IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF ALABAMA

EASTERN DIVISION

SOLUTIA, INC. and
PHARMACIA CORP.,

Plaintiff,

vs.

Case No.:
CV-03-PWG-1345-E

MCWANE, INC., et. al.,

Defendants.
_____/

VIDEOTAPED DEPOSITION OF

DR. E. SCOTT TUCKER

600 Peachtree Street, Atlanta, Georgia

February 18, 2010

9:06 a.m.

Anna-Marie Cheak, RPR-CSR-B-1109

WATER_PCB-SD0000054583

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DEPOSITION OF DR. E. SCOTT TUCKER

FEBRUARY 18, 2010

VIDEOGRAPHER: Here begins the videotaped deposition of Dr. E. Scott Tucker in the matter of Solutia, Incorporated, Pharmacia Corporation versus McWane, Incorporated, et. al., Case Number CV-03-PWG-1345-E.

We're on the record at 9:06 a.m, Thursday, February 18, 2010. This deposition is taking place at 600 Peachtree Street, N.E., 5200 Bank of America Plaza, Atlanta, Georgia.

The videographer is Patrick Sheehan. Counsel, please identify yourselves and state whom you represent.

MR. MERRILL: Yes. Charlie Merrill representing the Plaintiffs, Solutia, Inc. and Pharmacia Corporation.

MR. SCHICK: Bob Schick with Vinson & Elkins on behalf of Phelps Dodge.

MR. GAYNOR: Kevin Gaynor, Vinson & Elkins on behalf of Phelps Dodge.

MS. LAVEY: Wendy Lavey with Squire Sanders on behalf of Defendant, Mead West

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Vacl Corporation.

MS. MCADAM: Allison McAdam with Hunsucker, Goodstein & Nelson for Southern Tool.

MR. ZYGMONT: Max Zygmont with Alston & Bird for U.S. Pipe and Walter Energy.

MS. BABCOCK: Sarah Babcock with Alston & Bird for U.S. Pipe and Walter Energy.

MR. HENDERSON: Doug Henderson for Scientific Atlanta, with the law firm of Troutman Sanders.

MR. SCHICK: And on the phone?

MR. TURNER: This is Bart Turner with Maynard, Cooper & Gale representing McWane, Inc., DAE Systems, Inc. and FMC Corporation.

MR. MERRILL: And by the way, I am representing Dr. Tucker at this deposition.

MR. THOMPSON: This is Josh Thompson with Scott, Dukes & Geisler for Huron Valley Steel.

MR. SELIG: This is Marcus Selig with Baker Botts representing DII Industries.

VIDEOGRAPHER: Would the reporter

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please swear in the witness.

Whereupon,

DR. E. SCOTT TUCKER

being first duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. SCHICK:

Q Would you state your full name, please.

A My full name is Earl Scott Tucker, III.

Q Dr. Tucker, you have and received a Ph.D. in analytical and/organic chemistry in 1968; is that correct?

A Yes.

Q You worked as a chemist, as I understand it, for Monsanto from around the fall of 1967 until sometime in 1978?

A Yes.

Q You've testified previously on behalf of Monsanto or Solutia in other litigation, have you not?

A Yes.

Q And from time to time, have you also testified as an expert witness on behalf of either Monsanto or Solutia?

A Yes.

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Q Have you been asked in connection with this litigation, this case pending in Federal Court in Birmingham, Alabama, and styled Solutia versus McWane, et. al., to act as an expert witness?

A No.

Q Now, as I understand it, you left Monsanto in 1978, but you have testified on their behalf in the intervening years between 1978 and today, 2010; is that true?

A Yes.

Q Were you paid by Monsanto or Solutia for the work that you've done in connection with that testimony?

A Mainly for reimbursement for the preparation, but not for the actual testimony.

Q Understood. You're paid for your time?

A Yes.

Q What do you charge for your time?

A Well, in 1999, I think it was probably a couple hundred bucks an hour. It's at the moment probably around 400 an hour.

Q So for today's deposition, for example, you would be charging Mr. Merrill's firm or Solutia $400 an hour?

A Yes.

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Q Have you been involved in any way before getting ready for this deposition, in this particular piece of litigation that's pending in Federal Court in Birmingham, Alabama?

A No.

Q Are you familiar with the nature of the case?

A Yes.

Q What is your understanding of the nature of this case?

A My understanding -- hopefully it's accurate, but it's my understanding, is that it has to do with the clean up of the Anniston area as a result of some manufacturing emissions that occurred down there.

Q Emissions of what?

A Well, I think two things that come to mind immediately would be polychlorinated biphenyls, really Aroclors in this particular instance, and lead, I think are the two things that we're concerned about.

Q What did you do to prepare for your deposition today?

A Let's see. I was contacted I think on about the 25th of January and asked if that was --

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that was going to happen, would -- Monsanto would like to represent me, and of course, I said yes, thank you.

And at that time, they provided me some -- a small binder, and some other information. We've had some discussions.

Q Did you bring that small binder with you here today?

A No, I did not.

Q Does your counsel have a copy of that binder?

A My assumption is he may.

MR. SCHICK: And I'd ask that that binder be made available to us in terms of the documents that is reviewed in preparation for this deposition, maybe at the next break.

MR. MERRILL: I don't have it with me.

MR. SCHICK: Is there some way you can have it send over here?

MR. MERRILL: I don't know. I don't think I'm inclined to do that. There's nothing in the binder that hasn't been produced; and in fact, I think everything

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in the binder has been used as a deposition exhibit in this case.

And the preparation of my witness is really work product; the collection itself is a matter of work product.

MR. SCHICK: Well, I --

MR. MERRILL: Particularly when he's not being tendered as an expert witness.

MR. SCHICK: We don't have to debate it right now, but I don't think that's an accurate understanding of the rules. Anything that the witness looked at, I understand if you're representing the witness, what you talked about, the substance of what you talked about, is covered by the attorney/client privilege.

But what the witness looked at in preparing for the deposition is not, and so if I can even have a list, I'll take you at your word that these are documents that had been produced, and perhaps used as exhibits in other depositions.

But if I could have that list of what they are, that would be great.

MR. MERRILL: Yeah.

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BY MR. SCHICK:

Q Okay. How many time did you spend in preparing for your deposition today? You spent some time reviewing the documents?

A I probably spent on the order of a week reviewing different items that I consider important in terms of remembering accurately when I discussed PCBs and problems associated with it.

Q And generally tell me what types of materials you looked at over the course of that week.

A I use a book by Mitch Ericson, which is absolutely excellent, a friend of mine, that was written in about 1997. I usually use that to review my -- what went on and to be accurate about when it occurred of that sort.

The material that was in the binder was all material that had numbers on it and that kind of stuff, so it has all been presented previously, and I looked at that.

Q Excuse me, are those documents that you were an author of, or recipient of?

A Some are; some aren't. I think most of them pretty much have my name on it either as the author or as a carbon copy, so to speak.

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Q The book by Ericson, you said that was a 1997 book?

A It was published, I believe -- Mitch Ericson is his name. It was published in 1997.

Q What's the name of the book, what's the title?

A You know, you would ask me a question like that. Seems like I could remember that; something to do with PCBs, but I can make that available for you.

Q Okay, fair enough. I'm sorry, I interrupted you. What else did you review? The book, documents that you were either the author of or the recipient of?

A That's pretty much what I did. Basically I looked at the history to make sure that I'm remembering the dates correctly and things of that sort, because I think most of this occurred about 40 years ago, so...

Q Right. Most of this that we're going to talk about today, of course, took place during your employment at Monsanto from '67 to '78. When was the first time that you met with any lawyer for Monsanto or Solutia in preparation for today's deposition?

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A I met Charlie face-to-face yesterday, I think.

THE WITNESS: Right?

BY MR. SCHICK:

Q And how much time did you spend yesterday with Mr. Merrill?

A Well, we had dinner, and we maybe spent 15 minutes or so talking about the deposition today.

Q Did you spend any more time with him in preparation for today's deposition besides last night?

A We had breakfast together, but this wasn't the topic of what we talked about, so...

Q Just to frame kind of what we're going to talk about in some of these documents, and I probably have a number of the documents that have your name on it as either the author or recipient in a moment.

I want to take us back to your employment, kind of what your job was at Monsanto while you were there, okay?

A Sure.

Q Now, am I correct in understanding that your job at Monsanto as it relates to PCBs, which would be polychlorinated biphenyls -- or biphenyls

(pronunciation), was to analyze data and to come up with methods by which to analyze data?

A Well, it was actually more than analyzing data, because we had to produce the data, so we had to learn how to analyze the constituents that we were looking at so that we could get the data and then analyze what the data meant, yes.

Q Okay, and was it also a part of your function to come with appropriate tools, ways of analyzing data and test samples?

A Correct.

Q For example, you used gas chromatography?

A Yes.

Q What else did you use or develop?

A Well, the primary tools that were -- had to be brought on board and that I had to develop and learn how to use and teach other people how use, at that time was the gas chromatography involved with electron capture detectors, and with mass spec detectors.

In addition to that, since most of the things we were going to look at didn't come in a form that was readily amendable to introducing the instrumentation that would analyze it, we had to learn how to get those materials outside of whatever

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they were in, and get them in a form that could be delivered to the instrumentation.

Also, we had to do things like learn how to clean up other constituents that were in there and get them out of the way so that they wouldn't interfere with what we were really trying to measure.

Q And that was all a part of your function while you were at Monsanto?

A Yes.

Q Now, you were aware shortly after you arrived at Monsanto that PCBs had been reported in scientific literature to be linked to -- as toxic to some marine life; had you not?

A No.

Q When did you first learn that?

A I think sometime in 1967/68 area. Dr. Keller, who was my boss at that time, who I reported to, who was the head of the Applied Sciences Section that supported the Organic Division, called me in and he said we've had some communications from our European people with regard to PCBs, are being found in the environment in unusual places, and since we manufactured PCBs, we're going to get -- we'll probably get interested

in it.

We'd like you to look over the information that we have, and as we get it, and give us your opinion from a science viewpoint as to what's going on.

Q Is that when you first became involved in the study of PCBs in the environment and in wildlife?

A Yes.

Q Can you any more precisely identify when that was, whether it was late '67 or sometime in early 1968?

A I think the question you asked me was when I first heard of it?

Q It was.

A And so that's a little less than being intimately involved that we got, that we did eventually. But you were accurate in the sense that it was around '67; 68, in that region.

Q You began at Monsanto in the fall of 1968 -- or '67 rather?

A '67, yes.

Q Okay, and after your discussion with -- was it Dr. Keller, or Mr. Keller?

A Dr. Keller.

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Q Dr. Keller; did you do a literature search to see what else there was out there?

A Yes. What I did basically was review the information that I had been given from the internal communication of publications, such as they were at that time. This is pretty early in the game, regarding the PCBs.

And in fact, the first communication we had with respect to the PCBs from Europe -- and you have to keep in mind we didn't have E-mail and things of that sort. It was a little bit more difficult at that time.

It came across as polychlorinated biphenyls, which of course, is a different kind of compound. So there was even confusion at that level as to what was going on, but of course, it was close enough that that mistake didn't deter us from going ahead and looking at it and assuming that it might be PCBs.

MR. SCHICK: I'll object to it as non-responsive.

BY MR. SCHICK:

Q I do that for the record. I don't mean any disrespect. Doctor, as a part of the literature search then that you did, did you become familiar

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with the 1937, '38 work of Drinker?

A That -- I may have. I wouldn't doubt that I did.

Q Did you become familiar with the 1944 work by Miller?

A I'm sure it was significant to those authors, but it didn't appear -- it doesn't stick with me. No, I don't recall that.

Q Okay, fair enough. In addition to doing a literature search when you were given this task, did you also review internal documents of Monsanto that predated 1967?

A I may have.

Q You just don't have a present memory of that?

A Well, the truth of the matter, if I can answer that question -- okay, the truth of the matter is that there wasn't information just laying around on this particular subject, that it was so new, it was such a breakthrough for Soren Jensen & Widmark to really discover that some 14 different components that they've being seeing for years as pesticide analysts in the environment, were and could be PCBs.

There wasn't much information around, and

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in fact, the first information that we got was really a lecture that had been given by Soren Jensen, if I remember correctly, and it was -- the date was probably '66, and we didn't receive that.

I didn't receive it until '67 or '68. So when you're asking me did I review all the literature, it wasn't difficult. Now, if you're asking me did I review all the production information and all of the strange kinds of things that Monsanto has records, no. I was a scientist, not interested in that aspect.

Q No, and what I really was after was whether you had reviewed the internal documents Monsanto had reporting any connection between PCB and an alleged or suspected connection with some toxic effect?

A At that time, no.

Q When was the first time that you began to review that type of literature?

A Well, there were allegations that were being made, far from proven, but being made as to the potential impact that these PCBs might be having on organisms; not human beings necessarily, but on, you know, regular kind of organisms in our environment.

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And so we -- I know there was some toxicity information that had been done that time, but it was mainly acute exposure kind of stuff and things of that sort, and I think later on, we began a large number of studies with an animals and fowl and fish and things of that sort with industrial bio tests, but that a little bit later when we really got involved in it.

Q Okay, fair enough. Do you remember being provided with the Navy's report on exposure to rabbits --

A No.

Q -- done in 1957?

A No.

Q Okay. That was not one that was provided to you during your employment?

A You asked if I remembered, and what I'm telling you is that it could have been, and it might have been, but I don't remember it. So I wouldn't preclude the fact that I might have seen it, but...

Q Fair enough. Let me hand to what I've marked as Exhibit 1 to your deposition. I've got a copy for Mr. Merrill.

(Whereupon, marked for identification purposes,

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Defendant's Exhibit No. 1)

BY MR. SCHICK:

Q Exhibit 1 appears to be a report entitled Final Report on Aroclor in Gases from the Research Department Phosphate Division. And if you turn the page to the very first page, Dr. Tucker, you see it says, Final Report, Aroclor in Aroclor Gases, work started in November 8, '53 (sic.), work completed October 16, and report submitted March 15, 1954.

A I'm sorry, where are you at now?

Q The very top of that page.

A Okay, Final Report? On Aroclor in Gases --

Q Right.

A -- Job Number, File Number.

Q And then the date the report is submitted is 1954 March?

A Correct.

Q All right. Do you recall whether this is a document that you were provided in performing some of the analytical work you were asked to begin in late '67 or '68?

A I don't recall.

Q If you could, turn to the page up at the top that has the handwritten page 7.

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A It also has a 3 on it, -3- --
Q No, if you look at the bottom, look at the DSW number.
A Okay, you want the DS --
Q The one ending with 62.
A 62, okay, let's go back. There is a 7 on the upper-hand corner of that page in there.
Q Yeah.
A Okay. I want to make sure I'm not delusional.
Q I don't know who is responsible for that, but I did not.
A You don't remember it, right?
Q That's right.
A Okay. I'm --
Q We together?
A 762 at the bottom, DSW number.
Q Yes, sir; at the top it says Introduction.
A Correct.
Q I want to read some of these paragraphs. Then I'm going to ask some questions, okay?
A Yes, sir.
Q So you check my reading. It says, "Dow Chemical company is interested in using Aroclor as a plasticizer in manufacture of their Saran

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(vinylidene chloride) plastics, but is hesitant for fear that the Aroclor vapor might produce toxic effects upon the personnel in their plants."

"At the request of sales department, this work was undertaken to determine the Aroclor vapor concentration in the Anniston plant under usual working conditions. This data would then be used in an attempt to convince Dow that the use of Aroclor in their plant would be safe."

Did I read that correctly?

A Yeah. One of the chemical pronunciations was a little bit off, but it's just fine.

Q I do have that problem. And then I'd like to ask you to skip down. We're going to read all these. Then I'll just ask you some questions. I want to give us a frame of reference.

Under Summary in the second paragraph there --

A Yes, sir.

Q -- beginning with the second sentence, "the chlorine concentration in the air varied greatly giving calculated Aroclor concentrations ranging from about .35 milligrams per cubic meter up to 5 to 8 milligrams per cubic meter."

Did I get that right?

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A Yes, sir.

Q The last paragraph on the page, "sampling of the air in the room revealed that the Aroclor vapor concentration rapidly reached a maximum, and then generally decreased to a relatively safe low level at three days."

"In the heated laboratory hood, the concentration remained in the 1.0 to 2.0 milligrams per cubic meter range over a period of about one month. In a heated room, it appears that the concentration of Aroclor 1248 may remain high for a long period of time."

Did I read that correctly?

A Yes.

Q And then if you could, turn please to the page that ends in DSW No. 70?

MR. SCHICK: Can I get any closer to that?

VIDEOGRAPHER: Yes, sir. The buttons, the T and the W, the T is -- zooms in.

MR. SCHICK: Thank you.

A You know, I had forgotten about that. Now I can place where you're at a lot easier.

BY MR. SCHICK:

Q Yeah, if you look at the screen, it's going to be easier for you to follow along, but you've got a copy in front of you as well.

A I'll look at the copy I have, thank you.

Q So again, if you'll just read along with me, "the chlorine detected by this apparatus can be attributed to three sources."

"1. Chlorinated hydrocarbons in the air (Aroclors, or any other chlorinated hydrocarbon)."

"2. Chlorine in the air as free Cl2 or as HCl."

"3. Chlorine ion present in the absorption solution and wash water."

And then they go on to say "Source No. 3 can be eliminated," and they give some reasons, and in the last paragraph that I've highlighted on this page, they say "the results from all the vapor tests include chlorine from Sources 1 and 2."

"Under normal plant conditions, however, chlorine from Source 2 should be relatively low, and the results are therefore assumed as chlorine from Aroclor."

Did I read that correctly?

A Yes.

Q And finally Doctor, if you would turn to

the page ending in 72, up at the top we have Conclusions. And Conclusion No. 5 is "the Aroclor vapor concentration in the room painted with Lustrex Latex Paint was sufficiently high (greater than 1.0 milligram per cubic meter) to make the room unusable for about three days."

"The odor and concentration of Aroclor 1248 diminished to a safe limit." And then Recommendation, "any recommendations on the lack of toxic effects of Aroclor in the concentrations found will have to come from the Medical Department."

"However, based on the present MAC of 1 million per cubic meter, it appears advisable to wear a mask or respirator if concentrations of Aroclor are high enough to be irritable to the nasal membrane."

Did I read that correctly?

A Yes.

Q All right. Now --

A May I ask a question?

Q You bet.

A For clarification. My assumption is the MAC means maximum allowable concentration.

Q I was just going to ask you that. Is that what you would assume it means?

A That would be my interpretation of it but I did ask the question, so --

Q Right.

A -- but I think that's what it is, just refreshing my memory.

Q Now, had you seen what's been marked as Exhibit 1 before today's deposition?

A This is the Exhibit you're talking about?

Q Yes, sir.

A Yes, I have.

Q And when was the first time that you saw that? And I guess pardon my interruption on the question, but I'm interested in knowing whether this was something that was provided to you in the '67, '68 time frame as you began your analytical work.

A It was not provided to me in the '67, '68 frame time (sic). It wouldn't really have been of interest to me at that point, because it wasn't part of what I was tasked to do.

Q Fair enough. Do you know what actions were taken by Monsanto pursuant to the recommendations that we just read in that report back in 1954?

A No.

Q Do you know whether on the basis of this

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report that was done to evaluate a use that a customer, Dow, wanted to make of PCBs, whether any warnings or information was passed on to customers by Monsanto at that time?

A Let me clarify something. This was a potential customer, right?

Q Well, it looks like Dow was a customer. They were looking to use PCBs in a new application.

A Okay, so who would you send the warning to?

Q Well, I'm asking whether the findings about toxicity over the maximum allowable concentrations and the presence of Aroclor in a heated room over a three day or longer period was passed on to anyone at that time to your knowledge?

A No. I don't have any knowledge of that.

Q Let me hand you what I've marked as Exhibit No. 2 to your deposition, Doctor.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 2)

BY MR. SCHICK:

Q If you'll look at -- have you seen this document before?

A No.

Q It carries the title, How Monsanto Controls Air and Water Pollution, and it's by -- it looks like Dr. H. E. Morris. Do you recognize that name?

A No.

Q Down at the bottom of the page I've highlighted, it says, "author is Associate Director of Plastics Division, Monsanto Chemical Company, Texas City, Texas. Paper presented at Southern Industrial Waste Conference, Houston."

Did I read that right?

A Yes.

Q And if you flip to the second page, you see the date of June. It appears to me to be 28 or 23 of 1954?

A Yes.

Q And I'd just like to read you the two short sentences or paragraphs that I've highlighted, okay? You with me?

A Yes.

Q "In 1952, Monsanto built plants in Texas City for the production of acrylonitrile and vinyl chloride. These operations brought with them a whole series of new disposal problems. We have adopted the policy that no process is complete

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unless it can be operated without pollution of air or water."

Then at the bottom it says, "study local waters...our experience would indicate that it is advisable to obtain toxicological data on marine life indigenous to the area in exactly the type of water characteristic of the plant outfalls."

Did I read that correctly?

A Yes, sir.

Q Now, you've not seen this document before today?

A No.

Q And -- but you know that Monsanto had facilities in Texas City outside of Houston, Texas?

A Yes.

Q Do you know whether this policy that is suggested about, you know, nothing is finished until -- we've adopted the policy that no process is complete unless it can be operated without pollution of air or water was adopted and implemented by Monsanto for the Anniston PCB facility?

