10-28-81

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MONTANA
BILLINGS DIVISION

UNIGARD MUTUAL INSURANCE COMPANY, et al.,
Plaintiffs,
vs.
DARRELL ABBOTT, et al.,
Defendants.

PIERCE PACKING COMPANY, a Montana corporation,
Plaintiff,
vs.
GENERAL ELECTRIC COMPANY, et al.,
Defendants.

Nos. CV-80-9-BLG
CV-80-23-BLG
CV-80-105-BLG
CV-80-216-BLG

RITEWOOD, INCORPORATED, an Idaho corporation,
Plaintiff,
vs.
PIERCE PACKING COMPANY, a Montana corporation,
Defendant and Third-Party Plaintiff,
vs.
THE UNITED STATES OF AMERICA, et al.,
Third-Party Defendant.

FARMERS UNION GRAIN TERMINAL ASSOCIATION, a corporation,
Plaintiff,
vs.
THE UNITED STATES OF AMERICA,
Defendant.

DEPOSITION

OF

MR. WILLIAM B. PAPAGEORGE,

called for examination by counsel for claimants at the law

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offices of Crowley, Haughey, Hanson, Toole, and Dietrich, 500 Transwestern Plaza II, City of Billings, County of Yellowstone, State of Montana, commencing at approximately 9:35 a.m. on Wednesday, October 28, 1981.

APPEARANCES

For the Claimants:	MR. JOHN H. HINDERAKER MR. STEVEN R. ANDERSON Attorneys at Law 1300 Northwestern Bank Building Minneapolis, Minnesota 55402
For Transformer Consultants, Inc., and S. D. Myer, Inc.:	MR. DOLPHY POHLMAN Attorney at Law P. O. Box 509 Butte, Montana 59703
For Monsanto:	MR. ROBERT P. PIPER MS. MARY E. SMALL Attorneys at Law 1111 Third Avenue, Suite 2500 Seattle, Washington 98101
For Hygrade Food Products, Inc.:	MR. EARL J. HANSON Attorney at Law 412 Hart Albin Building Billings, Montana 59101
For Union Corporation:	MR. CHARLES R. CASHMORE Attorney at Law First Bank Billings Building Billings, Montana 59101
For General Electric:	MR. SIDNEY R. THOMAS Attorney at Law 200 Securities Building Billings, Montana 59101
For Pierce Packing Company:	MR. TERRY G. SPEAR Attorney at Law 500 Transwestern II Plaza Billings, Montana 59101
Also Present:	MS. KAREN A. WESTERBUR Paralegal Assistant, Monsanto

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EXHIBITS

Papageorge Deposition Exhibit Nos.	Marked for Identification
1	43
2	82
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MR. WILLIAM B. PAPAGEORGE,

called for examination by counsel for claimants, after having been first duly sworn to testify the truth, the whole truth, and nothing but the truth, testified as follows:

EXAMINATION

BY MR. HINDERAKER:

Q Would you state your full name, please?

A William B. Papageorge, P-A-P-A-G-E-O-R-G-E.

Q What's your residence address?

A 321 Pebble Valley Drive, Saint Louis, Missouri 63141.

Q What's your business address?

A 800 North Lindbergh Boulevard, Saint Louis, Missouri 63166.

Q Could you give us, please, your educational background, starting with your graduation from high school?

A I have a bachelor of science in chemical engineering degree earned in 1943, and the master of science in chemical engineering degree earned in 1947 from Washington University, Saint Louis, Missouri.

Q And can you summarize for us your work history, beginning with your graduation from college in 1943?

A From 1943 to 1946, I was with the U. S. Army, and then from 1947 to 1951, with Phillips Petroleum Company.

Q What did you do for Phillips?

A I had two specific assignments. Initially I worked

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in their research department.

Q What were you researching?

A Primarily had to do with drilling of oil wells and secondary recovery from existing oil wells. Chemical engineering problems associated with those.

Q I think you said there were two assignments. Was that one or both of them?

A That was the first one. The second one, I was a process engineer working on specification of equipment to be used in petroleum refining.

Q All right. What did you do after your employment with Phillips?

A I joined Monsanto Company in 1951.

Q Have you been with them ever since?

A Yes.

Q Why don't you describe for us the various jobs that you have had with Monsanto, beginning in 1951, and the duties associated with each position.

[Whereupon, Mr. Cashmore entered the conference room.]

THE WITNESS: I'll try to remember all of them.

Initially I was involved with process engineering related to the selection of equipment to be used in the manufacturing process. I was then assigned as a supervisor in a chemical production unit. Following that, I was assigned

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as maintenance supervisor responsible for the replacement, repair of production equipment. Following that, I was appointed maintenance superintendent responsible for the maintenance activity for the entire plant. I was then appointed an assistant engineering superintendent responsible for the administration of several engineers who worked on design of process and equipment for chemical manufacture.

BY MR. HINDERAKER:

Q What are we getting to now in terms of date?

A This was now about 1960.

Q All right.

A Okay. I was then appointed general superintendent of warehousing, distribution and utilities, responsible for those activities that provided services to the plant to assist the manufacturing operations, getting in raw materials, shipping out the finished material, and supplying steam, water, electricity. I was then appointed general superintendent of manufacturing responsible for all of the activities associated with the manufacture of half a dozen or so products.

Q Were PCBs included in that job?

A No. This takes us up to 1964. I was then appointed plant manager at the Anniston plant, Anniston, Alabama.

Q Let me stop you there, Mr. Papageorge. If I'm not mistaken, that plant did manufacture polychlorinated biphenyls.

A Yes.

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Q Was that plant, as plant manager at Anniston, the first contact that you had with Monsanto with PCBs?

A I don't know what you mean by "contact."

Q Well, had any of your prior duties with Monsanto required you to work with PCBs in any way?

A Yes.

Q Can you describe that for us?

A Well, throughout my Monsanto experience. I was associated with the PCBs initially as a user of the fluid, such as a fluid in a compressor which was part of the utilities operation of which I was general superintendent. I was also responsible for the unit that blended chemicals as part of the distribution network in the plant, and some of the products blended contained PCBs.

Q Were those Aroclor products?

A The products used Aroclor, but the end product had different names. That's my exposure to PCBs prior to the Anniston assignment.

Q Before the Anniston assignment, were you ever in a position where the majority of your work efforts were directed toward PCBs as opposed to other products or other processes?

A No.

Q So at least before Anniston, your contact with them had been incidental; is that a fair statement?

A That seems fair, yes.

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Q Before starting with Monsanto, had you ever had any contact of any kind with PCBs?

A Not to my knowledge.

Q Before taking the job as plant manager in 1964, had you ever been required to study PCBs from tme standpoint of chemical engineering?

A No.

Q Before taking that 1964 position, had you ever been required to familiarize yourself with the literature on PCBs?

A Yes.

Q What aspects of the literature were you familiar with before 1964?

A It had two thrusts, as I recall. One is, of course, the literature pertaining to the procedure to be followed in making these products, and included in that is the reference to the proper methods of handling the material.

Q Okay. What else?

A That's all I recall in terms of PCB literature prior to 1965.

Q Okay. Well, how long did you remain as the Anniston plant manager?

A Through 1969.

Q What did you do then?

A I was appointed manager, environmental control.

Q For the entire company?

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A I'm sorry, no. That was the title, and my initial interest or assignment had to do with PCBs.

Q What specifically was the initial assignment?

A I was to become familiar with PCBs as products, as chemicals; become familiar with all available information relating to environmental impact, health effects, types of uses; keep abreast of all the literature pertaining to PCBs; and make recommendations to Monsanto management based on this information that I was becoming familiar with.

Q Did you specialize entirely in PCBs, then?

A Initially, yes.

Q I guess I'm not sure I understand that title. You were the manager of environmental control for Monsanto Company; is that correct?

A No. The title, "manager, environmental control," applied to my assignment relating to PCBs as a part of a division within Monsanto, that part which was responsible for the PCB products.

Q Were there other people throughout the company who had similar environmental responsibilties but with respect to other products?

A I don't know of any.

Q To the best of your knowledge, was this a unique arrangement, then, that Monsanto set up for PCBs?

A To my knowledge, yes.

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Q Did you have a predecessor in that job?

A No.

Q So that it was a uniquely created position in 1969?

A Yes.

Q To the best of your knowledge, has Monsanto ever created a similar position for any other product or product line since 1969?

A Yes.

Q What product would that be?

A The first that comes to mind is those products related to detergents, detergent blends.

Q And there was some environmental concern about those products; is that correct?

A At one point in time, yes.

Q All right. Do you remember when that was done, when that position was set up?

A The best I can recall is early '70s.

Q Okay. Any other products for which a similar environmental post has been created?

A I don't want to mislead you. The title was the same. Each division has its own titles to describe the assignments.

Q I understand, but any other products for which a similar type position has been created, regardless of title or regardless of where in the company?

MR. PIPER: You're asking as to what he is aware of?

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MR. HINDERAKER: Right.

[Whereupon, Mr. Thomas entered the conference room.]

THE WITNESS: There aren't any that come to mind at the moment.

BY MR. HINDERAKER:

Q Okay. Now from the descriptions that you've given of your prior assignments with Monsanto, it sounds to me as though your duties in this environmental position, starting in 1969, were quite different from anything you had done for the company before; is that a fair statement?

A Yes.

Q What qualifications did you have for that environmental position as of 1969?

A Well, I had the technical background. I had experience in manufacturing operations. I had experience talking with regulatory agencies, representatives of regulatory agencies, experience dealing with the public in terms of contacts with news media, associations such as chambers of commerce, associated industries, groups. And, of course, as plant manager, I had responsibility that related to environmental matters, water pollution, air pollution, product safety, and all that.

Q Were you given any additional training, or did you go to seminars or take courses or anything like that that were

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specifically directed toward health or environmental issues?

A No.

Q How long did you stay, then, in that position?

A I need help in defining "that position."

Q Well, you told me that starting in 1969, you were the manager, environmental control, and were responsible for PCBs. I don't know how long you had those duties. If the name changed or the duties changed, you tell us.

A During my association with PCBs, the name change occurred--there were three different titles. The initial one, manager, environmental control, followed by manager, environmental protection. Following--

Q Were the duties different once they called you manager, environmental protection?

A Not as they related to PCBs.

Q What year did that change occur in?

A As best I recall, somewhere around '71, '72.

Q At that time did you also take on responsibility for other products?

A Yes.

Q What other products?

A Oh, there were several products belonging to a group that, in Monsanto, we would refer to as specialty chemicals.

Q Were PCBs in the group called specialty chemicals?

A Yes, yes. These chemicals were used by the paper

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industry and the wood industry and the industry in general. They're products referred to as industrial chemicals.

Q As of 1971 or '72, then, were you responsible for environmental and health concerns for all chemicals within the specialty chemicals group?

A Yes.

Q Were there some other chemicals in that group that gave rise to concerns of an order of magnitude that would compare to PCBs?

A No.

Q Did PCBs continue, then, to be your major focus, even after 1971 or '72?

A Yes.

Q All right. Why don't you continue on, then, and describe how the duties have evolved.

A Let me complete the title portion. At about 1973, my title was changed to manager, product acceptability. There were similar duties, as I recall. I kept the chemicals that I initially had, and I was given responsibility for several more.

Q Were these also from the field of specialty chemicals, or--

A Yes.

Q --are you going outside?

A Yes, specialty chemicals still.

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Q Okay. Can you tell us what some of the major chemicals were other than PCBs for which you were responsible as of 1973 or thereafter?

A I'll try to remember.

Most of the product line were mixtures of chemicals, so products as I think of them, I would refer to them by their trade names.

Q That's fine. Tell us the trade names of some of them.

A All right. There were heat transfer fluids sold under the Therminol label.

Q They contained PCBs, didn't they?

A Not all of them.

There were industrial hydraulic fluids.

Q And again, at least in some point in time, didn't they contain PCBs?

A Yes, the Pydraul line.

MR. SPEAR: I'm sorry; I didn't hear the word you used.

THE WITNESS: Pydraul, P-Y-D-R-A-U-L. It's a trade name for the hydraulic fluids for industrial applications.

There were chemicals, we used the acronym "ACL" to describe this group, that were used for a swimming pool disinfection treatment. There were some chemicals we sold under the Dequest line, D-E-Q-U-E-S-T, that were used for

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water treating purposes. And we had wood treating chemicals, pentachlorophenol and the sodium salt of pentachlorophenol.

BY MR. HINDERAKER:

Q Okay. So these are all examples of products for which you were responsible in terms of environmental or health concerns?

A Yes.

Q Again, did PCBs continue to be the major focus?

A I would say that PCBs were the major focus until about 1973, '74. Then I would estimate they occupied about half of my time from then on.

Q All right. Why don't you continue telling us how the job evolved.

A Well, that's the picture as of February 1976, at which time the PCBs were assigned to another individual.

Q Who is that?

A J. C. Weber.

Q Did your title remain the same?

A Yes.

Q What was his title?

A Same.

Q He was another manager of product acceptability?

A Yes.

Q So you were one of several people with that title, then?

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A Yes.

Q From 1976 to the present, have you had any responsibility for PCBs?

A No.

Q Do you know whether PCBs have been a full-time preoccupation for Mr. Weber, or does he work on other things, too?

A I do not know.

Q All right. What have you been doing for Monsanto since 1976?

A I was still manager of product acceptability until, as best I recall, late 1977, at which time I was made director, environmental operations for one of the operating units in Monsanto.

Q Which operating unit?

A The Monsanto Chemical Intermediates Company.

Q How long did you stay in that position?

A I am still in that position.

Q What generally are your duties?

A I functionally direct all the activities within the operating unit that relate to environmental impact and product safety for the facilities and the products that are assigned to this operating unit.

Q Who is your present immediate superior?

A Dr. Myron Dmytryszyn, D-M-Y-T-R-Y-S-Z-Y-N.

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Q What is his title?

A General manager, technology division, Monsanto Chemical Intermediates Company.

Q In the years 1969 to 1976, who was your immediate supervisor?

A There were several.

Q Was it one job title, or did you report at various times to different positions?

A Each position was a different person. Initially I reported to Mr. Howard Bergen, B-E-R-G-E-N, business director, I believe at that time it was called, specialty chemicals group. I later, and I have forgotten what year, reported to Mr. W. C. Corey. I don't recall his title. Following that, I reported to Mr. Robert Potter, P-O-T-T-E-R, and I believe his title was director of administration, Monsanto Industrial Chemicals Company.

Q I want to follow up now and get a little information about how Monsanto is organized. You have talked about different units within the company, and maybe we better be specific about that. Can you give us an idea generally how Monsanto is organized and where your area fit in?

MR. PIPER: I am going to interpose an objection, and more of inquiry. You're talking about the fields in which Mr. Papageorge is involved?

MR. HINDERAKER: Yes, of course.

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BY MR. HINDERAKER:

Q The entity that I know of that we've sued is called, I think, the Monsanto Company, and somewhere in there they make chemicals, and PCBs fit in someplace, and obviously I just want you to explain to us what the organization is.

A At what point in time?

Q Let's say 1969.

A In 1969, Monsanto Company was known as Monsanto Chemical Company, and it had operating divisions. The organic chemicals division was the division responsible for PCBs.

Q And your position as manager, environmental control, was within the organic chemicals division?

A Yes.

Q What about the specialty chemicals? Where did they fit?

A They were a business group within the division.

Q And were you a part of the specialty chemicals business group, or were you independent of them?

A I was part of the specialty chemicals business group.

Q Okay. So I've got Monsanto Chemical Company as the overall corporation, right?

A Yes.

Q You have an organic chemicals division, right?

A Yes.

Q And within that you have the specialty chemicals,

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you were a part?

Yes.

Okay. Did that system change between 1969 and 1976?

Yes.

How?

About '73, Monsanto Company reorganized and formed ıg companies. The Monsanto Industrial Chemicals Company e of five operating companies. It was the company that PCBs assigned to it.

And your environmental control unit, then, went along hat assignment, and you were part of that unit?

Yes.

Is that system basically the way the company is still zed?

Yes.

Okay. Starting in 1969, when you were manager, onmental control, what kind of a staff did you have with you or under you?

Well, I had no one reporting directly to me.

Did you have a secretary?

I had the services--I shared services of a secretary.

Did you have a research assistant of some kind?

No.

When you said that your responsibility, in part, familiarize yourself with the literature on PCBs, was

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that something that you were personally to do on your own?

A To a great degree, yes.

Q Did you have anyone working with you or for you in that effort?

A Yes. I had access to all the resources in Monsanto to assist me on a request basis; sometimes specific request, sometimes a very broad request.

Q But as far as your research and analysis of environmental issues was concerned, that was left entirely in your hands?

A It was entirely in my hands from my personal information.

Q Okay. Mr. Papageorge, have you had your deposition taken before today?

A You mean on this matter?

Q No, no.

A Oh.

Q In any matter.

A Yes.

Q Can you estimate how many times?

A Oh, I'd estimate half a dozen times.

Q Can you tell us approximately when, over what period of time?

A Starting in 1971, until the present.

Q Have those depositions all been taken in cases that

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relate to PCBs?

MR. PIPER: Are you referring now to transformer dielectric fluids?

MR. HINDERAKER: No. PCBs.

MR. PIPER: I am going to instruct the witness to answer as to cases involving transformer dielectric fluids.

THE WITNESS: There was only one deposition relating to transformer dielectric fluids.

BY MR. HINDERAKER:

Q Do you recall when that was taken?

A Somewhere in the period 1972 to 1974.

Q Do you recall what the nature of that lawsuit was?

A Yes. It involved a transformer, a fluid from that transformer. It discharged on the shoulder of a roadway and alleged harm to the health of some people and the damage of some property.

Q Do you recall where that case was venued, where the incident occurred?

A In Tennessee.

Q The case was--I asked you two questions, and I shouldn't have. Is Tennessee the answer to both of them?

A Well, I didn't really hear the first part.

Q The first question, I guess, is where did the accident happen. Is that Tennessee?

A Yes.

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Q And was the case also located or venued in Tennessee?

A Yes.

Q Do you recall who the manufacturer of the transformer involved in that incident was?

A Yes.

Q Who was it?

A General Electric Company.

Q Do you recall whether they were also a party to that lawsuit?

