, if there
5 wasn't a separate system in place for drawing out Pydraul
6 from the waste water at the bottom, would that be a
7 recommendation that would be made for a new account?

8 A. Sure, yeah, but in something to catch the
9 loss or the drippage or the spill or the broken pipeline,
10 trap it and treat it as follows, and as I remember, the
11 brochures had even some sketches in some schemes of work
12 somewhere.

13 Q. In any of the brochures or publications
14 Monsanto had prior to '69, demonstrating ways of
15 accomplishing the separation, did Monsanto reference this
16 as a way to alleviate discharge of the material into
17 either a sewer system or the waterways?

18 A. I don't recall the wording. I just don't
19 remember the exact words. I do remember this emphasis on
20 reclamation and the mixture of water and Pydrauls and
21 separating them.

22 Q. It could well be that the separation system
23 that we're talking about for separating Pydraul from waste
24 water was only advanced by Monsanto as a technique for
25 reclamation to save money by the consumer so that fluids

1 could be used, rather than to aid in treating of waste
2 water that was going to be discharged either into a
3 system, a sewer system or a waterway?

4 MR. SCHINK: I object. It asks for the
5 witness to speculate.

6 A. It could be as you say.

7 Q. (BY MR. CARLSON) Okay.

8 A. At the same time, I find that hard to believe
9 that the thought of "Don't expose people" isn't there
10 somewhere, "Don't get it out there where others can be
11 exposed." I'm thinking of the label and the handling
12 section in these brochures we talked about.

13 Q. Well, the label doesn't have anything on it
14 about reclaiming using the kind of system we're talking
15 about?

16 A. No. No.

17 Q. I'm talking about particular --

18 MR. SCHINK: Let him finish his answer.

19 MR. CARLSON: I'm sorry. I thought he did.

20 A. The label refers to waste that human beings
21 can be exposed.

22 Q. (BY MR. CARLSON) All right.

23 A. The idea being that once you get that
24 message, then you control how it's handled in this
25 workplace, how it might get down the sewer, what affect it

1 will have on the sewage plant people, and what might
2 happen later if they dump it in the wrong place and out in
3 the local lake. The people might be swimming or fishing.
4 Just don't expose people to this chemical, and that
5 includes the whole bit from handling, use, disposal.

6 Q. Going back to the original thought, that is,
7 the brochures which demonstrated ways of reclaiming
8 Pydraul from waste water, that was as a reclamation method
9 to aid the customer in treating his waste water?

10 A. I'd have to reread it. I don't remember the
11 exact words. I do remember the sections on reclamation.
12 I remember schematic sketches of how it might be done. I
13 remember a reference to, "You can reuse this."

14 It seems to me I also remember even a
15 recommendation where you might send it to have it cleaned
16 up a little more to some companies that were in this
17 business, but a specific wording as it relates to, "Don't
18 put it down the sewer," I don't know if that was in that
19 section or some other section. I just don't remember
20 those words.

21 Q. Do you remember when the brochure first came
22 out that we're discussing?

23 A. I think the earliest brochures came out when
24 the product was first introduced in the middle '50s.

25 Q. Do you remember about how many revisions

1 there were of it?

2 A. I'm under the impression about three.

3 Q. Just a few minutes ago in responding to a
4 question you had discussed the label and its advising the
5 customer of what would happen to people, for example, who
6 were exposed to this material when they were fishing or
7 swimming or that kind of thing. What hazards were there
8 to people that were fishing or swimming that were exposed
9 to this particular product after it had already been
10 disbursed in a lake or a river?

11 A. Well, hopefully, none, but it's again a
12 matter of quantity and periods, prolonged exposures. And
13 if it's just a water solution, as I said earlier, if it's
14 in a part per billion, I would not expect any effect.

15 On the other hand, if it's down in the bottom
16 sediment in high concentrations, and people wade or walk
17 in that too often, and it will vary from the small child
18 to the adult, and even between adults and children, it's
19 possible, for example, to get a reddening of the skin on
20 the feet that were in this muck too long. Exaggerating
21 somewhat, continuing in that, you might start getting some
22 chloracne appearing on your cheek bones because you did
23 this too often every day all summer long, maybe, again to
24 make the point. So, in order to avoid any of that, just
25 don't even get close to exposing people. Just don't

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1 dispose of it improperly.

2 Q. If the 10 parts per billion of -- I suppose
3 we ought to talk about which of the Aroclors we want to
4 address. Is the 10 parts per billion any of the PCBs?

5 A. Any of them.

6 Q. Okay. If that target is being met by a
7 company discharging waste water into a waterway for over a
8 period of 20 years, is there a potential then for the
9 sediment in the bottom of the receiving stream, receiving
10 lake, receiving pond, whatever it may be, then to reach an
11 unacceptable high level?

12 MR. SCHINK: I object to the form of the
13 question. The 10 part per billion figure that the witness
14 testified, I thought, was with reference to discharges to
15 municipal treatment plants, not discharges to streams.

16 Q. (BY MR. CARLSON) Let's discuss that for a
17 second. Does Monsanto have a different recommendation if
18 there was discharge into holding ponds?

19 MR. SCHINK: I object to the form of that
20 question. I don't think Monsanto had a recommendation. I
21 thought you asked him with reference to an internal goal
22 that Monsanto set for discharges from its plants to sewage
23 treatment plants.

24 Q. (BY MR. CARLSON) You can answer the
25 question.

1 A. We did not have a goal for free discharge
2 into a public waterway. We shared with our customers our
3 goal, telling them that this in turn goes to a treatment
4 plant, and we expect in that treatment plant for some of
5 it to be degraded and the rest to be trapped by the
6 sludge, and the sludge has to be properly disposed of.
7 And we anticipate that the water that is finally
8 discharged is acceptable, you know, measurable in terms of
9 analytic, current analytical methods.

10 Q. And that was first the goal as of
11 approximately when?

12 A. 1970.

13 Q. Okay. How did you feed that information to
14 your customer?

15 A. Word of mouth, these presentations I
16 mentioned earlier. In some instances I recall responding
17 to a letter, answering back in that kind of language,
18 Monsanto's goal is 10 parts per billion in their
19 discharge, so on.

20 Q. Into the sewer systems where it was going to
21 the waste water treatment plant?

22 A. Yeah.

23 Q. Was that ever put on the label of any of your
24 products?

25 A. No.

1 Q. Was that ever put in the brochure that was
2 mailed generally to the known customers?

3 A. No.

4 Q. Prior to 1970, did Monsanto make
5 recommendations to its customers with regard to different
6 handling of waste water that was going to be discharged
7 into a municipal sewer system and waste water which would
8 be discharged into a waterway?

9 A. I'm not aware of a distinction being made.
10 Word of caution was, "Don't mix the two. Don't dump it
11 freely. If it does get mixed, salvage." That was the
12 message prior to '69.

13 Q. How was that message conveyed? I mean, was
14 that an important message Monsanto wanted to get to the
15 customer?

16 A. Which message is this?

17 Q. The one you just mentioned to me that if
18 you're going to have a mixing of the water and the PCBs,
19 don't mix, salvage.

20 A. Salvage, yeah.

21 Q. Okay.

22 A. That was a pretty important message.

23 Q. Okay. Do you know who had the responsibility
24 of determining the appropriate labels that would be put on
25 the Pydraul products to convey that message?

1 A. The primary responsibility was the medical
2 department.

3 Q. Would they, that is, would people in the
4 medical department draft the original label in that
5 regard?

6 A. Yes. In the majority of cases, they would
7 make the original draft, would consult with the marketing
8 people, the research people, the label people. There was
9 a label department, and, of course, the lawyers, get a
10 consensus, but the medical department had the control.
11 They could overrule any other suggestions that they didn't
12 feel were appropriate.

13 Q. Okay. And they would originate the label,
14 the warning aspects of the label?

15 A. In most cases, nine out of 10. Once in a
16 while someone would start something with his
17 understanding, go by the medical department, say, "Here's
18 what I'm thinking. What do you think?" And they would
19 sit down and revise it if appropriate.