MR. MERRILL: I object to the form of the question.

A Specifically about Anniston, no, I have no knowledge of it. But I do know that when I was with

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Monsanto, they had industrial hygiene that generated information and things of that sort, and they were concerned about this kind of stuff, and they did have policies that were similar to this.

BY MR. SCHICK:

Q Have you seen any evidence that any testing of fish was done in the outflows of water from the Anniston facility before 1966 by Monsanto?

A No, I don't. I was trying to remember when Dunning and Stuttkus and those people started doing their studies, their surveys on the creek. That's what I was hesitating about, but no, I don't.

Q It was certainly in the mid Sixties; I mean, isn't that your recollection?

A Yeah, and if that's true, they did have people, university people who were monitoring the flora and fauna in the Choccolocco Creek and Snow Creek and the Coosa River.

Q Not until 1966 at the earliest?

A That would be my guess, but it's strictly a guess.

Q You've seen no evidence to suggest that it happened any earlier than that, say between the date of this article in 1954 by a Monsanto person and those studies that you are aware of?

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A No.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 3)

BY MR. SCHICK:

Q Let me hand you what I've marked as Exhibit No. 3 to your deposition. This appears to be a Monsanto Chemical Company document dated September 20, 1955 from a Dr. J.W. Barrett regarding the memo of September 8, regarding Aroclor Toxicity.

You've seen this document before, I assume?

A No, I have not.

Q You've not seen it before today?

A No. This was written in 1955?

Q Yes, sir.

A No, I have not.

Q Okay. So this was not one of the documents that back in the '67, '68, '69 time frame you would have been given by others, by Dr. Keller or others at Monsanto as a part of your analytical work; am I correct about that?

A That's correct, and let me just clarify something in the sense that I was not a toxicologist.

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Q I understand.

A So that wasn't my area of interest. What they'd asked me to do is verify the analytical methodology that had been used to initially identify the compounds, and then reproduce that in our laboratory to our own satisfaction.

So the toxicology, while it's important, there's absolutely no question about it, and there was a lot of effort that went on in that kind of thing throughout that company throughout their whole existence.

It wasn't something that I would have been -- important that I would be apprised of.

Q But what you were doing was coming up with analytical tools to measure the presence of PCBs which then others like toxicologists within the company might use in doing their work with respect to toxicology, true?

A Yes.

Q All right. If we could look at the paragraph, a couple sentences here I've highlighted in this September 20, 1955 memo, it says, "as you know, the maximum allowable concentrate is .1 milliliters per cubic liter in the case of 1254, and as high as 10.0, I presume, milligrams in the

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case of 1268."

"I think the former is too low, and the latter is too high. In this country, they don't use the MACs very routinely, but certainly in England I think it would be all right to consider .2 milligrams per cubic meter as perfectly safe."

Did I read that correctly?

A Correct. Where it says the maximum allowable concentration is .01 milliliters per cubic meter, I think that should probably be milligrams, wouldn't you?

Q Yes, because it's certainly that way everywhere else.

A I mean, because --

Q Right, and of course, when we're talking about 1254 and 1268, we're talking about particular Aroclors, correct?

A We're talking about products that were manufactured to have 54 percent chlorine in them, or 68 percent chlorine in them.

Q Right. Now, if you go to the last paragraph on this page, it says, "MCC." MCC would be Monsanto Chemical Company?

A Yes.

Q "MCC's position can be summarized in this

fashion. We know Aroclors are toxic, but the actual limit has not been precisely defined. It does not make too much difference, it seems to me, because our main worry is what will happen if an individual develops any type of liver disease and gives a history of Aroclor exposure."

"I am sure the Juries would not pay a great deal of attention to MACs."

Did I read that correctly?

A Yes, you did.

Q And again, MACs, we're talking about maximum allowable concentrations?

A Right, and I'm not sure who was responsible for the MACs.

Q Fair enough. Let me just ask you these questions about this document, Doctor. First, when you began your work, I think you told me that Dr. Keller told you we've had reports of a suggestion that PCBs may be toxic; you knew that?

A I don't recall seeing that. I recall that we had -- I think you might have said that, and I might have said yes to it as a question that was a multiple part question.

I was appraised of the fact that there were PCBs, materials in the environmental samples

that either had not been identified before that were now being identified as PCBs, and that there was conjecture about the fact that they might have a toxicological effect, which they wouldn't have, of course, if they weren't there.

Q And of course, we'll talk in a minute about sea eagles and rabbits and fish, but this document dated September 20, 1955 speaks about what would happen if an individual, and clearly a human individual, developed any type of liver disease; is that fair, that that's what that's speaking of?

A The question is is that what the document says, yeah. It's an indication of the industrial hygiene concern of human exposure during -- in the work place.

The target for chlorinated hydrocarbons is normally the liver, is the first thing that comes up as sensitive.

Q Okay, so that's known -- that's a known effect of chlorinated hydrocarbons?

A As a classic compounds in general, especially solvents like carbon tetrachloride and chloroform and vinyl chloride, things of that sort.

Q And polychlorinated polyphenols are -- or biphenyls are a subset of chlorinated hydrocarbons?

A Correct. They're generally referred to as chlorinated hydrocarbons.

Q Come out of benzene as the initial --

A Chlorinated benzenes are chlorinated hydrocarbons.

(Brief Cell phone interruption.)

BY MR. SCHICK:

Q So back in September of 1955 then, it had long been known that there was a toxic effect, and in particular with respect to the liver, from exposure to chlorinated hydrocarbons as a general class?

MR. MERRILL: Object to the form of the question.

A Yeah, that is a pretty big extrapolation there. I would say in 1955, the memo establishes that that was known, but when it was discovered and the process by which it became known, it really doesn't address.

BY MR. SCHICK:

Q Right, but do you know that, that it occurred before 1955?

A Do I know that the --

Q That the toxic effect on the liver --

A Had been noted before that?

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Q Yes.
A I don't have specific information that told me before 1945 everybody had concerns about that, but I do have information that says in a general routine that chlorinated hydrocarbons do target the liver if they're ingested, and it can cause some problems.
Q And ingestion can be -- includes inhalation?
A Every way that you can get it into your body, and that includes inhalation, yes, sir; absorption, you know, consuming.
Q Right, okay. Thank you.
(Whereupon, marked for identification purposes, Defendant's Exhibit No. 4)
BY MR. SCHICK:
Q Let me hand you what's been marked as Exhibit 4 to your deposition. And Doctor, this is a January 21, 1957 memo from an Emmet Kelly. If you look at the bottom there, it says Emmet Kelly, MD, regarding Pydraul 150. Was Pydraul 150 a product sold by the Monsanto Chemical Company?
A Pydraul was a trade name for Monsanto products they were manufacturing.

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Q And this -- and Pydraul contained chlorinated hydrocarbon, correct?
A Yes.
Q In fact, it was a chlorinated hydrocarbon?
A It was a functional fluid, if I remember correctly, and that was probably one of the components.
Q Well, certainly Aroclor was a component to be more precise?
A The product name that Monsanto used, Aroclor, but PCBs were --
Q In Pydraul?
A Yes.
Q Now, did you see that document during your employment at Monsanto?
A No.
Q So again, this is not one of the documents that you would have reviewed in the '67, '68 time period as you began your analytical investigation, correct?
A It is not one of the type of documents that I reviewed.
Q All right. And if you could just read along with me what I've highlighted here, it says, "Dr. Treon and I spent an afternoon with the Navy

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people to discuss Pydraul 150."

"Skin applications of Pydraul 150 caused death in all of the rabbits tested." The next part I've highlighted is "the inhalation of 10 milligrams of Pydraul 150 per cubic meter, or approximately 2/10ths of the Aroclor component per million for 24 hours a day, for 50 days caused statistically definite liver damage."

"No matter how we discussed the situation, it was impossible to change their thinking that Pydraul 150 is just too toxic for use in a submarine."

Did I read that correctly?

A Yes.

Q Now, do you know what attempts were made, if any, by Monsanto to duplicate, or to confirm or contest the findings of the Navy with respect to its tests of Pydraul 150 back in 1957?

A No.

Q Did you ever hear about a discussion about follow-up testing that Monsanto thought ought to be done when the Navy presented them with these findings?

A No, I did not. This was in 1957, right?

Q Yes, sir.

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A I was in high school at that time.
Q Well --
A I'm teasing a little bit. I keep looking at the dates hoping we'll get to something more recent.
Q We're getting there. In fact, we're about to get there, but the reason I ask you, Doctor, and the reason I asked you the first question I did with respect to this document is you weren't given this document and others as a part of the background work that you began in late '67, early '68 as you got into the analytical testing and technology for identifying PCBs, true?
A True.
Q Okay. Nobody said, look, Dr. Tucker, newly-minted Ph.D., we're so glad to have you on board, we need some better analytical tools to identify precisely what PCBs, what Aroclors, what -- which benzene rings may be causing some issues that we've seen over the years, and here's some of those issues just to give you background; that didn't happen?
MR. MERRILL: Object to the form of the question.
A Yeah, that's a multiple question, part of

which I can answer, and part of which I can't. So, I'm not sure what parts I should answer and what parts I shouldn't --

BY MR. SCHICK:

Q The only question is --

A -- I'm qualified to, I should say.

Q The only question is, did anyone at Monsanto ask you the sort of question I just asked--

A Part of that question, they did. They said --

Q Which one?

A Would you please verify that the methodology that's been used is really identifying the constituents of the samples they looked at, that they're polychlorinated biphenyls.

Q But did they make reference to the Navy study on Pydraul?

A No.

Q Did they make reference to the September 20, 1955 memo that we've discussed?

A No.

Q Did they make reference to the Texas City findings with respect to fish and the need to examine fish?

A No.

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MR. MERRILL: I'll object to the form of the question. I didn't have a chance to get that out before you answered.

THE WITNESS: Sorry.

BY MR. SCHICK:

Q All right. Is today the first time you've heard about the Navy report that we've just looked at?

A Yes.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 5)

BY MR. SCHICK:

Q Let me hand you what I've marked as Exhibit No. 5 to your deposition. Now we're jumping ahead to your time period.

A Okay.

Q At least we're getting close. Top of page--

MR. MERRILL: Bob, do you have a copy? If I have a copy, I don't have to turn around.

THE WITNESS: I was going to say, because you didn't get one. Maybe he should pass you mine.

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BY MR. SCHICK:

Q Up at the top of the page here it says Sweden, and then the title says Organochlorine Residues, OECD Preliminary Study, 1956-1967.

If you turn to the third page, third page of the document, I've highlighted -- meant to highlight Soren Jensen, Gunnar Widmark, September 14, 1967.

A Yes.

Q You are familiar with Jensen and Widmark?

A Yes, very similar.

Q You are familiar with the study that they did.

A Yes.

Q In fact, you are familiar with Exhibit No. 5?

A Yes.

Q You had seen it before?

A Yes.

Q You had been asked questions about it before?

A And I've even asked questions about it myself.

Q Did you ever ask questions of either Mr. Jensen or Mr. Widmark?

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A No, I did not.
Q Have you ever spoken with either Mr. Jensen or Mr. Widmark?
A No, I have not.
Q Did anyone suggest either that you should, or that you shouldn't speak to Mr. Jensen or Mr. Widmark back in '67, '68?
A We had a group of people from Monsanto who visited Soren Jensen and Gunnar Widmark, and also some of the people from our British subsidiary over there. And I couldn't work on what I was working on and visit them, so we sent some other people, so I didn't get to go visit them; however, I would have liked to.
Q Okay, and we'll get into some of the folks in Monsanto's European operations and what they had to say.
A What that means is that my boss went.
Q Okay. Mr. -- Dr. Keller did?
A Yes, sir.
Q Good deal. And by the way, do you concur with the conclusion that they reached with respect to the sea eagles that what they found there was PCBs, polychlorinated biphenyls?
A Yes. Eventually I did concur with that

after I validated the methodology and that kind of thing. What I really validated was that is using the techniques they did, if -- and they did the eagle feathers, that what they found were PCBs, but I didn't validate -- I didn't measure the material of the eagle feathers, to be real truthful with you.

Q You didn't measure --

A I didn't have the samples they used, but I could say that the technique and the information they published was valid based on the techniques that they employed, because I had been able to reproduce those in my laboratory.

Q Fair enough. And by the way, they were using gas or liquid chromatography?

A Yeah. We all used gas or liquid chromatography, or just gas chromatography it's referred to nowadays.

Q So you confirmed that what they found in the '66, '68 time period was indeed polychlorinated biphenyl on the feathers of an eagle?

A I verified that the methodology they used when used on samples the way they said they did could be used to identify if polychlorinated biphenyls were present.

Now, did I verify it in the eagle

feathers, no.

Q I understand.

A But I didn't doubt that it was there, because were, you know, professionals.

Q And good technique used?

A Yeah.

Q Valid technique?

A Yes, and I validated those techniques by reproducing in my laboratory, which is a common thing that scientists do.

Q Sure. Okay.

A In fact, we like other scientists to do that so we know we're correct.

Q Part of the deal, isn't it?

A That's absolutely right.

Q Known as the scientific method?

A That's it.

Q Or at least a part of it. Let me show you what's been marked as Exhibit 6 to your deposition.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 6)

BY MR. SCHICK:

Q This appears to be an in internal document dated January the 12th of 1967 from a Mr. Hardy.

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Was he your man i London?

A Yes.

Q And if you'll read what I have highlighted here, he says, "on 2nd January 1967, Mr. A. Richardson of Shell Chemicals' Tunstall Laboratory, Sittingbourne, Kent, talked with me over the telephone concerning the Swedish press report relating to the identification of polychlorinated biphenols" with an 'O,' "as trace contaminant in sea birds, fish, et cetera."

And then if you read on, "just as Soren Jensen reports he has obtained spectrographic evidence that these are very similar, if not identical with Aroclors. Mr. Richardson was quite sure that the compounds reported to be polychlorinated biphenols" with an 'O,' "are really meant to be polychlorinated biphenyls," with a "Y."

Did I read that correctly so far?

A Yes, sir.

Q And do you agree with Mr. Richardson's conclusion that he made to Mr. Hardy that if it was reported as polychlorinated biphenyls with an "O," it was really meant to be polychlorinated biphenyls, PCBs?

A It was a misusage of terminology or a

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typo.

Q But that got resolved early on?

A That's right, as I indicated earlier.

Q And when he's talking about sea birds and fish, certainly the sea bird refers to the very study we just looked at that Widmark and Jensen did, true?

A Yes.

Q And then the next highlighted sentence says, "I discussed with Richardson the soundness of Jensen's claims and was assured that his work and findings are sound."

Do you see that?

A Yes, I do.

Q So this is an in-house Monsanto individual discussing the Jensen/Widmark report findings and analysis, and recording those on to the company in January of 1967, correct?

A Yes.

Q And he concluded, or at least he reports that Mr. Richardson at Shell found Jensen's claims to be sound, and his findings also sound?

A Correct.

Q Which you also later confirmed?

A Correct. The only problem I have is that

it became common to generically to identify Aroclors as -- PCBs as Aroclors. And of course, there are a lot of other manufacturers in Europe, so it wasn't necessarily PCBs that would be of the Aroclor variety that were being found. It could have come from Czechoslovakia or Russia.

Q There very few companies though, even in Europe that actually manufactured PCBs?

A Well, actually, I don't think that's true, but that's just my opinion.

Q In the United States, it was Monsanto.

A It was one, that's correct. That's very few companies --

Q Right, yeah. And of course, Aroclor was the trade or product name that Monsanto applied to its PCBs?

A Correct.

Q And each PCB, or each Aroclor would be designated depending on how many carbons are on the two benzene rings, right?

A Yeah --

Q We talked about 1250 --

A 1200 referred to the fact that it was a biphenyl molecule, and the next two digits referred to the degree of chlorination of that particular

product. And since there were no other standards available, and since we were the people that made these readily available to everybody when they needed them to be able to measure them, it just became generic to refer to PCBs as Aroclors, which was incorrect.

Q Aroclors also will contain more than one homologue?

A Yes, sir.

Q Doctor, let me show you what I've marked as Exhibit No. 7 to your deposition.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 7)

BY MR. SCHICK:

Q Were you provided with a copy of this document back when you began your work later in the year '67, or in 1968?

A I don't remember when I was given it, but I do recall seeing it.

Q Monsanto was headquartered in St. -- I mean, this is a Monsanto document, right?

A That's correct, by Emmet Kelly.

Q Okay. Same Doctor who met with the Navy back in 1957?

A Absolutely correct. Emmet was the head of all the medical stuff which included the toxicology, industrial hygiene, employee exposure and all that kind of stuff.

Q Okay, and he reports that he talked to Dave Wood in Brussels this morning. And then in paragraph 2 he says, "his customers in Europe are seemingly less concerned than they were, especially since there has been no particular government activity, and no increase in the newspaper articles."

"The customers would like some reassurance on the toxicity of Aroclor (I explained to Dave that there was just was no information available on the action of nanograms of Aroclor in the human body over a life time)."

"There is no toxicological work going on at present in Sweden, and it appears that there is some likelihood that it will not be able to -- that it will not be able to obtain financing and might not be done."

"Everybody over there is one hundred percent convinced that what Jensen and Widmark found was Aroclor."

Did I read that correctly?

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A Yes.

Q Now, do you know whether anyone pointed out to Mr. Kelly, or reminded Mr. Kelly about the toxicity findings by the Navy?

A No, I don't, but I would mention that the level of study by the Navy were not in nanograms for sure.

Q Right, okay. So you think he's just referring to tiny, tiny exposures, nanograms?

A My opinion is, and understanding of what Emmet was referring to was that the levels at which Soren Jensen and Gunthar Widmark were seeing PCBs, not necessarily Aroclors in the environment, and that was not in the levels that I think we reviewed earlier in the Navy study.

So there had been no real toxicological information at that point in time that had been generated at such a low level.

Q Fair enough. Paragraph number 2 says "there is no necessity at present for anyone from St. Louis to contact the Swedish people. In fact, it would be unwise at present."

A Did you read it correctly, or --

Q Did I read it correctly?

A No, no, you -- was that a question?

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Q Did I read it correctly?
A Yes.
Q Now I did?
A Yes, you did.
Q All right. And did you ever talk to Mr. Kelly about why he would have said don't talk to the Swedish people, or it would be unwise?
MR. MERRILL: Dr. Kelly, by the way.
BY MR. SCHICK:
Q Dr. Kelly.
A Yes, it's Dr. Kelly. No, I did not. I would have no reason to.
Q Okay. The last sentence I've highlighted, "unless something unusual happens in the United States, I would be of the opinion that we should do no further action until we have time to evaluate this information."
Did I read that correctly?
A Yes, sir.
Q And in fact, nothing did happen for quite sometime after that; is that correct?
MR. MERRILL: Object to the form of the question.
A That's a pretty broad statement I'd have to say is not true.

BY MR. SCHICK:

Q Okay. We'll get into your work in a minute, but right now we're going to have to take a break because we're out of tape.

A Okay.

VIDEOGRAPHER: This marks the end of tape number one in the deposition of Dr. E. Scott Tucker. Going off the record. The time is 10:02 a.m.

(Recess 10:02 - 10:10)

VIDEOGRAPHER: This is the beginning of tape number two in the deposition of Dr. E. Scott Tucker. The time is 10:10 a.m.

BY MR. SCHICK:

Q Are you ready to continue, Doctor?

A Yes, sir.

Q So when we took our break to change tapes, we were talking about this February 21, 1967 letter, and Dr. Kelly's conclusion that unless something unusual happens in the United States, I'd be of the opinion that we should do no further action until we have time to evaluate this information.

And with that as our backdrop, I wanted to hand you what I have marked as Exhibit 8 to your

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deposition, which comes 6 days later from Dr. Kelly.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 8)

BY MR. SCHICK:

Q It's dated February the 27th of 1967, and it is apparently addressed to Dave Wood, whose name we've seen before in Brussels, right?

A Yes, sir.

Q Both Monsanto folks?

A Yes, sir.

Q And what I've highlighted here, Dr. Kelly is thanking Mr. Wood for some information he sent. Then he says where I've highlighted, he said, "there is no question but that Aroclor does possess a certain amount of toxicity."

Then he says, "I think we should fight the battle of the analytical method first before we get too involved with toxicology."

Did I read that correctly?

A Yes, you did.

Q We've talked already a bit about the fact that your specific job later that year when you arrived in the fall of 1967 was to look at the analytical techniques, analytical tools, analytical

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validity of what was being used to measure and assess the presence of PCBs, correct?

A Yes.

Q And it was a necessary prerequisite to a good full understanding of toxicology, correct?

A Absolutely. If you don't know the concentrations accurately, you can't understand what the exposure levels are and correlate them with whatever you see.

Q What attempts were made before you showed up as a newly-minted Ph.D. later that year by Monsanto, either earlier in the year, or sometime previous, to do what you ultimately did; that is, fight the analytical battle?

MR. MERRILL: Object to the form of the question.

A Fight the analytical battle?

BY MR. SCHICK:

Q I'm just using Dr. Kelly's --

A That's right, no, I just -- you know, I wouldn't put it that way, but do that question for me again so I can try to answer it correctly.

Q What work to your knowledge was done by anyone at Monsanto before you arrived in the fall of 1967 to fight the battle of the analytical method?

