you may be excused any time you wish. We thank you for coming.

Ladies and gentlemen, we are going to stand recess for 20 minutes. Please return to your places in 20 minutes.

(WHEREUPON AT 10:28 A.M. COURT WAS IN RECESS UNTIL 10:50 A.M. AT WHICH TIME THE FOLLOWING PROCEEDINGS WERE HAD AND DONE.)

THE COURT: Please be seated.

Who do you have next, Mr. Henderson?

MR. HENDERSON: Judge, we would like to call Dr. Stanely Pier the toxicologist expert retained by the Monsanto Corporation in this case and read portions of the deposition that was taken of Dr. Pier on May 15, 1987.

THE COURT: All right.

MR. HENDERSON: Mr. Musslewhite will be Dr. Pier.

MR. SHOEBOTHAM: Your Honor, we plan to call Dr. Pier as a witness in our direct case. This is about a 200-page deposition,

and I know that the Court is interested in moving this along. I would suggest that we just ask whatever questions the plaintiffs might have of Dr. Pier at the time he appears as a live witness.

MR. HENDERSON: Judge, this is important to us in placing the testimony that Dr. Pier can provide this jury at this point, we can do this in an hour or less and I think it's important in the context of where we are in the case in establishing in necessary essential elements of medical causation.

THE COURT: Well, the court does not permit a deposition to be read if the witness is going to be here.

So, I think we will accept the defendant's suggestion.

MR. HENDERSON: Okay.

THE COURT: We will offer him a little late.

MR. HENDERSON: Thank you, Your Honor.

MR. LACEY: We would call Dr. William Richard of Monsanto by video deposition.

THE COURT: All right. Can we use the

same format that it be seen and then --

MR. LACEY: Yes, Your Honor.

THE COURT: -- pick it up with --

MR. LACEY: That will be fine.

MR. SHOEBOTHAM: I assume that will be the case.

THE COURT: Are we ready to proceed?

MR. LACEY: Your Honor, we are looking for video operator at the moment. I don't see him in the courtroom.

MR. MUSSLEWHITE: He was here just a moment ago, Your Honor.

MR. LACEY: Here he comes, Your Honor.

THE COURT: All right.

We will excuse the operator's tardiness at this time but we hope it won't happen in future.

VIDEOGRAPHER: I apologize, Your Honor. I was on the telephone.

THE COURT: I'm sure you thought we were going to use another witness. All right.

Are we ready to proceed?

(WHEREUPON THE FOLLOWING PORTIONS OF THE VIDEO DEPOSITION WERE SHOWN TO THE JURY.)

Q Will you state your full name for the record, please?

A William Ralph Richard, Jr.

Q Tell me a little bit about your educational background.

A I have an A.B. degree from Amherst College, class of '43. I have a master's in chemistry from the University of Michigan in '47. And a Ph.D. from the University of Michigan in organic chemistry in '51.

Q And when you obtained your Ph.D., where did you go to work?

A I returned to Monsanto Company at Dayton Laboratories, Dayton, Ohio.

Q And from 1951 until what year did you remain in Monsanto's employment?

A I actually started in the fall of 1950, a few months before the degree was formerly granted. And I remained in Monsanto's employ until December of 1985.

(WHEREUPON THE VIDEO DEPOSITION WAS INTERRUPTED)

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MR. LACEY: We will continue now with the question and answer --

THE COURT: All right.

MR. LACEY: -- of the deposition.

THE COURT: You may proceed.

MR. LACEY: Beginning on Page 7, line 14 with Monsanto's offer.

(Reading from video deposition)

Q The time that you left to form your own consulting business --

(End of reading)

MR. LACEY: Page 7.

MR. MUSSLEWHITE: 7, I'm sorry.

(Reading from video deposition)

A I retired from Monsanto, right.

Q -- that was a retirement in '85?

A Retirement.

(End of reading)

MR. LACEY: Going to Page 13, line 5, continuing with Monsanto's offer.

(Reading from video deposition)

Q Let me try to understand a little bit about Monsanto Company itself.

Is Monsanto a United States company?

A Incorporated in the State of Delaware.

Q Okay. I guess what I was really asking you is whether its business all takes place in the United States?