A Yes.

Q In the cases in which your deposition has been taken other than that one which related to dielectric fluid, have there been other instances in which it was alleged that PCBs have been spilled or have in some way entered the environment?

A I need some help on the expression "entered the environment."

Q Well, have there been other cases in which it's been alleged that either personal injury or property damage resulted from PCBs?

MR. PIPER: Your question is encompassing PCBs and not transformer dielectric fluids?

MR. HINDERAKER: I'm asking now about other cases in which he's been involved.

MR. PIPER: And cases that he's testified to by deposition?

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MR. HINDERAKER: Right.

THE WITNESS: I have not been involved in any case personally where human health claims were made other than the Tennessee case. The remaining cases involve primarily property damage.

BY MR. HINDERAKER:

Q And would it be fair to say that the property damage was alleged to result from PCBs coming into contact with property in a manner that was unforeseen by the possessor of the PCBs?

MR. PIPER: If you know.

THE WITNESS: Yes.

BY MR. HINDERAKER:

Q What Monsanto products were involved in those other cases?

A Let me see. I am going to try to remember them all, but I may miss a few.

Heat transfer fluids, industrial hydraulic fluids, plasticizers. Those are the only categories that I can specifically point out.

Q Have you ever been involved in a case other than this one where it has been alleged that PCBs have gotten into either animal feed or food for human consumption?

A Yes.

Q Can you give us the particulars of that case?

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MR. PIPER: If the question is encompassing cases involving PCBs that are not used in the manufacture of transformer dielectric fluids, I am going to instruct the witness not to testify. Concerning other cases of that nature, if the cases involve PCBs that are the same as the PCBs used in the manufacturing of transformer dielectric fluids, he may answer.

THE WITNESS: I am confused.

[Discussion off the record.]

THE WITNESS: I understand.

BY MR. HINDERAKER:

Q You're ahead of me, then, sir.

Based on that instruction, is that a question that you can answer?

A Yes, I can answer it.

Q Okay.

A Two cases come to mind where PCBs were associated with entering food. The PCBs involved are the types that can be present in transformer dielectric fluids. One case involved the presence of PCBs in fishmeal that ended up as a component in animal feed.

Q Do you recall where that case was venued?

A North Carolina.

Q And was North Carolina also the place where the fish-meal contamination was alleged to have occurred?

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A Yes.

Q Your deposition was taken in that case?

A Yes.

Q Do you recall approximately when?

A About 1972.

Q And what else do you recall about that case? What was alleged to have happened after the PCBs got into the fishmeal?

A In terms of noticed effects? Many things happened after the fishmeal--

Q Was the fishmeal distributed, then, or was it stopped before it got anywhere? Was it eaten by animals, or what happened, do you remember?

A The fishmeal was delivered to meat processing plants. It ended up in several types of poultry feed, which, in turn, were distributed to the poultry farms, and the claim was made that poultry were contaminated, that eggs were affected. Those were the principal claims, as I remember.

Q Okay. What was the source of the PCBs in that case?

A This was a heat transfer unit used to sterilize the fishmeal.

Q All right. I think you said there were two such cases that you could recall. What was the second one?

A The second case that I recall really is one of several. This was the use of one of the PCB mixtures in a coating

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formulation that was used to coat silos to preserve the concrete surfaces, and the claim in those cases was that the PCBs were mixed with the silage, which was fed to the cattle, and the PCBs were detected in the milk.

Q Do I understand you to say that there were several cases of that general nature in various places around the country--

A Yes.

Q --to which Monsanto was a party?

A Yes.

Q And were you deposed in one of those cases, or several of them?

A I was deposed in one.

Q Do you remember approximately when?

A About 1973.

Q In addition to the deposition testimony that you have given, have you ever testified in court?

A Yes.

Q And on how many occasions?

A For what type of cases?

Q Well, let me start by asking any cases.

MR. PIPER: The question is how many times.

THE WITNESS: Twice.

BY MR. HINDERAKER:

Q In what sorts of cases were they?

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A PCB was involved.

Q Can you give us the places and dates when you testified?

MR. PIPER: Is your question encompassing Aroclors that are identical to the type of Aroclors used in transformer dielectric fluids, or are you inquiring as to any type of matter where he testified?

MR. HINDERAKER: I'm asking about the two times he testified.

MR. PIPER: Yes. I would instruct the witness to answer only if those cases involve Aroclors identical to the Aroclors used in transformer dielectric fluids or were, in fact, transformer dielectric fluid cases.

THE WITNESS: There was only one case involving the transformer dielectric fluid, and this is the one we referred to earlier in Tennessee.

BY MR. HINDERAKER:

Q So that was the fishmeal case?

A No, no, no.

Q That was the spill by the side of the road?

A Yes.

Q So that case did go to trial?

A Yes.

Q Do you recall what the outcome of that trial was?

A Only in that Monsanto was--I don't know the proper

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terminology--released from the case.

Q Do you know if that was in state court or federal court?

A I don't know.

Q Now the second occasion in which you testified was not a dielectric fluid case; is that correct?

A That is correct.

Q But it was a case in which there was a Monsanto product that included PCBs?

A It was alleged to be a Monsanto product. We don't know.

Q Well, but it was alleged to be a Monsanto product containing PCBs?

A I wouldn't quite say it that way. It was alleged to be PCBs--no. It was determined to be PCBs that were alleged to belong to Monsanto.

Q I see. Well, what kind of PCBs were they?

MR. PIPER: If it is not an Aroclor identical to the Aroclors used in dielectric transformer fluids, I would instruct the witness not to answer.

MR. HINDERAKER: Well, I am going to inquire further on this to lay foundation for a motion before Judge Battin, and the easiest way to do it is to find out what the product was and have the witness explain to me whether there is any difference or not. If he can articulate a difference that

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makes sense to me, I won't pursue it. If he can't, I would bring it before the judge.

MR. PIPER: You can ask him the foundation questions, if you want to lay it out as to what kind of questions you want to ask, but I am instructing the witness not to answer if it does not relate to a dielectric transformer fluid or if it does not relate to an Aroclor identical to the Aroclors used in dielectric transformer fluids.

BY MR. HINDERAKER:

Q Well, let me ask you this, sir. How were the PCBs or PCB containing product different from the ones that are in dielectric fluids?

A They did not differ.

MR. HINDERAKER: On the basis of that answer, I think I'm entitled to inquire further.

MR. PIPER: You've got my objection.

MR. HINDERAKER: Are you telling me that you're not going to let him answer even though the witness has said that the product does not differ from the product we're dealing with in this case?

MR. PIPER: If the Aroclor is not the same or identical to the Aroclors used in the manufacture of dielectric fluids, I am instructing him not to answer.

MR. HINDERAKER: Well, we'll pursue that at the next hearing and ask for costs.

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BY MR. HINDERAKER:

Q In addition, sir, to the testifying that you've done in Court, have you appeared before various regulatory agencies?

A Yes.

Q Can you summarize your experience in testifying before those agencies?

A I have appeared before an interagency, interdepartmental task force on PCBs organized by the concerned agencies in Washington, D. C.

Q Do you know if there's a record anywhere of your testimony before that group?

A I am not aware of any record, no.

I appeared before the scientific panel which was advisory to the Environmental Protection Agency on water pollution matters.

Q When, approximately, was that?

A 1973.

Q Your testimony there related to PCBs?

A Yes, yes.

Q Do you know whether you or anybody at Monsanto has a record or a transcript of that appearance?

A I don't have a copy. I don't know where it is, or--

Q Okay. Have there been other occasions?

A I have appeared before the Department of Natural Resources of the State of Wisconsin.

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Q When was that?

A About 1974.

Q Did that also relate to PCBs?

A Yes.

Q What was the subject of that testimony, or why did they have you there?

A It was at their request and an attempt on my part to bring them up to date on the information available to Monsanto regarding PCBs, how they're manufactured, what are some of the principal uses, what do we know about them from animal studies, what is the state of the art in analytical methodologies, what laboratories are reporting the presence of PCBs in the environment. It's a broad status report on PCBs.

Q Do you know whether Wisconsin was contemplating some legislative action with regard to PCBs or what the occasion of your appearance was?

A None other than just a broad interest in PCBs as an environmental pollutant.

Q Do you know whether there was a particular incident that had sparked that interest in Wisconsin?

A Not to my knowledge.

Q All right. Have there been any other agency appearances?

A I don't know if this rightfully belongs under the category of agencies, but I was requested by the attorney

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general of New York to appear before him in a PCB hearing.

Q When was that?

A About 1974.

Q Do you know whether there was some incident that prompted that or, again, what the occasion was?

A I don't know of any single incident, no.

I can't recall any other formal presentations before agencies.

Q Now I'm not sure if I defined the word "agency" or not, but have you included in your list any appearances you may have made before congressional committees or subcommittees?

A No, no.

Q How about that?

A I did appear before a congressional subcommittee on, again, the broad subject of PCBs.

Q What subcommittee was it?

A I don't remember its full title, but as I recall, there was the reference to merchant marine as part of its title. That's as close as I can come to it.

Q Do you remember when that was?

A 1973, 1974.

Q And, again, was there a particular reason for the interest on the part of that committee, or what prompted the appearance?

A I don't know.

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Q Any other committees or subcommittees?

MR. PIPER: You're talking about congressional still?

MR. HINDERAKER: Yes.

THE WITNESS: No more congressional appearances.

BY MR. HINDERAKER:

Q Any other legislative committees or subcommittees other than congressional?

A No.

Q Have you testified or appeared before any group or agency of any kind in connection with the Pierce Packing Company incident?

A No.

Q Mr. Papageorge, that almost completes the background information that I wanted to cover, but perhaps before we start talking about PCBs in a more technical way, you might define some terms for us so that we all know what we're referring to.

First of all, can you give us about a 30-second chemist's description or definition of what polychlorinated biphenyls are?

A I can only try.

MR. POHLMAN: Do you want me to tell you when to start? Four, three, two, one.

THE WITNESS: I'll have to assume that many of us are familiar with benzene. You have to start somewhere. Benzene is represented by the chemist, for communications purposes

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graphically, by a hexagon. If you can picture two hexagons sort of point to point, or really it's not point to point. Yes, point to point. You have a double hexagon configuration. That configuration represents biphenyl. Now at each points of these hexagons, it's possible to locate a chlorine, and these chlorines can go, of course, from none, for the biphenyl itself, to 10 maximum. And when biphenyl is exposed to chlorine, these chlorines will randomly connect to these points of the hexagons, anywhere from 1 to 10, and the commercial mixtures represent exactly that. Chlorinated biphenyls containing chlorines from 1 through 10 possible, those are known as PCBs.

BY MR. HINDERAKER:

Q And as I understand it, it is possible for PCBs to be more or less heavily chlorinated; is that correct? They have more or less chlorine?

A Yes. You can have as much chlorine as desired.

Q PCBs are, as I understand it, a very stable compound; is that a true statement?

A Many of the PCBs, specifically those with higher chlorine content, are very stable.

Q The higher the chlorine content, the more stability; is that it?

A Up to a maximum, and then it starts to decrease.

Q What is the maximum?

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A Oh, about six, seven, or eight chlorines gives you the most stable version.

Q What is it about PCBs that makes them high--or highly chlorinated PCBs that makes them so stable?

A I'll try to use layman's terms.

It's the tenacity with which the chlorine attaches to the carbon at this point on the hexagon is so great that other chemicals just can't get in there to displace the chlorine and to disrupt the configuration.

Q Is that tenacity something that would be predictable to a chemist?

A Not necessarily, no.

Q Is it something that you see in other chemicals other than PCBs that chlorine will tenaciously bond to carbon?

A Yes.

Q So that even if it may not be fully predictable, it at least would not be surprising to a chemist that a compound with those elements would be stable; is that a fair statement?

A Depends on what point in time.

Q Okay. Now another term that we're going to be using and have already used is Aroclor. Can you tell us what that means?

A Aroclor is a Monsanto registered trademark to describe chlorinated hydrocarbons.

Q PCBs, in other words?

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A PCBs were one of the families of chlorinated hydrocarbons.

Q Are there some Aroclors that have no PCBs in them?

A That is correct.

Q As I understand it, each Aroclor is identified with a four-digit number.

A Yes.

Q And the last two digits of the four-digit number represent the percentage of chlorine in the compound; is that correct?

A Yes.

Q So that the higher the number represented by those last two digits, for example, 60, the more heavily chlorinated the Aroclor is?

A Yes.

Q What about Aroclors that do not contain PCBs? Would they also have a four-digit suffix?

A Yes.

Q What were the Aroclors that were used in transformer fluid?

A Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260.

Q Were those formulas used interchangeably in transformer fluids? Does it matter, in other words, which of those you used?

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A Oh, it mattered very much, yes.

Q Okay. How do those last numbers, 42, 48, 54, and 60, relate to the points of maximum chlorination that you referred to earlier?

A Maximum chlorination would be a 72.

Q And would you get maximum--where would you get maximum stability?

A As I indicated, somewhere in the seven, eight chlorine range.

Q So it would be somewhere a little bit more heavily chlorinated than a 1260?

A Yes.

Q Would it be fair to say that the PCBs used in transformer fluids were relatively highly chlorinated as compared to other PCB products?

A I would prefer to use "relatively highly chlorinated" as it applies to Aroclor 1254 and Aroclor 1260. Aroclor 1242 is marginally so.

Q Okay. Another word that we may be using is askarel. Can you tell us what that is?

A That is a generic name used by the electrical industry to describe fluids used in electrical equipment that, because of their composition, offer fire resistance.

Q Is that a term that is still used in the electrical industry?

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A To my knowledge, yes.

Q So askarels may or may not contain PCBs?

A That is correct.

Q And askarels may or may not be used in transformers?

A That is correct.

Q General Electric had an askarel which it used in transformers called Pyranol; is that right?

A That is one of their trademarks, yes.

Q So Pyranol was a GE trademark for an askarel which contained PCBs; is that a true statement?

A I know that Pyranol was used to describe fluids that contain PCBs, but I don't know if it was also used for other fire resistant mixtures. I don't know what General Electric used that trademark for, totally.

Q Okay. Now the next thing I am going to do, Mr. Papageorge, is get back into the history of the development and testing and so forth of PCBs, and I'm going to ask you these questions without knowing whether you know the answer or not, and if you don't know the answer, we don't want you to guess or speculate, but tell us you don't know the answer, and we'll find out who does, all right?

A Yes.

MR. PIPER: If you're going to go to another subject matter, how about a five-minute recess?

MR. HINDERAKER: Fine.

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[Recess]

BY MR. HINDERAKER:

Q Mr. Papageorge, do you know what individual or corporation first developed polychlorinated biphenyls?

MR. PIPER: Tell him what you do know. That's a hell of a question to ask an engineer. Give him the information you do have concerning that.

THE WITNESS: Polychlorinated biphenyls are reported in German literature in the 1800s as a chemical identity. General Electric is the corporation that developed the application of these materials to the electrical equipment as a dielectric.

BY MR. HINDERAKER:

Q When did they do that?

A In the late '20s, early '30s. And they had a patent issued to General Electric covering the use of these materials as a dielectric fluid in electrical equipment.

Does that answer your question?

Q Sure does.

I've heard of something called Swan Chemical Company. Can you tell me what their role was?

A Swan Chemical Company produced the first recorded commercial quantity of PCBs.

Q Do you know when that was?

A Late '20s. '29. That period.

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Q Had General Electric produced a significant quantity pursuant to their patent or not?

A No. General Electric got their material that they were evaluating from Swan Chemical Company, and for testing purposes.

Q But they got the patent?

A But they got the application patent in electrical equipment.

Q I see. But it was Swan that supplied GE?

A Yes, yes.

Q So what they have patented, obviously, was not PCBs per se, but what?

A The use of PCBs in electrical equipment was their patent.

Q Okay. Now as I understand it, Monsanto purchased Swan Chemical Company at some point.

A Yes.

Q When was that?

A Early '30s.

Q And was that purchase done so that Monsanto could get into the PCB production business?

A No. The Swan Chemical Company made many other chemicals of greater interest to Monsanto than PCBs at that time. PCBs were a very, very small part of the total Swan operation.

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Q Do you know whether prior to the purchase by Monsanto Swan had done any testing of PCBs with respect to such issues as toxicity and health?

A I do not know.

Q Do you know whether, at or about the time that Monsanto purchased Swan and took over the production of PCBs, Monsanto did tests relating to toxicity or health?

A Yes.

Q Can you tell us when those tests were done, what they consisted of?

A In the 1930s, Monsanto had conducted for them the tests that were typical for industrial chemicals in the '30s, and the intent of that test was to provide Monsanto with enough information to guide them in terms of how to handle material in the plant, how to package it, how to label it, and how to inform customers on proper handling. And that consisted of a series of tests commonly referred to as acute toxicity screening. How much of the material is lethal, what will the material do to eyes, to skin.

Q Are these rats and rabbits?

A Yes.

Q What generally did those tests show?

A Well, they showed that they are an irritant. They do cause skin irritation and also cause irritation to the respiratory system; any moist tissue. That was the extent of

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the information obtained from those studies.

Q Was a lethal dose level determined in those tests?

A Yes. This is referred to in the toxicology profession as a LD-50.

Q Exactly the dose that kills half the rabbits or half the rats; is that right?

A It is the dose that is determined could result in the loss of half of a population of test animals.

Q Were those test results published anywhere by Monsanto?

A Not to my knowledge.

Q Do you know whether Monsanto still has in its possession the documents that would reflect those tests and the results that were obtained?

A I do not know.

Q To your knowledge was there anything in the literature available in the mid-1930s, published in other sources, that would indicate or could have indicated that PCBs were toxic or posed any kind of a health hazard?

A No, not to my knowledge.

Q Would it be fair to say that to the best of your knowledge, the first indication that Monsanto had of any health implications of PCBs came from the tests that it did in the mid-1930s?

A Yes.

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[Whereupon, Papageorge Deposition Exhibit No. 1 was marked for identification.]