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MR. MERRILL: I'm going to object to the form of the question.

A The battle of the analytical method had to do with whether or not it was valid or not. Hadn't been many scientists who had really taken the methodology that had been around for a while and applied it to PCBs.

Soren Jensen was the first, and we probably were the second, with the exception of maybe Shell who had gotten involved in there, too.

BY MR. SCHICK:

Q Soren Jensen and Widmark, we knew about their results the very beginning as we saw of 1967, January of 1967, when we had the discussion with the fellow, Richardson, at Shell.

This letter we're looking at now is in '67, and my question is who at Monsanto was doing then what you did later, if you know?

A Well, it had to be nobody, since we did that, but it had to do primarily with the specific matrix we were dealing with, and not necessarily with the techniques. Gas chromatography and those things had been around for a while.

The electron capture detector was actually invented in 1960, but not really understood very

well until 1968 by Dr. Lublock, I believe it was.

Q Okay. Let me show you what I've marked.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 9)

BY MR. SCHICK:

Q To narrow my question just a bit, Dr. Tucker, between the time of this letter in February of 1967 and the time that you arrived in September or October of 1967, who was looking at the refinement of the analytical method at Monsanto, or was it no one, to your knowledge?

A There could have been people doing it, but it would have been -- had to do with the applied sciences chromatography group, gas chromatography group, but I wasn't aware of anyone that had done any specific work like what I was tasked to do.

Q And when Dr. Keller assigned you your task, he didn't say, oh, I want to go talk to those guys who had been doing this very thing that I'm asking you to do for the last two years?

A No, actually what he told me to do is go see -- what the devil was his name -- the head of the gas chromatography group, and he thought they had an electron capture detector, and that I should

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see him and see if I could take a look at that and find out what electron capture was all about, because, you know, it was just really coming into its own. Nobody was real familiar with that stuff at that time, and I believe I did that.

Q But of course, they weren't looking, and they weren't using that instrument to analyze PCBs that were being reported as found in the environment?

A I don't think they were. I think the detector was so sensitive that the type of analysis they were doing at the level they were doing, they didn't know how to use it at that point in time, but they were trying to learn.

Q Well, did they go talk to Jensen and Widmark?

A No.

Q Let me show you --

A But Keller did, and he was their boss, too, as well as mine.

Q Well, I mean, did something -- I haven't seen any documents, though, that predate your employment where there's any exchange between anybody at Monsanto, and Jensen and Widmark about the validity of the analytical analysis and the

analytical tools, and so that's what I'm looking for.

A Okay --

MR. MERRILL: Object to the form of the question, if there is a question.

A The reason --

MR. MERRILL: Is there a question? What's the question?

MR. SCHICK: He understands the question.

MR. MERRILL: I don't think there was a question at the end of your question. I think it was a statement.

BY MR. SCHICK:

Q Go ahead. You began answering.

A Jensen was quite sure of what he had done, and he was the bench level person. Gunthar Widmark was the Director of the Institute, and he wasn't quite sure about what Gunthar had done yet, and so he was very reluctant not to be conservative about the interpretations.

So Gunthar had put -- had slowed Jensen down and said, gee, we need to -- there's some ramifications may be associated with this, possible, and we only need to slow down and make sure we're

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correct, and I want you to do more work and things of that sort, and that caused a lot of dissention during that period of time.

Q And that really is what Dr. Kelly was talking about when he said I think we should fight the battle of the analytical method first, isn't it?

MR. MERRILL: I'm going to object to the form of the question.

A I think what he's saying is we'd better figure out this analytical stuff first.

BY MR. SCHICK:

Q Okay, fair enough.

A I don't know if that's an answer to your question or not.

Q Let me hand you what I've marked as Exhibit 9 to your deposition, and in fact, we're still February -- in fact, the same date, February 27, 1967.

This is a letter again from Dr. Kelly, Medical Director, to a Dr. Thomas who's in the Research Division of National Cash Register in Dayton, Ohio. That's the company that was once known as NCR, right?

A That's correct.

Q You're familiar with them.

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A Yes, very familiar.

Q NCR had a product they made. It was called carbonless paper, right?

A Carbonless carbon paper.

Q Right. And he says, "Dear Dr. Thomas, attached is a photostat of the original paper of Dr. Jensen in Sweden relating to polychlorinated biphenyls."

The second paragraph, "as far as this section on toxicology is concerned, it is true that chloracne and liver trouble can result from" -- appears to be "large doses."

The last paragraph, "at any rate, I believe before we worry about the toxicological part of the problem, we should" -- something -- "the analytical part."

Did I read that correctly?

A Yes.

Q So Dr. Kelly is passing on to Dr. Thomas at NCR the report of Jensen clearly relating to PCBs. We've known for a long time about chloracne and liver trouble resulting from doses, but he repeats what he said in his earlier letter that we looked at, now to a different audience, that before we worry about toxicity, we need to settle the

analytical analysis, right?

A That's my interpretation of the memo, too.

Q All right. Could you turn to the second page of the document? There is sort of a summary of -- and it appears to be a speech that was given that he's attached here.

And he gives kind of a summary of some of the reports of an association between PCBs and various effects, and I just want to read the highlighted portions.

"In 1937, Drinker reported that rats exposed to color made biphenyls and concentration of approximately 1 milligram per cubic meter for 16 hours a day for 6 weeks, showed damage of the liver."

"After that time, he allowed concentration of PCB and air is .5 milligrams per cubic meter." Then he says, "the name authors finished their experiments in 1938 and related that those compounds have an injurious effect manifested solely in the liver."

"Chlorinated biphenyls appear to be the most injurious chlorinated compounds of all tested."

Did I read that correctly?

A Yes.

Q On the next page, "Miller, 1944, injected 69 milligrams PCB, 4 and 5 chlorine, subcutaneously in 32 guinea pigs. Eight to 10 days after injection, fat droplets were noted in the liver cells, and after 16 days, they were moderate or very large numbers."

"Rabbits and rats were also tested in this investigation, as well as the PCB was administered both continuously, subcutaneously or ingested in the food."

Did I read that correctly?

A You're reading is correct.

Q Okay. Here is my question. Were you given a copy of this document marked as No. 9 to your deposition when Dr. Keller assigned you the task of looking at analytical validity of various methods in the fall of 1967 and the beginning of '68?

A Yes. At about that time, I was, and I would like to point out, this is a lecture, and not a published paper. The actual publication of this came later.

Q Right. No, no, no, and I meant to say it appears to be comments of a lecture.

A And the point I'm trying to make from a

scientific viewpoint is that it had not been peer-reviewed in any way, shape or form outside of their actual institute.

Q Okay, fair enough. And the Jury will have heard about peer-review by the time they see your testimony. But let me just be clear about something. This is Dr. Kelly at Monsanto asking for any ideas that somebody at NCR might have, right?

MR. MERRILL: Object to the form of the question.

A You know, I really can't put myself in Emmet Kelly's shoes, but I can say what I think's going on here. I mean -- but I don't know whether that would be true or not. I don't know if it's worthwhile.

BY MR. SCHICK:

Q Well, do you -- let me just ask you this question. Do know whether Dr. Kelly sent a similar letter to, for example, Alabama Power Company, in Alabama?

A I don't know, but it wouldn't surprise me, since that seems to be what we're getting at here, is that Monsanto shared this information with our clients, who were using the materials.

Q I haven't seen any indication in all the

documents that we've received and reviewed, Dr. Tucker, that any of this information was shared with Alabama Power, or for that matter, with anyone other than NCR. Do you have knowledge to the contrary?

A No. I was a little more cosmopolitan about the concept and not about the specifics, so I don't know that Alabama Power ever got anything.

Q Fair enough. Let me -- do you know whether anybody other than NCR did?

MR. MERRILL: Object to the form of the question.

A You mean at this point in time --

BY MR. SCHICK:

Q Yes, sir.

A -- or ultimately?

Q No, no, at this point in time.

A No.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 10)

BY MR. SCHICK:

Q Let me show you what I have marked as Exhibit 10 to your deposition, Dr. Tucker. This appears to be an April 6, 1967 document, and it's

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from Mississippi State University. You've seen this document before?

A I'm sure I have. Is it two documents, or just not completely stapled together?

Q You know, I --

A I think the staple is falling apart, but that's okay.

Q I -- oh, the staple is falling apart. I apologize.

A Not a problem. This is one document?

Q You can grab Mr. Merrill's, if you want.

A Does it matter whether the --

Q No.

A -- I work with the Defendant's --

Q We'll give it back to the court reporter, I promise.

A Sorry about that.

Q Okay, so Mississippi State University, April 6, 1967. "The following report includes a summary of some of our refining water quality data collected March 22, 1967."

Now, did you come to learn why that water was being evaluated, Dr. Tucker; and specifically, it was being done because there had been some reports of fish kills in the waterways in Anniston?

A I know Denzel Ferguson, and in fact, spent some time with him at Mississippi State University discussing chlorinated hydrocarbons and how they, you know, worked in the environment and what they discovered, and what they were doing.

They were doing some pretty creative work, but they were more involved with toxicology than the analytical aspects of it, if I remember correctly. This is a long time ago.

Q The reason they were doing the water sampling was because there had been some findings of toxic effects in fish in the waterways around Anniston, true?

A I'm sure they could -- I'm sure that's what -- was the reason.

Q And then I've highlighted only a couple of these, because I don't want to go through all of them. We've got Choccolocco Creek. You're familiar with Choccolocco Creek, right?

A Yes, I am.

Q Four miles east of Boiling Spring?

A Yes, I am.

Q And a test is done. It says DOPPM. What's the DO stand for?

A I would assume dissolved oxygen.

Q So when we have in Choccolocco Creek at the surface 8.9, and I assume that's 8.9 PPM, what are we talking about?

A If you're going to ask me what it means, that's different from what we were talking about. I think we're just talking about the concentration of the oxygen in the water.

Q Is that what 8.9 is?

A I'm sure that's what I would -- that's the conclusion I would draw based on the limited information I've been given so far.

Q And to this day, February 18, 2010, you know no different from what you just told me, correct?

A Sounds good to me. Yes. It's a long time.

Q If you will flip to the page -- page 4 of this letter, I've highlighted -- it says, "note the clean sample from the fish taken upstream. Many of peaks in the downstream fish are those we have found in Snow Creek."

You see that?

A Yes, sir; I do.

Q Do you understand that by upstream, what's meant in this particular letter is above the

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effluent discharge from the Anniston Monsanto plant?

A If my recollection is correct, the Choccolocco Creek starts up here and comes down, and Snow Creeks starts here and comes down and intersects here, at the Anniston Water Treatment Plant.

The Anniston Plant is right about here, up Snow Creek, and it's discharge came down and went through the treatment plant, and then back into the Choccolocco Creek, and then Choccolocco goes down through -- I forget what it's called, some -- and then it goes on to -- it actually goes into the Coosa River, if I remember correctly. Is that your recollection?

Q Sounds right.

A That's my recollection.

Q My only question was upstream means up above where effluent may be discharged by the Solutia Plant?

MR. MERRILL: Object to the form of the question.

A I don't know, but I would agrees that it's above Snow Creek.

BY MR. SCHICK:

Q Okay, and Doctor, do you know whether the

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data reported by Mississippi State University in April of 1967 was shared with others outside of Monsanto; and specifically, I'm referring to, for example, officials at the City of Anniston?

A You know, it wouldn't surprise me in the least. He was a University Professor, and he was a scientist, and the reason he did all this stuff was so that he would publish it and share it.

Q My question is do you know whether Monsanto shared this data?

A No, I don't know if they did or not.

Q By the way, who hired Mississippi State to do this work, if you know?

A I don't know, and it's not evident, I don't think, from this information. Doesn't sound like a report -- somebody that's paying for the study.

Q Back in April of 1967, did anyone at the Technical Services Department with Monsanto compare any of the findings of these researchers in Mississippi with the findings of Jensen and Widmark in Sweden?

A Not to my knowledge.

Q Or with Miller, whose results were apparently published in 1944?

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A Not to my knowledge. I should point out, that this was about pesticides that they were finding, and not PCBs; is that correct? I hadn't had time to look at it all to refresh my memory, but...

Q I don't think that's correct. Please feel free to --

A Just referring to the first chromatogram in the article that deals -- that shows DDT and --

Q And DDE?

A Which is a metabolite, and it shows heptachlor peroxide, or oxide -- epoxide, and malathion, and a bunch of other stuff. Phthalate, it looks like, but I don't know any reference to PCBs.

Q But what they found were problems that they could -- that is, problems in the fish that they could not attribute to the pesticides?

MR. MERRILL: I object to the form of the question.

A I don't know. You're getting into an area -- I just was looking for PCBs in the article. I didn't find it.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 11)

BY MR. SCHICK:

Q Let me hand you what I've marked as Exhibit 11. Before I do that, let me just show you where I got that last one. I don't want you to think I was making that up.

A No. Can you verify the last point for me?

Q Yeah. I've just highlighted it. The peeks do not match these times perfectly, indicating that they are not pesticides do you see that?

A Yes, I do.

Q All right. Let me show you Exhibit No. 11, and we have our first document with your name on it dated August 5, 1968, true?

A Yes, sir.

Q To you from Mr. Garrett, the General Offices of Monsanto, correct?

A Yes, sir.

Q And he's asking you to do -- whether you're ready for some water samples for Aroclor analysis. Wants you to tell him what he's supposed to do with them, right?

A Yes, sir.

Q And he's talking about samples from the Anniston area, from the Anniston Monsanto Plant?

MR. MERRILL: Object to the form of the question.

A I'd have to read this to verify that.

BY MR. SCHICK:

Q Go ahead.

A Thank you. Yes. What threw me off was the associated Illinois Waste Treatment Plant just above the sentence that I finally got to, which is the Anniston Plant, so yes.

Q Okay, and were you able to do those analyses; that is, the analyses of the water samples for Aroclor?

A I'm not sure whether we were exactly ready, but we were able to do the analysis eventually after -- shortly after this, sure.

Q And certainly to your knowledge, no one at Monsanto had done any analysis for Aroclors of water samples before you did; that is, water samples in the Anniston area?

A Correct. By electron capture gas chromatography for specific levels and things of that sort. There's a lot of qualifiers.

Q If you flip to the second page of this

document, it has some objectives, you know, sort of project, electrical fluids, air, water pollution. It says Objectives, and I've highlighted a couple things.

"Keep in touch with laboratories doing research on environmental contamination by Aroclors, including Universities, FDA, USDA, Fish and Wildlife Service."

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

"4. Assess possible toxic effects on humans."

Did I read that correctly?

A Yes.

Q And was that the overall project at which you were just one part with respect to analyses and chemical analyses?

A It was part of the over -- project, part of which I was associated with.

Q Fair enough. Under Justification, I've highlighted the following. "Public health authorities have therefore felt that it was necessary to determine whether or not any environmental contamination by chlorinated biphenyls is a hazard to human life or health."

"It is vital that we cooperate in these studies so that we can be sure that the results are valid, and so that we can assess the impact of the findings on the Aroclor business. We may need to cooperate in developing disposal procedures which will not result in harmful contamination in order to avoid restrictive legislation."

Did I read that correctly.

A Yes, sir.

Q Then if you flip to the next page, there is an outline of various responsibilities. I've highlighted ST. Is that you?

A I've been known to be referred to as a/k/a. Yes, it's me.

Q All right, and it talks about in the first line, assessing the validity of analytical methods used by workers in the field, then collecting information on all work being done by others, and then your name is included at the last one, along with Elmer Wheeler, Dr. Wheeler.

"Toxicology, review with government agencies, research institutes start outside test program."

Did I read all that correctly?

A Yes, sir.

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Q So those were all parts of your function in this overall plan that Monsanto is distributing internally in July of 1968, true?

A Correct.

Q And they've even got an estimate of how many man years it's going to take from 1968, and it's even got the estimated costs, right, $25,000 for Calandra Labs?

A Yeah. That was -- that's industrial bio tests, and that was for the initiation of the toxicology studies.

Q And $25,000 for the metabolic study?

A And again, that was for the initiation.

Q And for what; what were they to do?

A Study the toxicology, and as it impacts laboratory animals, I would guess.

Q Do you know whether they were furnished with the information that Monsanto already had from the Navy in 1957, from Drinker in '37, or Miller in '44?

MR. MERRILL: Object to the form of the question.

A No, I don't know, but it wouldn't surprise me if Emmet Kelly through Elmer Wheeler had given him that information.

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MR. SCHICK: Object as non-responsive to -- after no, I don't know.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 12)

BY MR. SCHICK:

Q Sorry. Okay. Let me show you what I have marked as Exhibit No. 12 to your deposition. And we're just sort of moving in time here. Now we are to October of 1968. Your name appears as a CC, as you put it earlier.

And do you remember this document; does this look familiar to you from Dr. Wheeler?

A Let me look at it to be sure, please.

Q Yeah, go ahead.

A Yes, I do remember it. We picked it up in Washington.

Q Right.

A Okay.

Q This is the Risebrough paper?

A Actually, it was the first indication to the Risebrough paper, yes.

Q So what I've highlighted then is, "attached is a xerox copy of a technical paper which Scott Tucker and I picked up in Washington

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recently."

Skip to the next paragraph. "Risebrough's presentation, the attached, was made at a meeting of 20 to 30 Toxicologists held at the University of Rochester in June."

So it was a meeting of Toxicologists, but you, as an Organic Chemist, also attended, true?

A Organic Analytical Chemist, correct.

Q And then --

A Time out.

Q You bet.

A I did not attend the meeting of the 20 to 30 Toxicologists. It was a paper that was presented at that meeting that we obtained in Washington.

Q I understand. Gotcha, right. Okay. And then the last paragraph that I've highlighted, it says, "in a few words, Risebrough has found PCBs along with chlorinated pesticides in a number of species of fish and birds along the California coast, as well as in the waters of Baja, California and Central America."

"He further reports PCB in fish from the Channel Islands and Puget Sound. No PCBs were detected in the liver of tuna taken in the Galapogos Archipelago" or "Archipelago." (pronunciation)

"Scott Tucker is going to scrutinize the analytical aspects, and particularly the validity of some of the assumptions made by the author."

Did I read that correctly?

A Yes, you did.

Q And so basically, you all had received this information from Risebrough, and the initial response, at least as related in this document from Dr. Wheeler is Scott Tucker is going to scrub the data and scrub the analytical technique and figure out whether it's valid?

MR. MERRILL: Object to the form of the question.

BY MR. SCHICK:

Q Another way of putting it?

A I'd use the word "review" the information rather than "scrub." That's okay. I'm just --

Q Fair enough. But that's what you were going to do?

A All of the people -- if I may expand on that -- I don't know whether I should or not, or whether in this particular place, but all the people that were doing chlorinated hydrocarbon analysis for pesticides and things of that sort, were basically using the same kind of techniques, which involved an

electron capture detector, which is not specific, and doesn't absolutely identify the molecular structure of the compounds that they're observing.

But the peeks and the response if they're done under the same kind of conditions give you a fingerprint. And all of these people had been seeing these fingerprints for a long period of time, which had eluded them. They didn't know what they were, and Soren Jensen and Gunthar Widmark were the first to identify 14 of those peeks that's been associated with polychlorinated biphenyls.

Q And that was in '66 and '67?

A And Risebrough looked at the information, and he looked at the information he had generated but not validated by GC mass spec analysis, and he said wow, you know, these are -- I've gotten the same kind of stuff they're getting, I wonder if these are.

Q So then Monsanto through you decides, we'll confirm it, we'll see if we get the same results?

A We decided that we'd look at the information and see if we agreed, and then confirm it based on the experimental work that we had done.

Q Did you review the data and confirm it?

A I reviewed the data, but I didn't confirm that there were PCBs. I reviewed that what they saw was what they saw, and they did it in a fashion that was reproducible.

I did also verify that they at that point in time had not absolutely identified the molecular constituents as PCBs. It didn't mean they weren't, and it wasn't meaning that I was arguing with them. I just evaluated where they were at in their progress to determine what these peeks were.

Q And by the way, just as a general proposition, Dr. Tucker, as the only manufacturer of PCBs in the United States, was there anyone with a greater understanding of the chemistry of PCBs than Monsanto and its people?

A Probably not.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 13)

BY MR. SCHICK:

Q Let me show you what I have marked as Exhibit No. 13 to your deposition. This appears to be a December 4, 1968 document from Mr. Olson. Have you seen this before?

A I don't recall specifically seeing this

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document.

Q All right, and I'll be real brief about it, because this probably goes beyond your area, but I just have a couple quick questions for you. To read what I've highlighted, "in a discussion of competitive chlorinated biphenyl manufactured by Kaneka, or Kaneclor, the following is stated:"

"It was only last month that a serious accident happened at an edible rice-brand oil manufacturing plant in Kitakyushu, where Kaneclor is in use, leaked out into edible oil through stainless steel piping."

"The authorities investigated the whole plant and found out cracks of the Kaneclor circulating stainless steel piping. As many as 12,000 people suffered from toxication in addition to a great number of chickens fed with the oil died."

Now, I guess my question to you is were you asked to do any kind of analysis of what was being reported there in December '68?

A I was not asked to give analysis, but I was asked to give my opinion.

Q By whom, and when?

