WATER_PCB-SD0000049183

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF ILLINOIS

CERRO COPPER PRODUCTS COMPANY,) No. 92-CV-204
)
Plaintiff,)
)
vs.) East St. Louis, Illinois
) September 21, 1995
MONSANTO COMPANY, et al.,)
)
Defendant.)

TRANSCRIPT OF TRIAL
VOLUME VII, A.M. SESSION
BEFORE THE HONORABLE PAUL E. RILEY,
UNITED STATES DISTRICT JUDGE

APPEARANCES:

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Proceedings recorded by mechanical stenography, transcript produced by computer.

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THE COURT: All right. Thank you, sir. You're excused. Have a good day.

THE WITNESS: Thank you.

THE COURT: Call your next witness. But let's just take ten minutes while we're -- our morning break, and then we'll start with the new witness.

MR. RICCI: Great. Thank you, Your Honor.

(There was a short break)

THE COURT: Your next witness. Please?

MR. RICCI: Your Honor, Plaintiffs call William Papageorge.

WILLIAM PAPAGEORGE, PLAINTIFF'S WITNESS, SWORN.

DIRECT EXAMINATION

Questions by Mr. Ricci:

Q. Good morning, Mr. Papageorge.

A. Good morning.

Q. We met about a year ago at your deposition.

A. I recall that, yes.

Q. My name is Rich Ricci. Could you just state your full name for the record, please?

A. William B. Papageorge.

Q. And how old are you, Mr. Papageorge?

A. 73.

Q. What is your educational background?

A. Oh, I have a Bachelor of Science degree in chemical

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engineering in 1943 and a Master of Science degree in chemical engineering in 1947 from Washington University in St. Louis, Missouri.

Q. You are retired from Monsanto; is that correct?

A. That is correct.

Q. How long did you work for Monsanto?

A. About 35 years.

Q. Can you describe some of the major positions you held at Monsanto while you were employed there?

A. I don't know how to define major, sir.

Q. Well, you had a position at the J. F. Queeny plant; is that correct?

A. I had several positions there for 13 years. About every two years I was reassigned.

Q. What were -- what is the highest position you reached at the Queeny plant?

A. A general superintendent of warehousing distribution and utilities.

Q. And when was that?

A. 1962 to 1964. I may be off on those dates a little bit.

Q. What was the next position you held at Monsanto after that?

A. I was transferred to the Monsanto plant in Sauget, Illinois, referred to as the Krummrich plant.

Q. How long did you work at the Krummrich plant?
A. One year.
Q. What was your position there?
A. I was one of the general superintendents of manufacturing.
Q. Where did you go from there?
A. I was assigned to the Anniston, Alabama, Monsanto plant.
Q. What was your position at Anniston?
A. Plant manager.
Q. And how long were you plant manager at Anniston?
A. From 1965 to the end of 1969.
Q. What was the next position that you held with Monsanto?
A. I was appointed a manager of environmental control.
Q. And how long did you hold that position?
A. Well, the job title and job contents changed through the years, but in essence I had the assignment from 1970 till 1977.
Q. And what was the position that you took after that?
A. I was made a director of environmental affairs for one of Monsanto's operating units.
Q. Which operating unit was that?
A. That was the unit referred to as Monsanto Intermediate Chemicals Company.
Q. Did that operating unit include the Krummrich plant in

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Sauget?
A. Yes.
Q. And how long were you director of environmental affairs for that operating unit?
A. Until 1983.
Q. What position did you take in 1983?
A. I had the same title, but Monsanto had reorganized, and I was then assigned to the Monsanto Industrial Chemicals Company.
Q. Did the Monsanto Industrial Chemicals Company include the William G. Krummrich plant?
A. Yes.
Q. And how long did you have that position?
A. Until 1985.
Q. And where did you go from there?
A. Another reorganization occurred within Monsanto, and I was appointed the manager of occupational health for the new Monsanto Chemical Company.
Q. Focusing your attention for a second on the time when you were manager of environmental control from 1970 to 1977, was that a position that applied to the whole company, or was that for a business unit or group of the company?
A. That applied to different business groups through that period of time. Initially I was assigned only to one business group. This was referred to as the Functional

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Fluids Group within Monsanto's organic chemical division.

Q. In that position did you have dealings with the William G. Krummrich facility?

A. Yes.

Q. How long did you hold the position relating to occupational safety and health?

A. One year.

Q. And then where did you go?

A. I retired.

Q. What year did you retire?

A. The end of '86.

Q. Do you currently receive a pension from Monsanto?

A. I do.

Q. Now, at the time of your deposition you testified that you had a retainer agreement that you were working under. Do you recall that?