)ERAKER:

Mr. Papageorge, I'm showing you what has been marked
:ge Deposition Exhibit 1. This was supplied to us
answers to interrogatories by Monsanto. It has
it of October 11, 1937, and the name L. A. Watt
the bottom. Can you identify that for us?
I don't recall seeing this document personally.
Can you tell by looking at it whether that is a
of warnings that may have been put on PCBs as of 1937?
The thoughts expressed are there. I don't believe
e the exact words that were eventually on the label.
Would it be fair to say that Deposition Exhibit 1
v represents the knowledge that Monsanto had about the
plications of PCBs in 1937?

MR. PIPER: I will object to the form of the question.
he document speaks for itself. The witness indicates
oesn't recall seeing it before, and you can go ahead
im what he knows about Monsanto's knowledge, but if
king him to interpret the document, I would object to
of the question.

MR. HINDERAKER: Well, you produced the document. Do
what it is?

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MR. PIPER: I didn't produce it. It was produced by my client, Monsanto Company. This witness has testified that he doesn't recall seeing it. That doesn't mean we shouldn't produce it. If you're asking him to interpret the document, I would object to the form of the question.

MR. HINDERAKER: That's what I'm asking Mr. Papageorge.

BY MR. HINDERAKER:

Q I'm asking based on your knowledge of the studies and your understanding of what Monsanto knew as of about 1937, whether that would appear to be an accurate description of their understanding at that date.

A It appears to be, yes.

Q But it does not appear to you to correspond to any actual label or warning that you've seen on documents of that type; is that correct?

A That is correct.

Q As of 1935, or whenever it was that Monsanto bought Swan, was Monsanto, then, the only commercial manufacturer of PCBs in the United States?

A I don't know.

Q Do you know whether at any time throughout the period that Monsanto produced PCBs if there were any other commercial manufacturers of the product in the United States?

MR. PIPER: Now are you referring to manufacturers that are domestic manufacturers or manufacturers that would

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have manufactured PCBs and be imported into the United States?

MR. HINDERAKER: No, I know there were foreign manufacturers. I'm asking whether there were any other American manufacturers.

MR. PIPER: At any time?

MR. HINDERAKER: At any time.

THE WITNESS: I was informed that there were at least two companies making PCBs and making them available to some of Monsanto's customers.

BY MR. HINDERAKER:

Q When was that?

A I believe I first heard that in about 1970, '71.

Q Do you know if those companies stayed in the business for very long?

A No, I don't.

Q Do you know who they were?

A The names Costal Chemical and Geneva Chemical were mentioned to me.

Q Did Monsanto have patents of any kind that would protect its monopoly or near monopoly, do you know?

MR. PIPER: I object to the form of the question as to whether or not there was a monopoly or near monopoly.

BY MR. HINDERAKER:

Q Well, do you know whether Monsanto had patents either on the products themselves or process patents of any kind?

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A No.

Q No, they didn't, or no, you don't know?

A They did not have any patents relating to PCBs.

Q Are PCBs unusually difficult to manufacture?

A No.

Q Do you have any explanation for why it is that for some 40 years, Monsanto was virtually the only PCB manufacturer in the United States?

MR. PIPER: I don't want to interrupt this deposition continually, but I object to the form of that question as to whether or not Monsanto was virtually the only manufacturer. The witness has indicated he's aware of two others that he's heard about, and there may be more.

MR. HINDERAKER: Well, that's why I said "virtually."

BY MR. HINDERAKER:

Q You certainly would agree, sir, that Monsanto was the predominant manufacturer of PCBs in America for about 40 years?

A That's my understanding.

Q At a minimum?

A Yes.

Q And I'm just asking if you know why.

A No, I don't.

Q Okay. You've talked about the tests that Monsanto ran on PCBs in the mid-1930s. Do you know if those tests were

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run on just one formula or one type of PCBs, or were they run on a cross-section with various degrees of chlorination?

A As I remember, they were run on more than just one mixture, yes.

Q Do you remember how many?

A No, I don't.

Q Do you remember which ones?

A Not clearly, no.

Q I assume that you've read these test results somewhere, and that's what you're going by?

A Oh, yes. I was not physically present then.

Q Sure. So do you know whether those test results do exist somewhere at Monsanto?

A I don't know today where they are.

Q Does Monsanto have any particular policy with respect to preserving or destroying product testing results?

A Yes, they have a policy.

Q What is it?

A Oh, I don't know the details as it relates to toxicity studies.

Q Okay. Do you know whether there was anything in those tests in the mid-'30s that bore on the question of bioaccumulation?

A No.

Q You don't know, or there wasn't?

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A There wasn't.

Q As I understand it, PCBs are fat soluble; is that an accurate statement?

A Yes, yes.

Q And am I correct in understanding that that's the fundamental reason why they tend to bioaccumulate?

A I'm not qualified to respond to your question.

Q Okay. That didn't fall within the purview of your studies?

A I'm not a pharmacologist or a toxicologist, so I have to rely on the interpretation of experts.

Q Okay. Well, let me ask you this. Do you know enough about chemistry to know whether it is predictable from the formula and the chemical structure of PCBs that they would be fat soluble?

A Oh, yes, they would be.

Q A qualified chemist can tell that by looking at the formula?

A Yes.

Q Was there anything in the tests that were run in the mid-1930s that bore specifically on the question of fat solubility?

A No.

Q Do you know whether there's anything in the warnings or the statements that were put out on PCBs by Monsanto at

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that time that related to the question of fat solubility or bioaccumulation?

A No.

Q After the mid-1930s when this first set of tests were run, when, to your knowledge, was the next occasion on which Monsanto did further toxicity or health testing of PCBs?

A In the '50s, tests were repeated.

Q Do you know why they were repeated at that time?

A Twenty years or so had elapsed, and the methodologies had changed somewhat, and it was decided to run not only PCBs but other industrial chemicals through these tests at least a second time to see if the results remained the same.

Q Can you tell what tests were done? First of all, can you pin down the date any more specifically?

A The closest I can come or I can recall is mid-'50s.

Q Okay. Can you tell us what tests were run at that time?

A It's the oral toxicity, dermal toxicity, the eye irritation test and skin irritation test.

Q Again, with the rats and the rabbits?

A Yes.

Q What generally did those test results show?

A The results are a duplicate of the 1930s' results.

Q They were essentially the same?

A Yes.

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Q Do you recall what PCB formulations were tested in the mid-'50s?

A I don't recall them, no.

Q What sort of a substance would Monsanto use when it did those tests? In other words, would it use some sort of pure PCB substance, or would it use transformer fluid, or what kind of substance would they test?

A Well, the word "pure" confuses me because this is not a pure chemical. When we speak of PCBs, we're always speaking of mixtures of chemicals, and the material used for testing was the material available commercially and sold as Aroclor with the four digits.

Q Okay. So that the substance they would have tested may have been, for example, Aroclor 1254? I realize you're not sure whether that was it.

A Yes.

Q But it would have been that kind of a commercial formula?

A Yes, that would be the material tested on the animals.

Q Okay. Do you know whether Monsanto still has the documents or the records that would reflect those tests and the results they got?

A No, I do not.

Q At least they had them when you were undertaking your research in the '60s and '70s?

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A I saw some material of these reports. I don't recall seeing the report from the laboratory summarizing--with the full results reported.

Q Okay. Based on the test results that were obtained in the mid-1950s, did Monsanto change its products or its labeling of its products or anything else?

A The results in the '30s led to the wording that appeared on the labels that identified product sold by Monsanto. The results of the 1950s test did not result in any change in those, in the original set of works.

Q Okay. What part of the company is responsible for toxicity testing of products? Is there a central R and D group, or is that done within the operating division, or what?

A No. This is under the direction of the corporate medical director.

Q And was that true going back to the mid-1950s?

A Yes, yes.

Q So that toxicity tests were done by a separate group that covered the whole company?

A Yes.

Q Who was responsible for deciding whether certain products should be subjected to further tests? Someone in that group, or someone who had overall responsibility for the product?

A The individual who has overall responsibility is

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ultimately responsible, but he considers the medical director's opinion very heavily in his decision.

Q What person are we talking about as of the mid-1950s? If you know the name, that would be fine, or if not, what job title would it be that had responsibility for saying whether PCBs would or would not be tested?

A I don't know who it would be in the 1950s.

Q Do you know what job title would have had that responsibility?

A No, I don't.

Q All right. When were PCBs next tested by Monsanto after the mid-1950s?

A Well, to my knowledge, the next testing occurred in the late '60s.

Q And was that testing done in response to literature that came out from other sources between the mid'50s and late '60s?

A Yes.

Q All right. I want to leave Monsanto for a while now and talk about the literature. As I understand it from your description of your duties, one of those duties was to familiarize yourself with the literature on PCBs and their health implications.

A Yes.

Q Would you say that you are quite familiar with that

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literature?

A In a general way, yes. Not as an expert.

Q Okay. To the best of your knowledge, what was the earliest published study or article or whatever that suggested that PCBs may be toxic?

A Late 1960s, and I don't recall if it was 1968 or '69. There were articles that appeared that claimed that PCBs were responsible for health effects noted in sea birds in the North Sea area and in the pelicans and seals off of the coast of Southern California.

Q I am going to get to those articles in a little while. I think I know the ones you're talking about, but weren't there publications long before the late '60s that PCBs were toxic?

A I don't remember any.

Q Am I correct, sir, in understanding that in the late 1960s you were the one individual employed by the Monsanto Company that had responsibility for being familiar with the literature on PCBs as it related to health?

A No.

Q Who else had that responsibility?

A The corporate medical director.

Q Who was that?

A He never lost that.

Q I see. Who is that?

A At that time it was Dr. Emmett Kelly, R. Emmett Kelly.

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[Discussion off the record.]

BY MR. HINDERAKER:

Q In any event, as you sit here today, you are not aware of any studies that came out, for example, in the '30s or '40s or '50s or early '60s relating to toxicity and having to do with PCBs?

MR. PIPER: I am going to object. You have changed your question. From your prior statements and questions to this witness, you have asked him whether or not there were articles prior to the 1960s that said PCBs were toxic. Your question now is whether or not there were articles prior to the 1960s that dealt with studies involving toxicity of PCBs. Now I don't know if that makes a difference to the witness, but you've definitely changed the format of your question.

MR. HINDERAKER: Well, it may have, and the witness can tell us.

THE WITNESS: Well, let me try to answer that in this way. I was aware, as were many of us who dealt with PCBs, of the effect on skin, the presence of chloracne associated with overexposures to PCBs. I was aware of the irritation that can take place in the respiratory system when too many vapors are breathed. That kind of report I am well aware of, but I don't know of anything in the literature other than the articles I mentioned that described an observed effect on some creature, then relating it to PCBs. I don't remember any,

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seeing any.

BY MR. HINDERAKER:

Q I see. Well, you're aware that there was literature published long before the late 1960s that described, as you say, chloracne caused by PCBs, right?

A Yes, yes.

Q And respiratory irritation?

A Yes.

Q And that was consistent with the tests that Monsanto itself did in the 1930s?

A It was predicted by the animal tests.

Q Okay. How about liver damage? What is the earliest study that you're aware of that reported any sign of liver damage?

A The earliest report that I personally was informed of some effects on the liver were the studies that were started in the late '60s, which I was told that in higher levels of PCB exposure, the livers of the test animals were enlarged.

Q Okay. Well, let's talk about those studies in the '60s, and I don't want to mislead you. You said late '60s. My understanding is that a Swedish scientist published a study in 1966 which had to do with various forms of animal life in the North Sea region. Does that date sound right to you, or do you think it was later than that?

A I had a different understanding. The Swedish

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researchers reported the presence of PCBs in many environmental samples. They did not report or associate this with harmful effects. The marine birds and some other marine creatures that were reported in the North Sea were reported in the late '60s as having been discovered, after a storm, emaciated; of course, dead. And their tissues had PCBs in them, and the assumption was that the PCBs caused their demise, which was later discounted. Those are the reports that I'm aware of.

Q Okay. Well, we may be talking about different studies, but weren't there studies that came out in the middle or late 1960s which implied that PCBs may bioaccumulate in the fatty tissues of animals?

A There were no studies designed to make that determination in the late 1960s. In fact, the term was new to science. It was just becoming an evolving science in the late '60s based on DDT information.

Q What, to the best of your knowledge, was the first published indication of the possibility of bioaccumulation in PCBs?

A There were studies at two laboratories, government laboratories, U. S. Government laboratories, that were designed to determine bioaccumulation. One laboratory was located in Columbia, Missouri, which is the fish pesticide laboratory, and at that time it was part of the Department of Interior. And the other laboratory was the laboratory, the EPA laboratory

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in Duluth, Minnesota, where most of the accumulation studies in fish were made.

Q Okay. When did those studies become published, to the best of your knowledge?

A To the best of my knowledge, somewhere about 1973. '72, '73. In there.

Q Do you know what it was that prompted Monsanto to install you in the position of manager, environmental control in 1969 and give you these extensive responsibilities with respect to PCBs?

A Well, I was told that there was much information being received from many parts of the world, that information being associated with a Monsanto product, and we were a manufacturer of that product, certainly. And within Monsanto, there were two business groups involved, and it was decided that too many times the left hand didn't know what the right hand was doing in this area, and it was hoped that by assigning it to one person to act as focal point for all of this information, that we could better understand what was evolving and better manage the total situation.

Q What were the two business groups?

A There was the group that had what we call functional fluids, the dielectric fluids and the hydraulic fluids and heat transfer fluids applications, and then there was the other group in Monsanto called the plasticizers group. This is the

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group that markets materials to the plastics industry for use in plastics to give them favorable properties.

Q Was there anybody in either of those two groups before 1969 that had responsibility for keeping track of environmental concerns?

A They had environmental concerns as part of the fabric of their total assignment but not as a principal thrust.

Q Okay. So was it the reports of--well, you tell me. What was it, what information was it that Monsanto was getting from around the world that led to the establishment of this position?

A There is the early reports about presence of PCBs in samples as detected by the university in Stockholm. There are the reports from Southern California as reported out of the University of California, Berkeley. There are reports of the North Sea storm and the dead creatures. The dead sea information came out of the British, the office of the government chemist, as I remember.

MR. PIPER: Are you talking about the Dead Sea or the North Sea?

THE WITNESS: The North Sea. The dead creatures in the North Sea. I'm sorry.

We had communications with the WARF Institute in Madison, Wisconsin, who were beginning to develop the analytical methodology based on what they had heard out of Stockholm.

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These kinds of reports are really the very beginning of all this, and there was enough flowing back to Monsanto to create this interest.

BY MR. HINDERAKER:

Q When you were given your assignment of following the literature and so forth, was the concept that we now know as bioaccumulation one of the things that you were directed to be alert for?

A No. When I first arrived to take over that position, the concept of bioaccumulation was just evolving. Certainly later I picked it up as an item of considerable interest, but initially it wasn't a part of the normal thought process involved with industrial chemicals.

Q What made it an item of interest later?

A Our contacts primarily with government analytical chemists and government fish biologists were such that we included discussions on speculation regarding bioaccumulation.

Q Are we talking now 1972 and 1973?

A I think more like starting in 1970. In 1970, that was an item of discussion.

Q Okay. Can you tell me more specifically what, if anything, happened in 1970 that made it an item of discussion?

A All right. There was a meeting in Duluth, Minnesota called by the director of that laboratory of the broad subject of PCBs in the environment, and some of the attendees at that

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meeting, in trying to understand the PCB present situation and drawing analyses with DDT, expressed some opinions regarding some thoughts, speculation, that since these materials are soluble in fat, they could be very similar to DDT and accumulating in aquatic creatures. That's one discussion I recall.

Q That was in 1970?

A March of 1970.

Q Do you recall what speakers in particular expressed those concerns?

A No, I don't. There were several.

Q What about the Japanese Yusho incident? Did that play a part in Monsanto's concerns here?

MR. PIPER: In what way?

MR. HINDERAKER: That's the question.

MR. PIPER: Are you talking about bioaccumulation?

MR. HINDERAKER: Well, I said Monsanto's concerns here. We've been talking about bioaccumulation.

MR. PIPER: Okay.

THE WITNESS: No, we did not associate the unfortunate Yusho incident with bioaccumulation. That was an industrial accident that led to flue contamination, and people got sick. There is nothing there to indicate bioaccumulation is an issue.

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BY MR. HINDERAKER:

Q What did you see as the implications, if any, of the Yusho incident?

A I saw that, and from an understanding of the limited information that we were able to get, that sure enough, high levels of exposure would cause some of these skin problems we had predicted earlier, and personally also felt that a contaminant must have been present in that situation to create some of the effects that were being reported.

Q Which effects?

A Oh, there were many. There was the anticipated chloracne skin problem, watery eyes, running noses, nausea, weakness, headaches, loss of appetite.

Q You thought all of those effects must have been contributed to by a contaminant?

A That's a personal observation that, since our studies on PCBs as of that point in time had never shown all of these symptoms, there must be something else there that's contributing.

Q Other than that inference, was there ever any evidence of a contaminant in that incident?

A No.

Q Am I correct in recalling that one feature of the Yusho incident was that certain infants showed up with PCBs in their bodies, apparently as a result of drinking milk? Do you recall that?

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A No. I recall infants whose mothers were pregnant at the time of the exposure being born with PCBs in them, and I also recall the reports said after about three months, they were normal.

Q So you don't recall anything about the Yusho incident as having been pertinent to bioaccumulation?

A That is correct.

Q I assume you read up on that incident as thoroughly as you could and followed the published literature on it very carefully?

A Oh, yes. In fact, we talked in length with FDA officials who were trying to get as much information as they could.

Q Okay. Have we at least referred now to the major studies or articles that came out prior to 1971 on PCBs and their health implications?

A I believe we've got the major ones.

Q Okay. I think you have told us earlier that the next round of testing after the mid-'50s was initiated in the late '60s; is that correct?

A Yes.

Q Was that done in part as a response to these reports that started coming in?

A Yes.

Q What tests were undertaken starting in the late '60s?

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A In the late '60s, the tests were designed to be somewhat longer than the studies conducted in the '30s and '50s to establish exposure levels for a yet longer study to be initiated. For example, they had one-month studies and 90-day studies, and these were oral feeding studies to animals to determine a dose level and, of course, observe for effects, to help design the protocol for the two-year or lifetime feeding which subsequently took place.

Q When was that?