A By -- it came to me through the hierarchy

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in Monsanto, and basically that they just wanted to know is, gee, could this be happening, and the answer was obviously it did.

However, it wasn't PCBs that turned out to be the problem. What it turned out to be was some contaminants that were produced a result of the thermal exposure of the material, and they're called chlorinated dibenzofurans, which I think ultimately was discovered as the problem.

Q When was that ultimately discovered?

A I don't remember specifically.

Q But in the interim, was anything about this finding communicated to Monsanto's PCB customers, those customers who purchased PCBs, to warn then about making sure that the PCBs did not find their way into anything that might be edible?

A Are you saying did they send this specific observation to all of the customers?

Q Yes, sir.

A I don't know.

Q Why were you asked about this if your area was analytical and organic chemistry?

A Well, everybody --

Q I thought --

A Okay --

Q Excuse me.
A I'll let you finish your question.
Q I'm sorry. Start over. Why were you asked about this, Dr. Tucker, when -- you know, we talked a couple times in the course of this deposition about the fact that you're an analytical and organic chemist and really didn't get into the toxicology of things?
A The fact that I'm not an expert in those other areas didn't mean I didn't have knowledge of what was being done during that period of time by the other people.
Q Fair enough.
A It didn't mean -- what it meant was I always had disqualified myself as an expert, because I wasn't, you know. I'm not a toxicologist, but the information I generated was always used by them to do this and that, and that kind of thing.
So initially everybody wanted to know are these really what they're saying they are, and so that's why it always came back to me.
Q And you did the analysis?
A Analysis on what?
Q On the problem in Japan.
A No. I just offered an opinion when I was

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asked what I thought about the information after I reviewed it.

Q But you didn't have any of the underlying data?

A No, sir.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 14)

BY MR. SCHICK:

Q Okay. Let me show you what I've marked as Exhibit No. 14 to your deposition.

A Let me clarify something. When you asked me if I had any of the underlying data, it meant did I have the actual scientific information that was generated by the people that were verifying what was there and how much was there?

Q Yes, sir.

A And the answer was no. I never saw or reviewed the quality associated with the data, or the specific instrumentation or any of that kind of stuff; however, I did see the public reports.

Q And -- but you don't remember when that was?

A It had to be on or about that time, after that time, so but specifically, no, sir.

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Q Okay. Exhibit No. 14 is a December 30, 1968 memo, internal memo of Monsanto on -- I assume you're the E. Tucker copy?

A Yeah.

Q Yes?

A Yes, sir.

Q Your first initial. I won't ask you what it stands for.

A Earl.

Q And -- okay. First paragraph, "Bill, you wanted to become for familiar with the legal political problems facing Aroclor with regard to pollution and the accusations in the literature that chlorinated biphenyls are poisoning and killing wildlife."

Did I read that correctly?

A Yes, sir.

Q And Bill would be Mr. Kuhn?

A Kuhn, yes.

Q And who was Mr. Kuhn?

A I should remember, because this is the second to third time I have been asked that question, and you know, I don't remember.

Q But he would be an executive with Monsanto?

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A Right. No question about that.
Q It says, "the wildlife people have accused Aroclor of doing all the bad things of DDT."
Did I read that correctly?
A Yes, sir.
Q DDT, of course, is a pesticide?
A Yes, it is.
Q In about 1960, what, 5, (sic. 1965) is when Rachel Carson's book came out, Silent Scream?
A Silent Scream.
Q "We are taking three steps to protect ourselves. Scott Tucker and R. Keller are to repeat some of the analytical identification work feeding Aroclor to chickens and seeing if Aroclor is really present as, quote, 'shown' by the literature. I hope we have been falsely accused, but maybe Aroclor is present."
Do you see that?
A Yes, I do.
Q And do you remember being asked to do that work with respect to feeding Aroclor to chickens?
A I didn't feed the Aroclor to chickens, but I helped design the studies that were done to include enough animals such that tissue residue studies and excrement and all the -- and the feed

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that was fed and that kind of stuff, that there were extra samples of that taken and given to my laboratory to verify and analyze the concentrations of PCBs for Aroclors in them. Does that answer your question? I --

Q Yes, sir. If you turn to the second page, he's been talking about, you know, what we're going to do here, Bill. He says at the top of page 2, "the third step is to minimize exposure of Aroclor to reduce air and water pollution, to restrict Aroclor to uses which can be controlled."

"This is the only way I see to survive. I believe we should make sure that our plants have minimum air or stream pollution. I believe Anniston is vulnerable, and that off gas HCl and Aroclor should be 100 percent controlled."

Did I read that correctly?

A Yes.

Q And again, this is dated December 30 of 1968, correct?

A I'm going to double check with you. Yeah, it's right up at the top.

Q And by this -- I'm sorry?

A Yes.

Q By this time, you've been working with the

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company for a year and maybe two, three, four months?

A Correct.

Q And if you go back to the first page where it says, you know, we're facing -- "Aroclor is facing some problems with regard to pollution and accusation in the literature."

Were you skeptical about those accusations in the literature?

MR. MERRILL: Object to the form of the question.

A I wasn't asked whether I was skeptical or not. I was asked to verify whether the accusations could be true to the best of my ability. And so that's what I was in the process of it. I guess you could consider that skepticism, but I wouldn't.

BY MR. SCHICK:

Q Okay, fair enough. Do you know when the information contained in this memo, December 30, 1968 was first conveyed to any other industries or officials at the City of Anniston?

MR. MERRILL: Object to the form of the question.

A No, certainly not. I don't.

BY MR. SCHICK:

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Q And what he's saying here in the second page is, he wants to "make sure the plants have minimum air or stream pollution and thinks Anniston's vulnerable, and that off gas HCl and/or Aroclor need to be one hundred percent controlled," correct?

A That's what the memo says.

Q All right. So let's remember that date, December 30 of 1968. One other thing my colleague has pointed out is this paragraph I just bracketed says, "I believe we should help our customers dispose of off grade or non-reworkable Aroclor either by incinerating or by toxic dump."

You see that; did I read that right?

A Yes.

Q Okay, and you understood that back in December of 1968, that was the thinking of the folks at Monsanto?

A Dr. Richards was Director of the Functional Fluids Group, met a lot of responsibility for PCB-containing products, and he set goals that were to improve where we're at based on the knowledge we were getting.

Q Okay.

A And so that's really what this is all

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about.

Q Okay. These are the goals that the thought the company should strive to achieve --

A Correct.

Q -- December 30, 1968; do you have any knowledge as to what the company was doing to help customers dispose of unused or reworkable PCBs at that time?

A I know what they did. My recollection, they installed a liquid PCB incinerator at the Krummrich Plant, and I know they took -- I'm certain they took back material that customers wanted to dispose of, and they incinerated it at the plant. Is that what you're asking me?

Q Yes, in Anniston?

A No. In the Krummrich Plant, in Illinois; Sauget, Illinois.

Q But not in Anniston, they didn't do that?

A I don't know whether they did in Anniston or not, but I'm pretty sure they didn't.

Q You're pretty sure they did not?

A I'm pretty sure they did not have a liquid incinerator at the Anniston plant. By the way, Sauget used to be called Monsanto, by the way.

Q The town-wise?

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A Yeah, many years ago.
Q One of the early company towns, okay.
(Whereupon, marked for identification purposes, Defendant's Exhibit No. 15)
BY MR. SCHICK:
Q Let me show you what's been marked as Exhibit 15 to your deposition. This is a -- December 31. This is the next day, December 31, 1968, and the title of it is Aroclor in Fish Tissue, and you are the direct recipient of this particular memo.
A Yes, sir.
Q And what I've highlighted is the sentence that says "Aroclor being, quote, 'lost' at Anniston is coming partly from unpurified HCl/Aroclor off gas vapor stream from chlorination reactors."
Did I read that correctly?
A Yes, you did.
Q Do I understand correctly that -- and of course, we know that biphenyls are created when benzene is run through essentially molten lead. That's the process to join the molecules, the two benzene atoms --
MR. MERRILL: Object --

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BY MR. SCHICK:

Q -- or molecules?

MR. MERRILL: Object to the form of the question.

A Well, I -- based -- you asked me if you're correct, and you're not.

BY MR. SCHICK:

Q Okay. Well, let's just fast forward to HCl, hydrochloric acid is HCl, true?

A Yes.

Q Okay. Excess chlorine comes off the top of the reactor column?

MR. MERRILL: Object to the form of the question.

BY MR. SCHICK:

Q In the process, in the production process?

A Okay, in the production process, they don't use benzene. They use biphenyl as the starting material, which is the first place that you asked me if you're correct. So you weren't --

Q But benzene becomes biphenyl, and chlorine's --

A Correct, but when they actually make the PCBs, they use the biphenyl, not benzene.

Q I understand that.

A All right, so what are you asking me? I'm confused now. You've confused me.

Q Okay. When we're adding the chlorine to the biphenyl, excess -- excess chlorine comes off the top of the reactor column, because you've got a reaction going on, right?

MR. MERRILL: Object to the form of the question.

A It can if it's not completely reacted with the biphenyl.

BY MR. SCHICK:

Q All right, and in fact, you do have some, and at the Anniston plant, you had a wet scrubber where water is taking any of that excess chlorine that comes off the reactor column, right?

A Well, it also is intended to take any of that excess HCl that was produced during the reaction off there, too, because the substitution involves a replacement of a chlorine molecule for a hydrogen molecule --

Q Right.

A -- which then can combine with other chlorine molecules to produce muriatic acid or HCl.

Q Right.

A So the scrubber is not necessarily to

remove the chlorine. It's more so to remove the HCl which is a by-product of the reaction with the biphenyls. I'm not --

Q No, no, I'm glad to have the full explanation. I appreciate that. And there's going to be some PCB vapor captured in that process, true?

A Absolutely.

Q And you know that the Monsanto facility, the plant there in Anniston, would sell that product that comes out as muriatic acid?

A I did not know that, no.

Q Okay. You never heard that before?

A No, sir.

Q Do you know whether any of that product was run through any additional filtration system before it was sold?

A I didn't know it was a product that was sold by the plant or by Monsanto. It's certainly possible, so no is the answer to your question.

Q Good enough, thanks.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 16)

BY MR. SCHICK:

Q Let me show you what I've marked as

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Exhibit No. 16 to your deposition. Just to orient us to time, we just looked at a December 30, and a December 31, 1968, there's two memos, one regarding Aroclor wildlife where we talked about the aspirations and the objectives, I think you put it, that Mr. Richard wanted for the company, and then the Aroclor and fish tissue at the Anniston facility.

Now we're to January, three weeks later or so, and again, you're a recipient of this memo regarding Aroclors and plant effluent?

A Right, and the way you put that makes me want to say that Jerry Miller's identification of PCBs in the chromatograms that he had was not absolute. He just had some -- he had the same issue that Risebrough had.

He had chromatograms produced for different purposes, and they looked the same, because they had 35, 40, 50 peeks in them, and so he just assumed -- turned out to be rightly so probably -- that these might be due to PCB responses, so but I think what you said is what I said.

Q Okay, fair enough. So this memo dated January 23 that's been marked as Exhibit 16 to your deposition, you did receive at the time?

A Yes, sir.

Q And the highlighted portion says, "with the likelihood that the attention now being focused on presence of Aroclors in natural waters will draw attention to any Aroclor being sewered in our production plant outfalls, we should begin to protect ourselves."

And then there are some suggested steps.

"1. Waste samples. Before any cleanup action of any kind is taken, we need to know at least approximately how much Aroclor we are discharging into natural waters via our waste outfalls."

Did I read that correctly?

A Yes, sir.

Q Now, can you tell me before January 23rd of 1969 whether you had been asked to perform any kind of analyses to assure the company that you could be taking samples from water streams or effluent streams and testing them for PCB content?

A I don't understand that question. That's a compound question, so please repeat it for me.

Q Yeah. Before the date of this memo, did anyone at Monsanto say, Dr. Tucker, can you figure out how we can test water and confirm whether

there's PCB in it or not?

A The answer to that question is yes. Water is one of the -- obviously I don't know how to use this phone.

(Brief cell phone interruption)

MR. SCHICK: Let's go off the record.

VIDEOGRAPHER: This marks the end of tape number two in the deposition of Dr. E. Scott Tucker. The time is 11:02 a.m.

(Brief recess, 11:02 - 11:11)

VIDEOGRAPHER: We are back on the record. This marks the beginning of tape number three in the deposition of Dr. E. Scott Tucker. The time is 11:11 a.m.

BY MR. SCHICK:

Q Doctor, are you ready to proceed?

A Absolutely. Thank you for asking.

Q Thanks. When we left, I had in front of you, and I hope you still have in front of you, Exhibit No. 16. And rather than go through the earlier record with the interruption going off the record, let me just repeat.

This is a January 23, 1969 memorandum called Aroclors and Plant Effluent. You are a recipient, and they're talking about -- it looks

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like both the Anniston and Krummrich Plants, correct?

A Yes.

Q And it says, "with the likelihood that the attention now being focused on presence of Aroclors in natural waters will draw attention to any Aroclor being sewered in our production plant outfalls, we should begin to protect ourselves."

And then, recommendation "1. Water samples. Before any cleanup action of any kind is taken, we need to know at least approximately how much Aroclor we are discharging into natural waters via our waste outfalls," correct?

A Yes.

Q So what Mr. Hodges is saying here is, look folks, before we start going out there trying to clean up, let's get a handle for what it is we're putting into the waterways, correct?

A Yeah. If there's nothing there, there's no reason to clean up.

Q And that is a little different from what Mr. Richards said back on December the 30th of '68 when he said "I believe we should make sure our plants have minimum or air or stream pollution. I believe Anniston's vulnerable in the off gas HCl,

and Aroclor should be 100 percent controlled."

A You're asking me if I think that's different?

Q Yes, sir.

A And I do not.

Q Okay. Let's go to the second page of this document that we have up, which is Exhibit No. 18. Mr. Hodges is telling the recipients --

A I'm sorry, Exhibit 18?

Q I did.

A Okay.

Q Let's look at page 2 of Exhibit 16.

A Okay, I'm sorry. I just want to make sure that we're on the same page, so to speak.

Q You need to do that. And here what I've highlighted as suggestion No. 3 in the memorandum from Mr. Hodges is "in case you discover sewering of large amounts with a low cost alternative disposal method, proceed with the clean up."

Now, do you understand that to mean, look, if there's a large amount of PCB containing material being sewered, if you can find an alternative disposal method that has a low cost alternative, go ahead and clean it up, don't wait on the analysis of how much we're putting in there?

A That's absolutely correct.
Q Thank you. Okay.
(Whereupon, marked for identification purposes, Defendant's Exhibit No. 17)
BY MR. SCHICK:
Q Let's take a look then at Exhibit No. 17. We have another document that you authored dated February 25, 1969. Do you see that?
A Yes, sir.
Q And you say -- you're addressing this to Mr. Richard and Mr. Wheeler, and one was in Krummrich, and one was in Anniston, right; is that how that worked?
A No.
Q Oh, general office is in --
A Bill Richard -- Dr. Bill Richard was Director of the Functional Foods Group, and he was located in St. Louis at the headquarters.
Q Okay.
A And Elmer P. Wheeler was head of the Toxicology Industrial Hygiene-type person. Emmet Kelly, he was also located there, too.
Q Fair enough.
A So --

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Q What you tell them is "on September 6, 1968, four samples, two sediment and two water from Snow Creek were received for Aroclor analysis."

Did I get that right?

A Yes, sir.

Q Okay. Now, we know Snow Creek is in Anniston, right?

A Yes, sir.

Q And you received those four samples. When we say sediment, are we talking about bottom material underneath the waterway, or like a dredge?

A Yes.

Q And two water samples, and you analyzed those, and you report what the analysis was, true?

A I report what we found, yes.

Q And by the way, the location as to the sediment and water that was sampled was about one block below the plant outfall. That would be where the effluent goes into the ditch or stream, correct?

A At the effluent, and one block below; yes, sir.

Q You have your sample designations, and how much Aroclor was found, and then you say, "the amount the Aroclor found was calculated as Aroclor 1242. The EC/GC traces of the sediment were

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unmistakably Aroclor 1242."

So you confirmed it by your testing?

A Yes. The characteristic fingerprint was an exact match to Aroclor 1242.

Q Then you say, "Bill, on the basis of this information, I think that if the PCB accusation turns out to be true, and the government people become more active, we should plan on an extensive evaluation of the extent of contamination in this area."

Did I read that correctly?

A Yes, you did.

Q But you just confirmed that it's true, that is that there is PCB contained in the effluent from the plant, correct?

MR. MERRILL: Object to the form of the question.

A No, that's an extrapolation, I think. I confirmed that it was at the plant outfall and a block away, and my suggestion was we do a more cosmopolitan study to find out just what the distribution was.

BY MR. SCHICK:

Q Okay. Now, this isn't the first time; that is February 1969 is not the first time that

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anybody noticed, saw PCBs that are in Snow Creek or Choccolocco Creek coming off of the Solutia or Monsanto Plant, true?

A I don't know that. That's the first time I analyzed it.

Q Okay, first time you analyzed it; and by the way, why did that analysis take 5 1/2 months? And the reason I ask that is I'm looking at this, and you received the samples on September the 6th of '68, but you're not writing this memo until February 25th of '69, which I calculated to be 5 1/2 months later.

A There could be any number of reasons. The fact that I don't remember it means that I wasn't doing what I was supposed to have been, probably that we had too much to do, or that we hadn't gotten the methodology to the point where we could do a good job.

Q At the very bottom of this Exhibit 17 are two handwritten notes that says, "start new file Aroclor Pollution."

Is that your handwriting?

A No, it's not.

Q Do you know why this testing for the presence of PCB also in the samples didn't occur

back in 1966 or '67 when the study was done of fish contaminated in the creeks?

A The only recollection I have is that one of the TSD people had decided they needed to sample before we were ready, and they sampled them, and that samples were kept frozen for a long period of time before they were analyzed, but that's the only recollection that can come back to me at all.

Q Fair enough.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 18)

BY MR. SCHICK:

Q Let me show you what's been marked as Exhibit 18 to your deposition. This was done in march of 1969. This is work that you did, again, and it says, "Aroclor - wildlife, incineration of NCR paper."

Again, that was the paper we are talked about earlier, right?

A Yes, sir.

Q And that paper, it contained PCB material on it, correct?

A As much as 3 percent.

Q Okay. And it says, "it has been proposed

from the observed distribution of polychlorinated biphenyls and tissue samples taken from marine organisms that global eco distribution of these materials occurs via aerial transport, wind currents, airborne particulate matter, et cetera."

"A qualitative experiment has been performed with the objective of determining if Aroclor in NCR paper is destroyed or volatilized when the paper is disposed of by burning."

Did I read that correctly?

A Yes, sir.

Q And it's pretty self-explanatory what you're doing. You want to see if PCBs get into the air by burning of NCR paper, right?

A Absolutely. It's to confirm a presumption.

Q Did you -- and the presumption was that it did; that is the burning of NCR paper is going to release PCB in the air?

A If you burned the paper, there was a high probability we thought that you might see PCBs in the effluent from the paper. And so this is just a very simplistic experiment to confirm that, and I feel very bad about using the word incineration, because it certainly wasn't.

Q It's just burning?
A It's just -- yeah.
Q And you did confirm that --
A Yes.
Q -- presumption; and on the second page, you have some conclusions written where you say, "Aroclor is easily volatilized when NCR paper is burned. Aroclor undergoes little if any decomposition when burned."
"Unfortunately, it appears that significant air pollution can occur via burning of NCR paper or other Aroclor-containing materials even under more strenuous conditions."
Did I read that correctly?
A Absolutely.
Q And of course, one of the reasons you presumed that all along was because you know you about the thermal characteristics off PCBs?
A I know about the thermal characteristics of burning cellulose, and constituents that are on cellulose. That's a more accurate statement, because I think if you just put some PCBs and tried to light them up with a match, you'd have trouble with that.
Q Sure you would.

A Sure.
Q But can you burn the paper?
A Yeah, you can certainly burn the paper, and in doing so, you can have aerosol distribution of the materials.
Q And then what we have here is that we have Aroclors that are released into the atmosphere from that burning that may be carried by wind or what-have-you?
A Well, that's possible, but once again, we were about, you know, 6 centimeters from where the effluent from the funnel was. So it was a real simplistic experiment.
Q But you confirmed the presumption?
A Absolutely.
Q And what warnings then went to various customers of Monsanto who used PCB-containing materials not to burn anything that had been contaminated with PCBs, or that contained PCBs --
A I don't know --
Q -- contaminated or purposeful?
A Okay. That wouldn't be something I was I was in charge of. I don't know of any, but I'm certain that the information was needed by our clients that Monsanto as a good corporate citizen

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distributed that information.

Q Sitting here today, are you aware of a single such communication that went out after your experiment confirmed the presumption in March of 1969?

A You know, you've opened the window to after the experiment until today, and I don't think you want the window that wide --

Q Right.

A -- because I'd have to say yes.

Q You're right. From that time until say the product was withdrawn.

A In 1970 when --

Q It was after 1970.

A -- voluntarily withdrew the product. Okay. Do I know of any -- and specifically for burning, open burning of the stuff, I can't remember anything specific, but I'm not doubting it.

Q Fine.

MR. SCHICK: And I'll object to the non-responsive portion of the answer dealing with the withdrawal of the product.