A. I do.

Q. Do you still have that retainer agreement?

A. Yes.

Q. And is that still with the law firm of Smith Helms?

A. Yes.

Q. And that's a law firm in South Carolina?

A. North Carolina.

Q. North Carolina, I'm sorry. Now, at your deposition you testified that 90 to 95 percent of the consulting work that

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you did pursuant to that retainer related to cases in which Monsanto was involved. Is that still true?

A. That's a good approximation, yes.

Q. And those are cases where you are consulting on behalf of Monsanto, not against Monsanto.

A. Yes.

Q. Now, during the time that you were manager of environmental control, did you become familiar with a program by Monsanto to measure and control the losses of PCBs that -- into its sewer systems?

A. Yes.

Q. PCBs, by the way, are also referred to as Aroclors; is that correct?

A. Within Monsanto that terminology is correct, yes.

Q. How did that PCB control program arise?

A. In late 1966 some research chemists in Sweden in looking for DDT and environmental samples detected another group of chemicals which they initially identified as PCBs. That was made known to Monsanto and since Monsanto is a -- was a manufacturer of PCBs, we became very interested in determining for sure that these materials were indeed PCBs and if they're in the environment and what levels are they out there and is there any effect on the environment.

Q. Did the program evolve into something more than just looking at those sort of broad questions?

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A. Well, of course the broad questions gave the direction which we chose, and the program then was designed to be broken down into very specific smaller segments to address definite areas such as how much in the way of PCBs are in our products, how much is getting away and into the environment, what do our customers know, what does the government know, what controls, if any, are appropriate. There were very many unanswered questions at that time.

Q. In terms of how much PCBs were getting into the environment, one of the things that you looked at was sewer discharges; is that correct?

A. Yes, one of the things, yes.

Q. Now, what was your role in this PCB control program during the time that you were manager of environmental control?

A. Well, it was an evolving role because it was something entirely new to industry in Monsanto. There were so many unanswered questions relating to PCBs that it became very difficult for many individuals within Monsanto and with the other producers of PCBs and the government and the university labs and all to really keep abreast. And within Monsanto it was decided by the managers that it would be best if they would assign an individual to -- whose full-time assignment would be keeping tuned in to developments. And I use the expression let the left hand

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know what the right is doing, and not only within Monsanto, but anyone interested. Because we all had a lot of learning to do and wanted to speed it up, and we could learn from each other quite a bit if we worked at it. So my assignment really was one of serving as a focal point within Monsanto to gather information relating to anything involving PCBs and passing that onto those that I felt could use it or were interested and that needed to know.

Q. In that role is it fair to say that you gained a good amount of knowledge about PCBs?

A. I think that's a fair summation, yes.

Q. In fact, most of the cases that you consult on are cases related to PCBs; is that true?

A. That's true.

Q. At this time Monsanto was the only domestic manufacturer of PCBs, wasn't it?

A. I hesitate on the word only because I received information that others who had biphenyl were at times chlorinating and attempting to enter the marketplace. How much was made and when, I could never establish. That's the summary of -- there could have been others, but Monsanto was the principal producer.

Q. And how many plants did Monsanto have in the United States that made PCBs?

A. Two.

Q. One was the Krummrich plant?
A. Yes.
Q. Which was the other plant?
A. The Anniston plant.
Q. In your role as manager of environmental control, did you learn anything about the persistence of PCBs in the environment?
A. Yes.
Q. What did you learn?
A. I learned that the higher the chlorine content of the PCB, the chances of degrading in the environment were less.
Q. Were all PCBs generally very persistent in the environment though?
A. Not all.
Q. Which ones were not?
A. Well, some of the 4 chlorines, the 5, 6 and higher were quite persistent whereas those with 1, 2, and 3 chlorines under the right conditions would degrade and disappear. So the analytical chemist would not see it in his sample.
Q. Now, are PCBs lighter than water or heavier than water?
A. Heavier.
Q. And I believe you testified at your deposition that PCBs are only very slightly soluble in water; is that correct?
A. That is correct.

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Q. The range of 50 to 200 parts per billion under normal temperatures? Does that sound right?

A. Yes. That's in distilled water in the laboratory.

Q. There are materials that are lighter than water that are solvents of PCBs though; isn't that true?

A. Yes.

Q. What are some of those chemicals? Benzene?

A. Well, many organics materials. Benzene is a typical example. That's the material that's in your gasoline for example.

Q. Okay. And toluene?

A. Toluene is a cousin of benzene, yes.

Q. Xylene?

A. Xylene is another cousin of benzene.

Q. An acidic environment will also increase the solubility of PCBs, won't they?

A. The correct answer to that is yes because it can be detected by the chemist that in acid conditions, a little more PCBs is present than non-acid conditions, but I don't want to mislead. The difference is for all practical purposes not significant.