20 Q. How about for the Pydraul 312 prior to
21 reformulation? Do you know where that label came from?

22 A. That label was a copy of the PCB wording, and
23 that wording originated in the medical department.

24 Q. Okay. I don't know if it's either fair or
25 possible to approach it this way, but if Monsanto was

1 still manufacturing and selling Pydraul 312 with the 1242
2 Aroclor, do you have some opinion as to what the label
3 language looked like, that is, what language you had on
4 it?

5 A. Yeah, I have an opinion.

6 Q. Can you tell me what it would be?

7 A. I would say the label that existed prior to
8 determination is today still appropriate, because if those
9 words of caution are followed, I think it would achieve
10 what you're trying to achieve. Avoid exposing people.
11 Avoid harm to the environment. All of those things are
12 there, and they still are appropriate today.

13 Q. Do you remember how many revisions of the
14 Pydraul 312 label there were from '65, through the
15 termination of the product?

16 A. '65 to '71, I'm aware of only one addition.

17 Q. And when was that?

18 A. This was in 1970.

19 Q. And what was the addition?

20 A. We had a paragraph referring or
21 re-emphasizing, really, the impact, the possible impact on
22 the environment, and to keep it out of waterways, properly
23 handling and disposing.

24 Q. In 1970, were there landfills that existed
25 that would have approval from some governmental agency,

1 whether it be a local, state or Federal agency, for the
2 receipt of PCB material?

3 A. Yes.

4 Q. First of all, were they sites that were
5 approved Federally in 1970?

6 A. No.

7 Q. Sites that were approved locally by states?

8 A. Most of them were locally approved. A few
9 states were approving, but most of them were municipally
10 approved, county or city approved.

11 Q. Over the years have there been sites that
12 were municipally approved that later had to themselves be
13 cleaned up?

14 A. Yes.

15 Q. Why was that happening? Can you give me a
16 brief background of what occurred and why sites which
17 originally apparently were licensed or were approved to
18 receive PCB materials then later on had to go through
19 another cleanup process?

20 A. Oh, I can only attribute that to a changing
21 perception of the potential hazards of PCBs with time.

22 Q. Okay.

23 A. Back before '70, it was innocuous, perceived
24 to be innocuous, and free dumping was permitted. As the
25 public became more aware of PCB's and the regulatory

1 agencies began asking questions and scrutinizing, the
2 permitting procedure changed, and some of the landfills
3 that at one time would permit PCBs would no longer do so.

4 Q. And if they were weren't, they would have to
5 be cleaned up in some instances?

6 A. In some instances, yes.

7 Q. Do you have any understanding as to whether
8 or not the originators of the PCBs, that is, the company
9 that used the PCBs, in this case a manufacturing
10 operation, would still be responsible for the cleanup?

11 A. I'm aware of at least one case, yes, sir.

12 Q. If a company -- strike that. Is it possible
13 for a company to have believed it was disposing of PCBs in
14 an appropriate manner by having them taken to a licensed
15 landfill and then subsequently being found financially
16 responsible for the then removal of the PCBs from that
17 landfill?

18 A. You say is it possible?

19 Q. Yes.

20 A. The answer is yes.

21 Q. Are you personally familiar with the
22 landfills that were accepting PCBs in Wisconsin in 1970?

23 A. No.

24 Q. Are you aware of landfills in Wisconsin that
25 received PCB material prior to 1970, which have

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1 subsequently been ordered to be cleaned up?

2 A. I'm not aware of any.

3 Q. You're not aware that it didn't happen,
4 either? You just don't have any knowledge?

5 A. That is correct.

6 Q. Okay. As has Monsanto had to pay for cleanup
7 costs for any landfills that it used prior to 1970, for
8 disposal of PCBs?

9 A. Would you help me with the word, your
10 understanding of the word "cleanup".

11 Q. Where the material, that is, the actual soil
12 had to be removed and taken somewhere else.

13 A. No.

14 Q. When is the first time you recall there being
15 a maximum amount of PCB's that could be present in
16 hydraulic flood and die cast machines?

17 MR. SCHINK: Are you talking about when there
18 was a regulation?

19 MR. CARLSON: Yes.

20 A. I first became aware of this about 1980, '81.

21 Q. (BY MR. CARLSON) Do you recall what the
22 standard was at that time?

23 A. If I have my dates correct, I believe, as
24 best I remember, it was 50 parts per million.

25 Q. Do you know whether or not Monsanto

1 provided -- that was set by the EPA?

2 A. Yes.

3 Q. Did Monsanto provide any information to EPA
4 which EPA, to your knowledge, relied upon in part in
5 coming to that standard?

6 A. A Monsanto representative participated in
7 those discussions. I cannot personally say that I am
8 aware exactly what he proposed, but I do know he acted.

9 MR. SCHINK: His question is what EPA relied
10 on.

11 A. I don't know.

12 Q. (BY MR. CARLSON) Did Monsanto produce any
13 such information for EPA to review and take into account?

14 A. I don't know.

15 Q. Who was the person for Monsanto that had that
16 responsibility of providing information to EPA?

17 A. Dr. Craddock, C-r-a-d-d-o-c-k.

18 Q. What was his position at that time?

19 MR. SCHINK: He's already been deposed by you
20 in this proceeding.

21 Q. (BY MR. CARLSON) What was his position at
22 that time?

23 A. I believe he was product director, safety and
24 environment, some such title. That's not exactly it,
25 but --

1 Q. Did you participate in the decision for Dr.
2 Craddock to be the person to have contact with EPA?

3 A. No.

4 Q. Have the standards for allowable PCBs and
5 hydraulic fluid in die cast machines changed since 1980?

6 A. I don't know.

7 Q. Do you know what the standard is today?

8 A. No, I don't.

9 Q. Okay. Did Monsanto ever recommend to
10 customers that die cast machines which had Pydraul 312 in
11 it at one time be cleaned in an attempt to limit the
12 amount of PCBs present?

13 A. I would only be speculating. I don't know.

14 Q. The hydraulic fluid which followed the
15 Pydraul 312 would have been the terphenyl?

16 A. Yes.

17 Q. Was that a hydraulic fluid which could be
18 added to the Pydraul 312 which had the 1242 Aroclor?

19 A. Yes.

20 Q. At that time did Monsanto make any
21 recommendation that the 1242 Aroclor be drained from the
22 machine and then the 312 -- was it 312-A?

23 A. No.

24 Q. Which one was it? Oh, okay. The answer was
25 no, you didn't have to drain it?

1 A. That's correct.

2 Q. The next Pydraul 312 that came was which?

3 A. 312-A, I believe was the designation, which
4 was the terphenyl. Is that what you mean?

5 Q. Okay. And which followed the terphenyl?

6 A. One of them followed, but I don't remember
7 the designation.

8 Q. Do you remember, was that a phosphate ester?

9 A. Yes.

10 Q. Could that be used with the Pydraul 312 or
11 312-A?

12 A. I understood it can, yes.

13 Q. If a die cast company were to clean a die
14 cast machine and get the PCB concentration and the
15 hydraulic fluid down below the 50 parts per million, will
16 it stay at that level, or will it be at less, or can it
17 get more without the introduction of new PCBs?

18 A. This depends really on the procedure used to
19 clean up the system before the next, the new fill. If
20 there are pockets where liquid can collect that aren't
21 drained properly, if there are gaskets that soak up, if
22 there are old porous metal surfaces that act like sponges
23 where the PCBs can be trapped, all of these can be sources
24 of PCBs. The PCBs from these sources would be extracted
25 into the new oil and eventually, if analyzed, it could

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1 exceed the 50 part per million. So, it all depends on how
2 thorough the cleanup job was done and the condition of
3 that piece of equipment at the time the cleanup was done.

4 MR. SCHINK: I think his question was if all
5 that's done, if all the PCBs were removed and you put in
6 the new fluid, could you have more than 50 parts per
7 million of PCB?

8 A. Where would it come from? If it's all
9 removed, there is nowhere it would come from. Therefore,
10 you shouldn't see it.

11 MR. CARLSON: Why don't you go back and read
12 my original question for me.

13 (Reporter read from record as directed.)