(Whereupon, marked for identification purposes,

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Defendant's Exhibit No. 19)

BY MR. SCHICK:

Q Let me show you what's been marked as Exhibit No. 19 to your deposition, Dr. Tucker. Earlier we had talked about the Risebrough paper that was delivered in Rochester that you picked up a copy of in Washington. Do you remember that?

A Yes, sir.

Q This memo is dated March 6 of 1969. You were a recipient. And to read what I've highlighted on the ELMO, it says, "Risebrough in a recent paper, quote, 'Nature, Volume 220, December 14, 1968,' has attacked formed chlorinated biphenyls in three ways."

"1. A pollutant, widely spread by air, water; therefore an uncontrollable pollutant."

"2. A toxic substance with no permissible allowable levels causing extinction of Peregrine Falcon by induced hepatic enzymes which degrade steroids, upsetting Ca" or calcium, I presume," metabolism, leading to reproductive weakness, presumably through thinner egg shells."

"3. A toxic substance endangering man himself, implying that the Peregrine Falcon is a leading indicator of things to come."

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Did I read that correctly?

A Yes, you did. Let me ask a question. When you ask me if you read it correctly, you're not asking my if it's correct?

Q No, sir. That's -- you're right.

A Good. That's why I --

Q You're right, and we've talked about in a number of these instances, we read something and I said did you confirm it.

A Correct. No, I just -- just that little thing in the back of my head. I just want to make sure that --

Q But let's be clear about this. This is an internal Monsanto document; is it not?

A Yes, it is.

Q Okay. And then the question is posed, "where does this leave us?" It says -- and again, it's March 6, 1969, "under identification and control of exposure, we will be able to identify and analyze residues as well or better than anyone in the world."

Do you see that?

A No. I lost you on that first sentence.

Q Second page.

A You're on the second page?

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Q Under "where does this leave us."
A I saw "good" written on the first page. I got hung up. Where are you at now?
Q "Where does this leave us."
A Under --
Q "Under identification and control of exposure, we be able to -- "
A Okay.
Q -- "identify and analyze residues as well or better than anyone in the world."
Do you see that?
A Yes.
Q And of course, in part, that's Dr. Scott Tucker, because that's his job to identify and analyze residues, right?
A Yes.
Q And we already talked about the fact that we can probably do it better than anyone in the world, because we're the ones who make them, right? We, Monsanto?
A That's one of the presumptions of being first.
Q Okay. Then it says, "we can take steps to minimize pollution from our own chlorinated biphenyl plants. We can work with our larger customers to

minimize pollution. We can continue to set up disposal and reclaim operations."

"We can work for minimum exposure and manufacture and disposal of capacitors, transformers and heat transfer systems and minimize losses for large hydraulic users."

Did I read that correctly?

A Yes, you did.

Q Now, again, this document that's dated March of 1969, what steps were taken to your knowledge immediately after this memorandum was written to minimize pollution from your own chlorinated biphenyl plants? And specifically Anniston.

A Okay, as I said earlier, Dr. Bill Richards was high level in the company, and he set goals for the company. And so part of us setting goals to get a job done is to initiate and define what you need to do. This certainly is an action.

Now, what specifically was done in all the areas that you -- especially in Anniston and that kind of stuff, I don't know specifically, but I certainly know that this was a charge to initiate those kinds of things.

Q But like the memo that we looked at dated

December 31, 1968, what you're saying is he is setting objectives, and there may be a lot of other things that have to happen before those objectives are realized?

A Oh, sure. None of us work alone.

Q Do you know what communication was made to large hydraulic users, or the Alabama Power Company saying the year after this memorandum of March of 1969?

A Not specific in that time frame, but I certainly know it was done.

Q Well, how do you know it was done? What communication have you seen between Monsanto and Alabama Power?

A Now that you've made the question specific, I have seen none to specifically that client, but I've seen documents that were sent and widely sent by marketing and a variety of other people to the clients that purchased Aroclors from us.

Q What documents have you seen from Monsanto --

A Well, there's --

Q -- my -- excuse me, from Monsanto to my client, Phelps Dodge?

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A Again, that specific client, I don't know, but --

Q What about --

A -- if they're on the list, they probably got it.

Q What list?

A The list of clients that we sold Aroclors to.

Q Where is that list?

A I don't know a company that exists that doesn't keep a list of its clients. Now, where it specifically existed in Monsanto, I don't know. I'm way out of my ball park here in terms of absolutely seeing these things, but I know it was done.

Q Well, but I need to know how -- I mean, you say this, and the Jury is going to see this testimony. I need to know whether this is reliable just as you do tests to make sure that a scientific method is reliable.

I need to know -- sure, there's a list of customers floating around in Monsanto some place. There are customers in this time period. What I want to -- what I asked though, was, did you ever see any indication that a letter or some communication was sent to any customers saying we

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have learned these things, be aware of it, and we're going to be contacting you about how to better dispose of these products?

A Yes.

MR. MERRILL: Object to the form of the question.

BY MR. SCHICK:

Q And to whom did that letter go?

A As I indicated to you, it went to the client lists of the customers that purchased the material and used them from us. It was carried out by our marketing department. There were also little things called MSDS sheets, and a variety of other things that went out to --

Q When?

A You're asking me for information that I could probably find out, but I don't have at my fingertips right now. But you know, I can't see why I'd have any reason to make that up.

Q Well, let's keep reading. And we say -- and look, please understand. I'm not accusing you of making anything up, but we are dealing in evidence, and the Jury will be instructed at the close of testimony by the Court that they can make their decisions only on the basis of evidence that

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has been introduced before them, and I've not seen that evidence, Dr. Tucker, and that's the reason I'm pressing, okay?

I don't mean anything personal by it.

A I agree with you. The evidence hasn't necessarily been introduced, but you've asked me if I've seen it, and my recollection is I've seen communications like that, and I know there was efforts to do that, and that's all I'm saying.

Q But you don't remember during what period of time; it could have been during '72, '73?

A Could have.

Q Okay. If we go to the next paragraph, it says, "but we can't easily control hydraulic fluid losses in small plants. It will be still more difficult to control other end uses such as cutting oils, adhesives, plastics and NCR paper."

"In these applications, exposure to consumers greater, and the disposal problem becomes complex."

So do you understand that Mr. Richard is simply setting out this is going to be a tough task?

MR. MERRILL: I'm going to object to the form of the question.

BY MR. SCHICK:

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Q Reaching end users of things like adhesives and plastics and NCR paper?

A Dr. Richards is simply stating that -- the closed end uses. Those are not closed end uses, anything where you can recycle and control easily because of the distribution and the actual use.

Q Right. Was there a press release that went out shortly after this that -- to try to alert consumers of plastics, adhesives and NCR paper to these problems of releasing PCBs in the atmosphere, to your knowledge?

A No.

Q The last paragraph that I've highlighted then says, "Risebrough," and again, he was the one who wrote the paper that you picked up in Washington.

"Risebrough has taken Aroclor samples and claims to have evidence on enzyme and hormone changes. Here, there is no question of identification. Either his position is attacked and discounted, or we will eventually have to withdraw product from end uses which have exposure problems."

Did I read that correctly?

A Yes, you did.

Q When he says "there is question of

identification," he means it's been confirmed?

MR. MERRILL: Object to the form of the question.

A No, I don't read it that way.

BY MR. SCHICK:

Q Okay, how do you read it?

A Well, Risebrough was very concerned about the Peregrine Falcons, and he had felt that chlorinated hydrocarbons, specifically DDT and DDE were causing enzyme changes that caused egg shell thinning.

And of course, the egg shell thinning caused the egg shells to break, and of course, it was depleting the reproduction success of the Peregrine Falcon, and I think it was more an extrapolation that Risebrough thought well, you know, these PCBs are exactly like the chlorinated hydrocarbons DDT and DDE, which of course, they're not.

They have different characteristics, but they're the same class of compounds, and so ergo, they're responsible for that, too, and we've got to look for it, and that's what he was saying, in my opinion.

Q Okay. Were you asked to confirm that, or

contradict it by analyses?

A Not by analyses, no, but by validation of the techniques that should be used for the absolute identification and hadn't been, yes.

Q You did that with respect to Risebrough's conclusions?

A Okay. Unless you take a gas chromatograph and hook it up to a mass spectrometer, and run the sample through the mass spectrometer, and absolutely identify it that the piece you're looking at are PCBs, it's simply -- you have to simply say that the fingerprint you get looks like PCBs and acts like PCBs, but you have no absolute identification.

Q Okay, fair enough.

A The only time you can really get very good about it is by having the experience to recognize the fingerprint exactly, but even in those cases if you want to be absolute, you would have an absolute identification.

Now, the samples we're dealing with were not absolute fingerprints. They contained 14 of the potential hundreds of peeks that could have been there. I'm not trying to argue with you. I'm just trying to make some clarity here.

Q But that would have been something you

said in 1969. You know now, though, that PCBs do bio-accumulate in human beings, correct?

A Where are you -- what are you reading from, please?

Q I'm reading from a deposition you gave on August 2nd, 2000, in the case of Walter Owens versus Monsanto Company.

A Okay, and the question was?

Q "In fact, Dr. Tucker, you were aware that PCBs do bio-accumulate in humans, correct?"

You're answer was?

A I said "yes."

Q And then you were asked, "and you are aware that there is no question that PCBs are transferred from mothers to children through breast milk?"

And your answer was?

A "Yes." And the date of this deposition is, please?

Q 2000. And --

A That's fine, and that's when they were asking me, and that's what I was telling them.

Q And that's the way I phrased my question.

A Okay. I just want to make sure it was 2000, because in 1969 we didn't have definitive

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information. We didn't have analysis of human samples or breast milk or any of those kinds of things. So we knew that could, because they had the properties, and other compounds had, but in this statement, we had that information.

Q So ultimately whether they didn't have -- while they didn't have the precise analysis, both Risebrough and Jensen were right, it turns out?

MR. MERRILL: Object to the form of the question.

A Sure, they were right.

BY MR. SCHICK:

Q Okay.

A That's like betting a stock is going to go up, you know? If it goes up, you're right.

Q Okay.

A And they had more information than that. Nobody ever denied that these people weren't good scientists and didn't have the world in perspective, things of that sort. It's just that we needed to be sure before we committed resources that might be needed for something else to those kind of things.

Q Fair enough, and I wasn't suggesting to the contrary.

A Okay. I got a little carried away there.

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(Whereupon, marked for identification purposes, Defendant's Exhibit No. 20)

BY MR. SCHICK:

Q Let me show you what I have marked as Exhibit 20 to your deposition, Dr. Tucker. This is a March 1999 memorandum again from Mr. Richard, and you are one of the recipients, and it's notes on a meeting that occurred in March, on March the 6th of 1969 concerning Industrial Bio-Test laboratories, Inc. and Aroclor Wildlife, fair?

A Yes.

Q All right. If you could turn to the third page of this document, please, sir. And just to be fair, you can look this over. There's some background that was reviewed with respect to Aroclor properties, analytical results done by you, the history of Aroclor applications, ecology.

On the second page, you can see we discussed possible consultants who might be of help on this problem, both inside and outside, and then Bio Test Consultants are listed. You see all that?

A Yes, sir.

Q I just want to give you sort of the --

A The question is whether I need to read the

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memo, but that's fine.

Q If you do, just say the word.

A Yes, sir.

Q The third page, it says, "defense seems to have these elements."

"1. Aroclor not intended to be spread around. Used in closed systems. Recycled material, limited exposure - most but not all Aroclor uses meet the above description."

You mentioned that earlier about closed systems, and indeed, not all Aroclor uses are in closed systems, are they?

A A lot of them are not, no.

Q And even in closed -- in production, of course, we -- at the Anniston Plant, for example, of Monsanto, you wound up with Aroclors in effluent, both on plant surfaces and in streams, correct?

A That's correct.

Q Okay. Number 3 on the elements of the Defense is "atmosphere and streams around our manufacturing plants and major customers need to establish a norm and an acceptable standard."

Did I read that correctly?

A Yes, you did.

Q So that's a part of what the plan is, is

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to continue to do the testing, because we've already seen testing had begun, correct?

A And what they're asking is that we determine, or certainly we set standards based on the available information that says what level is acceptable, because there were no legislative levels that had to be met at that time.

Q Right.

A So it's ahead of the curve, really.

Q Right. By the way, you were not involved any discussions with the government and the regulators during this period of time, were you?

A Probably not, unless they were scientists, and they're not outside -- they're outside the category you just mentioned most of the time.

Q But you don't recall having even those sorts of conversations in the '69 period?

A You mean about instituting legislation?

Q Yes, sir.

A No. I'm just saying what they're trying to do is decide what's there, and what should be there to the best of their ability.

Q Right, and then that we saw since December 31 of '68. It was something Mr. Richard wanted you all to do at the very least, but what I

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was after was you weren't out there sharing the data that you had with your equivalent scientists, let's say, in the government?

A Oh, absolutely I shared that information.

Q At what point?

A Most of the time as soon as we got it. As a matter of fact, I had two people that did nothing but put together standard samples for all the laboratories that wanted to analyze for PCBs and things of that sort. So we were in contact with them. They knew what we were doing. We shared that information.

Q In 1969, though?

A I don't know specifically 1969. That might have been a little early, to be very truthful with you.

Q Okay. One thing that I didn't see as an objective set out by Mr. Richard here or defense was any attempt to let consumers of products that contained PCBs, like the adhesives and plastics we talked about before know about this.

Do you know whether there was any wide-spread warning distributed in the '69 period to let folks know about these issues?

A No.

MR. MERRILL: Object to the form of the question.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 21)

BY MR. SCHICK:

Q All right. I'm going to show you what's been marked as Exhibit No. 21, and there's some handwriting on it, and all kinds of directions, and I'm going to ask you to try to read with me. Some of it's legible; some of it isn't.

This is a March 25, 1969 document regarding Biological Studies on Choccolocco Creek. Does that look like what it is to you?

A That is the title of the memo; yes, sir.

Q Okay, and it comes from Eugene Wright, Pollution Control Engineer. Again, this is an internal document of Monsanto Company, true?

A Correct.

Q At the bottom, and with a handwritten 3/27, it says, "Bill" -- I'm sorry, strike that. I've highlighted in the second paragraph this part of the sentence.

"There are no fish or other aquatic life in Snow Creek."

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Snow Creek we've already talked about as existing in Anniston near the Monsanto Plant, true?

A Yes, sir.

Q "Snow Creek receives all of the waste water and sewered acid from our Aroclor process."

Did I read that right?

A Yes, sir.

Q So we know that Monsanto's waste water and sewered acid goes into Snow Creek there in Anniston. Then this handwritten note from -- I believe that would be Joe Landwehr.

It says, "Bill, our thought was that if the business group was interested in long-term effects of PCB in a stream, Choccolocco Creek would be a good place to start."

Did I read that correctly?

A Yes, you did.

Q Then if you turn it sideways, this is where it gets tough. You see the handwritten note up there?

A Yes, I do.

Q It says, "Dr. Gunning has recommended at least two more samplings in 1969."

A Yes.

Q "We do not feel that we can justify $4,000

to $6,000 for them."

Did I read at that correctly?

A Yes.

Q Who is Dr. Gunning?

A Drs. Gunning and Suttkus were, I think, professors and scientists from Tulane.

Q Right, and in fact, they're mentioned. It's underlined there. So they were recommending additional studies, but the company said, no, we -- that's -- we don't think that's necessary?

MR. MERRILL: Object to the form of the question.

A No, the sci -- or the TSD people were saying we're going to need some help to be able to finance this.

BY MR. SCHICK:

Q Okay, and the TSD people are -- that's Technical Services Department?

A Technical Services and Development. It's a general term I use for those --

Q And what they were saying was you're going to have to give us a bunch more money?

A Well, no, they were saying we need your support to do this. They weren't saying they didn't do it or they didn't want to do it, or they

shouldn't do it. It's just a monetary thing. We need the bucks, you know.

Q And in fact, it wasn't done, was it?

A Actually, Gunning and Suttkus did a number of surveys of the creek. Now, whether or not your question about your specific thing, whatever it is, was done, I don't know.

Q Okay. What they were recommending be done in this memo of March 25, '69 to your knowledge, was not done?

A I'm just saying that I know that there were a number of studies done by Drs. Gunning and Suttkus, and also Denzel Ferguson, Dr. Ferguson.

Q Right.

A So whether or not -- what you're talking about, I don't know.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 22)

BY MR. SCHICK:

Q Okay. I'm handing you what I've marked as Exhibit 22 to your deposition. Who is Robert Metcalf; was he a consultant to the company?

A Let me just read this directly.

Q Yes.

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A I think I know who he is, but I -- this guy was real helpful. I want to make sure it's the right one. Give credit where credit's due, so to speak.

Q Somebody penciled in University of Illinois.

A It was right up by Calandra Lab, Industrial Bio Test. That helps me understand it was who it was. He was a consultant we brought in that helped look at the problem and tell us what he would propose we do, you know, an independent person; what do you think we ought to do at this point in time, and it had a lot to do with the analysis and with the toxicology and industrial bio test, and the testing eventually went on.

Q And this is March of 1969 --

A That's correct.

Q -- that he basically delivers this data and his recommendations to the company?

A Right. Most of the efforts that we did were concurrent. None of them were -- it wasn't a serial process.

Q I understand.

A Okay.

Q Do you know whether you attended this

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meeting where he made this presentation?

A I knew him and I heard him talk, so I may have been at this meeting. I don't specifically know I was, but I appreciated this comment and the direction he provided.

Q Well, let's take a look at some of the things it says here. He says, "at first thought, it seems unlikely because of the major uses of PCB in capacitors, transformer oils, heat transfer fluids in closed systems, that these materials could be the source of the substantial degree of environmental contamination reported."

"However, about 40 million pounds annually is stated to be used as plasticizers, hydraulic fluid, adhesives and in carbon paper. From this amount, a very substantial percentage must escape into the environment as waste."

"Because of the apparent high stability of PCB, amounts entering the environment would be degraded very slowly, and it seems possible that at least 10 million pounds annually may become environmental contaminants."

"Since the PCBs were introduced commercially in 1929, there have been 40 years of production. If this is averaged 50 million pounds

per year, then about 2 times 10 to the 9th pounds have been made, and perhaps 2 times 10 to the 8th pounds have entered the environment."

Now, 2 times 10 to the 8th would be 2 billion pounds?

A I'd have to do the zeros, but I don't have any reason to doubt you. I'm sure you worked it out. So yeah, it's probably about 10 percent. Isn't that what it's kind of saying? Ninety percent not distributed, 10 percent distributed, okay.

Q You can turn to the next page then where we're just continuing to read this comment. He says, "this coupled with the thorough evidence from mass spectormetry suggests that there is an important environmental quality problem involved in wastes of PCB."

And then he discusses experimental work, and at the bottom he says, "it seems to the writer that the evidence regarding PCB effects on environmental quality is sufficiently substantial, wide-spread and alarming to require immediate -- immediate corrective action on the part of Monsanto."

"The defensive measures presently under way will do little, if anything, to refute the

evidence already presented."

Did I read that correctly?

A Yes, sir.

Q And what he was recommending was immediate action, right?

A ASAP.

Q Okay. And then number 4 down here, he suggests -- he gives a list of suggestions to back up that immediate response, and number 4 is "review of disposal and recovery methods for PCB in capacitors, transformers, heat transfer fluids and hydraulic fluids, emphasized to customers, importance of preventing environmental contamination.?

Did I read that correctly?

A Yes, you did.

Q This is dated March of 1969, and what I would like to know is what emphasis was made to Alabama Power, or to my client, Phelps Dodge in April, May of 1969 about this recommendation of Dr. Metcalf, if you know, specifically to Alabama Power and Phelps Dodge?

A I think at this point in time, this is a recommendation to be considered, and to have it immediately distributed to all the clients, that

kind of stuff, since he wasn't sure that he was necessarily right.

He was a consultant, and we were asking him his opinion based on his expertise. I would doubt that they immediately contacted them.

Q Okay, so --

A And I do know that there was a general program eventually to do that kind of thing, and that it was done.

Q Okay.

A Okay.

Q So in other words, what you just told me is that Dr. Metcalf is a consultant. You've asked him to do this work, and he's come to you, but you've got to do your own independent verification, validation, just as you were doing in connection with your analysis since the fall of 1967, true?

A We had to analyze the situation to make sure the researchers we had were focused on the correct objectives, that they were most -- that had the highest priority. That's what this is all about.

Q His recommendation, No. 7, "begin investigations of possible biodegradable substitutes for PCBs as plasticizers, adhesives, fire resistant

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hydraulic fluids, et cetera, anticipating loss of these markets as a necessary corollary of environmental problems."

Did I read that correctly?

A Yes, you did.

Q What steps, if you know, were being taken by Monsanto, to develop biodegradable substitutes to PCBs?

A Well, in actuality, it was part of the program that I developed as an offshoot for what we were discovering about products, and in general, we developed a battery of tests that were confirmed and set out to evaluate the relative biodegradability of all Monsanto products.

And once those tests were set up and confirmed, a half dozen guys in a couple of laboratories began to test products on a priority basis in terms of how they biodegraded on a relative basis.