Q. Okay.

A. In those two situations.

Q. Now, did there come a time that Monsanto began sampling the sewers at the Krummrich plant to determine the extent to

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which it was discharging PCBs into its sewers?

A. Yes.

Q. And when that sampling began, they often found that their analyses were showing PCBs at concentrations higher than at solubility; is that true?

A. Yes.

Q. Were there any explanations as to how that was happening?

A. Certainly.

Q. What were those explanations?

A. Well, it could be a case of the sample containing particulate matter, dirt, sand, grit, to which the PCBs adhere, in my conception, like magnets. They adhere and they cling to the particles. Or it could be a case of an emulsion formula, very much like you take a salad dressing and the vinegar and oil and you shake it and you get that kind of a sample. It could be that they actually might have grabbed some free PCBs along with the water and of course it shows up in the sample. I think I've covered them all.

Q. Would the presence of solvents in the sewer effluent lead you to find PCBs higher than their solubility in water?

A. Yes. If there are other materials in the water other than PCBs that are also solvent for PCB, you would pick up more PCBs.

Q. Mr. Papageorge, I'm showing you a document that's been

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marked as Plaintiff's Exhibit 356, and I'd ask you to take a look at it. This is a memorandum from Mr. Pierle dated June 23, 1970, and you appear to have been copied on that document; is that correct?

A. That is correct.

Q. Were you copied on that document in your position as manager of environmental control?

A. Yes.

Q. Now, if you look at the second page of the -- I'm sorry. If you look at the third page of the document, there's a discussion of samples being taken and analyzed for PCBs at the Sauget village treatment plant. Do you see that?

A. I see this. Under B?

Q. Yes, that's correct. And then table 2.

A. I see that.

Q. Do you have any familiarity with the Sauget village treatment plant?

A. It's a limited familiarity.

Q. Just generally what did you understand the treatment plant to entail at this time?

A. It's a collection of wastes from the village and the local industries, and it was an attempt to separate the sludges from the water, and that's about all I recall at the moment.

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Q. In the nature of a settling basin?
A. That's a fair description, yes.
Q. Now, in this memo, Mr. Pierle talks about PCB samples taken from the sludge and the scum at the waste water treatment plant. Do you see that?
A. Still under that part B?
Q. Yes, it's under part B.
A. I see that.
Q. And then in the table 2 there's a column for sludge and a column for scum. Do you see that?
A. Yes, I see that.
Q. What do you understand the sludge to be?
A. I understand that to refer to the material that's heavier than water that settles out when that water flow is quiescent, it's no longer turbulent.
Q. And the scum is the material taken off of that quiescent water?
A. Yes.
Q. Now, in this memo Mr. Pierle reports a fairly high concentration, 6,000 parts per million of PCBs in the scum. Do you see that?
A. I do.
Q. Now, if PCBs are heavier than water, why would there be such a high concentration in the scum?
A. Well, I can give you an example.

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Q. Okay.
A. As most of us know oil of the type that's used in your automobile, this is lighter than water and will float. If there's water in those wastes that enter this system, those oils when mixed with PCBs will dissolve. They will act like a solvent for PCBs. So when that water is quiescent and this film is allowed to form, which could be oil, the PCBs are dissolved in that oil. So when the analyst looks at that scum sample, he finds PCBs.
Q. Now, on -- in the middle columns of table 2 on this exhibit there are samples taken of the effluent of the Sauget waste water treatment plant; is that correct?
A. Yes.
Q. And the effluent is what leaves the waste water treatment plant after the solids have settled out and the scum has been removed?
A. That's my understanding.
Q. Now, in these samples, again, there are results that are above the solubility of PCBs in water; is that correct?
MR. NASSIF: Your Honor, I'm going to object to this question. I don't know what the relevance of it is in terms of what's leaving the treatment plant. It has nowhere -- anywhere near Dead Creek sector I. It's all the way at the end of the sewer line and past it before it goes into the Mississippi River, and I object to it. I don't

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think there's any relevance based on what we were talking about, the Court's rulings yesterday on other sites at other locations. I don't see the relevance.

THE COURT: What's the relevance?

MR. RICCI: Your Honor, Monsanto has taken the position in this case that in light of the engineering lessons that we got in the last day and a half that the water in manhole 24 had to raise up to go into Dead Creek. It's been their position that because PCBs are heavier than water, the PCBs couldn't have got over there. This evidence demonstrates that even after you've settled out the heavy stuff and you've taken the light stuff off the top, the PCBs are still in the water that's going out of the waste water treatment plant. So I think it's extremely relevant as to whether the PCBs could have gotten from manhole 24 into Dead Creek.