14 MR. CARLSON: Move to strike counsel's
15 comment, the witness' further voluntary discussion and
16 response to counsel's comment. If he moves it stands,
17 then that's fine.

18 In your opinion, is it possible to clean a die cast
19 machine that's over 10 years old of all PCBs if the die
20 cast machine was using Pydraul 312 for five years?

21 MR. SCHINK: When?

22 A. I'll qualify my response by reminding you I
23 don't know an awful lot about die cast machines. I do
24 know about Monsanto's system that made the Pydrauls. It
25 includes pipelines, steel tanks, reservoirs, pumps, hoses,

1 and the like. Our experience has shown when we cleaned
2 out that unit, our first attempt was not successful until
3 we went back and did an extremely thorough job, virtually
4 dismantling the whole system and rebuilding it. Then we
5 succeeded. If the similarities are there, I personally
6 believe a machine can be cleaned up properly.

7 Q. (BY MR. CARLSON) Do you think it could be
8 economically cleaned up towards the value of the machine?

9 A. That I don't know, because I don't know the
10 value of the used machinery.

11 Q. Do you have opinions on exactly what a die
12 cast company should do to properly clean the machine?

13 A. I have some opinions, yes.

14 Q. Okay. Can you tell me what those are?

15 A. Well, such things as --

16 Q. When I say "properly," can we limit that to
17 being realistically proper?

18 A. That's correct. Yes.

19 MR. SCHINK: This is not with reference to
20 the 50 part per million standard?

21 MR. CARLSON: That's right. That's right.

22 A die cast company wants to clean up a machine to
23 the best that it's possible, that's realistic. How should
24 that be done?

25 A. I would look for the obvious traps in the

1 system where liquid can accumulate and resist drainage. I
2 would look for ways to get to that point in the system. I
3 would look at the piping system to see if there's material
4 in there that acts as a sponge, if you will, of the
5 liquid, such as gaskets, rubber hoses and the like. I
6 would use a solvent of the petroleum nature, and needless
7 to say, it should be a safe solvent that wouldn't explode
8 or catch fire. And I would circulate it through that
9 system and, if necessary, drain it and do it several
10 times, and before each drainage, I would take a sample and
11 analyze it for the presence of PCBs to the point where
12 it's non-detectable.

13 If time permitted, I would allow that solvent to
14 stay in the system as long as I can, over a weekend or
15 something, if possible, circulate it. And, of course, I
16 would drain it entirely, put in new gaskets, new hoses,
17 and then put in my new fluid. I would then set up a
18 program for taking samples of this new fluid on some basis
19 periodically, and have it analyzed to see if PCBs are
20 still at work showing up again. Now, the number of
21 flushes, rinses and refills of the solvent and the number
22 of samples will vary from system to system, but I think
23 that procedure will eventually lead to a clean system.

24 Q. The reason for setting up the program for
25 samples after the first or second or third time, though,

1 is to ensure yourself that indeed you have gotten all the
2 PCBs?

3 A. That is correct, yes.

4 Q. Because even if you go through the procedure
5 as you outlined carefully a couple of times, you do not
6 necessarily have all the PCBs out, do you?

7 A. That's very possible. I'm talking about the
8 machine. Let's not forget the reservoir fluid, the whole
9 system --

10 Q. Right.

11 A. -- from beginning to an end.

12 Q. Has the company ever outlined for customers
13 the appropriate cleaning procedures that you outlined?

14 A. I do not know.

15 Q. In your opinion, is the cleaning procedure
16 that you have outlined necessary for machines that have in
17 the past used the Pydraul 312 with the Aroclor 1248 as the
18 hydraulic fluid?

19 MR. SCHINK: I object to the form of the
20 question. By "necessary," do you mean necessary to comply
21 with the applicable regulation or necessary for some other
22 reason.

23 MR. CARLSON: Necessary for any reason.

24 MR. SCHINK: Object to the form of the
25 question. It's purposely vague, misleading.

1 A. Well, if there's a regulation, naturally it's
2 necessary to comply with that regulation. My personal
3 opinion regarding the -- other than the need to comply
4 with statutes and regulations, this depends quite a bit on
5 how carefully the system is maintained. What happens when
6 it starts to leak? Where does that material end up, and
7 is it carefully managed? If so, then I see no problems
8 personally. If it's mismanaged and could lead to other
9 problems, certainly we ought to do a better job in
10 cleanup.

11 Q. Even if it's managed properly, though, you
12 still have a risk of something occurring which will allow
13 the PCBs to escape, wouldn't you?

14 A. Well, it could escape, but how would it
15 escape? It might escape through a pump plan. It might
16 escape through a ruptured hose, but I'd like to think that
17 by now we have been sensitized enough to PCBs that we've
18 got a curb and a concrete floor and a curb basin
19 somewhere. It's just not going to flow across the floor
20 into a sewer or out in the backyard somewhere.

21 Q. By now based on the literature that's come up
22 between 1969 and today?

23 A. That's right, yes. Our perception today is
24 such that the chance of it getting away from us is quite
25 remote.

1 Q. But if a company were to spend -- forget the
2 EPA exists. Okay. We're just looking at handling
3 machines that previously had the Pydraul 312. Even, you
4 know, with a good curbing and dike system and management,
5 the owner of the equipment could be better served by
6 cleaning the equipment than simply building a wall around
7 it, wouldn't it?

8 A. Is it one or the other?

9 Q. If you had to make that choice.

10 A. That choice? Yes, I would concentrate on
11 cleanup first, but at the same time I can't forget that
12 the new fluid is an industrial chemical. It shouldn't be
13 sloshed around into the environment, either.

14 Q. Okay.

15 A. So that curbing would help me in any event.

16 Q. And the curbing is going to help because
17 whatever fluid is in there now, even if it doesn't have
18 any PCBs, it shouldn't go out the door?

19 A. That's right. Mineral oil, you can't just
20 dump your motor oil out of your car anywhere. You
21 shouldn't.

22 Q. But because of the nature of the PCBs, you
23 would still recommend cleaning up the machine?

24 A. Yes.

25 Q. Has Monsanto at any time made a program

1 available to customers to aid in the cleaning up of die
2 cast machines of PCBs?

3 A. I don't know that I recall a program so much,
4 but it's the continuing assistance from the sales
5 representative in matters relating to the proper handling
6 of these fluids.

7 Q. I guess what I'm looking for is have you had
8 any customers that you have paid for the cost of the
9 cleanup in return -- for example, we had the incineration
10 program where if they burned, I mean, you would burn for
11 them if they bought from you?

12 MR. SCHINK: I think he testified they made
13 package deals with some customers that included that, yes.

14 Q. (BY MR. CARLSON) All right. And what I'm
15 looking for is did you have any package deals where you
16 cleaned or paid for the cost of cleanup of the machines if
17 they continued to buy?

18 A. I'm not aware of any.

19 Q. Was there any other component of Pydraul 312
20 besides the Aroclor 1248 which had a potential for causing
21 some adverse human health reaction, regardless of how
22 slight?

23 A. Well, I'm a proponent that all chemicals
24 eventually at some dose can cause some effect.

25 Q. Sure. Was there anything in Pydraul that was

1 of particular significance?

2 A. Not that I'm aware of.

3 Q. Do you know particularly what input the
4 labeling department had on the language that was on the
5 Pydraul 312 label?

6 A. Oh, their input was primarily one of
7 appearance, graphics and printing ease and legibility and
8 layout, not the words.

9 Q. I might have asked you, and you might have
10 said you don't remember. I don't recall anymore, but who
11 was in charge of the labeling department at any time that
12 the Pydraul label was being reviewed?

13 A. Oh, that was Robert Sido, S-i-d-o.

14 Q. Anybody else you recall in that capacity?

15 A. Mr. Sido had some assistance, but he's the
16 principal person. I don't recall his assistance.

17 Q. Do you know what filing system, if any, the
18 labeling department had for the different products?

19 A. No. It was a numbering system cataloging,
20 very much like a library, but I never became familiar with
21 it.

22 Q. Where was the labeling department located?

23 A. In St. Louis at the headquarters, Monsanto
24 headquarters.

25 Q. The script that you had for one of the

presentations, and I think it was one of the industry groups, do you have a copy of that yourself?