A It does not. It takes place outside of the United States as well as inside.

(End of reading)

MR. LACEY: Going to Page 15 line 12, continuing with Monsanto's offer.

(Reading from video deposition)

Q Looks like we have got maybe 20 or more different manufacturing locations spread throughout United States; is that correct?

A That's correct.

Q Did all of these plants make the same chemicals?

A Did they all make the same chemicals? Sometimes, yes, but usually not.

(End of reading)

MR. LACEY: Going Page 52, line 21.

MR. SHOEBOTHAM: Mr. Lacey, if I could, I think you have omitted a Monsanto offer on Page 45.

MR. LACEY: Okay. I'm sorry.

MR. SHOEBOTHAM: Let me give you another copy of that.

MR. LACEY: This what you gave me yesterday showing to delete Page 45.

MR. SHOEBOTHAM: This is our revised offer.

MR. LACEY: Oh, you've changed it again?

MR. SHOEBOTHAM: No. This is what I gave you yesterday, as I recall; and it is our revised offer.

MR. LACEY: I understood it was your deletions.

THE COURT: Are you able to resolve the difference?

MR. SHOEBOTHAM: He thought they were deletions, Your Honor.

MR. LACEY: Yes. I understood the list they gave me is what they did not want to offer instead of what they did want to

offer.

With the Court's indulgence, I think I can do that. I had marked it to try to show.

MR. SHOEBOTHAM: Can you work off that list I gave you?

MR. LACEY: I will try to. Maybe the easiest thing here, Your Honor, would be to let me just read my offer and then let them read their offer so I don't confuse it any further.

THE COURT: That will be okay if you are not able to work it out otherwise.

If you are able to work it out, well, I think it would make the continuity of it a little better.

MR. LACEY: Okay. Well, let me try to see if I can and if you will help me here.

THE COURT: If not, well, counsel for the defendant can stand there with you and can make the offers as you go.

MR. LACEY: If you will just follow along with me, I will try to do it.

THE COURT: That might be the best way to do it

THE COURT: All right. Let's proceed.

MR. LACEY: Going to Page 45, line 1, continuing with Monsanto's offer.

(Reading from video deposition)

Q Were there occasions when Monsanto would be producing a particular chemical and because of the way the process was structured or other factors, you couldn't reduce the production to the level of sales and you would have to try ti find new applications in order to be able to sell the entirety of the production?

A In general, no.

Q Okay.

A You could always cut production.

Q Were there occasions where plant capacity was such that the requirements for current sales did not involve operating at or near plant capacity?

A Yes.

Q And in those cases, would Monsanto attempt to, if possible, find a way to increase the market so the plant could be run more nearly at capacity?

A The fluids business is not that easy. You

have to have your customers and your applications and so forth are pretty well set. So, you just can't go out and move more and more, more fluid fluid to somebody easily. It's not like selling methanol where you can sell it around the world, cut the price and move it. It's not -- the fluids business is much more of specialty operation not geared to all-out production.

Q Well, I guess my question was: If I put a new plant on-line that made a particular component of fluid and with my current demand, I was only operating at 60 percent of that capacity, would it be a charge that might be laid to your group to try to find new applications for the remaining capacity to develop the market?

A That was not the normal kind of assignment nor a specific assignment. We geared production to what we thought we could sell. We had excess capacity and that was normally and there no way to quickly turn anything like that around.

(End of reading)

MR. LACEY: Going to line 25 and continuing with Monsanto's offer.

(Reading from video deposition)

Q With regard to the function of working with the technical staff of market users, I believe you indicated that that was one of the things that was part of what group did.

A Yes.

Q Can you explain to me generally what is involved there?

A Well, a user has control over the product line, particular product if it's used in -- we'll say in dielectrics, the capacitor manufacturer really calls the shots. If it's a transformer, the same thing is true.

General Electric and Westinghouse are calling the application shots as far as they are concerned, and we are just supplying a component part. So, their engineering staffs and their management, they are the key to whether a product is used or not and in what volume.

The same is true in aviation. It doesn't matter whether it's jet engine lubricant or the end user is in control. You have to meet his specifications; you have to meet his requirements.