So it actually led to that kind of knowledge, that initial knowledge about a product that it could really happen that way kind of stuff, led us to develop the techniques we needed to evaluate the 3000 other products we were manufacturing, and any new products before they got

to the manufacturing stage with the best we could with biodegradation tests that would simulate what would happen to these materials in the environment, and so we did that.

Q So concurrently with your analysis of PCBs in the environment and how to confirm or validate what is being done as a particular Aroclor, for example, or congeners, more generally, at the very same time you were doing that, you're also looking at biodegradable alternatives to PCBs?

A Correct. Substitutes.

Q Okay. Fair enough.

A Because they weren't being used, because they weren't valuable, I mean the products themselves. I mean, it's --

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 23)

BY MR. SCHICK:

Q Okay. Let me show you what's been marked as Exhibit No. 23. This is a May 12, 1969 document, and it actually comes from the Anniston Plant; is that how you read that?

A Yeah, it says from the Anniston Plant to Paul Hodges, which is general offices, and then

Taffee, a name I don't recognize.

Q Then I've highlighted this paragraph. "The Anniston Plant, plans for polychlorinated biphenyl PCB determinations in liquid waste drains, including sources, quantities and recommended actions are included."

"We do not plan to look for atmospheric losses based on our present mutual feeling. The losses to the atmosphere are negligible."

Did I read that correctly?

A Yes, sir.

Q So do I understand -- whoa, I just kicked this out. Off the record.

(Brief off the record, 11:56 - 11:57)

BY MR. SCHICK:

Q Doctor, before I inadvertently kicked off the ELMO, we'd read this paragraph from the May 12, 1969 memo. "The Anniston Plant plans for poly-chlorinated biphenyl PCB determinations in liquid waste streams, including sources, quantities and recommended actions are included."

"We do not plan to look for atmospheric losses based on our present mutual feeling that losses to the atmosphere are negligible."

I read that correctly, true?

A Correct.

Q Am I correct in understanding then that this is in response, or a continuation of what was set out back in December of '68 as to we've got to do some studies, and we've got to make some determinations, and this was when it was next -- this is the next step?

A Yes.

Q Or at least a next step?

A Sure. They're setting priorities. They're saying what's our biggest losses, let's look at those first if we have any, and certainly we know we did now.

Q But the decision was made not to look at atmospheric losses, because there was a feeling that those losses probably weren't significant?

A No, I don't think that they weren't significant. I think that relative to the other kinds of losses that could be occurring, they weren't as big.

Q If you could turn to the second page with me, please? I've highlighted other aspects of the proposed plan, and under 5, you have "b" that says "audit Aroclor and HCl departments previously identified as major sources to determine source and

amount of PCB loss to sewer."

Did I read that correctly?

A Yes, sir.

Q Do I understand correctly that it was already known that the Aroclor and HCl departments were major sources of waste of Aroclor and HCl into streams; it simply hadn't been quantified precisely at this point?

MR. MERRILL: Object to the form of the question.

BY MR. SCHICK:

Q Is that what was happening here?

A Well, I think what they were saying is now that we know we should be concerned about this, let's identify the bigger losses and try to cut those first, but let's get rid of everything we can to the extent that we need to.

That would be the logic that they would be applying. So obviously, if you find PCBs in the environment, and you don't know whether you're the source or not, you've got to think that you're probably losing some, and you want to figure out where.

Q Anybody else manufacture PCBs in Anniston?

A Not to my knowledge.

Q And if you go down further on the same page we were looking at, planned item No. 7 says, "investigate means of disposal or Aroclor scrap. This would need to be a cooperative venture between research marketing, WGE Anniston and CED since the problem is not unique to a single Monsanto location and is facing our customers, too."

And I just need to know whether you have any specific knowledge, or whether you were involved in getting that word out to -- or being involved in that cooperative venture?

A No. That wouldn't have been my job.

Q But you as a thinking, intelligent scientist know that was certainly an important part of the process?

A Right. And first you need to establish what you're losing, so you send me the samples and I analyze them and tell you how much, and then you decide what you need to do about it.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 24)

BY MR. SCHICK:

Q Let me show you Exhibit No. 24 to your deposition, Dr. Tucker. This is a May 12, 1969 memo

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from Mr. Hodges to Mr. Kuhn. You're copied, as we see in the top right-hand corner, and it's marked as confidential, and it says, "at your request and for your transmittal to appropriate members of the Business Group, I have summarized information on actions, plans and problems at Anniston and at WB Krummrich to avoid sewering Aroclors into natural waters."

Now, we just saw a document also from May 12 of '69 whereas, you know, you know we're losing it, but we haven't quantified them yet. We need to do that, and now Mr. Hodges is saying "we need to avoid sewering these," and it looks like he doesn't care about doing quantification of the losses; he just wants to make sure we're not sewering the losses. Is that how you see this?

MR. MERRILL: I'm going to object to the form of the question.

A Not at all.

BY MR. SCHICK:

Q You can't -- you can't read it that way?

A (Shakes head negatively.)

Q Fair enough. Turn to page 4 of the document. It says Work to Reduce Sewering, toward the bottom of the paper. "1. Aroclors in HCl, a

catch tank has been installed in the vapor line near the HCl absorber. The Aroclors captured are now being hauled to landfill."

"A coalescer is being installed to capture globules in the crude muriatic acid. This Aroclor will be taken to landfill."

Did I read that correctly?

A Yes, sir.

Q And of course, that technology of a catch tank was nothing new; I mean, that's been around a long time, just like sort of an oil/water separator, right?

A I'm going to say to you, if you say so on that kind of thing.

Q You just don't know?

A Well, I know the technology was around, but I know it might have been new to this particular type of process and things of the sort, and the application, now that the need had occurred.

Q Well, you know what an oil and water separator is; those have been around for years.

A Many different varieties for a long number of years; yes, sir.

Q And to your knowledge, those have never been used -- in fact, never were used with respect

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to the Aroclor waste drain at the Anniston Plant, were they?

MR. MERRILL: I'll object to the form of that question --

A I don't have knowledge of that.

MR. MERRILL: -- foundation.

BY MR. SCHICK:

Q Okay, fair enough.

A In fact, isn't this a coalescer? That's an oil and water separator?

Q No. This is -- what he's talking about is a coalescer.

A Which is an oil/water separator.

Q Right.

A Okay.

Q And I just wanted to ask you about how long has it been around, because I believe it's been around for a long time. Number 3 that he has here says, "Aroclor production department and audit of losses is under way."

And that would have been what we just read from the folks in Anniston, true?

A Yes, sir.

(Whereupon, marked for identification purposes,

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Defendant's Exhibit No. 25)

BY MR. SCHICK:

Q Let me show you what I've marked as Exhibit No. 25 to your deposition, Dr. Tucker. We're going to see a couple of these, but there was an Aroclor Ad Hoc Committee put together in Monsanto. Is that accurate?

A Minutes of the Aroclor Ad Hoc Committee. And are you asking me if there was this committee that was specifically designated and called and formed as the Ad Hoc Committee, or if it was just an Ad Hoc meeting of people associated with -- I mean, I --

Q Do you know?

A I don't know if there was an official -- I don't think there was a group that was entitled officially think. I think it may have been referred that in a shorthand fashion.

Q Okay, but it says Minutes of Aroclor, quote, "Ad Hoc" Committee, First Meeting. First meeting of this committee took place on September 5, 1969, true? Were you a part of this meeting?

A Let me look at the -- no.

Q Have you seen this document before?

A Yes.

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Q Did you see it shortly after it was generated, or sometime in connection with the litigation?

A Shortly after it was generated.

Q Okay, good deal. So under Objectives, it says, "Agreed to By the Committee. Submit Recommendations for Action which will:"

"1. Permit continued sales and profits of Aroclors and Terphenyls."

"2. Permit continued development of uses and sales."

"3. Protect image of Organic Division and of the corporation."

Did I read that correctly?

A Yes, sir.

Q So do you understand that to be the agreed-upon objectives of this Aroclor Ad Hoc Committee as of September 5, 1969?

MR. MERRILL: Object to the form of the question.

A I think based on the information the committee had available to it at this point in time, that that's where they were at, and what they felt they needed to do.

BY MR. SCHICK:

Q Okay, and so they agreed those were their objectives at this time?

MR. MERRILL: Object to the form of the question.

A Correct, at this time.

BY MR. SCHICK:

Q Okay. And then it gives some background discussion of the problem, and it lists a number of different things, but I've highlighted, for example, "PCB has been found in fish, oysters, shrimp, birds."

Under B it says -- it names some other locations, Lake Michigan, Pensacola Bay. And it says, "it may be a global contaminant."

Did I read that correctly?

A Yes, sir.

Q On page 2 it says at the top, "Sample acceptance from the numerous researchers was discussed. This has been done on a limited basis. Our corroboration of testing of their samples add to our knowledge and demonstrates a willingness by Monsanto to help define the problem, but it is expensive, and also tightens any possible legal cases against us."

"It rules out possibilities that Aroclors

are not involved."

Did I read that correctly?

A Yes, sir.

Q What is meant by "tightening any possible legal cases," if you know?

A I don't know about the legal part, but I do know that since we had -- we were the only source of standards for the scientists to use to measure what they were measuring, since there were no individual standards, nobody else had them and that kind of stuff, that we provided those samples freely.

We also identified large specific lots of each of the materials in question, and characterized them as completely as we could on a bulk basis so that we would know what everybody was dealing with so we're all playing in the same field.

Q Okay.

A Now, the problem associated with that was PCB, not Aroclors. But because we provided the standards and called them Aroclors, then the problem became Aroclors on a global basis, and not PCBs.

So that's what problem was he was talking about.

Q And we've talked about that previously?

A Yes, sir; we sure have.

Q If you look down here at the Escambia River Problem, it says, "for a clearer understanding of the general problem, the situation of Pensacola was reviewed."

"From a relatively negligible discharge of 1 to 3 gallons per day into a large river, a quarter mile downstream levels of 42 parts per billion in water, and 476 parts per million in mud were found."

"Although use of Aroclor was halted immediately, we can expect the water contamination to continue for a lengthy period by leaching from the contaminated mud."

Did I read that correctly?

A Yes, you did.

Q And that was a conclusion of this Ad Hoc Committee, correct?

A It was a conclusion of the results it was designed to, yes.

Q Okay, and the -- it says, "use of Aroclor was halted immediately." What use of Aroclor was halted immediately back in 1969?

A I think I remember this clearly, so I'll give you my remembrance of what the situation was. It's my understanding that there was a transformer

that developed a leak, and the transformer leaked.

It was not something that was being manufactured at the plant or anything. So it was an end use of PCBs as a dielectric fluid. And when that leaked, it became evident that the PCBs were being leaked in, so it was one time occurrence, and it was an occurrence that was shut off quickly.

Q The leak was fixed?

A Absolutely.

Q And of course, that meant you had to deal with the customer, the power company presumably that owned that transformer?

MR. MERRILL: I'm going to object to the form of that question.

BY MR. SCHICK:

Q Do you know?

A No, not really.

Q Well, is it your understanding that Monsanto owned the transformer that was leaking, or someone else owned it?

A I think the knowledge Monsanto had was that when a transformer back then leaked with PCBs in it, they probably shouldn't be letting it go into the water, and so they shut it down quickly. Plus, it doesn't work when it leaks.

Q And Monsanto manufactured the PCBs that were contained in the transformer?

A Manufactured and sold it to the people that made the transformers.

Q By the way, one other thing on this page that I omitted, we talked earlier about DDT, and here the committee's apparently reached the conclusion that "allowable levels of PCBs are probably lower than DDT. The worst example to date is the test in Pensacola where 5 parts per billion was found to be toxic to shrimp in 18 days exposure," and you know that that was a finding?

A I have no reason to doubt it.

MR. SCHICK: We'll go off the record now, and if it's convenient to everyone, we'll take a lunch break, if that works. Be back at 1:00.

VIDEOGRAPHER: This is the end of tape number three in the deposition of Dr. E. Scott Tucker. Going off the record. The time is 12:12 p.m.

(Lunch recess, 12:12 - 1:03 p.m.)

VIDEOGRAPHER: We are back on the record. This marks the beginning of tape number four in the deposition of Dr. El

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Scott Tucker. The time is 1:03 p.m.

BY MR. SCHICK:

Q You ready to proceed, Doctor?

A Yes, sir.

Q All right. When we broke for lunch, we were looking at Exhibit No. 25, which was the Minutes of the Aroclor Ad Hoc Committee, which was dated September 5, 1969, and we had spoken briefly about the Escambia River issue, and your recollection that that was a transformer spill.

There were 476 parts per million of PCB found in the mud, and while that leak was apparently halted immediately, the expectation of the Ad Hoc Committee was that the water contamination would continue for a lengthy period by leaching from the contaminated mud. Do you see that?

A Yes, sir.

Q And that was the view of the Ad Hoc Committee of Monsanto on Aroclors back in 1969?

MR. MERRILL: Object to the form of the question.

A You probably don't want to hear this, but it was more of their understanding; in other words, based on the information they had at that point in time, that is what they understood it to be.

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BY MR. SCHICK:

Q Sure.

A Not that's what as God says.

Q No, no, no, I -- okay, fair enough. Based on their exposure, their work and the work of others in the company that was fed to the Ad Hoc Committee, that's what they understood, right?

A Yes, sir.

Q Okay. So if you turn to the next page then please, sir, of Exhibit 25, this page number 3 at the top, there is articulation of Problem in Producing Plants, and the committee says that "P. Hodges reviewed what was being done to stop growth losses at Anniston and at WGK."

WGK would have been the Krummrich Plant?

A Yes.

Q "Basically the work to date consists of stopping or trapping any sewering of free Aroclor with return to process or land fill disposal of the trapped Aroclor. This will reduce levels in plant effluents to solubility ranges, particularly as we move to install or sumps back into the waste source points where flows are small and as yet undiluted by Aroclor-free waste streams."

"The question of exactly how far to reduce

(how much money to spend) is not yet clear, and expenditures to date have been comparatively small. It was agreed that until the problem of gross environmental contamination by our customers have been alleviated, there is little object in going to expensive extremes in limiting discharges from the plants."

Now, did I read that correctly?

A Yes, you did.

Q Do I understand what the Ad Hoc Committee was saying correctly, if I understand that they're saying, look, we've got a number of customers out there who are also contaminating the environment with PCBs that we may have sold them, but they've got the problem, and we're going to have to get our arms around that --

MR. MERRILL: I'm going to object to the form of that question.

BY MR. SCHICK:

Q -- is that a fair reading of that paragraph?

A I think if you're saying -- and let me rephrase it, is that there are -- we're not the only issues. There are a lot of issues we all need to address to have a significant impact on any

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reductions that are needed, then that's what I understand them saying.

And what they're trying to do is get the best priority that they can so they can be most efficient about addressing the issue.

Q And so what we're still doing at this point in 1969 is we're taking those objectives, but the company is still trying to prioritize where do we go first?

A Right, because acceptable practices in light of the new information that was being generated have changed.

Q And so what happened though to the conclusion or the objective that was set forth by Mr. Richard in December of 1968 when he said, "I believe Anniston is vulnerable, that off gas HCl and Aroclor should be 100 percent controlled," what happened to that objective, if you know?

A Well, I can only tell you how it impresses me. It impresses me that Bill -- Dr. Richards was the coach, and he wanted to win, and that's what he was trying to inspire his troops to do by saying that kind of thing.

Like I said earlier when I talked about it, he was a goalsetter, and he wanted as best

performance as he could get out of his people to do and understand what they needed to do and to do it and get it done. So that's what I get out of it.

Q The next paragraph then I've highlighted here in Exhibit 25 from the Ad Hoc Committee says this, "air pollution reduction has not been considered by the plants to date, except as incidental prevention of product contamination during tank car and drum loading operations."

"Long range, 1 to 2 years, improvements at Anniston are planned to reduce product contamination (and air emissions) in car loading operations. It was agreed that a comprehensive air sampling and testing program would be very expensive, and is probably not justified at this stage of the problem."

Did I read that correctly?

A Yes, you did.

Q And again, is this a matter of setting priorities?

A Partially. I think it's partially the understanding of the engineers, not the toxicologist, not the analytical chemists and not the other people involved at this particular point in time.

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Q Understanding --

A Well, engineers have different goals in life than say I did, or the president of the company and things of that sort, so in aspect of what they were doing, they could say, well, we've got more important things to do right now than that, and we can't do them all at once, so let's do the more important things first.

So that would be my feeling. As far as the different kinds of areas in the physical handling of the Aroclors and getting them in tankers and getting them in drums, all that kind of stuff. You should probably know that I've been to Anniston, Alabama, but I've never done a review of the plant, because that's not my job.

Q Okay. The next paragraph under Environmental Contamination by Customers says, "our in-plant problems are very small versus problems dealing with environmental contamination by customers. In one application alone, highway paints, 1 million pounds per year are used."

"Through abrasion and leaching, we can assume that nearly all of this Aroclor winds up in the environment."

Did I read that correctly?

A Yes, sir.

Q Do you know which customer was the largest customer in using PCBs in highway paints?

A No, I don't.

Q Do you know what discussions the company had, and when they had them with that particular customer about this finding that the Ad Hoc Committee made in September of '69?

A No, I don't.

Q You agree it would have been a good thing to do get them involved, right?

A If it would help alleviate the problem, yes. There's absolutely no question about that.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 26)

BY MR. SCHICK:

Q Let me show you what I've marked as Exhibit No. 26, and there is an October 8, 1969 memo from you regarding Electron Capture Gas Chromatographic Analysis of Anniston Water and Sediment Samples for Polychlorinated Biphenyls.

So we had looked earlier at, you know, samples that you had done and analyzed, and these are some additional samples then that you've

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analyzed from the water?

A Yes, sir.

Q And then you have results, you have Aroclor and Amount Found, and you list three different types of Aroclors; 1242, 1248, 1260, true?

A Those are the three products that covered the elution region that the peeks came out in.

Q So those where the ones you were identifying; you were able to identify through your gas chromatograph?

A Right. First by retention time, and then next, actually by the fingerprint.

Q Okay. And you have down here, it says, Sample Description. It says that is where it came from, I presume. Snow Creek, Glen Eddie, Water, 23.3 parts per billion, right?

A Yes.

Q So that was a water sample that you had taken, and you found Aroclor 1242 in a concentration of 23.3 parts per billion?

A Correct.

Q Then you have Snow Creek, Glen Eddie, Sediment, and you report that as the 1242 that you found as 2.36 percent, is what it looks like to me?

A Oh, it is percent.

Q What -- how do I translate percent to parts per billion, or parts per million? I mean, does that mean you found 2.36 parts per hundred?

A Percent times 10 to the 3rd equals parts per million, if I remember correctly, and I've been correct on that before, but I think that's correct.

Q So this would be something on the order of--

A 2,360.

Q Parts per million?

A Yes.

Q Okay. So you have other places where you express things in parts per million, or in parts per billion, and I'm just curious, why did you express this in a percentage?

A Because of the largeness of the number.

Q Okay.

A Because if you expressed it as parts per billion, or parts per trillion, or pentagrams, that kind of stuff, it doesn't make any sense, because all you're doing is including a lot of superfluous zeros, which don't mean anything, because they're not statistically significant.

Q Okay. Then you report Choccolocco Creek at Jackson Shoals, and you have water in parts per

billion, and you have sediments of both 1248 and 1260 of over 3 parts per million. You have at the City Treatment Plant, now we're into the 527 and 211 parts per million, right?

A 527 --

Q In the sediment.

A Which one are you on, Choccolocco?

Q No, sir; now City Treatment Plant.

A Oh, you're at that City Treatment Plant, yeah, okay. 527 parts per million, and 211, and less than 2 parts per billion in water.

Q Right, in the water. Now, was this information transmitted -- once you had completed this analysis, did you transmit this information to anyone in Calhoun County, or in the City of Anniston?

A I did not, but it may have been done.

Q You don't know that that was done, but you did not?

A No, I did not, and -- but I don't know that it was done by anybody else, but it may have been. I don't preclude the fact that they might not share that information, which they do frequently.

Q Thank you, Doctor. Let me show you Exhibit No. 27 to your deposition.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 27)

A Thank you.

BY MR. SCHICK:

Q This is an October 9, 1969 memo from Mr. Hodges in the general office of the company, and it says Status Report, Aroclors Clean-Up of Plant Effluents. You've seen this document before; you're shown as a carbon recipient?

A Yes. I don't remember it specifically, but I know I've seen it.

Q Okay, and as I see this, and you can flip through it. He's outlining sort of where things stand with respect first to the Krummrich Plant, and then he also sets forth as we can see, sort of current status in the Anniston Plant, right?

A Yes.

Q If you'll take a look at page 3 and double check me that he's still talking about the Anniston Plant, which begins in the middle of page 2.

A If I can physically get there. Okay. Now, what am I supposed to check?

Q Well, where it says Waste -- in the middle of the page 3, sort of at the top, it says, 2, Waste

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Sampling.

A Okay.

Q And we're talking about out of the Anniston Plant now.

A It says Snow Creek, and so --

Q And we know that's in Anniston.

A That's Anniston, because Mississippi had to it.

Q I'm sorry?

A Mississippi -- Krummrich is on the Mississippi.

Q Okay, and it says, "a set of samples taken June 10 were analyzed recently. A full report will be issued soon. The most interesting data are A, Snow Creek, about 1 mile below our plant. Mud, 2.36 percent PCB. Water, 8.3 parts per billion.