A That was about--I think the two-year program started in '69 and was finally reported in about 1972. So we had what are referred to as subchronic studies and chronic studies, and they had to do with oral feeding to observe any effects on the lifetime of the test animal, and we had reproduction studies to see how it affected the test animals in its ability to reproduce itself through two generations. The test animals were rats, dogs, and chickens.

Q Can you describe for us the results of those studies?

A Generally it was determined that the higher exposure levels of PCBs--and these, incidentally, were Aroclor 1242, Aroclor 1254, and Aroclor 1260. At the higher dose levels, the animals exhibited the enlarged livers that I referred to earlier and a decrease in weight gain. They did not gain weight as fast as the animals that were not exposed, but they did gain some weight. At the higher dose levels, there was an

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impairment in the reproduction. As I recall in the second generation, there were fewer pups per litter in the rat studies. There were, as I remember, a hundred parts per million in the diet that the animal eats every day of its life.

Poultry reacted differently. They were able to tolerate the 1254 and 1260 better than the Aroclor 1242, and with the Aroclor 1242, there was an observed effect on the eggs and the hatchability of the eggs.

That's, in general, the overall work.

Q And those results became available when?

A Well, interim reports were available about every six to nine months, and they were shared widely. The final reports which confirmed the interim reports were available in 1972.

Q So that the first interim reports would have been available in what year?

A About 1970, as I remember. June or July of '70, we had a summary statement from the laboratory.

Q You may have already answered this, and if so, I apologize for the repetition, but I asked you earlier when you first became aware of studies that show a possible liver damage. Was this study the first such study, or had other such results been reported by others earlier?

MR. PIPER: You mean, by "others," outside of Monsanto?

MR. HINDERAKER: Well, either inside or outside.

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THE WITNESS: My first awareness of liver effect as distinguished from liver damage was as a result of interim reports reporting the enlarged livers. I was informed that this is expected because a liver is the organ that is designed to cope with materials like chlorinated hydrocarbons, and the toxicologist telling me this told me that the liver enlarges so it can take care of the added burden. I did not personally walk away from that discussion with an impression that it was damage.

BY MR. HINDERAKER:

Q Do you know whether there has ever been any literature published to the effect that PCBs not only affect but also damage livers?

A No. I don't know of any personally.

Q Are you aware of any literature that has ever been published which has stated the conclusion, be it right or wrong, that PCBs may generate liver cancers?

A Yes. There is an animal study that comes to mind, yes. There was a study conducted by a government employee in which she concluded that high doses of Aroclor 1260 causes liver cancer in some of the rats that she was studying.

Q Do you recall the date of that study?

A I don't know when it was started. I believe it was 1973 that it was made known to Monsanto.

Q Are you aware of any studies other than hers which

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would support a claim that PCBs may be carcinogenic?

A No.

Q To the best of your knowledge, that's the only one?

A That is right.

Q Let me just go back to bioaccumulation for a moment. Has anybody at Monsanto ever told you that he suspected or expected or could have predicted that PCBs bioaccumulated at some point prior to the late '60s or early '70s?

MR. PIPER: So that I understand the question, and possibly the witness, you're asking whether the witness has ever been told by anyone from Monsanto at any time as to whether or not he could have, did, or might have predicted something prior to 1970?

MR. HINDERAKER: Yes.

BY MR. HINDERAKER:

Q Do you understand the question?

A I think I do.

I don't personally recall anyone at Monsanto mentioning bioaccumulation to me before 1970. I just don't remember that.

Q Well, that's not my question. What about after 1970? Did any of the Monsanto scientists come up and say to you, "Well, now, Mr. Papageorge, it really isn't surprising that this stuff bioaccumulates. I always suspected that it would." Did you ever have that type of conversation with anybody at

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Monsanto?

A I don't remember it.

Q Are you aware of any documents, memos, correspondence, notes, any kind of documents at Monsanto that discuss the possibility of bioaccumulation, either under that name or some other name, prior to 1970?

A I just don't remember prior to 1970. I don't recall any.

Q Have you ever had a conversation with anybody at the--what did you call that medical office at Monsanto?

A Well, in the early '70s, it was medical department.

Q Have you ever had a conversation with anybody in the medical department about bioaccumulation of PCBs?

A Eventually. That became a topic of discussion rather generally amongst those of us who were involved with PCBs. I personally don't recall any specific discussion with members of the medical department. I just don't remember.

Q Do you recall having ever had a conversation with anyone at Monsanto on the subject of bioaccumulation as it relates to fat solubility?

A Many people.

Q Who?

A That became sort of the thrust of conversations involved. This involved analytical chemists and the medical people.

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Q Let me stop you there. What medical people have you talked to on that subject?

A It would be Elmer Wheeler and Dr. Kelly.

Q Did either of those gentlemen ever tell you something to the effect that bioaccumulation was predictable based upon the known fat solubility of PCBs?

A Not to my knowledge.

Q Okay. Am I correct in understanding that in 1970, Monsanto, as a corporation, made certain decisions about the future production and distribution of PCBs?

A Yes.

Q Do you recall when in 1970 those decisions were made?

A Late April or early May of 1970.

Q Was there a series of meetings that led to those decisions?

A Yes.

Q I guess what I'm trying to do is pin down the time period in which this is being considered. Can you tell me roughly what that was?

A The thought was in place when I arrived on the job, and I picked it up and pursued it in terms of trying to get a specific plan developed.

Q So that as of sometime in 1969 when you got your environmental position, the company was already seriously thinking about limiting distribution of PCBs; is that a fair

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statement?

A Yes, yes.

Q Who told you that?

A I don't recall a specific individual.

Q Was that part of the assignment that you were given in this job, to follow up on that idea and make recommendations as to what limitations might be appropriate?

A Yes.

Q In fact, was that the main thrust of your job?

A I don't know that it was--it was one of the principal thrusts. I don't know that it was the main thrust.

Q Was it your understanding that at the time you took over that position, some limitation had already been decided on and the question was how exactly it was to be done, or was it still an open question, then, whether there would be any kind of limitation?

A When I arrived, I would say that it was considered to be a good idea that should be pursued further.

Q That is, the limitation of distribution?

A The limitation. In response to presence in the environment and types of uses.

Q Would it be fair, then, to say that consideration of that idea was going on continuously from sometime in 1969 until April or May of 1970?

A Yes.

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Q Who was involved in that analytical process besides yourself?

A That involved the representatives of the medical department.

Q Who was that?

A Mr. Wheeler, Dr. Kelly. It involved research directors.

Q Who were they? Excuse me. Go ahead.

A Well, there's a Dr. Richard for the fluids applications and a Dr. Farrar for the plasticizer applications. It involved the directors of the business group. Those were the principal functions that were contributing to the discussion.

Q Who were the directors of the business group?

A Mr. Bergen, and Mr. Springate for the plasticizers group.

Q Who had the ultimate responsibility of making the decision as to whether and to what extent PCB distribution would be curtailed?

A Corporate management committee, Monsanto.

Q Did that committee include some or all of the people you have just been mentioning, or is that a different group?

A That is a different group.

Q Who is in that group?

A I don't recall all members, but they included the top officers of the company, the president, and several vice

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presidents.

Q Was it ultimately the president's decision to change the distribution system?

A Yes.

Q The group that you referred to earlier that included yourself and the medical people and so forth, did you function as a committee?

A Yes. I refer to it as my task force.

Q Did you have meetings, for example?

A Yes.

Q Were you the chairman of the committee?

A Yes.

Q And was the committee charged with the responsibility of making recommendations?

A Yes.

Q Did you issue a report?

A The report was oral. It was a presentation before this management committee.

Q Did your committee generate any documents of any kind; memos, notes?

A Oh, yeah.

Q Do you know the present whereabouts of those documents?

A No, I don't, but the documents were not issued by the committee but by the members of the committee. It depends

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on the subject matter.

Q What sort of documents were they?

A They were usually memoranda containing information addressed to people that were perceived to be in a need-to-know or could-use basis.

Q These memoranda were generated by individual members of the committee?

A Yes.

Q And did they go to other members of the committee or to this top management group?

A Oh, they usually went down the organization to the people that make things go.

Q I see. Did your committee collect that kind of correspondence or those memos in a special file?

A Each member had his own filing system.

Q Was there any collective filing system for the committee as a whole?

A No.

Q Did the committee as a whole process any documents of any kind, be they reports, recommendations, memos, anything?

A No.

Q The only report that you ever gave to management was oral?

A Yes.

Q Were you specifically requested by management to

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give only an oral report?

A No.

Q Was there any particular reason why you gave only an oral report?

A Other than that's my normal style. I prefer the oral, and if they want a copy of something, I can always get it, but that's never been requested.

Q Did you yourself have certain files that you generated during this whole period of time you were working on that project?

A Yes.

Q Not only until April or May of 1979, but thereafter?

A Yes.

Q Are those files still maintained somewhere in Saint Louis?

A I don't know.

Q What did you do with them?

A I turned them over to my successor.

Q They were intact, at any rate, at that point?

A I'm sorry?

Q Were they intact at that point?

A Yes. They were useful to me. I don't know if my successor found them useful.

Q In any event, to the extent that you generated documents during this review period in late 1969 and early

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1970, those documents were not thrown away by you but were retained in those files; is that true?

A True.

Q So if we want to know whether they still exist, presumably we should go to your successor?

A That's where--yes.

Q Okay. Do you have any knowledge or information as to what may have happened to any documents generated by other members of your committee?

A No.

Q Did management give you any kind of a deadline for making recommendations?

A No.

Q You indicated that the decisions that were made by management were made in late April or early May of 1970. Is that approximately the same time that the committee gave its recommendations?

A Yes.

Q Or was there a time lag there?

A Oh, I think it was almost instantaneous, as I remember. We made the recommendation--we were asked to go back and follow it up a bit and refine it, and went right back, and then they approved the final proposal.

Q Were the actions taken by the company consistent in every respect with the recommendations made by your

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committee?

A Yes.

Q Okay. Were the recommendations made by your committee unanimous, or were there certain members who dissented from certain aspects?

A I don't recall any dissention.

Q So as far as you know, the recommendations and the decisions were all unanimous?

A Yes.

Q When you say that management sent you back to polish it up a little bit, what do you mean by that?

A When I made my first presentation, I did not have specific dates at which certain steps of the withdrawal program would take place. I had dates of a much broader timeframe, and they asked us to go back and come up with specific target dates, and this is what was done within a week or two with a representation.

Q Okay. Why don't you summarize for us the recommendations that were made by your committee.

A I'll try to recall all the features.

We would terminate sales of the PCBs to those uses that were determined to be open systems by August 30 of 1970. We would terminate the use of distributors of PCB products as of August 30, 1970. We would seek alternatives for the hydraulic fluids, concentrating initially on those that

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contained Aroclor 1254 and 1260, which were the PCBs being reported as existing in the environment, and eventually find alternates for the remaining PCB formulas, and the objective there was to do all this by the end of 1970. We would try to develop an alternate material for the carbonless copy paper application, recognizing this was a difficult technology challenge, but we had hoped to accomplish this by early 1971. We would continue to sell the dielectric fluids and the heat exchange fluids, since these were perceived to be applications that were closed systems and controllable. We would continue to share information with our customers as it evolved. We would take immediate steps to install an incinerator to provide a disposal service to our customers.

I believe those are the features of the program.

MR. HINDERAKER: This might be a good time to stop for lunch.

[Luncheon recess, after which time Messrs. Hanson and Thomas were not present.]

BY MR. HINDERAKER:

Q Mr. Papageorge, I believe when we broke off this morning you had listed the various recommendations which were made by your committee. Am I correct in understanding your testimony to be that all of those recommendations were implemented by Monsanto's management?

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A Yes.

Q Did your committee consider the alternative of ceasing production of PCBs altogether?

A Yes.

Q And I take it that alternative was rejected by you?

A Yes.

Q Why was it rejected?

A We were informed by the dielectric users that there was no alternate fluid available to use in their electrical systems which would give the fire retardency that the PCB formula gave, and, therefore, that equipment would not be--could not be installed in many areas governed by many codes; fire codes, electrical codes.

Q I take it from that that your committee did have some contact with PCB users?

A Yes.

Q Was GE one of those?

A Yes.

Q Can you describe for us the contact that you and your committee had with GE during that period of time?

MR. PIPER: Are you referring now just to from 1970 on, or even prior to 1970?

MR. HINDERAKER: Well, he started with this committee in 1969, so I am starting then and carrying it up through the period when these decisions were being made.

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THE WITNESS: The contact was through the individuals of our task force committee with their normal contacts with the customers. For example, the research people would be in contact with the technical people at the customers' offices.

BY MR. HINDERAKER:

Q Was it your understanding that there was an ongoing communication between the technical people at Monsanto and the technical people at GE on the subject of PCBs?

A Yes.

Q And that communication predated your appointment to this post in 1969?

A Oh, yes.

Q And continued thereafter?

A Yes.

Q Who were the people at Monsanto who were involved in that communication, to the best of your knowledge?

A The principal individual was Dr. Ralph Munch, M-U-N-C-H. His superior, Dr. Richard, would also get involved on a less frequent basis.

Q What were their job titles?

A Dr. Richard was director of research for functional fluids, and Dr. Munch was--I don't recall his title, but he was the principal researcher for dielectric fluids.

Q Were either of those gentlemen on your committee?

A Dr. Richard represented the research function.

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Q Okay. Do you happen to know the names of the people that they typically communicated with at GE?

A I used to know. I don't recall them anymore.

Q Okay. In any event, it was those two gentlemen who communicated with GE on behalf of your committee with respect to the substitute product issue?

A Yes.

Q Were there ever any formal contacts with Monsanto and GE at this time; for example, an appearance before your committee by someone from GE?

A Yes. We had formal meetings. GE representatives arrived in Saint Louis, yes.

Q Were all the members of your committee present at those meetings?

A Only those members that were associated with dielectric fluids.

[Whereupon, Mr. Thomas entered the conference room.]

BY MR. HINDERAKER:

Q Were you present at the meetings?

A Yes.

Q Okay. How many meetings were there?

A I can recall three which involved the full committee.

Q Were there various other informal contacts in addition to that?

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A Oh, yes. Frequently.

Q You've indicated that at least one subject you communicated with GE about was the matter of substitute products for dielectric fluids, correct?

A Yes.

Q Were there any other topics on which you communicated with GE?

A Certainly. We talked about our contacts with laboratories and their reporting PCBs in the environment, the type of PCB that was reported, the state of the analytical arts or methodologies, the status reports on the animal studies. In general, that was the type of discussion that was frequently held.

Q Was it your understanding that GE had a procedure for keeping track of that data that was comparable to Monsanto's?

A Yes.

Q They seemed to be just as well informed as you were on PCB developments?

A Yes.

Q And, again, we're referring now specifically to the technical people at GE whose names you don't recall; is that correct?

A As well as others in GE.

Q During the time these decisions were being made in

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'69 and '70, did you do any further investigation to determine the feasibility of a substitute product for transformers; for example, other than your contacts with GE and companies like GE?

MR. PIPER: Would you read that back?

[Whereupon, the last question was read by the reporter.]

MR. PIPER: Okay.

BY MR. HINDERAKER:

Q Do you understand that?

A I think I do, yes.

No. The only contacts were made to users of these fluids.

Q So you didn't try to doublecheck whether they were correct in telling you that there was no satisfactory substitute; is that true?

A I am confused by the question. I don't know who I would doublecheck with--

Q Okay.

A --other than the experts in the business.

Q Okay. Basically you took the word of your customers for the proposition that there was no acceptable substitute; is that correct?

A Yes.

Q Okay. Do you know whether prior to that time in

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'69 or '70, as these discussions were going on, Monsanto had done any work on developing a substitute for PCBs and dielectric fluids?

A Prior to this time?

Q Yes.

A Yes. As normal research activities go, the search for alternates is never-ending. Always looking for something better. Always looking for competitive materials. So the search for alternatives was not new. It was accelerated.

Q Do you know what division or department of Monsanto was responsible for that effort?

A That would be Dr. Richard's research department.

Q Do you yourself have any information as to the funding that was given to that effort at various points in time?

A No.

Q Would it be fair to say that the funding for that effort rose significantly in about '69 or '70, do you know?

A About that time, yes.

Q Okay. Would Dr. Richard be a person we could talk to to get the details on that research effort?

A Yes.

Q Do you have any information as to when that research effort started?

A Well, the accelerated research effort started about 1968 or early '69.

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Q It accelerated, I assume, in response to environmental concerns?

A Yes.

Q But there was an effort before that time, was there?

A Yeah.

Q Do you know when the effort originally began?

A No.

Q Was there anybody within Monsanto, to your knowledge, who advocated a complete cessation of production of PCBs in 1970?

A No.

Q Now I take it that when these decisions had been made to cut back in certain areas on some kind of a timetable, you communicated with customers of various types to inform them of what the company was doing.

A Yes.

Q I want to show you another letter which we'll have marked as Papageorge Deposition Exhibit No. 2.

[Whereupon, Papageorge Deposition Exhibit No. 2 was marked for identification.]

BY MR. HINDERAKER:

Q It's a letter dated February 18, 1970. It's addressed, "Dear Sir," and signed by Donald Olson. Can you tell us if you've seen that letter before?

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A I have seen this letter, yes.

Q Could you take a minute to look at it and tell us what class of customers that letter would have gone out to?

[Pause]

THE WITNESS: Copies of this letter were sent to customers on record as of February 18, 1970 who were purchasing dielectric fluids from Monsanto for use in electrical equipment.

BY MR. HINDERAKER:

Q That would include transformers?

A Yes.

Q And GE presumably would have been one of the companies that got that letter?

A Yes.

Q Okay. I want to direct your attention to a couple aspects of this letter. First, did you have any role in drafting the letter?

A Yes. I was one of several who reviewed versions of several drafts before the final draft was approved.

Q Okay. I first want to direct your attention to the last sentence on the first page which has a number 2. It says, quote, "PCBs with a chlorine content of less than 54 percent have not been found in the environment and appear to present no potential problem to the environment," close quote.

Is that a true statement, to the best of your present knowledge?

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A Present knowledge, no. That's not true.

Q What have you learned since that would make that statement false?

A We have learned that if you take a sample out in the environment that's near the point of entry into the environment--

Q In time, you mean? What do you mean, "near the point of entry"?