A. I don't have a copy, no.

Q. When was the last time -- strike that. Do you know where any copies are?

A. No, I don't.

Q. When is the last time you did know where a copy was?

A. When I turned over my assignment to my successor back in '76, it was in my file cabinet.

Q. Was it in a folder that had a title to it?

A. Yes, it was in a folder. The title would be under "ANSI," A-N-S-I, on the tab of the folder.

Q. When you made your other presentations, did you do those from prepared notes?

A. Well, as I indicated, some were prepared, and some were from handwritten notes, key words that I would look at and then talk extemporaneously.

Q. Did you keep any of your handwritten notes?

A. No.

Q. Do you know if any of your presentations were tape recorded or taken down by a stenographer?

A. They were not.

Q. What was the reason labels were submitted to the legal department for review?

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1 A. It's Monsanto practice for all labels. I
2 don't know the reason.

3 Q. Okay.

4 A. They are part of the reviewing team is all I
5 know.

6 Q. With regard to any of the labels on 312 that
7 were used for 312, do you know what input, if any, the
8 legal department had?

9 A. I don't recall any input other than their
10 approval. They didn't change anything.

11 Q. Did you correspond with people at EPA
12 regarding PCBs?

13 A. Yes, sir.

14 Q. Do you remember the names of the people at
15 EPA that you corresponded with?

16 A. Oh, there was Dr. John Buckley, Kenneth M.
17 Kenthum, K-e-n-t-h-u-m. I've forgotten most of them.
18 Thomas Kopp, K-o-p-p. There were so many, I've forgotten
19 them all. There must be a dozen more.

20 Q. Okay.

21 A. Those are the key people, though, program
22 managers and so on.

23 Q. Did you have more than one file set up for
24 your correspondence with EPA, both to and from?

25 A. No. As I recall, I just had one tag, "EPA,"

1 but it became several sections because it got too thick.

2 Q. About how thick was it at the time you left?

3 A. Oh, gosh. I would suggest that it was about
4 three folders, each about, oh, roughly two inches deep.

5 Q. Were they in the file drawer when you last
6 left the company?

7 A. Yes.

8 MR. SCHINK: Did you say when he left the
9 company or when he left his position in '76?

10 Q. (BY MR. CARLSON) When you left your position
11 in '76, is what I meant to say.

12 A. Yes. That's right. Yes.

13 Q. Okay. Did you make any presentations to any
14 Congressional committees?

15 A. Yes.

16 Q. How many?

17 A. One.

18 Q. And when was that?

19 A. '74 or '75.

20 Q. Was your presentation from a prepared script?

21 A. Yes.

22 Q. And do you currently have a copy of that?

23 A. I don't.

24 Q. Where was it the last time you saw it?

25 A. In my files that I turned over.

1 Q. Okay. What was that file entitled, or what
2 was the file entitled that had that script in it?

3 A. As best I recall, just plain "Congress."

4 Q. Did Monsanto have a manufacturing plant in
5 Pensacola for producing?

6 A. Yes.

7 Q. Were PCBs used in that plant?

8 A. Yes.

9 Q. Did you ever visit the plant?

10 A. Yes.

11 Q. Did you ever visit the plant prior to a
12 discharge of PCBs from the plant?

13 A. Yes.

14 Q. Did you have an opinion prior to the
15 discharge as to whether or not the plant was well run with
16 regard to maintenance and attempts to contain fluids?

17 A. Yes.

18 Q. Did you think it was a well run plant?

19 A. Yes.

20 Q. How did the fluids get out?

21 A. There was an accidental leak out of a
22 compressor.

23 Q. But where was --

24 A. Pipeline.

25 Q. Pipeline failure?

1 A. Pipeline break, yes.

2 Q. And what was it discharged into?

3 A. It eventually ended up through a dry creek
4 bed, sort of drainage ditch, into the estuary there, the
5 channel, the Scambia Bay.

6 Q. Did Monsanto have to clean up that area?

7 A. Yes. They didn't have to. They did it.

8 Q. They did it?

9 A. Yeah.

10 Q. Okay. And when was that?

11 A. '69 or '70.

12 Q. Have you been at some die cast companies
13 where Pydraul was being used?

14 A. No.

15 Q. Have there been changes in proper disposal
16 methods by die cast companies of residual fluids
17 containing PCBs over the years? I guess that's
18 self-evident. There have been changes over the years in
19 how you are legitimately or reasonably to dispose of PCBs,
20 haven't there?

21 MR. SCHINK: Well, he hasn't been in a plant.
22 I don't see how he has a foundation.

23 A. I have no basis for evaluating personally the
24 changes that have taken place, but there have been
25 regulations and all, so there must be attempts in

1 complying.

2 Q. (BY MR. CARLSON) Do you have a working
3 knowledge of current regulations regarding disposal of
4 PCB's?

5 A. No.

6 Q. Have you at some time in the past had that
7 knowledge that was then current?

8 A. Yes. Up to 1976, I was up to date. Since
9 then I don't believe I'm up to date.

10 Q. Okay. As of '76, or in 1976, what were
11 permissible ways of disposing of PCBs?

12 A. In early '76, February, '76?

13 Q. Right.

14 A. All right. At that time liquids could be
15 incinerated in approved units, incinerating units. Solid
16 materials such as rags, sawdust, contaminated clay,
17 equipment that was used with PCBs, could be deposited in
18 approved landfills. I think that takes care of both the
19 solids and the liquids.

20 Q. Okay. Do you remember or do you have some
21 recollection of how many incinerators there were that were
22 permitted to incinerate PCBs in February of '76?

23 A. '76, Rollins Company had three units. There
24 was one located in Arkansas, Eldorado, Arkansas, and there
25 was one located in Illinois. I believe it was Sheffield,

1 Illinois. And for a while there was a unit up in New
2 York, Blasdel, B-l-a-s-d-e-l-l, New York, near Niagara.

3 MR. SCHINK: This is in addition to the
4 Monsanto unit, I assume?

5 MR. CARLSON: Right.

6 Monsanto had it until '77?

7 A. Yes.

8 Q. When we're talking about -- when you're
9 talking about approved landfills, the landfills would be
10 approved by who for receipt of PCB's?

11 A. In 1976, the states certainly, and I believe
12 EPA became active at that time.

13 Q. When were the rules with regard to disposal
14 of PCB's and landfills -- strike that. Do you know if
15 Monsanto had looked at alternatives for Pydraul with the
16 1242 Aroclor prior to 1969?

17 A. Not to my knowledge.

18 Q. Were there other companies selling products
19 that would have the same function as the Pydraul 312 prior
20 to 1969?

21 MR. SCHINK: What do you mean by "the same
22 function"?

23 Q. (BY MR. CARLSON) The hydraulic fluid in die
24 cast machines in this instance.

25 A. There were competitive hydraulic fluids, yes,

1 other companies manufacturing these other products.

2 Q. Do you know what the principal components of
3 those were?

4 A. I'm aware of two components. Actually, it's
5 three. A mixture of water and ethylene glycol was quite
6 popular, and then there were some phosphate esters used.
7 That's the extent of my knowledge of the competitive
8 fluids.

9 Q. Did Monsanto make a hydraulic fluid utilizing
10 a phosphate ester prior to 1969?

11 A. Some of the Pydrauls in addition to PCBs had
12 phosphate esters in them.

13 Q. I'm going to switch subjects entirely just
14 for a second. Why didn't any other company in the United
15 States ever make PCBs, or did they?