The same thing is true in fire-resistant

hydraulic fluids. The aircraft manufacturer specifies what he wants. All you do is the preliminary testing enough the get him interested, but he has to qualify the fluid, he has to test for the flight -- flight testing. This is true, I think, of almost all of the applications. The end user, the pump manufacturer, whatever, has got control.

(End of reading)

MR. LACEY: Going to Page 91, line --

MR. MUSSLEWHITE: You said 50 awhile ago.

MR. LACEY: That's not correct, though. Their offers have been changed.

Going to Page 91, line 21.

MR. MUSSLEWHITE: I'm sorry. I thought you said you had an offer on Page 50 something.

MR. LACEY: No. That was a Monsanto offer.

MR. MUSSLEWHITE: All right. Okay.

MR. LACEY: Going go to Page 91, line 21.

MR. MUSSLEWHITE: All right.

MR. LACEY: Continuing with Monsanto's offer.

(Reading from video deposition)

Q Was there any period of time in the United States when anybody other that Monsanto manufactured PCBs?

A I don't know. On a limited basis, there might have been others.

Q Are you aware of any?

A I think Standard Chlorine might have had -- might have at one time. I'm not sure about that. I think Dow probably made some inadvertantly, possibly.

Q But not to sell?

A I can't operate that -- I can't tell you that operation. But not to sell very much of it anyway.

Q Okay.

A Why to the extend, you know --

MR. MUSSLEWHITE: Oh, I'm sorry. That's your question.

(Reading from video deposition)

Q Why to the extend you know, did anybody else besides Monsanto make any appreciable quantities of PCBs in the United States?

A I think the investment was considerable in terms of when you look at the biphenyl, the quality of the biphenyl that was required, the capital investment that went into making biphenyl and the purity and investment that went into making biphenyl, and the purity and price of the final product. In other words, it was not profitable for somebody else to go in.

Q You mentioned to me earlier that sometimes chemicals are patented. Do you know whether or not Aroclor or PCBs were a patented chemical?

A Monsanto had not a patent. I think the patents -- application patents were issued to -- to General Electric. And, of course, then other electrical manufacturers had various combinations of polychlorinated biphenyl and various stabilizers and various end-use patents.

Q So, if I'm understanding what you are telling me correctly, there was no patent restriction that would keep any other manufacturers from making PCBs?

A That's largely correct, yes.

Q And nobody else chose to enter the field significantly for whatever reason?

A Well, for the reasons I think I've enumerated. The capital cost and the profitability were not -- not there.

Q Are you telling me that PCBs were a relatively unprofitable chemical for Monsanto?

A Well, profitability is relative. But in order to enter the manufacture, you had to invest capital in biphenyl or get biphenyl of a high purity. And that was difficult to do. You could always make that investment if you wanted to. I think people chose not to.

Q Well, I guess my question was whether you're telling me that the profit margin on the manufacture of biphenyl was such that it would not be attractive for anyone else to enter the market?

A It's not the profit margin. It would be the profit margin and the volume and what they could sell it for that would be important. They would have to calculate that. And I'm sure they did.

(End of reading)

MR. LACEY: Going to Page 101, line 16

with the plaintiffs' offer.

(Reading from video deposition)

Q That's pretty common, isn't it, for chemical processes to generate some waste materials that you're not really trying to create but they just are part of the process?

A True.

(End of reading)

MR. LACEY: Going to Page 109, line 24 continuing with the plaintiffs' offer.

(Reading from video deposition)

Q Now, why is it that dibenzofurans are created when one is attempting to convert diphenyl into PCBs?

A Why is it that they're created.

Q Yes.

A Some traces of oxygen might be present in the dehydration, dehydrogenation of the benzene.

(End of reading)

MR. LACEY: Going to line 15.

(Reading from video deposition)

Q This is in the process of making the benzene into diphenyl?

A Right.

(End of reading)

MR. LACEY: Going to line 24.

(Reading from video deposition)

Q Is it also possible it may be created in the step of converting dephenyl into PCBs?

A That's also possible.

(End of reading)

MR. LACEY: Continuing plaintiffs' offer Page 115, line 21.

(Reading from video deposition)

Q Is it fair to say that the creation of dibenzofuran that was a contaminant in Monsanto's PCBs must come either during the stage of converting benzene into diphenyl or the stage of chlorinating the diphenyl?