A In distance. Right near the point of entry. And time is a factor. Now we're talking many years. That the lower chlorinated PCBs are also detectable if they're discharged into that stream or soil or what-have-you.

Q To your knowledge, did you or anybody else at Monsanto ever do anything to correct that last statement on the first page of Exhibit 2?

A No, because when we did establish that this is possible, the customers that had the potential for discharging had been taken off our list. They were no longer receiving the material.

Q When did you make this discovery about the lower chlorinated PCBs?

A Oh, I would say starting late 1970, early '71.

Q And how did that come to your attention?

A Oh, by the middle of 1970, we had developed our analytical methodology to the point where we felt confident

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that the results obtained were reliable, and at that point we were able to go out and get samples and determine that other chlorinated biphenyls were detectable.

Q So that until the middle of 1970, you really didn't even have a test that would tell you for sure whether you were looking at one variety of PCB or another; is that what you're saying?

A I don't know that it distinguished between varieties so much as whatever variety was the standard to which the answer was being compared, the results were reproduceable and accurate.

Q Is there a correlation between the degree of chlorination and the use to which PCB fluids are put?

A Yes.

Q Can you explain that briefly?

A The degree of chlorination establishes not only its fire retardency or its resistance to normal wear and tear or resistance to chemicals, but it also helps determine whether it's a free-flowing liquid, a very viscous liquid, or a solid, and depending on the application, you choose that particular mixture that fits your needs. For example, in dielectrics--

Q Transformers?

A Transformers--if a transformer is installed in the tropics, you can use an Aroclor 1242 as the PCB ingredient in that transformer fluid. However--I was wrong. You can use Aroclor 1260 in that transformer and it will function well.

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But to use Aroclor 1260 up in Alaska near the Artic Circle, it wouldn't function because its viscosity at low temperatures is too great.

Q In normal use in the United States, what Aroclors would be used in transformers?

A Depends on the manufacturer.

Q What did GE use?

A GE used Aroclor 1254 and 1260.

Q Would uses such as carbonless paper, hydraulic fluids, and some of the others that you've talked about normally be lower degrees of chlorination than transformers?

A Carbonless copy paper was the lower chlorinated mixture. The hydraulic fluids would vary, depending again on type of use.

Q How about the others, other uses? Heat transfer and what else?

A Heat transfer, there again, the choice of which Aroclor mixture to use, dependent on what temperature the process demanded, the intent was to try to select as low a chlorinated material, because it was less viscous and more pumpable and easier to service, as low as one could get by with and still achieve the high temperatures desired without the material breaking down and carbonizing and losing its properties.

Q Did you sometimes use degrees of chlorination as

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high as the 54 or 60 for that use?

A At times, yes.

Q Generally not?

A Generally it would be Aroclor 1248.

Q How about capacitors?

A There the principal fluid had the Aroclor 1242 mixture in it. That was the most common.

Q Would it be correct, then, to say that at least for some of the uses to which you were no longer going to put PCBs, for example, carbonless paper, some of the others--

A Um-hmm.

Q --the only PCBs used are the PCBs predominantly used were in the category that you described as presenting no potential problem to the environment?

A Those uses that were discontinued?

Q Yes. In other words, it looks to me as if you quit doing some things that, by your own description, were of no potential hazard to the environment; is that correct?

A That is not correct. The phaseout programs, first steps, were to eliminate those uses that used 1260 and 1254. That eliminated the paint applications, the higher chlorinated hydraulic fluid applications. I can't think of all the uses, but the drive was to eliminate the 1254, 1260, and once that was accomplished, we then directed our resources to finding alternatives for possible--for the lower chlorinated.

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Q But you did eliminate uses such as carbonless paper, right?

A Yes, eventually.

Q And that was a degree of chlorination that did not rise to the level that you described as being a potential problem; isn't that true?

A That was 1970, February. Carbonless paper was removed in April of '71. By that time we had other information that led us to the decision to get out of that application.

Q Okay. The other aspect of this letter I want you to take a look at is the last paragraph which talks about the fact that the customer to whom this letter is directed has marketed or may still market transformers including Aroclor 1254 and 1260. Would you just take a look at that paragraph, please?

[Pause]

BY MR. HINDERAKER:

Q As I understand it from that paragraph, sir, Monsanto was relying upon its customers such as GE to get the word out to their customers or other persons with whom they dealt with respect to the possible environmental hazards of PCBs. Is that a correct statement of your intention?

A Yes.

MR. PIPER: Are you referring now just to this letter?

MR. HINDERAKER: Well, let's start with the letter.

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BY MR. HINDERAKER:

Q That's what the letter says, isn't it?

A Yes.

Q Okay. Is that, then, a correct statement of what Monsanto's intention was; that is, to rely on its customers to pass the word on, if necessary, to somebody else?

A Yes.

MR. THOMAS: I will object to that. Oh, it's too late. For the record, I'm going to object to that.

BY MR. HINDERAKER:

Q Let me just quote briefly from the letter. It says, quote, "Since the dielectric fluid contained in this equipment is only an incidental part of the overall unit manufactured by you, we are not notifying the purchasers of such equipment of the potential environmental contamination problem described in this letter. We do recommend, however, that you notify such equipment users of this problem." Did your group ever consider the possibility of trying to notify the purchasers of transformer equipment and other persons who might actually have possession of PCBs?

A The thought was discussed but quickly eliminated, primarily because of two reasons. One very important reason is we never had access to the list of those customers, and our customers, in turn, would not divulge such a list to us.

Q Did you ask them?

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A Yes, and, of course, we knew the answer. That's their confidential information. Secondly--

Q Excuse me. Let me just stop you there. Did you ask GE specifically for a list of its transformer customers?

A I personally didn't ask.

Q Did someone?

A I'm led to believe someone did.

Q Do you know who?

A I'm not--no, I don't know.

Q Is it your understanding that that request was refused by GE?

A Yes.

Q Do you remember who told you that?

A Only it was a member of the marketing organization. I don't know the specific individual.

Q Was the request for GE's customer list made with a view toward contacting the customers or at least possibly contacting the customers to pass on this kind of warning to them?

A That was my understanding of the intent of the discussion with GE.

Q But that effort, it's your understanding that that effort was blocked by GE?

A That was one of the reasons, and a very practical reason.

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Q Okay. All right. Now you were enumerating reasons why you didn't undertake to notify people beyond your customers. What were the other reasons?

A Well, the other one really is a corollary of the first, in that the dialogue between a seller and a customer really belongs to the seller, and a third party should not intrude, not knowing the entire situation that exists and the relationships that exist and doesn't necessarily have all the facts at his disposal.

Q A matter of good business manners, so to speak?

A Oh, there's some of that, yes.

Q Any other reasons?

A That's all I know of, personally.

Q To your knowledge, did anybody at Monsanto recommend at any time that Monsanto, despite those obstacles, make an effort to identify current possessors of PCBs and extend this type of warning to them?

MR. PIPER: Your question is at any time; that would be from 1970 on up through 1979?

MR. HINDERAKER: Or at any time before or after.

THE WITNESS: I'm not aware of such a recommendation, no.

BY MR. HINDERAKER:

Q Was any kind of study ever undertaken of the feasibility of trying to identify likely current possessors

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of PCBs or industries that use PCBs and getting warnings out to those people?

A Not to my knowledge.

Q You didn't commission anyone to do such an analysis?

A No.

Q As far as you were concerned, the analysis of that possibility proceeded no further than to find out that GE wouldn't give you the customer list and that there was a sense that you shouldn't interfere in somebody else's customer relationships?

MR. PIPER: I have to object to the form of that question. Your earlier question confined his contacts with GE. Your question now encompasses the customers of Monsanto that may or may not have been contacted apart from GE. If you're confining it to the GE customers, I haven't any objection, but if you're encompassing now any other customers of Monsanto that weren't contacted, I'd object to the form of the question.

MR. HINDERAKER: That's a good point. Let me pick up on that.

BY MR. HINDERAKER:

Q Do you know whether Monsanto asked anybody other than GE for customer lists?

A Yeah.

Q Do you know who else was asked?

A Along those same lines, I don't recall specifically,

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but several of the dielectric customers were approached and not only GE.

Q Would that include, what, Westinghouse, or do you know?

A Westinghouse and a few others, the key ones, and the answer was anticipated to be a, "No, we'll handle our own business," and we stopped pursuing that. It was not a popular item of discussion. That was what I was told.

Q And, again, can you pin down who gave you this information, even if it's one of two or three names?

A Well, it has to be the marketing people in place at that time.

Q Who were they, do you remember?

A There's Don Olson, marketing director, Paul Begnignus, B-E-G-N-I-G-N-U-S, I believe is the spelling, and Randy Grahame.

Q All right. Let me pick up, then, with the question that Mr. Piper objected to, and let me rephrase it.

Apart from making these inquiries to dielectric customers, and apart from the consideration that there was a sense of not interfering in somebody else's customer relationships, did you do anything else to explore the possibility or analyze the possibility of Monsanto's making direct contacts with the people that were using PCBs?

A No.

Q To your knowledge or recollection, did anybody within

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the organization recommend or advocate that you should do more to investigate that possibility?

A No.

Q Did you or anybody else at Monsanto ever try to identify the industries which were most likely to be using transformers containing PCBs?

A I didn't personally, and I don't know of anyone in Monsanto who did.

Q To your recollection, did you or anybody else ever suggest the possibility of analyzing those industries, and, for example, taking out advertising in trade journals for those industries?

A No.

Q That was never discussed?

A No.

Q To your recollection, did you or anybody else at Monsanto ever discuss trying to identify the industries where a PCB spill could be most damaging, for example, the feed industry or the food industry, and put advertising in trade journals, in those publications?

A No.

Q That suggestion was never made by anyone, to your recollection?

A No. That's correct.

Q And certainly never studied by your group?

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A That's correct.

Q Do you know whether there were any documents ated with respect to this effort to get customer lists transformer manufacturers?

A No, I don't.

Q The last sentence of your letter here to GE and the er customers recommended that they pass this warning that were giving them on to their customers. Did you ever check with GE and the other customers to find out whether they done that?

A Yes.

Q Tell us about that.

A I don't know what there is to say except that I was sured that they had informed their customers. In fact, many ur customers attached copies of our letter to them, to e transmittal letter they sent on to their customers.

Q Do you specifically recall talking to somebody from o find out whether they had passed this warning on to their stomers?

A Yes. As I remember, the GE people who met formally n Monsanto described this as part of their communications ogram.

Q Okay. The statement by the GE people that they had sed this along onto their customers, this came in a meeting th your committee?

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A Remember earlier we talked about formal meetings with GE?

Q Right.

A The two companies exchanged notes. At one of those meetings, the GE people, when it came time for them to describe their state of knowledge, their activities, mentioned that they had followed up on Monsanto's communication in this fashion.

Q Do you remember the name of the GE person?

A There were several people present. I remember an Ed Robb being present who appeared to be one of the principal spokesmen for GE. I don't recall who exactly reported on this activity for GE.

Q In addition to the meetings that you've described, was there correspondence going back and forth between Monsanto and GE on this topic?

A Yes.

Q Did you yourself author some letters to people at GE and receive some back?

A Yes.

Q Do you recall what the general subject of that correspondence was?

A I don't recall specifically, but it was in the general area of the state of knowledge of PCBs, what's being found and where are we headed.

Q In the communications you had with GE, did they

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tell you whether or not they had done any independent tests of their own on PCBs?

A No.

Q They had not?

A They did not tell me of any testing on their own of PCBs.

Q Did you ever, or, to your knowledge, did anybody at Monsanto ever have any communication with anybody from GE on the subject of the design of their transformers?

A The technical people were in frequent communication with each other on matters that touched on transformers and design. I personally did not get involved in that.

Q When you say the "technical people," who do you mean?

A Dr. Munch, for example, would talk to Mr. Robb that we mentioned earlier and others in other companies.

Q And one of the things they talked about was transformer design?

A Yes.

Q Specifically with reference to that, do you know?

A The type of fluid that would be appropriate for a given application, the type of materials to use internally in the transformer that would be compatible with the fluid, the transformer design, but those are the kinds of things I was aware that they were talking about.

Q Do you know whether anybody from Monsanto ever had

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any contact or conversation with anybody from any transformer manufacturer about transformer design from the standpoint of trying to prevent spills of PCBs out of transformers?

A I recall the subject generally, but not specific to any particular company or person.

Q What do you recall generally?

A The general subject of how to prevent units from leaking. If they do leak, how do you control the leakage? These thoughts were exchanged among the experts in the business. They would come up with their designs.

Q Do you recall any such--were you personally in on those discussions, or are you repeating now something that somebody else has told you?

A I would be present in the room, but most of the discussion was beyond my knowledge, so I didn't participate.

Q Okay. Do you recall any of those discussions specifically being with people from GE?

A Yes.

Q Do you remember any names?

A Well, Mr. Robb was the most active person.

Q And did those discussions encompass things like talking about the possibility of putting some kind of a guard on the transformer so that the pipes wouldn't be broken or some kind of a pan underneath the transformer so that fluids would be caught if they started to leak? Anything along those

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lines?

A I don't remember specifics. I don't remember pans, but I do remember concrete curbing inside of vaults where these units are installed. I remember them mentioning, "Don't put them near any sewer systems." These kinds of things.

Q Tell me about the concrete curbing. I don't understand.

A Well, usually these units are mounted on a concrete surface, and if they do drip the fluid, it could spread, and the thought was given that if we could build a small dike around the unit which would contain a leakage in time to be observed and collected and properly disposed of, that thought was quite common, and that was expressed many times.

Q Do you recall any discussion about the advisability of having GE or another transformer company or anybody contact current owners of transformers and pass on these ideas about dikes or guards or pans, or whatever people might be thinking about, to prevent spills?

A Yes.

Q What do you recall along those lines?

A There again, I don't remember the specific guidelines except those that were finally put together in a document by this group I have in mind. It's an industry group that met and put together a standard.

Q Is this the ANSI standard?

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A Yes, sir.

Q You were the chairman of that group, if I'm not mistaken.

A Yes, sir. That's why I was present in the room, but the discussion was too technical for my understanding, of all the details.

Q Okay. That gets off into another group or whole different time, or was that going on at the same time?

A Well, let me think.

MR. PIPER: A whole different time from what?

MR. HINDERAKER: Well, we've been talking about what went on in 1969 and 1970 when Monsanto was thinking about what to do with PCBs and having contact with GE, correct?

MR. PIPER: I may be wrong, but I don't think your questions for the last five minutes have been relegated to any timeframe in 1969 or 1970.

THE WITNESS: No, all through the '70s. The frequent communications with GE took place regularly throughout the '70s.

BY MR. HINDERAKER:

Q Okay. And the communications that we've recently been talking about having to do with transformer design and so on, when would they have been?

A My personal involvement was with the formation of a group of industry representatives to address PCBs in the electrical industry under the auspices of the National Electrical

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Manufacturers Association, and I think that it was about '71. I don't remember the exact date, but somewhere along in there this group was formed, and they met and had many discussions.

Q Did you ever recommend to anybody from GE that they should go out and do the kinds of things we've been talking about, tell their customers about dikes or guards or pans or whatever it might be?

A Yeah.

Q To whom did you give that recommendation at GE?

A Several GE people, but I don't remember all their names.

Q Do you remember any of their names?

A Mr. Robb is the principal contact.

Q Did Mr. Robb give any response to that recommendation?

A Yes. He assured me that that was being done.

Q In addition, did you ever have any discussion with anybody from GE about the fact that there may be current possessors and users of transformers containing PCBs who may not even be GE's customers; in other words, who may be remote purchasers? Did that subject ever come up?

A Yes, as part of the general discussion about the ability of the industry to keep track of all these units, how complex it was.

Q What was said on that subject, do you remember, and when?

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A Just the general expression that it's almost an impossible task since there is no central place where the records are kept as to who was the current owner and who was servicing the unit and what they were doing to the unit. It's just an impractical task to try to keep abreast of. That kind of discussion was going on.

Q That kind of statement was being made by people from GE?

A The whole industry had the same problem.

Q And when was that discussion going on?

A From 1970--it's probably continuing. It's still the same thought.

Q Did you at any time hear in the same meetings that you've been referring to and discussions you've been referring to, was there ever any discussion of taking out some kind of advertising or pinpointing certain industries, trying to identify people who had transformers and get this sort of warning out to them?

A There was some talk about communications through the various trade associations. I personally don't know what was done.

Q Do you recall whether that talk included GE?

A Yes, yes.

Q Mr. Robb, again?

A Primarily, yes.

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Q As I understand it, most transformers, even, say, in the 1960s, did not use PCBs; is that true?

A I don't know.

Q Do you have any knowledge as to what would or would not be an appropriate application for a PCB transformer as opposed to another kind of transformer?

A Well, it's my understanding that a PCB containing transformer could be used in any installation, but the reverse is not true.

Q You're talking about the flammability characteristics, right?

A Yes, yes.

Q In a packing plant, for example, do you know whether it would be typically true that flammability requirements or flammability factors would require a PCB transformer?

A That's my understanding, yes.

Q That they typically would?

A You'd have to have a unit that will not catch fire or create fire.

Q Do you know whether that relates in any way to the location of the unit; for example, whether it's inside a building or outside of a building?

A That's my understanding, yes.

Q What's your understanding?

A The location of the unit will determine the type

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of unit that is acceptable, depending again on the local codes.

Q For example, if it's on a roof, do you know what the significance of that is, typically, or was?

A Normally those units that follow the national electrical code, that would have to be a nonflammable type fluid, or a dry, so-called dry, unit.

Q Okay. If it's on the roof of a packing plant, say?

A Any building.

Q Okay. Mr. Papageorge, do you recall whether there's anything in writing anywhere where GE says that they carried out the warning that is referred to here in Exhibit No. 2 to their customers?

MR. PIPER: Counsel, do you mean in addition to the documents that have been produced for the repository?

MR. HINDERAKER: No, I don't mean in addition to anything. I mean whatever Mr. Papageorge knows about.

THE WITNESS: I recall seeing a GE letter to their customers to which our letter was attached.

[Discussion off the record.]

BY MR. HINDERAKER:

Q When was the decision finally made to discontinue sales of PCBs for dielectric uses?