So that's a mile from the plant that in the mud we had 2.36 per hundred, or what are you saying, 2,360 parts per million?

A Yes.

Q Then you say, "with this" -- and that's a mile downstream, right?

A That's what it says, yes.

Q "With this concentration of Aroclor in the mud at Snow Creek, we can expect leaching to

continue for a long time, regardless of how well we clean up in the plant."

That was your feeling then?

A Not my feeling. It was whoever wrote this memo, and whoever did the analysis. I may or may not have done this analysis. It may have been done by the plant, but you never can tell. We'd have to look at the record to make sure they didn't have the capability.

Q Well, but you were the person who ultimately did the analysis; I mean --

A In that memo, these numbers were taken from there.

Q It looks like it to me.

A Okay, then you're absolutely correct with that added information you've shared with me.

Q Okay, okay. And that's always consistent with the memorandum --

A Now, let me say this. The numbers came from me, but this isn't my memo. I didn't write it, so this isn't necessarily my opinion.

Q Understood.

A Okay.

Q However, it is consistent with what the Ad Hoc Committee believed about leaching and how long a

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time we might consider or expect leaching to continue as we saw in their report of their first meeting on the Escambia River problem, right?

A The problem is that that's so simplistic that it's probably not applicable. In terms of the turbulent associated with it, the amount of water soluble materials other than PCBs, which are classily not water insoluble (sic.) that could be carried, the amount of disturbance that happened, how much rain you had, how deep did the -- was the actual PCBs?

I mean, there's -- did it go down for a hundred feet, or did it go down once it topped 6 inches or something like that?

Q They're not saying there's going to be a lengthy period of leaching?

A Yeah, okay, but lengthy could be almost anything. It means that they'll continue to leach as long as there's some there, but it also will continue to decrease as they leach.

Q You said PCBs are not insoluble in water?

A No, I said are not classic soluble in water in the classic sense that you and I would think of things being soluble.

Q Okay.

A In fact, the truth is, some of the levels we're seeing in the water here are due to the fact that the water samples were provided by people who didn't necessarily take out the particulate, all of it, a hundred percent.

And so some of the residual PCBs in here, if there's particulate that's not readily observable, very fine particulates and that kind of stuff, could have more PCBs and easily exceed the solubility of PCBs in a non-classical sense in water.

Also, there's a little thing called globules and emulsions and stuff like that that can be transparent, look just fine, but are not really true solubility.

MR. SCHICK: I object to the last answer as non-responsive.

A Okay.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 28)

BY MR. SCHICK:

Q Dr. Tucker, let me show you Exhibit No. 28. This is another report of the Ad Hoc Committee that we discussed a little while ago. This one is

dated October 15 of 1969. The one we've been looking at earlier was beginning of September of '69, so it's a little over a month later, okay?

A A little over what? I'm sorry.

Q A little over a month later?

A Probably the second meeting, I guess, something like that.

Q Yeah, I didn't see any other one in the intervening period. So it says Report of Aroclor Ad Hoc Committee, and this is the second draft. I'd like to direct your attention to just, you know, a couple things.

There's some background that's given. This looks like a bit more of a formal report that they prepared here than their initial Meeting Minutes. At least that's how it looks to me.

A You're on page 1?

Q I am. It says, Evidence of Problem. Third paragraph down, you'll see that they point out the Professors Widmark and Jensen of the Institute of Analytical Chemistry at Stockholm in November 1966, their identification which was confirmed by mass spectroscopy.

Next paragraph it says, "PCBs were identified in fish and wild life in Great Britain in

1967, the Rhine River and Netherlands estuaries March 1969."

Are you familiar with those studies as well?

A Not the Rhine River and the Netherlands estuaries, I'm not familiar with. I'm familiar with the first part that you read.

Q And then in August of 1968, of course, Professor Risebrough made his presentation, which we've already talked about, right?

A Yes, sir.

Q Those are all things that we've already talked about at some length, true?

A With the exception of what I told you I didn't know.

Q Right, right. And then at the bottom they say, "in the last six months, PCBs have been reported in milk in Georgia, waters of Lake Michigan, fish in Connecticut, sea food along the Gulf Coast (toxic - fatal to shrimp at Pensacola)."

And the shrimp, that was at a concentration of 5 parts per billion, true? Do you remember that?

A If I remember correctly, that's when we looked at the Escambia Bay thing.

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Q Yes, sir.
A Okay, and the fatal to shrimp is conjecture at this point.
Q Well, that's certainly what they concluded back in September of 1969, wasn't it?
A Well, I'm not qualified to say, but I didn't interpret it that way. My feeling, my understanding was that there hadn't been any shrimp around Escambia Bay where the plant was for a long period of time, and that shrimpers didn't shrimp there.
When I hired a shrimp boat to go collect samples, I had convinced to some old fisherman that he should go for shrimp there, because he didn't want everybody to think he was silly.
Q Because there weren't any shrimp to be found there?
A That isn't what -- at that point in time, that's what he told me. So --
Q Okay, but just -- I just want to --
A Might have been that way for a while, too.
Q Sure, right, right. The second paragraph up here that we looked at earlier, I'm going back to the initial meeting to the Ad Hoc Committee.
It said, "allowable levels are probably

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lower than DDT. The worst example to date is the test at Pensacola where 5 parts per billion was found to be toxic to shrimp in 18 days exposure."

That was the conclusion, right?

A It was a conclusion that the tests were probably done in a laboratory by the government lab that's located down there. Yeah, and not necessarily -- I mean, it relates to the environment, but it's not exactly the same, to be real truthful with you.

Q Back to Exhibit No. 28 now. We're looking at the other things that happened in the last six months. In addition to the milk in Georgia, "waters of Lake Michigan, fish in Connecticut, sea food along the Gulf Coast, we have electric dish washing compounds, milk in Maryland, Bald Eagles from the Midwest and mother's milk, rumor not confirmed in Denver."

Did I read those correctly?

A Yes.

Q Then the next item that the Ad Hoc Committee lists as sort of an After Investigation, Not Complete in All Cases, the Committee has Concluded the Following:

"1. The identifications of the PCBs as

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contaminants of the environment is certain."

Do you see that?

A Yes, I do.

Q "2. There is no question as to the non or low biodegradability of the PCBs, particularly the higher chlorinated members of the series, including Aroclors 1254 and 1260, and probably 1248."

"3. The possibility of national origin of the PCBs (such as biological or chemical degradation of other chlorinated hydrocarbons by natural processes or metabolism in the eco-system) is so remote that it is not a satisfactory explanation of their presence."

"4. As discussed in the following section, these may be significant toxicological effects in some species of living organisms."

Did I read all that correctly?

A Yes, you did.

Q And these now are conclusions which had been reached after at least some investigation, maybe not complete in all cases, by the Ad Hoc Committee, true?

A Right. Number 4 I have a problem with the word "these" rather than as discussed in the following section.

Q "There" may be?
A "There" may be, yes.
Q I read it that way, too.
A Okay, good. Actually, you know --
Q If you would, please flip to page 5 of Exhibit No. 28. They list a Summary of Toxicity Considerations. Do you see that?
A Yes, I do.
Q "A. The PCBs are, quote, 'moderately' toxic to man. A probable safe level for Aroclor 1254 and 1260 in the diet will be something less than 1 part per million."
"B. Although only moderately or slightly toxic to adult birds and fish on the basis of acute exposure, the safe long term or chronic dose is less than 100 parts per million insofar as reproduction is concerned."
"C. In the case of shrimp, the safe or no effect level for Aroclor 1254 is less than 5 parts per billion."
Did I get these correct?
A Correct, and the safe level refers to an acute level, not a chronic level. Short term exposure --
Q Right, right.

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A -- at a high level is different than long term exposure at a low level.

Q Sure. You need less of that in chronic -- in a chronic situation to have the same effect?

A Well, you can't do chronic at the level that's acute, because it kills the organisms, but yes, it's the answer to your question in a simple way, truthfully.

In other words, they can tolerate long amounts, but it has to do with bio accumulation and that kind of stuff. They have to be there long enough to the point where it saturates whatever deposition is in the thing --

Q Right.

A -- and then it's released to become metabolically active and have a problem.

Q Yes, sure. So for example, in the case of these shrimp, let's say --

A Right.

Q -- so take the shrimp. So 5 parts per billion has an acute effect we saw, about 18 days, kills the shrimp in 18 days at 5 parts per billion?

A In nice, clean water that they can live in with no other things in there, that kind of stuff, you put 5 parts in, in 18 days, you've got a

significant --

Q Kill?

A Yeah.

Q However, to go to the point you just made about chronic exposure, the same shrimp might only be exposed to 1 part per billion, but over a 6 month period it may also have a fatal effect, but that wasn't studied.

A It doesn't usually --

MR. MERRILL: Wait, wait, wait. I wanted to object to the question because of a lack of foundation.

BY MR. SCHICK:

Q But is that -- does my example meet your point about the difference between chronic and acute exposure?

MR. MERRILL: Same objection.

A Well, if the shrimp can live long enough to be chronically exposed to a level that can become fatal, true. But a lot of times, we accumulate things over our whole life time, and the way it goes into the lipid in other ways is the way it's taken away from the body and protects itself, so that you continue to live until it passes.

So it's just a lot more complicated than

-- and it's not -- I don't think --
BY MR. SCHICK:
Q No, I understand that. Okay. And then the last bit of a paragraph here at the tail end of the report of the Ad Hoc Committee is "there are other species of life in the ecosystem, whereas zero to 5 parts per billion limit for Aroclor 1254 and 1260 (and possibly other more highly chlorinated biphenyls) will be the tolerance level."
Do you see that?
A Yes, sir.
Q And do you know what other species of life they were referring to for which 0 to 5 parts per billion would be the tolerance level besides the shrimp?
A No, and I don't think they did either, because this is truly conjecture.
Q But this was the report prepared in October of 1969 by the Aroclor Ad Hoc Committee of the company which was forwarded to a Rodney Harris, Jr. in the Law Department, correct?
A Yes.
(Whereupon, marked for identification purposes, Defendant's Exhibit No. 29)

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BY MR. SCHICK:

Q Dr. Tucker, I'm going to hand you what's been marked as Exhibit 29 to your deposition. I'm sorry, would you take the last Exhibit back? I apologize.

A No.

Q Would you take a look at Exhibit -- no, I don't need it back. The last one we were looking at.

A Oh, this one here?

Q The Ad Hoc Committee. I'm sorry, I got ahead of myself.

A No problem.

Q So we were looking at page 5, and we were talking about the other -- and what the tolerance level was when we quit.

A Oh, you want me to take it back? I thought you wanted it back.

Q No, no, no. I'm sorry.

A Not a problem. Page 5. It's my fault, I'm certain.

Q That's what we were just talking about, right? Where we had the Summary of Toxicity Considerations --

A Yes.

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Q -- set out by the Ad Hoc Committee, October of 1969, true?

A Yes.

Q Now, will you turn to page 11 of the same document?

A Okay.

Q The committee again in this more formal report provides in No. 7, Alternatives and Probable Outcome. It says, "in the face of all of the circumstances, what can Monsanto do? What does the committee recommend?"

"First, the committee has considered several alternatives as follows: 1. Say and do nothing." And then they say "make the governmental agencies prove their case."

"2. Take action to create a smoke screen hoping to delay any restrictive action by governmental agencies."

Then they list a third about discontinuing the sale of 1254 and 1260.

"No. 4, discontinuing manufacture of all PCBs."

And then No. 5, they list a response in which there would be -- admitting that there's evidence of growing contamination, or growing

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evidence, and that winds up ultimately being what they say they recommend. Do you see that?

A I'm seeing that they are saying these are possible actions that could be taken at the status where they're at right now, yeah.

Q Do you know whether the executives at Monsanto reprimanded, or in any way suggested to the Ad Hoc Committee that suggestions No. 1 and 2 had no place in a discussion about corporate problems to this issue?

MR. MERRILL: Object to the form of the question.

A I think this is more of a brainstorming situation where you bring up things no matter how ridiculous they are or may seem.

BY MR. SCHICK:

Q Were you there?

A No. I said I think, which should clarify whether I was there or not. I also would like to point out in 1970, Monsanto voluntarily quit manufacturing the materials, period.

Q Well, certainly ultimately -- I mean, you don't think discontinuing the sale of all PCBs was ridiculous, do you? That was not ridiculous suggestion?

A Obviously not. That's what was finally done.

Q And you don't think that the suggestion of discontinuing the manufacture and sale of Aroclors 1254 and 1260, that wasn't a ridiculous suggestion?

A It's a partial one of the one we just discussed.

Q Okay, but my precise question is this.

A Okay.

Q Do you know whether or not any of the members of the Ad Hoc Committee, or the committee itself was reprimanded or talked to by any executive at Monsanto to suggest to them that No. 1 and No. 2 recommendations had no place in a corporate document or discussion?

A No, I don't think so, in context of the document.

Q Okay, all right. Now we can move on to Exhibit No. 29.

A Okay.

Q Okay. Do you have Exhibit No. 29 in front of you?

A Yes, I do.

Q That's November of 1969. And this is -- says it's an outline PCB Environmental Pollution

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Abatement Plan?

A Correct.

Q Correct; and this is another internal document of the company, is it not?

A Yes.

Q On the first full page, there's an Introduction, and it says October 15, the Ad Hoc Committee, and it lists the members, issued a report. That was the report we were just looking at, right?

A My assumption is that's what they're talking about.

Q That was dated October the 15th?

A Sure --

Q -- the report contained --

A 1969.

Q -- considerable information, conclusions and recommendations, and then some additional information is provided in this also very formal report, correct?

A Also what?

Q Formal report. It's a relatively formal report.

A I know, but you were reading it? Or just--

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Q No, no, I'm saying it.
A Okay. I was looking for --
Q Could you flip to page 4 of the document, please?
A Okay.
Q They say "the seriousness of the problem can best be spelled out as follows," and then they list some things, and I've highlighted just as an example.
"Monsanto's confirmed the egg shell by feeding chickens a high order of the species" --
A Which 4 are you referring to? The 4 on the top, or the 4 on the bottom? I'm not on the same page you are.
Q I'm sorry. Page 4 at the top is -- the bates label at the bottom is 15.
A Okay, and you're at --
Q Under Bird.
A Okay, I see the Fish. Where are you reading? Okay, you're down in your yellow area?
Q Yes, sir.
A In fact, Monsanto has?
Q "Confirmed the egg shell by feeding chickens, a high order the species, PCBs in controlled tests."

Did I get that right?

A You read that statement correctly.

Q And of course, they were relying on some of the analytical work you did, correct? Wouldn't some of your work have gone into being able to comfortably reach that conclusion?

A I don't know what they're exactly talking about. I'm sure they do, but confirm the egg shell by feeding chickens.

Q The effect on egg shells that we saw earlier?

A The proposed thinning of egg shells, is that --

Q Yes, sir.

A Okay. No, I wouldn't have anything to do with that. That would be done by a toxicologist, probably industrial bio test.

Q Oh, okay, okay.

A I would measure the PCBs that they fed to them, and what might be in the tissues or in the eggs and things of that sort, but somebody else would have to measure the thickness of the eggs.

Q If you could turn to page 5 of the document. Again, there's a number at the top of the page, page 5. I think you've gone too far. It says

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Effect on Monsanto.

A Probably stuck together with 4. Here is 4.

Q It is a totally random page.

A I don't know. We talked about a lot of things here.

Q No.

MR. SCHICK: Charlie, would you mind letting the Doctor have your copy of page 5?

MR. MERRILL: Oh, sure. There are a couple of unnumbered pages, and then it starts numbering again.

THE WITNESS: Oh, really?

MR. MERRILL: Yeah.

THE WITNESS: Okay. Now I have 5.

MR. SCHICK: Thank you.

THE WITNESS: You're welcome. I'm sorry.

BY MR. SCHICK:

Q It says, Effect on Monsanto, and then it first lists Business Potential at Stake. Then it has a paragraph that says Legal Liability, which says, "all customers using these products have not been officially notified about known effects, nor do

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our labels carry this information."

Do you see that?

A Yes, I do.

Q And would you say that we could rely on this document, an official -- I mean a company document dated November 10 of 1969, more than we can on your recollection about at least something like this?

MR. MERRILL: I object to the form of the question.

BY MR. SCHICK:

Q That is customers not being notified?

MR. MERRILL: Object to the form of the question.

A I don't think my recollection was specifically orientated toward 1969, October 10th thereof.

BY MR. SCHICK:

Q Fair enough.

A So I think that's really kind of -- I mean, you might want to ask me a different question, I think, maybe.

Q You don't have any reason to doubt this statement by the Ad Hoc Committee, do you?

A That they said it?

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Q Yes, sir.
A No, I don't doubt that they said it.
Q Or that it was accurate.
A As accurate as they knew.
Q Okay, fair enough.
A I have a problem with all and never, so...
Q Well, that's -- you know.
A But that's fine. That's my problem, not yours.
Q At the bottom of that page it says Customer Relations. Do you see that?
A Yes.
Q "Some customers who presently use these materials will be scared off to other competitor products."
Is that a reasonable conclusion by the Ad Hoc Committee that some of this information will scare off customers?
MR. MERRILL: I object to the form of the question.
A Yes, where substitutes were available.
BY MR. SCHICK:
Q If you turn to the next page, page 6 --
A Yes.
Q -- Effect on Customers and Ultimate

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Customers. It says, "one of the unique features of PCBs is their fire resistance. Here, the basic decision whether to risk lives due to fire or risk extinction of some series of birds."

"In this case, the PCB would probably be accepted as a necessary pollutant and tolerated under controlled conditions."

Did I read that correctly?

A Yes, you did.

Q And this was essentially what the Ad Hoc Committee is telling the management of Monsanto about this is the -- these are sort of the risks and benefits that are going into some of the things we're talking about; is that right?

A Well, as long as we point out it says would, probably.

Q Okay. If you can flip to the next page please?

A Yes, sir.

Q Sources of Contamination, "although there may be some soil and air contamination involved, by far the most critical problem at present is water contamination."

And again, this particular document is dated November 10 of 1969, and you remember it was

in December -- I hate to keep going back to this -- but it was in December of 1968 that Mr. Richards said, let's get control emissions at Anniston a hundred percent, right?

A Yeah. We've discussed that.

Q And there's no doubt, even as late as November of 1969 that the most critical problem is water contamination, true?

A Continuing water contamination, existing water contamination, continuing contamination if we never manufactured them again. I mean, I don't understand based on what we're reading here, the excerpt we've taken, exactly what critical problem we're discussing, because there are a variety of approaches to what the critical aspect of this is.

Q Okay, but all they say, that is all the --

A Yeah. No, I don't disagree with what you said. I already said you read it correctly.

Q Okay, and that is the conclusion of the Ad Hoc Committee of Monsanto on Aroclors?

A I can't speak for the committee or individual members. This is what they decided was okay for an interim report.

Q Fair enough, fair enough. They also mention at the bottom of the same page that "all of

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the fluids have had the pink" -- I think it's pink -- "constituent dumped on dirt roads as a de-dusting agent, which inadvertently found its way back to the stream."

This is just, I guess, another way in which PCBs can find their way into waterways. Were you aware of that?

A "All of the fluids have had the pink constituent dumped on dirt roads as a de-dusting agent." You know, I can't draw much conclusion if anything from that sentence, because it's -- taken out by itself, it doesn't mean much. It doesn't identify anything to speak of, so I don't know.

Q Do you know what the pink constituent of PCBs might be?

A No, absolutely not.

Q Go back up to the top. You see where it says -- of this little Section A, Open Pollution? "Our manufacturing facilities sewered a sizeable quantity of PCBs in a year's time: 1, fluids; 2, electrical; 3, heat transfer; 4 industrial."

Under Industrial, "these fluids have generally been sprayed into drains, washed down sewers and generally regarded as very harmless."

Do you see that?

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A No, I don't. Where are you at?
Q I'm right above where we were just reading.
A Okay, good. I thought you had gone to the top. And yes, I do see it now.
Q And again, this is the report, November 10, 1969 of Monsanto's Ad Hoc Committee on Aroclors, true?
A Yes, sir.
Q So on page 12, we're going to talk some more about the implementation of a Recommended Course of Action. Do you see that?
A Yes, sir; I do.
Q And number 2 under that section says "decide on timing and content of any public and/or customer notification of PCB problem."
Did I read that accurately?
A Yes, you did.
Q And again, just for reference sake, this is November of 1969, and at the top of the very next page 6 says, "initiate customer education or need for effluent control of all products."
Do you see that?
A Yes, I do.
Q And it says Develop a Comprehensive

Program short, and it says Short Term, within the next six (sic.) months. And it lists some things like research, marketing, production, legal.

Under legal it says, "define our position, recommend reasonable action that will not unduly alarm the market, but reduce the exposure in terms of liability."

Did I read that correctly?

A Yes, you did.

Q You weren't involved in any of that action to reduce the company's exposure in terms of liability, were you?

A No, sir; I'm not a lawyer.