A Right.

Q Okay. And is it also fair to say that in

each of those stages there must be some oxygen present in order to create a dibenzofuran?

A Oxygen, yes; some form.

(End of reading)

MR. LACEY: Going to Page 117, line 3.

(Reading from video deposition)

Q And whether the dibenzofuran contamination in Monsanto's PCBs is created in the step of going from benzene to diphenyl or in the step from diphenyl to PCBs, in either one of those steps there must be oxygen and there is heat applied. Correct?

A Yes. In small amounts.

(End of reading)

MR. LACEY: Continuing with the plaintiffs' offer on Page 120 -- I'm sorry, Page 120, line 23.

(Reading from video deposition)

Q If, for example, in the process of making benzene diphenyl in a particular batch more oxygen was introduced into that process than in

another batch, there would be a greater likelihood of dibenzofuran contamination of that batch, would there not?

A It's possible.

Q The greater the amount of oxygen, the greater the amount of possible dibenzofuran contamination. Correct?

A Correct.

Q Similarly, if in the process of converting diphenyl into PCBs in one particular batch, for whatever reason, there was more oxygene present than in another batch there would be the greater likelihood of more dibenzofuran contamination. Correct?

Q One, and maybe the only, as far as you know, limiting factor on the amount of dibenzofuran contamination in the manufacture of PCB would be the amount of oxygen present. Correct?

A Yes.

(End of reading)

MR. LACEY: Going to Page 124, line 12 and continuing with the plaintiffs' offer.

(Reading from video deposition)

Q If I understand your previous answer correctly, it would not be desirable to have PCBs with no contamination; rather, it would be desirable to have a consistent level of contamination.

A A consistent low level of contamination.

(End of reading)

MR. LACEY: Going to line 22.

(Reading from video deposition)

Q So that in electrical testing we can almost be assured that every batch of Aroclor would have had some dibenzofuran contamination in it. Correct?

A Below a certain level.

(End of reading)

MR. LACEY: Then going to Monsanto's offer at Page 125, line 1.

(Reading from video deposition)

Q But present in every batch. Correct?

A I can't say whether it was present in every batch or not.

(End of reading)

MR. LACEY: Continuing with Monsanto's offer at Page 126 -- okay, I'm sorry. Page 125, line 23.

(Reading from video deposition)

Q Now let me ask you about PCBs. Were all PCBs put to electrical applications?

A Were they all put to electrical -- no. The answer was, they were used in other areas as well.

Q Did all of the PCBs have to meet the electrical specifications before they left Monsanto's plant?

A They were all producted in the same plant, probably went through all the same quality control tests. We didn't isolate nonelectrical and electrical at the manufacturing -- at the Aroclor plant itself.

Q You mean even Aroclor that didn't need to be refined to the level to meet the standards you've described for electrical purity was nevertheless refined to that level anyway?

A Yes, probably.

Q You you say probably. Do you know?
A I don't know it was given special, special treatment in some cases. Whether that was always carried out I don't know. You would have to look at the records. But the main process was always the same.
Q The general process --
A General process was always the same.
(End of reading)

MR. LACEY: Going to Page 136, line 3 and continuing with Monsanto's -- I'm sorry, that's incorrect -- yes, that is correct. Going to Page 136, line 3 continuing with Monsanto's offer.

MR. MUSSLEWHITE: That's an answer on line 3, isn't it?

MR. SHOEBOTHAM: Both actually begin 135.

MR. LACEY: Going to Page 135, line 25.

(Reading from video deposition)
Q And then there were other people who reported to him in a different type of research capacity, which would include --

A Well, there were other groups, yes, that would report to him.

Q Dr. Keller's section was a parallel section to yours?

A It would supply analytical services to the entire MIC division at that time.

Q Okay. So your group, then, was involved in thermal testing, electrical testing and blending?

A And hydraulic testing, right.

Q Okay.

What sort of precautions were taken around your laboratory dealing with laboratory samples of PCBs?

A Depend on the application. In electrical, analytical, I think the main precautions were to make sure that the samples were not contaminated. During the entire rest of the operation I think it was just good laboratory practice: Don't spill anything, use hoods if you need to. But I don't think there were any special rules or precautions in the Aroclor handling.