A Sometime between late '75 and early '76.

Q And what precipiated that decision?

MR. PIPER: I'm going to object as to the phraseology.

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Are you asking to go back and rephrase what was testified concerning the inception in 1970, '71, or are you asking for some other?

MR. HINDERAKER: Of course not.

BY MR. HINDERAKER:

Q The decision originally was that there were no substitute products, and therefore you shouldn't discontinue that use. Obviously something happened in the mid-1970s, and you did discontinue it. Can you just summarize for us what developments there were that made that possible? I assume you were involved in this decision-making process, weren't you, or were you?

A Yes. As I recall, it was in late '75 at a meeting that Russell Train, the EPA administrator, had called in Washington of the electrical equipment manufacturers and Monsanto, at which a vice president of Monsanto got up and said, "Monsanto is ready to terminate the production and sale of PCBs as soon as the electrical industry has a viable, acceptable alternative fluid." That was late '75. And in early 19--by early 1976, we were led to believe by the electrical people that they felt they had alternate materials with some tradeoff in properties that they could go to, so that in early '76, Monsanto announced the getting out of the business.

Q Do you know who developed the substitute material?

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A No.

Q Do you know what the substitute material is?

A Well, one of them that I heard is a silicone based material. I have not heard of any others.

Q To your knowledge at the time that happened, was there any discussion about going about and retrofitting existing transformers with the new material?

A Yes.

Q Tell us about that.

A I really don't know what to say other than that there were trial retrofits made using silicone based fluids. They were apparently successful. At that time the only drawback that I was told was that the units had to operate at a lower rating than the original rating, and by rating, have something to do with the voltage it can withstand and the current that it can supply and the like. So there had to be a derating of the retrofitted units. At that point in time, not enough time had elapsed to give a clear indication of how long these fluids would last in that service. That was another remaining question. That's all I know at the moment. The success appeared to be fairly good.

Q Were you ever involved in any discussions, either internally at Monsanto or with people from other companies, at which the subject of trying to go out and retrofit all or a portion of the existing transformers with this new material

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was discussed?

MR. PIPER: I'm going to object to the form of the question. It's compound in the sense as to internal discussions as to discussions that may have been overheard in dealing with transformer manufacturers, and, for the record, I reiterate that Monsanto is not in the business of manufacturing transformers.

MR. HINDERAKER: We know that. I'll split it up.

BY MR. HINDERAKER:

Q Did you ever have any internal discussions at Monsanto about the feasibility in participating in a program to go out and retrofit transformers in the field to take out the PCBs and put in the new stuff?

A No.

Q Were you ever involved with any such discussion with people outside of Monsanto?

A I was present at discussions. I was not personally involved in the discussion. I had nothing to offer. Monsanto was not in the business, didn't have silicones.

Q Sure.

A It was not our issue.

Q Whose discussions were they?

A This was the NEMA-ANSI group talking about retro-fitting.

Q Were the representatives of GE in those discussions?

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A Yes.

Q And what was the substance of the discussion on that topic?

A That retrofitting is possible. Some derating can be expected. No one knew the life of the unit or the frequency at which it would have to be refilled or overhauled. That's all that was known at the time.

Q Was it your understanding from listening in on those discussions that there were at least some people in those groups who were advocating this kind of a retrofit program?

A I didn't sense any advocates. It was a sharing of available information. I personally did not sense any commitment on anyone's part to pursue anything.

Q To the best of my knowledge, that never was pursued. Is that your understanding?

A No, I can't say that. I don't know.

Q Okay. Were you ever privy to any discussions where any decisions were made as to whether that should or should not be pursued?

A No.

Q Or recommendations were given to manufacturers?

A No, I don't.

[Discussion off the record.]

BY MR. HINDERAKER:

Q Mr. Papageorge, one thing I'm not sure if we covered

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or not. We talked about communications that you and your committee had with GE on the subject of PCBs in 1969 and 1970 and thereafter. Do you know what the earliest communications between Monsanto and GE on the question of PCBs and their health implications were?

A No, I do not.

Q Do you know whether or not there were such communications before you took over your position in 1969?

A Yes. Someone in Monsanto had talked to someone in GE.

Q Do you know the names?

A I don't know who or when.

Q How do you know that someone talked?

A When I arrived to take over my new assignment, arrangements were already underway for the first of the three formal meetings, I recall, to take place, and this was--I arrived on the job on January 1 or thereabouts, and this meeting took place on January 20 or thereabouts, so someone had already talked to GE, and they were most anxious to meet with Monsanto. As I said before, I don't know just who.

Q Do you know whether, prior to, say, 1969, there had been any communications between the two companies on that subject?

A I was led to believe that some of the early information was shared with GE.

Q By "early information," you mean what?

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A Oh, this Swedish work and the presence of PCBs and our intent to establish methodology for analysis of PCBs and our thoughts regarding animal testing. All of that was shared with somebody at GE. They were as up to date as anyone in Monsanto, to my understanding.

Q Do you know anything about the basis on which PCBs were sold to GE; for example, where GE sent certain specifications to Monsanto, or what types of warranties, for example, may have accompanied sales?

A Well--

Q Are you familiar with those general subject areas or not?

A Yes. The PCBs for dielectric use sold to GE were manufactured to GE's specifications, and there were very strict quality control programs established. Many a discussion on the quality of the material. I recall such things as sending, for example, a sample of the shipment to GE before the shipment was released so they had opportunity to check its quality to see that it met its specifications before they would release the shipment for acceptance. They would specify the particular blends that they wanted for us to blend.

Q As far as you know, was that true throughout the course of dealings between the two companies?

A Yes. Yes, it continued to the last day.

Q When you talk about blends, are you talking about

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blends between, for example, Aroclor 1254 and Aroclor 1260? What do you mean by a "blend"?

A Well, it could be a blend of the two Aroclors in given proportions. Generally it was a blend of one of Monsanto's Aroclors with chlorinated benzenes, either trichloro or tetrachloro, or a mixture of the two, blending in the right proportions along with some other ingredients that GE would specify, so that we could put the Pyranol label, which was GE's label.

Q Did you actually put the Pyranol label on?

A On the material that was put in the containers that would take labels. So really everything we made and sold had to meet GE's instructions.

Q Have you personally ever had any contact with a company called Transformer Consultants, Inc.?

A Yes.

Q Can you describe for us the contacts you've had with them?

A I believe it was in mid-'70s, '75 or thereabouts. 1975. And I was contacted by one of our marketing representatives concerning a request from Transformer Consultants for many copies of a brochure that Monsanto had published on the proper handling of askarels containing PCBs. And it appeared at that time that this Transformer Consultants was going to conduct a program, seminars, regarding the servicing of PCB

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containing transformers, proper handling of the fluids, and the like. And their intent was to hand out these brochures to the audiences that they were going to have. The marketing individual suggested that we might want to go visit Transformer Consultants, and I agreed, and a date was set. And we did go to the home offices, I believe, in the Akron, Ohio area, Cleveland-Akron area, and met with the people there.

Q Who was there from Monsanto?

A I was there, of course, and David Wood, the marketing representative on PCBs at that time.

Q Anybody else?

A That's all the Monsanto people.

Q Can you relate for us the subject of that discussion?

A The primary intent was to share our collective knowledge of PCBs, and it was my role to bring them up to date on where we stood analyticalwise, animal testingwise, with program withdrawalwise, the availability of an incinerator and the returned scrap material destruction service we had provided. Really it was an updating, if you will. They were well educated. They understood many of the things I was reviewing. In fact, in many cases I was redundant. It was old news to them.

Q Okay. Let's talk specifically about the environmental effects or health effects of PCBs. Did you go through them? Did you go through with them the various tests, studies that

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we've talked abour earlier today?

A Yes.

Q And was it your impression that they were already familiar with that data or not?

A They were familiar enough to know what the situation was and that care must be taken, and properly disposed, yes. They had enough knowledge, I felt, that they were well informed on the subject.

Q In that general area of health and environmental concerns, do you recall anything that you told them that, at least as far as you could tell, was new to them?

A No. I did not sense any surprise on their part.

Q Did you talk with them about what effort they were making to educate their customers as to the PCB health concerns?

A This was part of the general discussion, and, as I recall, these seminars that they had planned was part of their customer educating program.

Q Did they tell you that that was one of the things they were trying to do is educate their customers about environmental concerns relating to PCBs?

A Yes.

Q Did you encourage them to do that?

A Yes.

Q Did you discuss with them the fact that there was some difference, as we've talked about earlier this afternoon,

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and from the transformer manufacturers' point of view or from your point of view in identifying who currently is operating transformers?

A That was part of the general discussion, but they were knowledgeable enough to know that, how to identify that type of unit, when they went into a client's premises, and they knew from the markings on the name plates and all what kind of unit they were to service. So it didn't appear to them to be, from their vantage point, a difficult situation. They knew their customers and, by an audit of their facilities, could determine whether or not PCBs were present.

Q Okay. Let me just go back, though. Was one of the things that you discussed the problem that a company like Monsanto has in identifying the current users of PCBs?

A Yes. We talked about the situation and that it's really beyond our control. We have to rely on our customers to do that.

Q And if your customer is a transformer manufacturer, they, in turn, may have to rely on someone like TCI?

A I don't know that we got into that particular part of the discussion, no.

Q Okay. In any event, was there discussion on both sides to the effect that there was some duty or obligation on the part of TCI to be making its customers aware of the potential hazards of a transformer that contained PCBs?

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MR. PIPER: I'm going to object to two things. You used the word "TCI." I don't believe in the status of this case that there is a company known as TCI. Transformer Consultants is not known as TCI.

Secondly, if the word "duty" is calling for a legal conclusion, I object to the use of that word. Other than that, no objection.

BY MR. HINDERAKER:

Q Well, Mr. Papageorge, when I said TCI, obviously I meant Transformer Consultants, Inc. Was there a discussion in that meeting on both sides to the effect that Transformer Consultants was assuming some obligation to get the word out to its customers with respect to PCBs?

A I did not assume or sense or understand that Transformer Consultants was assuming any obligation. I got the impression that they were in a position to be of service to the electrical equipment community in the proper handling of PCBs. I did not get the impression they felt they had an obligation or a duty to inform these people.

Q But you did talk about the fact that whereas you were not in a position to be able to do that, they were; is that true?

A Yes, but I don't know the exact words or form that took, but yes. They were in a better position than we were.

[Whereupon, Papageorge Deposition

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Exhibit No. 3 was marked for identification.]

BY MR. HINDERAKER:

Q Can you identify that exhibit for us, please?

A This is a copy of a memorandum, a Monsanto memorandum prepared by David Wood, addressed to Mike Petrilli, P-E-T-R-I-L-L-I, dated March 4, 1975, describing the visit that Mr. Wood and I had with representatives of Transformer Consultants.

Q Is the description that he gives there accurate to the best of your recollection?

MR. PIPER: Counsel, when you use the word "accurate," are you indicating is there anything that he says in there that is not true, or is there something that took place that is not described in there?

MR. HINDERAKER: That's my next question. "Accurate" means is there anything there that isn't right, and the next question is were there things discussed that may not appear in that brief summary.

MR. PIPER: I withdraw my objection.

THE WITNESS: This appears to be accurate for what it contains. In terms of what is missing, really, the details of what was discussed where Mr. Wood refers to the fact, quote, "Bill and I talked to an assembly of approximately 15 engineers," he doesn't elaborate on what we had talked about, which is what

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I had discussed earlier.

BY MR. HINDERAKER:

Q Okay. I think you mentioned earlier that Transformer Consultants contacted you and wanted some brochures of yours; is that correct?

A Transformer Consultants contacted Mr. Wood and asked for the brochures, yes.

Q What brochures were those?

A It's a Monsanto bulletin which is really a compilation of guidelines on how to properly handle PCB containing transformer dielectric fluids.

Q And these brochures, I assume, contain warnings about the environmental hazards of PCBs and recommendations for use, care, and avoid spills, and that kind of thing?

A Yes, yes.

Q What was your understanding as to what Transformer Consultants intended to do with those brochures?

A I understood that they were going to issue them to the attendees at these seminars that they were going to conduct.

Q Did you, in fact, give them the brochures?

A Yes.

Q Did Transformer Consultants tell you anything else at that meeting that they proposed to do by way of educating their customers with respect to PCBs beyond handing out brochures at the seminars?

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A I don't recall any other specifics, no.

Q Do you recall making any recommendation to them as to what they might do to educate customers other than putting on these seminars?

A I didn't.

Q Do you recall if anybody from your group did?

A I don't recall.

Q Do you recall whether Transformer Consultants indicated in any way that they intended to do anything to educate or warn their customers beyond putting on these seminars?

A I don't recall any other.

Q Did they indicate that they were going to pass on these brochures to customers that might not happen to attend a seminar?

A That thought was expressed, yes.

Q In other words, that they weren't just going to limit this to the ones that happen to go to the seminar but, rather, they intended to give them to all their customers; is that it?

A They intended to share with customers. I don't recall the word "all" being used. I can't speak for them on that.

Q Okay. But in any event, your understanding was that this educational process, that they did not propose to simply limit this educational process to the ones who happened to go to the seminars; is that correct?

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A That is correct.

Q Are the names of the Transformer Consultant people who were at the meeting listed here on the memo?

[Pause]

BY MR. HINDERAKER:

Q Maybe, Mr. Papageorge, you could look at the attachments to Exhibit 3 and identify them for us. Is one of these attachments the brochure that you gave them at that meeting?

A Well, none of the attachments are the brochure.

Q Okay. Did you ever have any contact with Transformer Consultants other than this meeting?

A I recall getting some telephone calls. I don't recall how many or who, but there was a continuing dialogue, although limited in time, because we apparently exhausted everything there was to share after a while.

Q When was that, approximately?

A It was shortly after this meeting. I guess the remainder of 1975.

Q What were they calling about? What did they want to know?

A Any new developments. Anything new kind of thing, or, "We had a good meeting up in Chicago." Sort of feedback as to the success of their program. Very informal.

Q Do you recall anything in those conversations about any efforts on their part to educate their customers about PCBs?

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A No, I don't remember that.

Q During those conversations, did you give them any additional information about test results or anything else relevant to evaluating the possible PCB hazard?

A No. I had nothing new to offer.

Q Do you know whether anybody else at Monsanto had contact with Transformer Consultants besides what's documented in the memorandum, the memorandum documents at that one meeting, exactly?

A Mr. Wood and Mr. Petrilli had continuing dialogue. I don't know the extent of that dialogue, but I do know that subsequent contacts were made.

Q Do you know if there were any other meetings?

A I do not know of any other meetings.

Q Do you know if there was any conversation between Monsanto and Transformer Consultants?

A I don't know of any.

MR. PIPER: For the record, we produced some records in response to request for production.

MR. POHLMAN: What was your comment?

MR. HINDERAKER: They produced some.

MR. PIPER: We produced, in response to a request for production, certain documents between Monsanto and Transformer Consulants which this witness would not have had dealings with.

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MR. POHLMAN: John, you didn't refer to it, but for the record, Papageorge Deposition Exhibit 3 which you have been referring to, may I ask; is that taken from answers to interrogatories or response to request for production?

MR. HINDERAKER: Yes.

MR. POHLMAN: In its total form? All of the pages?

MR. HINDERAKER: Yes.

MR. POHLMAN: Thank you.

[Discussion off the record.]

BY MR. HINDERAKER:

Q Mr. Papageorge, who would have been responsible for keeping track of environmental concerns related to PCBs before you got that responsibility in 1969?

A It would depend on the function involved.

Q In the dielectric fluid area.

A Dielectric, are you speaking now of manufacturing the dielectric fluid?

Q I don't know.

A Or selling the dielectric fluid, or shipping it?

Q I want to know who was in charge of knowing what the environmental impacts were. If no one, you can tell me no one.

A There is no one person. Everyone was supposed to stay tuned in and conduct his operations accordingly.

Q For example, if an article appeared in a Swedish

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scientific periodical in 1966 talking about findings of PCBs in birds, was there any particular person at Monsanto as of that time who would be responsible for knowing about it?

A Yes. That was an implied responsibility of the research director.

Q Who was the research director?

A Dr. Richard.

Q And he was the research director for the entire company?

A No, for functional fluids.

Q Now you were the plant manager at Anniston--

A Yes.

Q --starting in 1964?

A '65.

Q Can you describe for us what kind of safety precautions you took at Anniston, starting in 1965 in the handling of PCBs?

A Well, they were the precautions that were in place when I arrived. I just try to improve on things. This had to do with employee's wearing proper protective equipment such as gloves; housekeeping, proper disposal of the material preventing it from getting into the sewers or escaping out into the environment.

Q What in particular did you do to try to prevent spills of PCBs?

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A The primary emphasis is placed on good maintenance, and I'm assuming by "spill" you're also including leakage from faulty equipment, so maintenance is very important. If there is a spill, and there will be in any operation, then the proper cleanup procedure must be followed. For example, with a material like PCBs, you don't hose it down with water, as an example. It doesn't mix with water in the first place, so there we use some absorbent material, commercial absorbent material, or sand or clay, dirt, saw dust; collect it, put it into a steel container, and put it in our landfill that we operate at the plant.

Q Was that your method of disposal, in a landfill?

A Yes.

Q What, in barrels or what?

A Yes. Steel barrels.

Q I assume there were times when you would store PCBs in drums or tank cars or something prior to shipment?

A Yes.

Q What provision, if any, did you make with respect to the area where PCBs were stored to make sure that they wouldn't leak out?

A It's the concrete floor in the warehouse where the drum material was stored. It had the concrete curbing that I referred to earlier, and the leakages that were observed would be contained quickly, the damaged container would be

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pulled out of the inventoried material, and the contents transferred into a different container or back into the storage tank. The damaged container and any of the collected spillage would be disposed of in the landfill. Around the tank cars, we had no problems in rupturing tank cars sitting on a siding. The movement of cars in the plant is at 5 miles per hour at the most, so we never came across that type of problem. The loading and unloading, if there was any drippage, it would be collected under a concrete portion between and on each side of the rail tracks at that particular tank car site and, there again, would be collected, swept up, shoveled into a container, and buried.

Q Did you have some kind of a dike arrangement there, too?

A Yes.