Q Well -- and were you in any way providing input to the Legal Department, to the Engineering Department, or to any other executives that would assist them in determining how they might reduce their exposure in terms of liability, or to your knowledge, maybe they -- maybe they --

A You know, I generate the information in terms of what was going on from a measurable viewpoint, and I offered that up to the people, some of which are on the Ad Hoc Committee and that kind of stuff, but it wasn't -- I did not give that kind of information, or was required to give it directly

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to our legal department. It would get to them through other people.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 30)

BY MR. SCHICK:

Q Let me show you what I have marked as Exhibit 30 to your deposition. Getting close, getting close. This is December 23, 1969. It's been a year since Mr. Richard's memo.

A Memos.

Q Yeah, you're right. There were two right in a row. But this one is from you, Aroclor Wildlife Monthly Summary, right?

A Yes, sir.

Q You say, "analysis of 5 commercial detergents and some of the detergent components manufactured by Monsanto have been completed. The analysis confirmed the presence of low levels of Aroclor in laboratory samples of Finish and Electro-sol manufactured by Economic Laboratory, Inc., and in All," A-L-L, "made by Lever Brothers?

A Right.

Q What are PCBs doing in detergents?

A Well, probably it was -- it's one of those

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things, inadvertent contamination. If you go back to 1966 and read Jensen Widmark's publication, he talks about an inadvertent contamination, and that's what he called what he first discovered it.

I just do that to make the point of the fact that the PCBs were not in the detergents themselves from manufacturer of the detergents. They were in the box for it, which was recycled paper, and we all know that recycled paper, of course, probably could consume some of the materials that were the carbonless paper materials and things of that sort.

And so if you looked at the actual materials, you'd find it in the detergents, but if you really looked at the cardboard, you'd find it in there, and that's where it was coming from.

Eventually when they use boxboard for food containing packages and that kind of stuff, they have now put the food inside of a package inside of the box to prevent that kind of migration from occurring, and also they don't have NCR paper around anymore, the PCBs and that kind of stuff.

Q Right. But that was the origin of why things were placed in a bag within a box?

A Well, it was one of the things that was

done to ensure that PCBs which were taken out and any other kinds of things that might get into the food, that it wouldn't get into the food.

But we were surprised, too. Believe me, when I first looked at it, what the heck is it doing there, and I didn't say heck, but the truth of the matter is I wondered.

And then we started really looking at it, and we found out because of the recycling of paper that boxboard, a lot of cardboard, the gray board that you see that's in food packages, that kind of stuff, contained PCBs.

They were migrating into the food, especially if it had high lipid content.

Q And you confirmed this with respect to at least the detergents back in December of '69?

A Yes.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 31)

BY MR. SCHICK:

Q Okay. Exhibit No. 31?

A Thank you.

Q Exhibit No. 31 is a December 24, 1969 memo regarding PCB analysis by Mr. Lidgett?

A Yes, sir; Ron Lidgett.
Q And I believe he is writing to you actually thanking you for your memo about the use of a particular tape of column for PCB analysis?
A And that's Support Code at Open Tubular Column. It's not Scott Columns.
Q Okay, although that's --
A Would have been nice; I take credit for something.
Q And he says, "I've noticed that there is little evidence for 1242 in chromatograms obtained in the U.N. on extracts from wildlife residue, et cetera, possibly because it is degraded, and most people are quoting the PCBs found as 1254, and occasionally 1260."
Do you find a similar situation in the United States? And I was just curious as to what your answer was. Do you, and if so, what does it mean?
A Okay, you want answers to both of those questions?
Q Yes, sir.
A Yes. As I've said over and over, verbal and in the literature, the predominant Aroclors that were being found in samples that were weathered. In

other words, they've gone through the whole biodegradation scheme.

Predominantly, those isomers could be also found in 1254 and 1260. The implication, of course, was that these isomers because of the higher degree of chlorination were much more recalcitrant to any physical or biological degradation that could have occurred during the period of time that they went through the environment.

And in fact, we actually -- I've actually published a paper on the biodegradability of 1221, 1242, 1254, 1264 -- 1260 and 1248, and a product we thought might have some viability called Aroclor 1016. I think you may be aware of that.

Q Do you know Mr. -- Dr. Kaley?

A Dr. Kaley?

Q Yeah.

A Yeah, sure. Bob worked for me.

Q Okay. He probably has taken on a lot of the information that you began developing back in the Sixties?

A Well, actually Bob -- yes.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 32)

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BY MR. SCHICK:

Q Let me hand you what I've marked as Exhibit 32 to the deposition. This appears to be a letter from you to a company called Appleton Coated Paper Company dated St. Patrick's Day of 1970, true?

A Yes.

Q And you're reporting to this gentleman that -- "regarding our phone conversation, I'd like to confirm our offer to analyze air samples for you. Please send them. I've included with this letter, a copy of an article showing Aroclor vapor tolerance levels, and a copy of the method we will use to analyze your samples."

So you were willing to do air sampling for folks who asked for it for PCB content?

A We did everything we could to help facilitate those people that didn't have the capabilities to understand what was going on with their use of the Aroclor.

So, yes, even the government people. I mean --

Q Well, I'm actually more interested in other Monsanto people, like the Monsanto people in Anniston, Alabama. Did you do analyses of air, and PCB in air in Anniston?

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A I'm trying to remember whether we did or not. I can't exactly remember whether we did. I do know that once we felt that we understood the methodology well enough to teach somebody else how to do it, we taught people from Anniston, Alabama in St. Louis how to do that analysis and made sure we knew how, and then monitored them to where we were satisfied with the quality control associated with what they were doing.

Q Do you remember when you did that?

A Not specifically without going back in the records, but as soon as we could.

Q But of course, the priority as we've seen in all the documents that we've talked about today with respect to Anniston was, and the issues of contamination, it was water contamination first, air we believe was negligible, I think was the word used in an Ad Hoc Committee meeting; is that your recollection?

MR. MERRILL: I'll object to the form of the question.

A Well, I mean, just to say "we" didn't include me necessarily, and we'll leave it at that.

BY MR. SCHICK:

Q I stated it correctly with respect to the

documents?

A To the document, absolutely. You got that right on. No question about that. I'm sorry, I didn't mean to imply that.

Q No, no, I appreciate the clarification. I guess we're running out of tape time, and I still have five exhibits to go through, so why don't we take a short five minute break, and we're close.

A Thank you.

VIDEOGRAPHER: This concludes tape number 4 in the deposition of Dr. E. Scott Tucker. The time is 1:57 p.m.

(Brief recess, 1:57 - 2:07)

VIDEOGRAPHER: We are back on the record. This is the beginning of tape number 5 in the deposition Dr. E. Scott Tucker. The time is 2:07 p.m.

BY MR. SCHICK:

Q You ready to proceed, Dr. Tucker?

A Yes.

Q Okay. I wanted to ask you to go back with me for a moment to Exhibit No. 28, which you remember is the October 15, 1969 report of the Aroclor Ad Hoc Committee; do you recall that?

A Yes, I do. I have it in front of me.

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Q I just had a couple of additional questions. If you could turn to page 17, it's down at the bottom, the actual number 17.

A Yes, sir.

Q Under sort of Status of Individual Products, and then Monsanto Plant's Continued Action. Number 1 action says, "take steps to see that every precaution is taken to prevent Aroclor entering water streams. Try to reduce to parts per billion level."

Do you see that?

A Yes, I do.

Q And we know at this very same time that they weren't down to parts per billion level, because in the sediment a mile away from the Anniston plant, you found 2.36 percent in the sediment, correct?

MR. MERRILL: Object to the form of the question.

A We're talking specifically in a less cosmopolitan fashion about specifically Anniston, because this says Monsanto Plants. Okay.

BY MR. SCHICK:

Q They want to reduce for all plants, right?

A That's what it says.

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Q Okay, and do you know what steps were being taken to do that at this time in November of 1969?

A No.

Q And if you would, turn please to page -- back up to page 12 of that same document, please.

A Yes, sir.

Q It says in sort of the alternatives, and we talked earlier about sort of what the alternatives were, that the committee considered and what they ultimately recommended, and their final recommendation is "finally in view of the above, this course of action will dictate that we will have to restrict uses and begin a program of clean up starting immediately," and they underline starting immediately.

Do you see that?

A Yes.

Q Do you understand clean up to mean clean up as in if we got a whole bunch of PCB in some sediment here, pull it up and clean it? Is that what clean up means to you?

MR. MERRILL: I'm going to object to the form of the question.

A Well, clean up to me means clean up, and

without any further adjectives or adverbs or direct objects or subjects and stuff that, that's what it means. So it could be washing the dishes. I'm not being facetious. I just --

Q No, sure. But here we're talking about cleaning up PCBs?

A Yeah, and the first would be to clean up your process so that it's not leaky. That would be from an engineering viewpoint, I assume these guys are engineers that were doing it.

Why would you run out and clean up a stream if you still had some that was leaking from your operation?

MR. SCHICK: Object as non-responsive.

A I'm sorry, I didn't --

BY MR. SCHICK:

Q Do you recall that in December 1968 what Mr. Richard said was that we've got to get to a hundred percent control and not be putting anything in the waste streams, right?

MR. MERRILL: Object to the form of the question.

A Yeah; no, I recall that.

BY MR. SCHICK:

Q If you could turn to page 22 of this same document, again, this was pursuant to the recommendations of the Ad Hoc Committee. They came up with a special budgetary account they thought "would allow implementation of the various recommendations and a continuation of the toxicological research effort under way and continuing" -- I guess they were projecting until June of '71.

"The problem involved not only Research whose budget has born the major costs to date. It's a joint problem involving sales and production or manufacturing. The budget for the remainder of '69 and all of 1970 should include" -- and then it lists "costs of a three-man task force for six months."

"2. A continuing three-man effort in the analytical area."

And "3. Toxicological research" and the total is $220,000 for all of 1970 and the remainder of '69, correct?

A Yes, sir.

Q All right. Would you have been one of the three men?

A Actually, I already was.

Q Doctor, here is -- I finished with that

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one, thank you.

A Sure.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 33)

BY MR. SCHICK:

Q Exhibit No. 33.

A 31 and 32 are also --

Q Yes, I'm finished with both, thank you. This is the next up, 33. Doctor, Exhibit 33 is an August 7, 1970 memo to -- well, it says Anniston PCB Clean Up Program. Do you see that?

A Yes.

Q So again, now we're a year and seven and a half months, seven months after Mr. Richard's suggestion that we get our effluent to one hundred percent control.

And the status at Anniston is that No. 1, under Status, "we are presently discharging to Snow Creek about 16 pounds a day, PCBs (down from 250 pounds per day in 1969)."

Did I read that correctly?

A Yes, you did.

Q It's certainly not zero, is it?

A Do you really want me to answer that?

Absolutely not. It's 16. I mean --

Q If you turn the page, next page?

A Yes, sir.

Q Program, A, Public Relations. "E.V. John developed a proposed statement to be used in event of public disclosure, but after consultation with Legal felt it should not be used because of the recent lawsuit instituted against the plant by BASS; therefore, an innocuous essentially no comment-type statement is being drafted."

Do you know what that was being done for?

A No.

Q Do you know, or has anyone told you that it was regarding the PCB contamination in the creeks and waterways downstream of the Anniston Solutia or Monsanto facility?

A No.

Q B, it says Operator Education. "All Anniston personnel have been re-advised of the necessity to avoid sewering of any Aroclor."

Do you see that?

A Yes, we do.

Q But of course, we know from page 1 that where regardless of that re-advising, we're still discharging about 16 pounds day in Snow Creek --

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MR. MERRILL: I object to the form of the question.

A There's a difference between discharging and sewering.

BY MR. SCHICK:

Q Okay, tell me about that difference.

A Well, sewering would be an overt act that you can control and you knew how to take care it, and you could say don't do that anymore, and it would be done.

Processes that leak, and 16 pounds could come from a hundred different spots, so you know, you have to ferret out where it's all coming from to understand to get rid of it. So you know, it's just the way you look at something.

Q But the company did do that, didn't you? The company put a sump in there before the effluent reached Snow Creek, right?

A Actually, they caught the leaks.

Q Could be done anytime?

A Which is a faster way to get to it, but that's right, and yes, I would answer that question.

Q Then on page 3 the report goes on and says, No. 5, Final Treatment. "Based on some indications (and much hope), by September, and we're

talking 1970 now, the actions above may approach the present plant objective of 10 parts per billion of PCBs in 700 GPM, or .1 pounds per day."

Did I read that correctly?

A Yes, you did.

Q So, what was going on in Anniston was we're down to 16 pounds, and hopefully if we can continue this sort of fingers crossed, much hope, we'll get to 10 parts per billion per day? Is that a fair reading?

A Yes.

MR. MERRILL: I'll object to the form of the question.

BY MR. SCHICK:

Q And we already know that at least with respect to shrimp and the Ad Hoc Committee said some other species, 5 parts per billion is too much?

MR. MERRILL: Object to the form of the question.

BY MR. SCHICK:

Q Right?

A I think, yeah, you're correct. What you're saying is correct, I think. It was 5 parts per billion, not 5 parts per million. I know that, but I mean, progress, not perfection, yeah, but

they're getting there.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 34)

BY MR. SCHICK:

Q Exhibit No. 34 -- wait a second. Can you hand that back to me?

A Sure.

Q I think I skipped some stuff.

A Sorry?

Q Exhibit 34 --

A Thank you.

Q -- is from you dated December 21, 1979, it looks like. Subject is PCB Content of Hog Fat and Liver Samples Sent from Anniston. You did the analysis on the dead pig?

A We did.

Q The dead pig was found at the landfill; that is the Monsanto landfill on the south side of the Monsanto Plant?

A To the best of my recollection, that was my understanding.

Q Did you find PCBs in the dead pig's fat and liver?

A Yes, sir, and we reported it.

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Q Is that what killed the dead -- the pig?
A Pardon?
Q Is that what killed the pig?
A No.
Q How do you know that?
A Because I was told that it wasn't the reason. They just found a dead pig, which wasn't too, you know, unusual, and -- but any rate, as far as I know, nobody determined forensically that the pig died from PCBs.
Q Okay, fair enough. What was the content of the PCBs in the pig's lipids and fat, liver and fat? Looks like 92? For example, I mean, net weight in the liver, I see at 1.69 parts per million of Aroclor 1224, and 92 parts per million of 1254. Am I reading that right?
A Correct. Are you having problems between the difference of lipid weight and wet weight?
Q Excuse me, Doctor, this document that we've just been looking at is 1970. I apparently said '79.
A Yeah. It's hard to read this document.
Q Well, you were gone by '79, right?
A Yeah, so I probably wouldn't have been writing this.

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Q And that stamp there says December of '70, right?

A Correct.

(Whereupon, marked for identification purposes, Defendant's Exhibit No. 35)

BY MR. SCHICK:

Q Exhibit No. 35, and I'm sorry, you'll have to look at this together, because I only have one copy.

A Okay, let me look at the --

Q -- look at the screen. This is -- appears to be a sales invoice of some sort from Monsanto Company to Westinghouse. I guess this sale actually was shipped out of Sauget.

And would you just -- do you see what I've highlighted that's sort of a warning there? "This product contains polychlorinated biphenyls -- biphenyls, PCBs, which some studies have shown may be persistent an environmental contaminant and possibly injurious to certain forms of bird, aquatic and animal life, prevent any entry into the environment through spills, leakage, disposal, vaporization, re-use of containers or otherwise."

"Spills, leakage and waste product must be

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collected. Use of this product must be restricted to two applications."

My presumption is it continues on page 2 of the invoice, which I do not have. Now, did I read that correctly?

A Yes, you did.

Q My question is this. Is this the kind of -- is in the warning that we talked about earlier that was provided to customers with respect to PCBs and what was turning up in various studies or literature?

A I think it's an example of one of them, sure. But whether or not it's the total one, or the one that we specifically talked about, no. I just knew that they were distributing information like this sort to their clients.

Q Now, this provides no information about the amount parts per million, what can be fatal, for example, to shrimp, the 5 parts per billion, does it?

A No, it doesn't.

Q And it doesn't give any details with respect to its longevity in, for example, sediments of streams, its insolubility in water, correct?

A Correct.

Q And we also talked earlier about your having shared information, and I wanted to ask you, when you came up with the finding that a mile from the plant outfall you found 2.36 percent in the sediment in Anniston, do you remember that?

A Yes, I do.

Q And 2.36 percent would be 2,000 (sic.) 360,000 parts per million or --

A Parts per billion.

Q Would that be parts per --

A You multiply by 10 to the 3rd. Put three zeros -- move the decimal point three places to the right.

Q 2,360 -- no, 2,360 --

A Parts per million.

Q Per million? Sure, okay, I had it right. That it would be 2 million --

A No, you didn't.

Q -- 360,000 parts per billion.

A Billion, okay.

Q True?

A Yeah. I thought you said million.

Q Okay. So was that information when you discovered that, was that shared with the regulators in the State of Alabama? Did you provide that?

MR. MERRILL: I'll object to the form of the question, and lack of foundation.

A And I don't know whether the people that I reported the information to shared it. They could have.

BY MR. SCHICK:

Q And did you share with them the information that at a level of 5 parts per billion, 5, it was fatal to shrimp in 18 days?

A Could you re-define "they?"

Q "They" being any regulators or Department of Health in the State of Alabama.

MR. MERRILL: Again, I'll object to the form of the question.

A No, because there were other people that--

BY MR. SCHICK:

Q That would have done that?

A -- were responsible for sharing that kind of thing.

Q Do you know whether they did?

A No, I don't.

Q And as you look at Exhibit No. 35 that's up on the board, are you aware of any other warning that appeared before this one?

A Could have. You know, I wasn't in charge

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of writing these warnings or anything like that. Now, I may point out it says "prevent any entry," which kind of gives you a clue as to how much you should let out.

Q Fair enough. Again, just to make sure without putting too fine a point on this, this is the only warning that you remember? We talked about warnings going out. You can't remember the specifics of anything, whether there was a warning or when it was issued any earlier than this one?

MR. MERRILL: Object to the form of the question.

A The truth of the matter is until you showed me this, I didn't remember this one specifically. So, I mean, the answer to your question is yes, in that context.

BY MR. SCHICK:

Q Thank you. Those are all my questions. Thank you very much, Dr. Tucker.

A Absolutely. Thank you.

MR. SCHICK: Why don't we take just a quick break.

VIDEOGRAPHER: Going off the record. The time is 2:26 p.m.

(Brief recess, 2:26 - 2:35 p.m.)

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VIDEOGRAPHER: We are back on the record. The time is 2:35 p.m.

EXAMINATION

BY MR. ZYGMONT:

Q Dr. Tucker, my name's Mac Zygmont. I'm with the law firm of Alston & Bird. I've got just a couple of follow-up questions for you here. It shouldn't take but a few minutes.

You've testified a couple of points throughout the day today about the distribution of various information about PCBs and Aroclors manufactured by Monsanto, toxicity information and information of that sort to various Monsanto customers.

You referenced at some point or another that it involved some marketing decisions, and may have involved distribution through means other than marketing as well. You recall that testimony in general?

A Yes.

Q And you previously testified that you don't remember specifically when any of those communications may have been made; is that correct?

A Without reference to a lot of documentation and that kind of stuff, no, I don't.

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Q And you don't recall the names of any Monsanto customers in particular that that information was sent to, do you?

A Well, sure, I know some of it probably got the stuff, but I mean, they were just clients, and I knew ultimately they got things, General Electric, Westinghouse. You name them.

Q Do you recall any other names?

A My recollection is not complete, so I don't know what good it would do. It might be relative to the size of the company. It might be relative to any interactions I had and things of that sort, but I do know that they distributed those kinds of things.

Q I'm interested particularly in your recollection of to whom the information was distributed.

A Okay, and I stated my recollection. I remember that there was an effort to do it, and that the effort was accomplished over the period of time that it was supposed to be.

Q And you indicated a moment ago that you know that information, or you recall that information being distributed to Westinghouse and General Electric?

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A I don't recall it specifically, but I do know if they had put labels on drums and that kind of stuff, they got it. So I don't know where you're going with this, but go ahead. That's for sure.

Q Your testimony very broadly states that you know in some form of another that this information was distributed to clients. What I'm interested in knowing is whether you know the names specifically of clients that received this information.

A No. I might have understood it was sent to them, but I couldn't swear that they actually got it or anything like that. So the answer to your question is no.

Q Thank you. No further questions.

MS. LAVEY: We don't have questions.

MR. ZYGMONT: Thank you, Dr. Tucker.

THE WITNESS: You're welcome. My pleasure.

VIDEOGRAPHER: This marks the end of tape number five and concludes the deposition of Dr. E. Scott Tucker. Going off the record. The time is 2:38 p.m.

(Concluded 2:38 p.m.)

(Signature is reserved)

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C E R T I F I C A T E

STATE OF GEORGIA:

COUNTY OF FAYETTE:

I hereby certify that the foregoing deposition was stenographically recorded by me as stated in the caption. The deponent was duly sworn to tell the truth, the whole truth, and nothing but the truth. The colloquies, statements, questions and answers thereto were reduced to typewriting under my direction and supervision and the deposition is a true and correct record, to the best of my ability, of the testimony/evidence given by the deponent.

I further certify that I am not a relative or employee or attorney or counsel of any of the parties, nor am I a relative or employee of such attorney or counsel, nor am I financially interested in the action.

This the 2nd day of March, 2010.

/s/Anna-Marie Cheak, CCR, B-1109
Registered Professional Reporter

My Notary Commission of Fayette County, Georgia, Expires:
October 26th, 2012

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