16 A. Well, there's rumors that some tried it.
17 I've been asked that question. Are we on the record?

18 Q. Yeah, we're on the record, but I can tell you
19 that I haven't read it from any transcript. I was
20 curious.

21 A. The PCB business was driven primarily by the
22 dielectric applications. The big ones, General Electric
23 and Westinghouse, had put so much in the way of resources
24 in making sure this dielectric fluid was just right for
25 their uses. They had worked with Monsanto and its

1 predecessor, Swan Chemical, for so many years, and they
2 had gotten the relationship such that they were getting
3 what they wanted at a price that they felt was reasonable.
4 They were not willing to start a competitor down that same
5 road of experience producing the right quality
6 consistently, and they were satisfied that Monsanto,
7 starting in the '40s, had two plants. So if one exploded
8 or had a fire, there would still be a continued source.
9 So, they were quite satisfied, and they were not willing
10 to give business to anyone else. Anyone else getting into
11 that business could not make a profitable product line
12 without the dielectric business, so they were discouraged
13 from even trying it. That's my understanding.

14 Q. How about importing of some of the PCBs for
15 hydraulic fluid? Apparently they were being made in
16 Europe.

17 A. Yes, they were. I was never able to
18 establish from the records kept by the tariff people
19 whether any liquids came in for that purpose, because they
20 were not identified as such. They would always be marked
21 what's known as NOI chemicals, not otherwise identified.
22 There's some indication, in my opinion kind of strong,
23 some of the hydraulic fluids were brought in for use in
24 mining equipment because of the tie-in with the machinery
25 and the source of supply. That's all I know. I've never

1 been able to substantiate that.

2 Q. Have there been studies addressing themselves
3 to PCBs becoming airborne and moving about in the world's
4 atmosphere and being deposited in different locations?

5 A. Not to my knowledge.

6 Q. Earlier this morning we talked a little bit
7 about monitoring of effluent from Anniston and Krummrich
8 for the presence of PCB's. What kind of analytical
9 equipment was being used for analysis of the PCBs at
10 Anniston starting as far back as you can recall?

11 A. By today's standards they are very crude. It
12 was based on, first of all, a big, bold assumption that
13 the material you're looking at is PCBs.

14 Q. Okay.

15 A. Then you analyzed for the chlorine that's in
16 that material, and by my arithmetic, you calculate back
17 how much PCBs would create that much chlorine. This is
18 why the detection level was high or in the thousands of
19 parts per million or tenths and hundredths of a percent.
20 It's a very crude method, but that was the method used up
21 until the Swedish work came along.

22 Q. What development was used prior to the
23 Swedish protocol being published?

24 A. Oh, there was no single piece of equipment.
25 It was a matter of taking the unknown material --

1 Q. All right.

2 A. -- and in essence burning it in a crucible, a
3 platinum crucible, converting the organic chloride to a
4 sodium chloride or calcium chloride, and then they would
5 analyze for the chlorine with water chemistry.

6 Q. When did Anniston get more sophisticated
7 equipment then?

8 A. Anniston never did get the latest. They took
9 a step in the right direction in about early 1970, but the
10 unit was shut down in '71. So, no further refinements
11 were made. So at best they got what you may have heard of
12 as a GLC unit, gas liquid chromatogram.

13 Q. How about Krummrich? Prior to 1970, were
14 they using the same technique as Anniston?

15 A. Correct.

16 Q. And what additional equipment did they get
17 there?

18 A. They got -- starting in about 1970, they got
19 a GLC unit. In about 1974, they added to that a mass
20 spectrophotometer.

21 Q. Did people from Monsanto talk to those --
22 talk to Jensen and others that worked with them in the
23 Swedish study?

24 A. Yes.

25 Q. When did that occur, or if it was more than

one time --

A. There was a discussion held, as best I recall, in about 1968, and then --

Q. Who was involved with your company?

A. At that time it was Mr. Elmer Wheeler, medical department, and Robert Keller, Monsanto's analytical services center. And I joined those two individuals for another visit in 1970, and we talked to Mr. Widmark or Dr. Widmark, Dr. Jensen's supervisor.

Q. The visit in 1968, was that with Jensen?

A. I understand Jensen was in the audience, yes.

Q. Okay. Did Elmer Wheeler and Robert Keller go over to Sweden to meet with Dr. Jensen in 1968?

A. Yeah.

Q. Okay. And were there others in attendance at that meeting other than the people from your company and Dr. Jensen?

A. I'm not aware of any others, just the university people, Widmark and Jensen and the Monsanto people; and then Mr. Wheeler and Dr. Keller were accompanied by a Monsanto from Europe, representative from Europe, but I don't know who that individual was.

Q. Did that meeting generate any reports?

A. Not to my knowledge, no.

Q. Did you discuss with Elmer Wheeler and/or Bob

1 Keller the results of the 1968 meeting?

2 A. Yes.

3 Q. And when you went over in 1970, was there any
4 new information given to you by Dr. Widmark which you did
5 not receive or your company did not receive, to your
6 knowledge, at the 1968 meeting?

7 A. No.

8 Q. Did Monsanto ever fund any additional studies
9 to be performed by Dr. Widmark, Dr. Jensen, or others who
10 participated in that study --

11 A. No.

12 Q. -- as it followed? Did Monsanto try to
13 reproduce that study?

14 A. Yes.

15 Q. In Sweden?

16 A. No. I misled you there.

17 Q. Okay.

18 A. We tried to reproduce their protocol, their
19 methodology. That was the intent of the first visit, was,
20 "Let's get a copy of their method, go back to St. Louis,
21 and try it."

22 Q. What were they using for their analytical
23 equipment in looking for PCBs in 1966, when Jensen was
24 doing his work, or prior to?

25 A. Who was, Dr. Jensen?

1 Q. Yes.

2 A. He was using a GLC with mass spec
3 confirmation.

4 Q. Okay. In 1966, did Monsanto own a GLC?

5 A. We had a GLC, but not in mass spec.

6 Q. Did Monsanto have a testing laboratory that
7 it would refer material to if mass spec analysis was
8 necessary?

9 A. That I don't know. I do know that they
10 purchased a mass spec.

11 Q. Do you know when they bought it, the first
12 one?

13 A. The first one arrived in about, as best I
14 remember, in '67, sometime in '67, and it was replaced
15 with a more sophisticated unit in about 1974.

16 Q. Without my dragging out the letters, do you
17 have a working knowledge of the series of letters that
18 were sent in 1970, 1971, to Monsanto customers who used
19 the Pydraul 312?

20 A. I believe I do, yes.

21 Q. Okay. Did the author of those letters
22 actually draft them, or at least the person who signed the
23 letters actually draft them? I guess the author always
24 drafts them, but did the person who signed the letters
25 actually draft them?

1 A. As best I recall in these letters, he
2 prepared the initial draft, had it reviewed starting in
3 1970. I was one of the reviewers and would make my
4 comments. He had had it reviewed by the key functions
5 associated with PCBs, the research representative, the
6 medical representative, the public relations guy, and the
7 legal people, and the business people. Anyone who had an
8 interest in the product was involved. In most cases they
9 couldn't contribute much, but at least they were informed
10 of what was being proposed. Occasionally there would be a
11 suggested paragraph added or a word change here and there.

12 Q. Did Monsanto ever go out into the field and
13 seek to have the Pydraul 312 with the 1242 Aroclor
14 returned to the company, that is, the material that was
15 unused?

16 A. No.

17 Q. Why not?

18 A. Keep in mind in 1970, our state of knowledge
19 then. The PCBs that seemed to be on the environment were
20 the 1254, 1260, not the 1242. This was 1970, when we
21 first informed our customers that, "There's a presence out
22 there. You ought to be aware of it. Your product
23 contains PCBs."

24 Shortly after that went out, we embarked, Monsanto
25 embarked on a program of finding a replacement, and it

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1 looked promising. So we had a target then of phasing out
2 of that application by the end of '70. Now, we missed
3 that, as I remember, by a couple, three months. But
4 anyway, by early '71, we had no longer any hydraulic fluid
5 with PCBs in them that we were marketing or selling.

6 Still through '71 and all, there was no evidence,
7 no information that says 1242 is a problem to anybody.
8 So, there was no perceived need to do anything unusual and
9 upset the whole industry, have to drain machines, ship
10 material on the highways back to Monsanto. It looked
11 irrational. That's really the principal reason.

12 Q. Okay. When the replacement fluid was being
13 developed, were there studies done on the potential
14 environmental effects of the product?

15 A. Yes. If you include animal testing as part
16 of that knowledge with potential impact to the
17 environment, yes. The replacement esters were tested.