Q How did you first become aware of the Pierce incident?

A I read about it in a newspaper clipping.

Q Did you or anybody else from Monsanto perform any investigation of the incident? Before the lawsuit started, I mean. Cut it off there.

MR. PIPER: I would instruct the witness to answer only as to those investigations that he's aware of that were conducted by individuals working other than for counsel retained by Monsanto or counsel at Monsanto.

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BY MR. HINDERAKER:

Q Well, I mean, obviously we're in the middle of a lawsuit and there is no doubt that somebody by now has investigated something, but let me withdraw that question and ask you a different one.

Were you asked to conduct any kind of an investigation at any time with respect to the Pierce incident?

A No.

Q Have you ever been assigned to conduct any kind of analysis of that incident or write any memos about that incident, or anything like that?

A Not to my knowledge.

Q Do you know whether any other employee of Monsanto, other than yourself, conducted any such investigation?

A I do not.

MR. HINDERAKER: That's all. Thank you.

THE WITNESS: Thank you.

MR. SPEAR: I assume it's my turn.

EXAMINATION

BY MR. SPEAR:

Q Is the pronunciation of your name "Papageorge"?

A That's what I use. I'll answer to anything.

Q Do you prefer to be called Mister, Doctor, or is there some other title?

A Mister is appropriate.

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Q All right. Mr. Papageorge, my name is Terry Spear. I represent Pierce Packing Company in this litigation, and I'll apologize in advance because I am probably going to replow some ground that's already been plowed, but I will try to keep that at a minimum.

Have you, in preparation for this deposition, examined documents that are internal to Monsanto to refresh your recollection of particular events that might come up during the deposition?

A Yes.

Q Can you describe for me what documents you have examined to refresh your recollection?

A I understand that they were copies of what was submitted along with some interrogatories.

Q I see. Were there any other sources of documents which you examined in preparation for this deposition other than documents which you understand have been produced?

A No.

Q Okay. It's my understanding, based upon your testimony, that you, from 1969 through 1976, had within your duties for Monsanto the task of gathering information and being aware of information about PCBs; is that correct?

A That is correct.

Q And your purpose in gathering this information was to make recommendations to Monsanto as to how PCBs should be

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handled, and by "handling," I mean what should be done about producing them, what should be done about selling and distributing them, what safety precautions should be taken, and so forth. Is that generally correct?

A That was one of the purposes, yes.

Q So if we were to identify any one individual within the entirety of Monsanto who should have been aware of what was going on with regard to PCBs, I assume you would be that individual?

A I would come close to it, yes.

Q And you have identified as someone else who might have overlapping responsibilities with regard to PCBs, the medical director, the corporate medical director; is that correct?

A Yes, he would overlap in the medical toxicology fields.

Q And I think that medical director was actually a member of what's been called your task force or your committee; is that correct?

A Yes.

Q So, once again, presumably what he knew would be communicated to you; is that correct?

A Well, he would interpret his professional knowledge into layman terms for my benefit.

Q In terms of your qualifications to assume the position that you assumed in 1969, had you, during your previous

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experience with Monsanto, stayed abreast of laboratory technology with regard to organic chemicals generally, or PCBs in particular?

A No.

Q Had you, during your prior work in Monsanto, stayed abreast of medical technology or medical aspects of toxicology with regard to organic chemicals or industrial chemicals?

A No.

Q Had you, prior to assuming that position, had any exposure to or training in the developing field of environmental--let's say environmental toxicology, although that may be inexact?

A Environmental toxicology? No.

Q Perhaps you could suggest for me a phrase that would be better. Had you stayed abreast of technical developments in terms of monitoring the environment for pollutants in the developing field of environmental science?

A No.

Q Have you maintained currency with regard to some aspect of chemical engineering during your prior work at Monsanto?

A Yes.

Q Okay. And what aspect of chemical engineering would that have been?

A The full spectrum; process design, operations, the

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equipment design. I don't know how else to describe it.

Q You may not know the answer to this, but I'm curious; do you yourself have any knowledge or information as to why you were chosen for this newly created position in 1969?

A I can only tell you what I was told.

Q What were you told?

A I was told because of my broad experience as distinguished from specific expertise. I could bring something to this task force in terms of pulling it together and having it work in that direction.

Q In response to some of Mr. Hinderaker's questions, you described your career progress within Monsanto.

A Um-hmm.

Q Would that appointment in 1969 to this position be properly characterized as a promotion?

[Pause]

MR. PIPER: Do you mean in hindsight?

THE WITNESS: That's what I'm wrestling with.

MR. PIPER: Forget hindsight.

THE WITNESS: Since it was a new assignment, I can only go by the method in which Monsanto assigns given levels to its jobs, and the level of the new job was equal to the level of my previous job. Based on that, I would say it was a lateral move, not a promotion.

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BY MR. SPEAR:

Q And when you were subsequently offered the position in 1976 of manager of product acceptability, was that a promotion?

A No.

Q Was that also a lateral transfer?

A Yes.

Q Can you describe for me the steps that you took upon assuming the position in 1969, which was then called manager, environmental control, to satisfy the duties you were given to become conversant in the field as to what's going on with PCBs? What did you do?

A Many things, really. I had an intensive reading program to try to catch up with all the material that had been accumulated up to that point in time on the subject. And then I sat down with the individual members of the task force for varying degrees of time and compared notes, and they, in essence, tutored me, if you will, from their vantage point how they understood the situation. And I, along with some members of this group, made appointments with university people, government people, customers, European coproducers or competitive producers. We reached out and wherever we had any hint that a contact would be of value, we would make that contact.

Q Was there a written job description or assignment of responsibilities for this position, manager, environmental

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control, at the time of your assignment?

A I never saw one.

Q Who briefed you on what the position would involve?

A Mr. Howard Bergen.

Q What were the resources that you used to find the materials for your reading program?

A They were the individuals representing the functions within Monsanto that were involved with PCBs. For example, Mr. Wheeler would be my medical contact, and Mr. Richard would be my research contact, and Mr. Olson would be my marketing contact, and so on.

Q Through these contacts, you developed a bibliography and then started reading the materials they identified, or am I misunderstanding you?

A Well, yes. There was a collection of articles, yes.

Q And through the course of developing your expertise, did you develop a separate library that was comprised of the files that you earlier described?

A Yes. I didn't call it a library. They were just my files for my benefit.

Q Were the recommendations that you made from time to time, that the task force made from time to time, always directed to the management committee that you described?

A Not always, no.

Q Were recommendations directed to others outside of

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your task force other than the management committee?

A On occasion, yes. Yes.

Q To the best of your recollection now, can you identify others to whom recommendations went other than members of the task force or the management committee?

A The one that comes to mind quickly is the recommendation to the individual in charge of label design to change the wording on the label and implement a program for getting new labels available to those people who affix labels.

Q Do you recall what the change to the labels was?

A Well, there were--at what point in time?

Q Well, I guess I'd have to direct the question back to you. Apparently from the way you phrased that there was more than one change in the labeling over the course in time that you had this position; is that correct?

A Yes, yes. I recall two changes, two basic changes. One, a change that incorporated some words that described this material as being a potential environmental contaminant and some words about preventing spillage, leakage lost to the environment.

Q May I interrupt you? Do you recall when that change was made?

A Yes. That was May 1970.

Then there was another change that referred to proper disposal, as I remember. Proper disposal and, if I remember,

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they also had a reference to, "Call this number at Monsanto." That referred really to the incineration service that we had available later, starting in the '71-'72 period.

Q Would that be the time of that change, then, the '71-'72 period?

A Somewhere in early '71. Somewhere in there.

Then there was another statement referring to, "Keep this material away from food, feed stock." "Feed stuffs," I believe that's the word. Feed stuffs and pharmaceuticals. Some sort of wording. In other words, don't get it into the materials that might end up in human food. That was the intent.

Q Do you recall when that change was made?

A Late '71, early '72.

Q Were there other changes in labeling that you now are able to recall?

A Not in substance, but the only other change is that the PCB dielectric label was eventually printed in seven languages containing these messages.

Q I see. With regard to changes in labeling, the changes that you've described, is your testimony limited to changes in labeling of PCBs contained in dielectric fluids, or are these all of the changes in labeling of PCBs manufactured by Monsanto for whatever purpose and in whatever form?

A It applied to all PCBs, as long as they were sold.

Q Returning to the first of the three changes which

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I believe you testified occurred in May of 1970--

A Right.

Q --do you recall the basis upon which that change was made?

A This was based on the reports that we had as of early 1970 of the detection of PCBs in the environment.

Q And this change in the labeling was made on all manufactured PCBs that were labeled?

A Yes.

Q Irrespective of the percentage by weight of chlorine contained in the particular compound or mixture?

A That is correct.

Q The second change that you've discussed which I believe had to do with your incineration service, do you recall the basis for that change?

A This followed the availability of a unit to do the destruction, and this was one way to communicate that it was available.

Q Later in your testimony you indicated that when you were managing a plant that produced PCBs, the means of disposal was landfill.

A Yes.

Q Had something occurred between then and '71 or '72 to indicate to your task force that landfill disposal was inappropriate?

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A Yes. What had occurred is that our customers, many of them, did not have access to proper landfills. They needed help. Monsanto did not have a landfill big enough to take care of all the potential wastes. The most effective way would be incineration, so we chose that route to help the situation. It didn't totally solve it.

Q I see.

A It helped the situation.

Q And the third change in labeling that you've described--I don't want to put words in your mouth, so why don't you again tell me. The third change was what?

A It was to caution the purchaser of this material to prevent it from getting into food, animal feed, and pharmaceuticals.

Q And what had occurred or come to the attention of the your task force that led to this change?

A Oh, by that time we had information from the food and drug administration that they were seriously looking at PCBs in foods, and there was--at that point in time we were aware of PCBs in ths silo cases I mentioned earlier. We had the experience with the PCBs in the fishmeal that went into the poultry feed that ended up in the North Carolina situation. Based on those experiences, we decided that we would include those words on our labels.

Q Aside from the changes in the labels, with regard

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to avoiding the risk of contamination of foods and feeds, et cetera, were there other means that you recommended to disseminate this information to customers?

A Yes, through the marketing organization.

Q And what means were recommended to the marketing organization for further dissemination of this information?

A We give marketing people, as a normal way of doing things, we give them the information. It's their choice, then, to orally transmit during a customer visit, or telephone, or memorandum, letters, sales bulletins. Whatever means they feel is appropriate for their type of business.

Q I take it, then, that the task force made no recommendation to marketing as to how to disseminate it?

A That is true.

Q Did the task force receive any reports back from marketing as to how further dissemination was accomplished?

A Yes.

Q And what was reported to you as the means by which the further dissemination was accomplished?

A I don't recall the specifics, but the marketing representative on the task force would review for the group the status of all these programs, one of them being communications. I recall that he assured us that messages were being conveyed to the customers on record.

Q With regard to recommendations, this recommendation

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in particular and other recommendations to members of the task force or other inhouse groups, and with regard to changes such as the labeling changes, were there written memoranda kept by the task force as to such recommendations and changes?

A Not normally, no.

Q So at least as far as your files are concerned, there would have been, at the time that you left this position in 1976, no file or files containing a history of what recommendations had been made and what actions had been taken pursuant to those recommendations?

A That is correct.

Q Okay. And this is--

MR. PIPER: That's other than what we've produced, Counsel, such as the labels, history, and that type of thing.

BY MR. SPEAR:

Q And it's my understanding from your testimony that the reason there were no such records is that it was not your usual policy to keep such records.

A That's right.

Q There was some testimony given with regard to the meaning of the numbering system that goes with Aroclor which, as I understand it, is a registered trade name. What do the first two digits of an Aroclor indicate?

A They were arbitrarily selected. The "12" refers to refined PCBs.

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Q There apparently are other numbers that are used in Aroclors other than the first two digits, being 1 and 2; is that correct?

A That is correct.

Q And what are those other digits?

A Oh, the "11" is the unrefined PCBs. There was a 20 series and a 40 series that were blends of PCBs with polychlorinated terphenyls. There was a 50 series that was polychlorinated terphenyls, and then there was a 60 series which was polychlorinated terphenyls with monochlorobiphenyl blends. That's all I remember.

Q The last two digits of the Aroclors, and now I'm limiting the question to Aroclors for which the first two digits are 1 and 2, the last two digits, as I understand it, indicate the percentage of chlorine by weight contained in the mixture; is that correct?

A That is correct.

Q And a mixture that was virtually exclusively polychlorinated biphenyls that are chlorinated to the maximum would be 1272; is that correct?

A That is correct.

Q I don't know if you can do this in your head--I certainly can't in mine--but Aroclor 1260, then, for example, would be 60 percent chlorine by weight?

A Yes.

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Q Can you translate that to a chlorination level by number of chlorines per biphenyl, approximately?

A Oh, it would be very, very crude. Keep in mind that anywhere from 1 to 8 chlorobiphenyls are present. For 1260, it would be about 6 chlorines.

Q I may have missed this in the course of your testimony, but you testified that you were deposed once in approximately 1973 with regard to the use of PCB mixtures and stuff used to coat dairy silos. Do you recall where that deposition took place?

A Yes. In Ohio.

Q Was the litigation in Ohio, as far as you recall?

A It never went to trial. It did not go to trial.

Q But the suit itself was proceeding in Ohio?

A Yes.

Q Do you recall if it was in state or federal court?

A I don't recall.

Q Okay. Are you familiar with the means to identify a particular PCB mixture by chemical analysis?

A I don't think I understand your question.

Q Are you familiar with the means that a laboratory chemist can use to identify a mixture as being a particular PCB mixture?

A Oh, yes. Yes, I am familiar.

Q Using you to find out if I'm right, it's my

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understanding that it's possible by particular laboratory analysis to identify a particular mixture as not only PCBs but to give to it the particular appropriate brand name; for example, Aroclor 1260. Is that possible by analysis as far as you know?

MR. PIPER: So I understand your question, does your question encompass the fact that the laboratory technician can identify the brand name?

MR. SPEAR: [Counsel nodded head affirmatively.]

MR. PIPER: Go ahead and answer.

THE WITNESS: Let me try answering it in a little different way.

BY MR. SPEAR:

Q Go ahead.

A The methodology in analyzing for PCBs involves the use of a PCB standard, and that standard, in many cases in the United--well, world wide, would be obtained from Monsanto. They run some of this standard through the instrument, and a peak and valley graph is printed which is typical for that material. Aroclor 1260 comes out pretty much the same every time it's run through the instrument. The analyst then runs an unknown material through the same procedure, the same instrument, and out comes a peak and valley graph. It's something now for the analyst to look at that unkown peak and valley graph and compare it to his standards. He then makes a

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judgment subjectively. "Which is it closest to?" He then decides, "I think it's closest to," for discussion purposes, "it's closest to Aroclor 1254, and I will report it as Aroclor 1254. Now I have to report how much is in this sample." The way they do that, there's two ways. One way is to count the height of all the principal peaks and compare to the height of the peaks in the standard, then make the necessary calculations. Another is to measure the total area covered by this curve between the bottom line and the peaks and valleys and compare the square whatever, square inches to square inches, and report a quantity. The fact that an analysis is reported as Aroclor with some four-digit designation does not mean that it's exactly that. It's close to.

MR. PIPER: You haven't finished answering the question. He also asked about whether you can identify brand name.

THE WITNESS: He cannot identify brand name. The material could be started off as the buyer's Clophen-60, but when he's doing the analysis in a laboratory using Monsanto's Aroclor 1260, he will report it as Aroclor 1260.

BY MR. SPEAR:

Q Given the fact the peaks and valleys are similar?

A Are close, very close. It doesn't say it started out at Aroclor 1260.

Q In discussing toxicity testing, you used the term

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"LD-50" and explained that that refers to a level of dosage that results in more than could cause the death of--50-percent death of the test population; is that correct?

A That's my understanding, yes, sir.

Q And I understood you to say this is a relatively standard toxicity measure?

A Yes.

Q Are there other toxicity measures that are designed to obtain a dosage at which a smaller percentage of the test population dies?

A I have not heard of any that is used among toxicologists.

Q You also indicated that you were informed that at least two companies were making PCBs available to Monsanto customers in, I believe, the 1970-'71 timeframe. Is that accurate?

A That's my recollection, yes.

Q Were you informed that these companies were manufacturing PCBs in the United States or that they were selling PCBs in the United States?

A I was informed they were manufacturing PCBs and selling them in the United States. I did not get a clear distinction about where manufactured.

Q I want to be sure I understand the relationship between the brand names such as Aroclor 1254, Aroclor 1260,

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and the Monsanto product that goes in transformers.

Let me start with during the timeframe that you had this job, 1969 through 1976, was there a line of Monsanto products that were designed as fluid for use in dielectric equipment?

A Yes.

Q And were those products marketed under the brand name Aroclor with a four-digit number?

A Yes.

Q Now were those products purely Aroclor with a four-digit number as manufactured by Monsanto?

A Yes.

Q So any solvent or other content was a part of which you would normally label as Aroclor, for example, 1254?

A No.

Q Aroclor 1254 itself, is that purely a mixture of PCBs without any solvent?

A Yes.

Q Now the fluid that is put in transformers which is labeled Aroclor 1254, is there something added to pure Aroclor 1254?

MR. PIPER: I will object to the form of the question, and it's only as to form. You've identified a product manufactured by Monsanto as 1254, and then you've gone ahead and said, and the product "put in transformers," implying that

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only 1254 goes in, and I'm not sure whether the question is confusing to that extent or not.

MR. SPEAR: Let me rephrase it, then.

BY MR. SPEAR:

Q Monsanto manufactures a product which is labeled Aroclor 1254 which is among the products manufactured by Monsanto intended for use in transformers; is that correct?

A That is correct.

Q Now that product, which is labeled Aroclor 1254, and similar products for use in transformers with four-digit numbers following the trade name Aroclor, these products are not the same as the pure products manufactured by Monsanto and labeled Aroclor with a four-digit number; is that correct?

A No, they are the products.

Q There is no dilution of, for example, Aroclor 1254 in order to make it a fluid usable in a transformer?

MR. PIPER: I'm going to instruct the witness to answer this question on the basis that I believe he's inquiring as to the transformation from Aroclor 1254 with other chemicals, including non-Monsanto chemicals, to comprise a fluid known as a transformer dielectric fluid; i. e., Pyranol.