Q Did you have chemicals for which you had special precautions?

A Later there were things that were put under special conditions, like the chloroethers, I

think, something like that. Things that were considered highly toxic. There were special rooms, for examples, created.

Q But PCBs were not handled that way?

A No.

(End of reading)

MR. LACEY: Going to page 153 with the plaintiffs' offer.

(Reading from video deposition)

Q Did you determine from your visit to Sweden that there were health issues involved?

A No. We couldn't tell health issue or not. I think Widmark was an analytical chemist basically.

Q You mentioned that when you got back you began to monitor the literature. Do you know whether or not anybody with Monsanto ever monitored literature about products Monsanto produced prior to that time?

A The -- sure. The answer is yes. Marketing would monitor, medical would monitor, research would monitor. And certainly the three were responsible for trying to keep track of what was

happening around the world.

Q So it was the intention, then, of the company that somebody in the company monitor technical literature that would relate to the chemicals it was producing?

A That's right. And the library had -- usually had a profile on research chemists, managers, group leaders, on what they should be monitoring in terms of what publications they should be reading. And you wouldn't get the whole publication, but you would get the title page, index pages of these journals, magazines and so forth.

(End of reading)

MR. LACEY: Line 25 of Monsanto's offer.

(Reading from video deposition)

Q So that, for example, to the extent you had a responsibility to monitor certain aspects of the literature, you would receive the title page from the appropriate journals each month and review it and decide which articles you wanted to have a copy of?

A Yes, you tried to. You couldn't do a perfect job.

Q Certainly.

A It was easy at first, but it eventually became a large matter. And, of course, that's when I think Papageorge really took over part of the responsibilities.

Q But prior to that you and somebody in the medical department and somebody in the marketing department each would have your areas of responsibility?

A We would try to monitor what was happening to our products in the environment. We were also in contact with government agencies. We were in contact with places like Woods Hall, Scripps Institute, Wisconsin Alumni Research Foundation. And we would ferret out people who were doing analytical and environmental work in the areas of small -- detecting small concentrations.

(End of reading)

MR. LACEY: Going to Page 156 with the plaintiffs' offer.

(Reading from video deposition)

Q Now, you mentioned earlier, I just want to make sure I understand correctly, you didn't just monitor the American literature, you also monitored foreign literature as well?

A We tried to. We had representatives in Japan, John Durland, who was available for information from there. Sweden, England. Tried to monitor the continent -- what was coming out of Holland.

(End of reading)

MR. LACEY: Going to Page 157, line 16 with Monsanto's offer.

(Reading from video deposition)

Q What sort of people did you have come in and advise you about their knowledge?

A We had people who were monitoring the environments of oceans, of air. We didn't know much about fish toxicity. I think medical asked a lot of questions about testing procedures in fish.

We had a Mr. Riseborough come in and tell us what he had found. Dr. Riseborough probably.

We had WARF, W-A-R-F, come in and tell us

what they were doing in the Great Lakes.

Keller visited an environmental lab in Scotland doing monitoring work on chlorinated residues, fish and wildlife.

We consulted with people at University of Illinois in the environmental area, Metcalf.

We consulted with Mailer at Marquette, biological enzymes, which we really couldn't do much with. Talked with him.

I think these were some of the people that either Elmer talked with or I talked with, or Keller. Some combination.

Q When you say talked with, did you have a formal presentation made or was it just a phone call in some cases --

A No, no. These would be face-to-face contacts.

(End of reading)

MR. LACEY: Going to Page 163, line 15 with the plaintiffs' offer.

(Reading from video deposition)

Q With regard to the Industrial Biotest, let me first understand this analytical testing you

mentioned. Now, what did that involve?

A We wanted to do tissue analysis for aroclors, chlorinated biphenyls.

Q Where were these tissue samples coming from?

A They were coming from Industrial Biotest.

Q How was the work between Industrial Biotest and Monsanto coordinated?

A Coordinated through the medical department.

Q Who did that?

A Elmer Wheeler was the main contact.

Q How was Industrial Biotest selected?