18 Q. Okay. What test protocol did the replacement
19 esters go through?

20 A. It was the lifetime rat feeding study was the
21 best test available.

22 Q. We're looking at this in 1970?

23 A. In '70, yes.

24 Q. Okay.

25 A. And then some biodegradation studies to

1 confirm that these phosphate esters would degrade.

2 Q. Why was that important?

3 A. We didn't want to have any experience --
4 having experienced the PCB issue, we didn't want to
5 introduce another chemical that was fairly stable and
6 would again be an environmental contaminant. We wanted to
7 avoid that.

8 Q. Did Monsanto make DDT?

9 A. No.

10 Q. Okay. Who did the biodegradation studies on
11 the phosphate ester hydraulic fluid?

12 A. It was the same laboratory in Monsanto that
13 did the PCB biodegradation studies.

14 Q. Okay. Were lifetime rat feeding studies done
15 when the terphenyl was apparently marketed for a short
16 period of time?

17 A. No.

18 Q. Were biodegradation studies done?

19 A. Some, yes.

20 Q. Why were the terphenyls discontinued?

21 A. The biodegradation studies showed that they
22 were kind of persistent. They didn't degrade too readily,
23 and since the phosphate esters looked promising, at least
24 suitable, Monsanto decided that it preferred going to the
25 more degradable material.

1 Q. Were the terphenyls marketed for that short
2 period of time while the company was still looking at the
3 phosphate ester hydraulic fluid? Was it kind of a stop
4 gap measure?

5 A. Yes.

6 Q. Were there any products that you're aware of
7 that were manufactured by Monsanto prior to 1969, which
8 had been looked at for the ability of the product to
9 biodegrade?

10 MR. SCHINK: You're talking now any product?

11 MR. CARLSON: Any product.

12 MR. SCHINK: Not just hydraulic fluids?

13 MR. CARLSON: That's right.

14 A. The only one I'm aware of is the detergents
15 that I mentioned earlier today.

16 Q. (BY MR. CARLSON) Okay. Why was
17 biodegradation looked at with regard to the detergents?

18 A. There was a period of time when synthetic
19 detergents were manufactured that didn't degrade in the
20 environment, and the consumption increased to the point
21 where there were many small rivers and streams that
22 started to foam because the detergent was still active,
23 would not degrade. This became quite a problem, and the
24 industry then had to go back to the research bench and
25 find a detergent that would degrade, leading to today's

1 so-called soft detergents.

2 Q. When did the biodegradation studies occur in
3 the detergents?

4 A. I'm going to say 1960's, early '60s.

5 Q. Technically, could biodegradation studies of
6 PCB's have been done in the early '60s if Monsanto had
7 chosen to do so?

8 A. I would suggest that if once the detergent
9 degradation protocol was in place and demonstrated to be
10 reliable, if there had been an indication that PCBs or any
11 chemical other than detergents should be tested, yes, that
12 protocol could have been applied.

13 Q. Okay. It's not terribly relevant, but do you
14 remember when the DDT issue came about?

15 A. I'm trying to remember when "Silent Spring"
16 was published.

17 Q. I remember spraying it with my little pump
18 gun, but --

19 A. '54 comes to mind.

20 Q. Okay.

21 MR. SCHINK: I think the book was published
22 in 1962, Rachel Carson's book, but in any event --

23 A. Somewhere I've got 1954 in mind here.

24 Q. (BY MR. CARLSON) Okay. Sometime in the
25 early '60s, or sometime in the mid-'50s to early '60s?

1 A. That's my understanding, yes.

2 MR. CARLSON: Let's mark these. Off the
3 record.

4 (A brief recess was taken.)

5 [Plaintiff's Deposition Exhibit Papageorge
6 Nos. 1 through 16 marked for identification.]

7 Q. (BY MR. CARLSON) Why don't you, if you
8 would, start with Papageorge Deposition Exhibit No. 1, and
9 the first page of that is, if you could describe for for
10 me generally, what, sir?

11 A. The first page is a Monsanto memorandum
12 addressed to six individuals, dated April 7, 1970, and
13 signed by me.

14 Q. And attached to that memo is there a
15 "Management Plan, Polychlorinated Biphenyl Environmental
16 Problem"?

17 A. Yes.

18 Q. Did you draft that document?

19 A. Yes.

20 Q. The problem is stated in the first section of
21 the paper?

22 A. Yes.

23 Q. And in the second section of the paper
24 entitled "Basic Strategy," the second full paragraph, the
25 last sentence reads, "We are deliberately assuming an

1 aggressive posture and working closely with customers,
2 co-producers, and regulatory agencies to prevent
3 precipitous action." First of all, did I correctly read
4 that sentence?

5 A. Yes.

6 Q. Can you tell me, first of all, what
7 precipitous action was it that you were attempting to
8 prevent?

9 A. Primarily the total ban of the use of PCBs in
10 those applications for which there were no acceptable
11 fire-resistant substitutes.

12 Q. And can you tell me specifically which
13 applications those would be at that time?

14 A. At that time, the hydraulic fluids and the
15 dielectric application.

16 Q. With regard to the hydraulic fluids, how did
17 your competitors' phosphate ester-based fluids compare
18 with your PCB-based fluids in performance?

19 A. They were not quite as good as the PCB types.
20 PCB types were considered the premium product and the
21 preferred product in terms of fire retardants and all the
22 other properties, corrosion resistance to the parts of the
23 machinery, the lubricating, the lubricity characteristics,
24 stability under all kinds of conditions.

25 Q. How did your company's phosphate ester

1 hydraulic fluid compare to your competitors when you put
2 it on the market?

3 A. The final?

4 Q. Yes.

5 A. They were equivalent, basically.

6 Q. Have there been any studies, reports
7 demonstrating increased costs incurred by die cast
8 companies as a result of not having PCB fluid available?

9 A. I have not seen any.

10 Q. There is also reference to working closely
11 with customers and co-producers. Who were some of the
12 co-producers that you were working closely with?

13 A. Bayer in Germany, Rhone-Poulenc in France,
14 Kuhlman, and Caffaro in Italy.

15 Q. Did Bayer, to your knowledge, do any work on
16 biodegradability of PCBs?

17 A. Not to my knowledge.

18 Q. Did any of the others that you referenced?

19 A. No.

20 Q. Had any of them, to your knowledge, either
21 conducted or paid for long-term health effect studies for
22 people exposed to PCBs?

23 A. Not to my knowledge.

24 Q. When you indicate that you are working
25 closely with them, what was the nature of the working

1 relationship with Bayer on this subject?

2 A. Well, we took the initiative to go and ask
3 for an audience with their representatives. We shared
4 with them our understanding of the issue, tried to
5 convince them of the seriousness of the matter as it
6 regards that product line and the applications, and tried
7 to get them to -- we were hoping that they would conduct
8 some studies on their own. As it turned out, they
9 preferred to have Monsanto lead the way, and they chose
10 not to take any initiative on their own.

11 Q. Were there any reports of the meetings that
12 Bayer prepared?

13 A. No.

14 Q. Did you participate in any of those meetings?

15 A. Yes.

16 Q. How many meetings with Bayer did you have on
17 that subject?

18 A. I personally attended only that one. There
19 were other contacts with Monsanto representatives in
20 Europe and Bayer people in Germany at industry association
21 meetings and telephone conversations and the like,
22 informal contacts.

23 Q. Did Rhone-Poulenc perform any studies?

24 A. No.

25 Q. Did you participate in conferences with any

1 of their representatives?

2 A. Yes.

3 Q. Did you also with Kuhlman?

4 A. Yes.

5 Q. And Caffaro?

6 A. And Caffaro.

7 Q. Did any of them provide any funds that were
8 used for studies that were conducted?

9 A. No.

10 Q. They seemed to think this was an American
11 problem, and the Americans should take care of it?

12 A. Well, to be more blunt, they thought it
13 was -- Monsanto was making a problem, that it really
14 wasn't anybody's problem.