MR. SPEAR: Maybe I'm making too many assumptions. Let me skip back and start over.

BY MR. SPEAR:

Q Does Monsanto itself manufacture fluids suitable

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for use in transformers without any further processing or addition?

A Yes.

Q And are some of those products labeled with the Aroclor brand name?

A Yes.

Q And during the timeframe 1969 to 1976, if I had wished to buy such fluid directly from Monsanto, what kinds of products would I have ordered? Aroclor 1254, 1260, or some such name, or would I need some further designation?

A You may use those materials in your equipment as-is.

Q Okay.

A That's your choice as a user.

Q Were they marketed by Monsanto for that purpose?

A They were marketed as dielectric grade Aroclors.

Q And they were, as so marketed, liquids?

A Yes, yes.

Q As manufactured by Monsanto, are these Aroclors always liquids?

A Yes.

Q Okay. Is anything added to the Aroclor product before it is marketed by Monsanto as a dielectric liquid?

A The answer is yes, but it's not sold as Aroclor.

Q Okay. If I understand your answer correctly, Monsanto markets a dielectric liquid which is an Aroclor of some

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four-number designation plus something else; is that correct?

A We sell a lot of chemicals. That "something else" covers thousands--

MR. PIPER: No. The question is whether Monsanto markets a dielectric fluid that includes Aroclor and some other chemical.

THE WITNESS: He didn't ask that, did you?

MR. PIPER: That's what I think he was asking.

BY MR. SPEAR:

Q Assume that I asked that. Go ahead and answer. Is there such a product?

A Yes.

Q Assuming that we are talking about a Monsanto product which is used as a dielectric fluid in the transformers, such a product that contains one of your Aroclors and some other chemical--

A Yes.

Q --what would the other chemical be?

A Well, it's primarily or generally a chlorinated benzene.

Q And this compound would then have a brand name other than one of the Aroclor labels; is that correct?

A That is correct.

Q And in addition to marketing both the pure Aroclors, if I may call them that, and the Aroclor plus, generally the

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chlorinated benzene, you would manufacture, for other entities such as General Electric, fluids for use in transformers to the specifications of the purchaser?

A Yes.

Q Okay. The testing that was done in the 1930s and next in the 1950s, was a pure Aroclor compound used in that testing, or was one of the other things we've described used; that is, Aroclor with chlorinated benzene or Aroclors in specifications given to you by the purchaser?

A They were Aroclors in the so-called pure sense, not blended with anything.

Q And, of course, the reason that was done is because what you were trying to find out is what PCBs did, not what PCBs with some other things did?

A That is correct.

Q At various times in your testimony you've described some seminars. The one in particular I'm thinking of is one in Duluth, Minnesota, I believe, in 1980. I wasn't clear from your testimony whether you were present at that seminar or were advised of what had gone on at it.

A I was present.

Q I see. Okay.

I was confused by one of the recommendations you testified that was from the management committee and your later testimony about the elimination of carbonless paper, and perhaps

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it was my misunderstanding. I understood one of your recommendations to be the termination of sales of PCBs for uses in open systems by August 30, 1970; is that correct?

A Yes, yes.

Q And then I understood you to testify that carbonless paper containing PCBs was eliminated as a Monsanto product by April of 1971; is that correct?

A Yes.

Q Is the manufacture of carbonless paper containing PCBs not a sale for use in open systems?

A That is true.

Q Perhaps then you could define for me "open systems." Perhaps I am misunderstanding what that means.

A The target of August '70 was a well-intentioned target for all of these. The finding of a replacement for the carbonless paper proved to be a very difficult challenge, and we just didn't get one until '72.

Q Okay. So that was an open system use?

A Yes.

Q You just weren't able to reach your target date?

A That is correct.

Q And at the time that that recommendation was made to the management committee, had you received any information that the lower percentage Aroclors such as 1248, 1242, were environmental problems?

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A Not at that time.

Q Well, I'm not sure I understand then why a recommendation was made to eliminate these sales if the product being sold was not an environmental problem.

A Well, if you remember, at least I tried to make a distinction between those materials that contained and used 1254, 1260, and those that had the lower chlorinated. As to why they were all included finally in May of 1970, the decision was made that the dielectric closed system applications with their benefits, fire retardency and the like, were socially desirable and that the alternatives for the other uses, even for the lower chlorinated, were more easily available, so we might as well make the move and get out of the open systems. It was not based on any perceived problems at that time.

Q I see.

In the course of your testimony about discussions regarding prevention of spills, prevention of leakage, I made notes of two suggestions, one being the concrete curbing that you described; the other being not to put containers that utilize PCBs near sewer systems. Were there other particular recommendations that you recall in that context?

A Well, the principal one that we expounded many, many times is keep water away from PCBs, because the two are not compatible and the introduction of water will just complicate the control problem. That was the big message that we kept

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sending out. The most basic recommendation is one of just, "Maintain your system in such a way that the leaks and spills are kept to a minimum.

Q Other than the documents that have been produced, and the--I say "undocumented" in the sense that they were spoken rather than written, the recommendations that were exchanged by Monsanto both inhouse and with its customers, is there any other dissemination of these recommendations?

MR. PIPER: For the record, are you excluding the Federal Regulatory Acts effective between 1970 and 1979? Are you excluding industry publications, that type of thing, or are you confining it to documents within Monsanto?

MR. SPEAR: I'm trying to confine it to dissemination by Monsanto.

THE WITNESS: I don't think I can add any more than what I've already described, up to the time I was personally involved, 1976.

BY MR. SPEAR:

Q And I understand by that answer that there may have been some other means of dissemination by Monsanto but you are unaware of them; is that correct?

A Correct, correct.

Q If we were interested in trying to find out if there was, in fact, other dissemination of these recommendations, who would be the people within Monsanto who might know?

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A I would suggest David Wood.

Q I understand Mr. Wood is in marketing; is that correct?

A Yes.

Q Is there anyone in any of the other departments who might also be aware of other dissemination?

A I suspect that David Wood would be the principal individual from '76 on.

Q You've testified about, I believe, three formal meetings with General Electric. Did these meetings include any written agendas, exchange of written documents, presentations that included written documents, or the like?

A I don't recall written agendas. I just don't recall anymore.

Q At one point in describing those meetings, you talked about an exchange of notes, but I wasn't clear whether that meant something that was written or simply an exchange of information.

A Well, a typical meeting would be a situation where a spokesman would speak on his area of expertise, and generally using a blackboard or a transparency projector, and those in the room would make their own notes to satisfy their own needs, and that would be the normal way to communicate.

Q To the best of your recollection, was there any exchange of actual written documents in any of those meetings?

A I don't remember any.

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Q Okay. The brochure that Monsanto provided to Transformer Consultants, is there a title or TM designation or some other label that we could apply to identify that brochure specifically?

A Oh, there is a title, but I don't recall it.

Q Okay.

MR. PIPER: I may be wrong, but I believe that it's one of the documents that was produced in response to the request for production. Now which of our numbers it is or something, I don't specifically recall.

MR. SPEAR: You may be right, but I'm not sure even now that I'll be able to go back and tell.

MR. PIPER: I'm not sure I would be by looking at it without some help.

BY MR. SPEAR:

Q Well, would you be able, if you saw a copy of the brochure, to identify it as the brochure that you testified about?

A Oh, yes.

Q Was your task force involved in any way in the development of standards for occupational exposure to PCBs by the Federal Government?

A Not the task force.

Q Were members of the task force involved in providing information to the Government for establishing these standards?

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A I have to confess some confusion now. I was not aware the Government had established exposure standards.

Q Let me rephrase it.

Were any Monsanto personnel, to your knowledge, involved in providing information so that a criteria for recommended standards for occupational exposure to PCBs might be established?

A Yes.

Q Was the task force itself involved?

A No.

Q Can you identify the individuals from Monsanto who were involved?

A I was the spokesman and participated in a review panel, and I had help from our medical department and research department in commenting on sections of the proposed document.

Q I see. In the course of that participation, did any new information come to light which Monsanto had been previously unaware of regarding the state of the art of PCBs, exposure, risks, et cetera?

A No.

Q You have described some health problems of which you became aware during the course of your investigation, if you will, of PCBs in your position from 1969 to 1976; for example, chloracne, eye irritation, and the like. Have you exhaustively described for us the, if you will, health risks

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involved from exposure to PCBs of which you are aware?

A Yes.

Q Okay. And those risks would then include, if you would, for me, just what?

A Well, these are the effects noted from overexposure in an industrial setting of PCBs to humans. The material will irritate eyes. If too many vapors are breathed, depending on the individual, you will get a respiratory coughing, irritation, and, depending on the individual, it will vary in degrees of irritation. Depending again on the individual and degree of exposure, you will get skin reddening; the chapped hands effect. For some individuals, that will become very serious and even result in a chloracne eruption on exposed skin surfaces. I believe that covers it.

Q To your knowledge, are digestive disturbances a risk of overexposure to PCBs?

MR. PIPER: Do you mean after ingestion of the fluid or as a result of an industrial exposure?

MR. SPEAR: Well, I've tried not to limit it by saying exposure because I don't know, and I'm trying to find out if the witness does.

THE WITNESS: You would not expect ingestion in an industrial scene. An ingestion would be inadvertent, accidental, such as the reports from Japan.

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BY MR. SPEAR:

Q Would there be a type of exposure, not to exclude ingestion, which could result in digestive disturbances, to your knowledge?

A Not to my knowledge.

Q Would there be a type of exposure, and I'm not limiting this to the industrial setting, which could result in impotence in men?

A I am not qualified. I don't know.

Q You're not aware of any such potential risk?

A No, I'm not aware.

Q And when you answer these questions "no," I am assuming then that you are unaware of any indication that the problems I'm describing can result from exposure to PCBs.

A That is correct.

Q All right.

[Discussion off the record.]

BY MR. SPEAR:

Q Are you aware of any fatalities resulting from industrial exposure to PCBs?

A No.

Q Again without limiting exposure to an industrial setting, are you aware of any indications that hyperpigmentation can result from exposure to PCBs?

MR. PIPER: Again, are you talking about exposure

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externally or internally?

MR. SPEAR: I'm deliberately not limiting it, but I'm asking whether this witness is aware of any indications that exposure in any fashion to PCBs can result in these problems.

THE WITNESS: The Japanese report is the only report I have seen referring to pigmentation of infants.

BY MR. SPEAR:

Q And that is the only indication of which you are aware that that problem can result from exposure to PCBs?

A It's alleged to result. I don't know if it is directly due to PCBs.

Q During the course of your testimony, you indicated that the long-term study done by Monsanto showed a decrease in the number of whelps or pups in rat litters in the second generation; is that correct?

A Yes.

Q Are you aware of any other indications that some interruption or misfunction of the reproductive system, or of child bearing, can result from exposure to PCBs?

A None other than the chicken bit. Now that's a different species that I referred to earlier.

Q Are you aware of anything, for example, in the Japanese incident which would indicate that human reproductive functions can be impaired by exposure to PCBs?

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A I have not heard that.

Q Other than the one study which you discussed with Mr. Hinderaker, are you aware of any indications that PCBs are carcinogenic or could be carcinogenic?

A That's the only study.

MR. SPEAR: Okay. That's all I have.

MR. THOMAS: I don't have any questions.

MR. CASHMORE: No questions.

MR. POHLMAN: I have no questions other than to note for the record also that I would reserve my rights under the Court's order and the specific reference to the manual, Section 2.31.

MR. PIPER: No questions.

MR. HINDERAKER: I have maybe just a couple.

REEXAMINATION

BY MR. HINDERAKER:

Q Did I understand you correctly to say that you do not know of any evidence of reproductive difficulties being caused by PCBs, either in humans or in animals, with the exception of the chicken problem that you mentioned, and what was the other one?

A The rat.

Q The rat. Are you not aware of experiences that people have had with minks that have ingested PCBs?

A Ah, I had forgotten those. Yes.

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Q So there is, in fact, additional evidence that would suggest, at least in animals, PCBs can have severe reproductive impacts?

A In those two species, rat and mink.

Q Okay. Are you aware of any species where the animals have been fed PCBs and have not had reproductive effects?

A No.

Q And, finally, can you give us an estimate of the volume of files or documents that you personally accumulated when you were in charge of the task force? If I were to ask for all of your documents for that period, what would I be asking for? One file drawer or one file folder, or what might it be?

A An estimate? I would say it would fill a standard four-drawer file cabinet.

MR. HINDERAKER: Okay. That's all.

MR. PIPER: No questions. We'll have him read it.

MR. SPEAR: May I ask one more question?

MR. PIPER: Well, yes, go ahead, as long as we're here.

REEXAMINATION

BY MR. SPEAR:

Q With regard to the inquiries that have been made to you about particular effects from exposure to PCBs, would there be someone else in Monsanto other than yourself to whom

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you would go with that question if you were still in the position that you held in 1969 through 1976?

A Yes.

Q Who would that be?

A Well, I would go to Dr. Coleman.

Q And his position is?

A He is a medical doctor, director of occupational medicine and epidemiology. I'm not sure of the title, but he is the principal occupational medicine doctor in Monsanto.

MR. SPEAR: That's all I have.

[Whereupon, the deposition was concluded.]

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DEPONENT'S CERTIFICATE

I, William B. Papageorge, the deponent in the foregoing deposition, do hereby certify that I have read the foregoing 159 pages of typewritten material and that the same is, with any changes noted below, a full, true and correct transcript of my oral deposition given at the time and place hereinbefore mentioned.

Page	Line	Correction	Reason for Correction

_____
William B. Papageorge

Subscribed and sworn to before me this _____ day of _____, 1981.

_____
Notary Public
For the State of _____
Residing at _____

(Seal)

My commission expires:
_____.

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REPORTER'S CERTIFICATE

I, JoAnn C. Bacheller, a Registered Professional Reporter, certify that the witness, Mr. William B. Papageorge, was first duly sworn by me to testify the truth, the whole truth, and nothing but the truth; that I was then and there authorized to administer an oath; that his deposition was reported by me in machine shorthand and thereafter reduced to typewriting by me; that after being reduced to typewriting, the original of this deposition transcript was retained by me and the deponent's certificate mailed to Mr. Robert P. Piper; and that this is a true and correct record of the testimony given by said witness.

I further certify that I am not attorney for, nor employed by, nor related to any of the parties or attorneys to this action, nor financially interested in the action.

IN WITNESS WHEREOF, I have set my hand and seal at Billings, Montana this 15th day of November, 1981.

JoAnn C. Bacheller
Registered Professional Reporter
Notary Public for the
State of Montana
Residing at P. O. Box 1958
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(Seal)

My commission expires
September 20, 1984.

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Page	Line	Correction Is	Should Be	Reason For Correction
6	21	---1964---	---1965---	Error
10	20	---was the---	---was not the---	Error
20	11	---from---	---for---	Error
23	12	Yes.	Yes, in several cases it was so alleged.	Purposes of Clarification
25	14	---meat---	---feed---	Error
29	13	---differ.	---differ, because various PCB mixtures were reported. I do not know what products may have been involved.	Purposes of Clarification
39	9	---identity---	---entity---	Error
45	17	---Costal---	---Coastal	Error
51	1	---of---	---from---	Error
51	10	---works---	---words---	Error
58	12	---is---	---are---	Error
60	2	---analyses---	---analogies---	Error
60	22	---flue---	---food---	Error
65a	24	1973---	1974---	Error
69	14	---Springate---	---Springgate---	Error

William B Papageorge
William B. Papageorge

Subscribed and sworn to before me this 2 day of December, 1981.

Jane Y. Andrain
Notary Public
For the State of Missouri
Residing at St. Louis

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My commission expires:
12/20/81

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Page	Line	Correction Is	Correction Should Be	Reason For Correction
72	13	Yes.	I had files both before and after April and May, 1970.	Purposes of clarification
86	18	---dependent---	---depended---	Error
96	10	---Robb---	---Raab---	Error
97	14	---Robb---	---Raab---	Error
98	20	---Robb---	---Raab---	Error
101	13	---Robb---	---Raab---	Error
101	14	---Robb---	---Raab---	Error
102	24	---Robb---	---Raab---	Error
105	23	---announced the---	---announced---	Error
106	12	---apparently---	---reportedly---	Purposes of clarification
106	20	---know at the moment---	---knew at that time---	Purposes of clarification
106	20	---appeared	---reportedly	Purposes of clarification
106	21	to be---.	was---	Purposes of clarification

William B Papageorge
William B. Papageorge

Subscribed and sworn to before me this 2 day of December, 1981.

Jane G. Andrews
Notary Public
For the State of Missouri
Residing at St. Louis

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Page	Line	Correction Is	Correction Should Be	Reason For Correction
108	6		Add. Residual PCBs are another matter.	Purposes of Clarification
141	18	---buyer's---	---Bayer's---	Error
141	23	Are close---	Or close---	Error
147	18	---1980.	---1970.	Error
148	17	---'72.	---'71.	Error

William B Papageorge
William B. Papageorge

Subscribed and sworn to before me this 2 day of December, 1981.

Jane Y. Andrus
Notary Public
For the State of Missouri
Residing at St. Louis

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AFFIDAVIT

STATE OF MONTANA)
) ss:
COUNTY OF YELLOWSTONE)

JoAnn C. Bacheller, being first duly sworn upon her oath, deposes and states:

That I am a Registered Professional Reporter and, in such capacity, reported the within deposition proceedings;

That on February 8, 1982, I was contacted by Ms. Mary Small, Attorney at Law, of the law firm of Karr, Tuttle, Koch, Campbell, Mawer and Morrow, Seattle, Washington, and asked to check the stenographic notes from which this deposition transcript was transcribed to determine whether the reference to "1979," appearing on page 72 at line 12, had been correctly transcribed;

That in comparing the transcript to the original notes, I determined that "1979," as appears in this deposition transcript at the above-referenced page and line, should properly have been transcribed as "1970";

Further your affiant sayeth not.

JoAnn C. Bacheller

Subscribed and sworn to before me this 9th day of February, 1982.

Notary Public for the
State of Montana
Residing at Billings, Montana

(Seal)

My commission expires:
5/24/84.

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