A The initial toxicity was done by Younger Laboratories in Acutes. The Industrial Biotest was one of the companies that Monsanto used for long-term lower-level feeding studies. Monsanto had use Industrial Biotest for other products.

Q Do you know what other products?

A Not specifically, no.

Q When you and Mr. Wheeler and Dr. Keller went to Industrial Biotest, who did you meet with?

A We met with Dr. Fancher and we met with Calandra, the head of it, briefly. But the protocols were, I think, really between Wheeler and Fancher.

Q When you talk about protocol, what do you

mean?

A Well, this is an agreement to test the products in a certain way and certain animals for certain lengths of time.

Q So the decision about how to conduct the testing and how long to test it and what animals to use was one that Monsanto participated in?

A Yes.

(End of reading)

MR. LACEY: Going Page 171, line 1 with Monsanto's offer.

(Reading from video deposition)

Q And Monsanto actually engaged in a program of destruction of PCBs for customers?

A They did.

Q Was there any charge for that service?

A That's a question for Papageorge. I'm not quite sure what the answer was. I think maybe a nominal charge or something.

(End of reading)

MR. LACEY: Continuing on line 8 with the plaintiffs' offer.

(Reading from video deposition)

Q Did anybody in your group suggest that Monsanto immediately cease production of PCBs?

A Cease production?

Q Uh-huh.

A It might have been suggested. But it was never considered seriously. If you talk about a very short time interval, I'm sure that it was considered as a phase-out. It was considered as a phase-out. And in conjunction with our customers.

Q Who suggested that you immediately cease production of PCBs?

A I don't know specifically. But probably people at one time or another suggested it.

MR. LACEY: I think the answer was probably "many" people.

MR. MUSSLEWHITE: I'm sorry. But probably many people at one time or another suggested it.

(End of reading)

MR. LACEY: Going to Page 174, line 1 with Monsanto's offer.

(Reading from video deposition)

Q Yes. As I understand it, when Monsanto made the decision to stop selling PCBs application like carbonless paper, plasticizers, heat transfer fluids and the like, they did not at the same time make the decision to stop selling PCBs for dielectric use at any point in time.

A The points do not coincide in time. The electrical use was continued because Westinghouse and General Electric and the government said they didn't have substitute products and therefore, Monsanto should continue until they at least got substitute products. So, it was not -- in any of these cases, it's not necessarily Monsanto's decision alone. It's Monsanto's decision plus the customer -- all usually big companies -- that would try to reach an agreement, "Yes, we will substitute; we will stop." But it's always a Monsanto customer relationship that is important -- or sometimes a Monsanto-government agreement of what will be done.

(End of reading)

MR. LACEY: Now, going to Page 181,

line 15, continuing with Monsanto's offer.

(Reading from video deposition)

Q When it came to developing substitutes, electrical dieletric fluids, was that a matter that the customers were to come up with or was Monsanto involved in doing that?

A Both sides.

Q In other words --

A Monsanto did, and G.E. was also working.

Q When did Monsanto first develop a substitute fluid that could have been used in capacitors and transformers had PCBs not been available?

A We worked on 1016, okay? And that was introduced. Non-PCB fluids, we worked on diphenyl sulfones, aromatics sulfones, and hydrocarbons mixtures. These were introduced to the dieletric capacitor people. Some testing went on. Some tested, some did not. And that's about the time when those -- I had been phased out when those things started to be taken to the marketplace. I was no longer a part of the projects; so, I don't know specifically what happened.

Q But that became available as an alternative

at about the time you left functional fluids?

A '74, '75, '76, somewhere. Somewhere in there.

(End of reading)

MR. LACEY: Going to Page 193, line 21.

(Reading from video deposition)

Q Are you familiar with the specific blending of particular Inerteens or Pyranol?

A I'm not familiar with the details of the blending. I know we did blend some mixtures for both G.E. and for Westinghouse.

Q But what those blends were and why they were done, you do not know?

A Oh, well, yes. I know some were blended for transformers. Some were blended for stabilizers, when they were requested.

Q Let me show you Document 2026, which is a part of a document beginning at 1967 and going to 2015, where there is given at the bottom there the blending for Pyranol 1467 and 1470, both of which apparently are transformer oils. Are you familiar with a particular reason for the different formulas there?