15 Q. Okay. Back in 19 -- let's see. The memo was
16 April of 1970. What regulatory agencies were you working
17 with?

18 A. Oh, in 1970, the Department of Agriculture;
19 the Department of Interior, through their fish and
20 wildlife people; the beginnings of EPA, which had just
21 been approved and not fully organized as of yet; the Food
22 and Drug Administration; the Department of Commerce; the
23 Council of Environmental Quality; the Office of Science
24 and Technology of the Executive Office of the President;
25 and I was in contact with regulatory people in Michigan.

1 I believe I had started some initial contacts with
2 regulatory people in Wisconsin, the DNR, primarily their
3 laboratory people. That's all I can think of now.

4 Q. For each of the agencies that you had contact
5 with, did you have a separate file set up?

6 A. Yes.

7 Q. And when you left your post in 1976, were
8 those files referable to those agencies still in the files
9 where the other ones were that we mentioned?

10 A. Yes.

11 Q. Was there a separate file for each of those,
12 separate file for the Department of Agriculture, a
13 separate file for the Department of Interior, et cetera?

14 A. Yes.

15 Q. What did those files consist of? What would
16 be in those generically?

17 A. What would be in them?

18 Q. Yeah. Was it correspondence back and forth
19 to the agencies --

20 A. Yes.

21 Q. -- or notes of telephone conferences? I'm
22 not saying that that was in there. I'm just trying to
23 give you an idea of the things I'm looking for.

24 A. Primarily letters, memoranda to and from the
25 agencies. Occasionally I would put in to that file a copy

1 of the "Federal Register" that referred to the agency and
2 PCBs, so that I would have a "Federal Register" file, in
3 addition a copy in, say, the FDA file or the U.S.D.A.
4 file. There might be clippings from journals, the popular
5 press that referred to that agency and to PCBs. That
6 would be --

7 Q. Okay. Did you use a numbering system for the
8 pages in your file?

9 A. No. It was chronological.

10 Q. Did your office ever make up an index for the
11 contents of any of the files?

12 A. No.

13 Q. Do you know whether or not the files exist
14 today in the same format as they were when you left that
15 position?

16 A. I do not.

17 Q. Do you have some recollection with regard to
18 what specifically your correspondence with the Wisconsin
19 Department of Natural Resources was about?

20 A. As best I remember, I don't remember the
21 specific documents, but the subject was primarily one of
22 analytical methods and findings in some of their samples,
23 water samples, fish samples, and that was trying to get
24 their laboratory in touch with Monsanto's laboratory so
25 the labs could talk to each other, compare notes and

1 exchange samples. I have copies of the correspondence
2 that took place between the two labs, and I would get a
3 carbon copy. It was that type of thing, primarily
4 analytical at that time.

5 Q. When you say "at that time," was there a
6 change in the subject of the correspondence later on?

7 A. Later on, it became -- oh, there were, as I
8 remember, some meetings called by the DNR, and in that
9 file would be the notice of the meeting and the invitation
10 to attend. These kinds of things would appear. I can't
11 remember any other specifics, but that's in general the
12 kinds of things that would appear in any of these files.

13 Q. Okay. If you would be kind enough to take a
14 look at page 2 of the paper, beginning two-thirds of the
15 way through the fourth line on the top paragraph,
16 beginning with the phrase, "It appears that."

17 A. I see it.

18 Q. Okay. The sentence reads, and correct me if
19 I read it incorrectly, "It appears that in those uses
20 where control of spillage and disposal can be rigidly
21 exercised and the Aroclors are in sealed containers; e.g.
22 capacitors and transformers, the manufacture of Aroclor
23 1254 and 1260 should be continued." That's the end of
24 that particular sentence. With regard to 1242, does this
25 sentence mean that you thought the 1242 should be

1 discontinued?

2 A. No.

3 Q. Okay. At the time that this paper was
4 prepared, was the 1242 still thought to be not a problem?

5 A. Correct.

6 Q. When did the status of the 1242 change?

7 A. I'm assuming by "status," you mean the
8 decision?

9 Q. To treat it as the 1254 and 1260.

10 A. It occurred really at about this time. I
11 don't know if it's in this particular write-up, but a
12 meeting following this one, that the corporate management
13 committee -- there's a program outline for phasing out of
14 such uses as the hydraulic fluids, irrespective of the
15 type of PCB. So, I would say in response to your question
16 at about this time it was decided, whether or not 1242 was
17 being identified in the environment, where we can, we will
18 discontinue selling to some uses.

19 Q. In Section III, there are a series of
20 objectives which are stated. First was, "Reduce and
21 effectively control the PCB content of all effluent from
22 Monsanto plant." At that time, that is, at the time this
23 paper was prepared, in your opinion, did the Monsanto
24 plant effluents contain higher amounts of PCBs than were
25 desirable?

1 A. Yes.

2 Q. Okay. Was that true for both Anniston and
3 Krummrich?

4 A. Yes.

5 Q. Was it true for any other Monsanto plants?

6 A. No.

7 Q. The phrase "all effluent," I suppose, is
8 somewhat all encompassing. Does that include effluents
9 that went into municipal sewer systems as well as into the
10 waterways of the country?

11 A. Yes, anything that left the plant fence.

12 Q. Okay.

13 MR. SCHINK: I think he's asking you about
14 specifically Anniston and Krummrich.

15 Q. (BY MR. CARLSON) No, I'm talking more about
16 the phrase, "all effluent."

17 A. This is all Monsanto plants.

18 Q. I'm a little bit puzzled, and I think maybe
19 you can help me. Earlier today we discussed the concept
20 that die cast companies, prior to 1970 and post 1970, but
21 die cast companies at all times should have been cognizant
22 of the chemicals that were being used and take steps to
23 see that they did not get into the open waterways, or, I
24 guess, into the open waterways as a concept. We discussed
25 that, didn't we?

1 A. In concept, yes, but I'd like to suggest that
2 we're not talking zero molecules, either.

3 Q. I appreciate that.

4 A. It's controlling the discharge to a point
5 that the environment can tolerate or the neighborhood can
6 tolerate, the community.

7 Q. Sure.

8 A. Yes.

9 Q. I'm not saying, you know, one molecule, you
10 know, that kind of thing. What I am looking at is the
11 question of in 1970, how was Monsanto determining what
12 would be an acceptable discharge level, PCB discharge
13 level, into the waterways from its own plants?

14 A. It wasn't addressing the nation's waterways.
15 It was addressing the amount that left its plant --

16 Q. Okay.

17 A. -- going into the municipal treatment plant.

18 Q. But you were also discharging some that were
19 going into the waterways, weren't you, waste water?

20 A. With PCBs in them?

21 Q. Yes.

22 A. I'm not aware of any.

23 Q. Okay. All of the waste water discharge from
24 any Monsanto plant prior to 1970, went into municipal
25 treatment systems or your own company's treatment system?

1 MR. SCHINK: Are you talking about the plants
2 where it was manufactured?

3 MR. CARLSON: No, where PCBs were present.

4 A. If PCBs were present in the water effluent,
5 I'm only familiar with those systems that did go to
6 municipal treatment plants.

7 Q. (BY MR. CARLSON) Okay.

8 A. I'm not aware of any plant that discharges
9 into creeks and river beds freely that had PCBs in that
10 effluent.

11 Q. Okay. When you used the phrase "discharged
12 into the creeks and river beds freely," does that mean
13 that on occasions it would occur when there were flood
14 conditions, or valves that broke, or what have you?

15 A. That's a poor choice of words. What I meant
16 is it did not go into a system for further treatment.

17 Q. Okay.

18 A. It got some preliminary treatment. It might
19 have gotten filtered. It might have gotten aerated, and
20 then it goes out into the public waterways. It doesn't go
21 to a municipal treatment system.

22 Q. Okay.

23 A. Under those conditions I'm not aware of any
24 plant that had PCBs in that effluent.

25 Q. In those plants effluent was looked at for

1 the purpose of seeing whether or not PCBs were present?

2 A. If PCBs were in that plant in the first
3 place, yeah.

4 Q. Okay. For example, in Pensacola where they
5 are using it in compressors, you check the effluent to see
6 whether it made its way into those waters?

7 A. Right; downstream from that compressor. You
8 wouldn't check the effluent going out the other end of the
9 plant where nylon is made and no PCBs are present.

10 Q. Why was it necessary at that point to then
11 reduce the PCB content of all effluent?

12 A. I don't know that it was necessary; only
13 because Monsanto's management as represented by this group
14 of us working felt that this was the prudent thing to do.

15 Q. Was that sparked by a concern that there
16 could be a potential adverse effect on the environment?

17 A. Could be, yes.

18 Q. The third objective is stated to be, "Develop
19 products to replace Aroclors for those uses in which
20 Aroclors have been demonstrated to be harmful to the
21 environment and cannot be prevented from escaping into the
22 environment." First of all, did I correctly read that
23 objective?

24 A. Yes.

25 Q. Did that include developing products to

1 replace the then PCB-based hydraulic fluid?

2 A. Yes.

3 Q. Including the Pydraul 312?

4 A. Yes, which is a more conservative
5 interpretation of the intent if it goes further.

6 Q. On page 3, under number 1 of the action plan,
7 first it's stated the objective and then the status, and
8 in the status it says, "A tentative target of 10 ppb in
9 PCB in plant liquid effluent has been established." First
10 of all, I guess I've got to stop right there. Did I
11 correctly read the sentence?

12 A. Yes.

13 Q. And the target of 10 ppb is the same as we
14 discussed earlier this morning?

15 A. That is correct.

16 Q. There were no regulations which required you
17 to limit PCB discharge to 10 ppb at that point?

18 A. That is correct.

19 Q. Did you advise any customers that were
20 purchasing PCB fluids from you of any nature that if they
21 were using those fluids, they should try to limit their
22 effluent to 10 ppb of PCBs?

23 A. Yes.

24 Q. Were these just particular customers that
25 received that information, or was there an attempt to get

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1 that information to all customers?

2 A. The intent was to get it to all customers.

3 Q. And how was that to be --

4 A. I personally don't know how well that was
5 done.

6 Q. How was it to be done?

7 A. The marketing representatives, who were the
8 primary contact, when discussing PCBs and control, were to
9 use this as an example of a good target that Monsanto had
10 established and that Monsanto was striving for, and we
11 recommended that they might consider it.

12 Q. Was there consideration given to providing
13 this information to customers in written form?

14 A. Yes; by some of the marketing managers, yes.

15 Q. Can you tell me why that wasn't done?

16 A. Oh, I didn't say it wasn't done.

17 Q. I'm sorry. I thought you did, and maybe I
18 misinterpreted.

19 A. I know that I recall definitely that in the
20 electrical applications it was done. I was personally
21 involved in that one.

22 Q. Okay.

23 A. I do not recall at this moment the specifics
24 of how it was done for hydraulic fluids. That's why I
25 made the earlier remark that I don't know the extent that

1 this was carried out.

2 Q. Okay. When the technology to detect PCBs
3 down to the 10 part per billion level or lower was
4 available at Monsanto, do you recall, when they checked
5 the effluent from Anniston, what that level was for PCBs?

6 A. The numbers escape me. As I remember, the
7 best I remember, the parts per million range, and it was
8 above the solubility, which would indicate that the water
9 was turbid, had particulate matter in it, and the PCBs
10 were associated with that particulate matter. I just
11 don't recall the numbers, but it was hundreds of times
12 bigger than the 10 parts per billion.

13 Q. Was that true, also, for the Sauget plant?

14 A. Yes.

15 Q. Was the soil around the manufacturing
16 facility ever checked by Monsanto to determine PCB
17 content?

18 A. I believe it was, yeah.

19 Q. Do you know how that came up?

20 A. It was in the percent level.

21 Q. Oh, was it?

22 A. One percent, very high, thousands of parts
23 per million.

24 Q. How was it getting outside the building?

25 A. This is not a building. It's an outdoor

1 structure.

2 Q. I'm sorry. Okay. Every time there's a
3 leak --

4 A. In the old days it used to kind of dribble on
5 to the concrete pad and on to the soil, until the curbs
6 were built later.

7 Q. But in those days there really was no concern
8 about what was going to happen to it?

9 A. No. It just stayed there.

10 Q. Do the records of each of the plants
11 somewhere have the effluent PCB studies?

12 A. They did. I don't know what they have today.

13 Q. When you had the accidental pipe rupture in
14 Pensacola, did any of the PCBs get into the soil outside
15 the building?

16 A. Yes. Yes, and it formed, of course, a trail
17 on down, so that that whole area was dug up, carried away.

18 Q. Switch subjects again. I'm not trying to
19 deceive you, but if I don't remember to ask you now, I may
20 never remember. By any chance do you happen to know who
21 was calling on customers for Monsanto and selling
22 hydraulic fluid back in the middle '60s and early '70s?

23 A. No.

24 Q. See, I wouldn't have missed anything, anyway.

25 A. There were just too many salesmen. I

1 couldn't remember. And there was turnover.

2 Q. How was the sales organization structured?
3 Would there be a salesman assigned to Milwaukee or
4 Wisconsin, and would he report to some regional manager?
5 I'm not trying to suggest that's how it was done, but I'm
6 just trying to find out.

7 A. That's very close. There would be a salesman
8 assigned the hydraulic fluid accounts in a geographic
9 area, and as best I recall, he would report
10 administratively to the regional manager in the Chicago
11 office, and he would report functionally to a marketing
12 manager in St. Louis assigned to that product. In some
13 instances these salesmen would handle more than one
14 product line, depending on the volume of business, the
15 area covered, the number of customers, and so on.

16 Q. Thank you. Monsanto didn't deliberately dump
17 any amount of PCBs on the ground outside their plants or
18 manufacturing areas?

19 A. Not that I'm aware of. They had their own
20 landfill. They wouldn't need to do that.

21 Q. Okay. But are those circumstances where they
22 would be -- I'm talk about pre-1969 now, where there would
23 be spillage on to your own soil, that wouldn't be of any
24 concern to you because you didn't think that would cause
25 any problem, anyway?

1 A. No. They would just cover it with crushed
2 rock. That's it.

3 Q. If you go to page 4, we're on the third
4 objective now, and I'll just read it for the record.
5 "Develop products to replace Aroclors for those uses in
6 which Aroclors have been demonstrated to be harmful to the
7 environment, are resistant to biodegradation, and cannot
8 be prevented from escaping to the environment." Again,
9 have I read that properly?

10 A. Yes.

11 Q. And again, that included the 1242?

12 MR. SCHINK: What included the 1242?

13 Q. (BY MR. CARLSON) I'm sorry. Developing
14 products to replace the 1242 Aroclor.

15 A. It did by a very conservative interpretation
16 of that statement you just read.

17 Q. If we could turn to page 6, the fifth
18 objective, it reads at the top of the page, "Develop
19 methods for effective disposal of wastes containing PCB
20 without contaminating the environment." First of all,
21 have I correctly read the sentence?

22 A. Yes.

23 Q. And from this would I be correct in inferring
24 that, in your opinion, at that time better methods were
25 needed for effective disposal of PCB waste?

1 A. Well, I don't know so much better as a
2 variety of ways were to be explored to give much more
3 flexibility for different circumstances that might arise.

4 Q. Which methods were explored besides the
5 incineration and landfill?

6 A. Oh, sand bed filtering, carbon bed filtering,
7 removal by centrifuging, all of these. I don't claim to
8 know them all. The laboratory tried everything that came
9 to mind. Many of them were failures.

10 Q. Any of them that proved to be economically
11 effective?

12 A. Not really. The best way was to prevent it
13 from mixing with water to start with. That was the best
14 way.

15 Q. If we could turn to page 7, at the top it
16 reads, "Evaluate alternate methods of disposal by
17 incineration - Monsanto operated vs. contract." Again, I
18 correctly read the sentence?

19 A. Yes.

20 Q. Did Monsanto ever have a contract with other
21 concerns for incineration of PCBs?

22 A. Eventually.

23 Q. When was that?

24 A. We had arrangements with the Rollins unit in
25 Baton Rouge and in Deer Park, Texas. As best I remember,