MR. NASSIF: Your Honor, what the evidence demonstrates is that after it gets to the treatment plant that a scum forms at the top of the material when it's in a treatment plant settling basin, and then that scum after it is formed is removed prior to the discharge of the water in the Mississippi River. There is no evidence that that scum exists in any sewer lines on its way to the treatment plant. In fact, as Mr. Papageorge testified, treatment plant is sort of a settling area where, I don't know if

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there's stuff added to it that allows the scum to be formed or these dynamics take place while it's sitting there. It is not in any way, shape, or form any testimony as to what happens when the stuff leaves the plant before if gets there and commingles with everybody else's material. I don't think there's any evidence of that, and what leaves the treatment plant certainly isn't any evidence other than Counsel is establishing that there were PCBs down to the treatment plant that weren't getting into Dead Creek sector A.

MR. RICCI: Your Honor, may I just respond briefly?

THE COURT: Very briefly.

MR. RICCI: This evidence shows that there were PCBs in the scum, there were PCBs in the sludge, and there was PCBs in the water, yet they claim that the water that went from manhole 24 to Dead Creek couldn't have contained PCBs.

THE COURT: I will let you put on this testimony. I am not, however, agreeing that that demonstrates the point you say it demonstrates.

MR. RICCI: I assume that you're also not disagreeing with that.

THE COURT: I'm not making a conclusion as to that at all because I don't have enough information to make such

a conclusion.

MR. RICCI: That's all I could ask, Your Honor. Thank you. I'm sorry. Was there a pending question?

(The Court Reporter read back the last question)

Q. We're talking about the effluent samples on table 2 on Exhibit 356.

A. The amounts reported in that column are higher than the laboratory study that showed the amount of PCBs that would dissolve in water. And that is for some of them, not all.

Q. For some of what?

A. Not all of these numbers.

Q. Some of the samples?

A. Some of the samples show a number that indicates a higher level of PCBs and is demonstrated in the laboratory.

Q. Thank you. Mr. Papageorge, let me show you a document that's been marked as Exhibit 316 for identification purposes. This is a October 29, 1969, letter from a Mr. Tucker, E. S. Tucker to Mr. Pierle; is that correct?

A. It is.

Q. Do you know who Mr. Tucker was?

A. Yes.

Q. Who was he?

A. He was the analytical chemistry in Monsanto's research group that studied analytical procedures. Dr. Tucker was assigned the study and development of PCB analytical

methodology.

MR. NASSIF: Your Honor, I'm going to object to the questioning of this witness on this document. Apparently the witness, 1, was not at the W.G.K. plant at this time and, secondly, didn't get a copy of this document when it was distributed at the time it was distributed unless he lays a foundation that this witness received it at some point in time and can identify it.

MR. RICCI: Your Honor, if he's familiar with the subject matter of the letter, I don't think there's any rule that says he has to receive the document.

THE COURT: I agree with you. However, there has to be a foundation to establish that he's familiar with it.

MR. RICCI: I didn't get there yet, Judge.

THE COURT: Okay. Let's go.

MR. RICCI: Thank you.

Q. And who is Mr. Pierle?

A. Mr. Pierle was a member of the Krummrich plant's technical department assigned to environmental affairs at the plant.

Q. And was it your understanding that Mr. Pierle was involved in the PCB control program?

A. Yes.

Q. Now, this memo deals with water samples taken from the Krummrich plant; is that correct?

A. Well, this is the first I've seen it. Can I read it?
Q. Sure. Take a moment.
A. I have read it.
Q. And the memo deals with water samples taken from the Krummrich plant, doesn't it?
A. It does deal with water samples.
Q. From the Krummrich plant?
A. Yes.
Q. And it deals with analytical techniques to determine how best to sample for PCBs in water samples, at least in part?

MR. NASSIF: Your Honor, I will object. He hasn't laid a foundation. He's just reading the letter to the witness and asking him what it deals with, and now hearing what the letter deals with, he hasn't laid a foundation that this witness has independent knowledge of the information contained in the memo.

MR. RICCI: I'm trying, Your Honor, if he would let me get there.

THE COURT: I'm going to let you continue, but you're going to have to lay a foundation that establishes some knowledge.

Q. (By Mr. Ricci) You can answer the question, Mr. Papageorge.
A. Will you repeat it? I forgot.

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(The Court Reporter read back the last question)
A. I would suggest that it deals with sampling techniques as distinguished from analytical techniques.
Q. Okay. And you were involved in evaluating sampling techniques for PCBs, were you not?
A. I did not consider myself as evaluating the techniques. I was a recipient of the activities relating to such a study. I was in no position personally to judge the validity of the methods used or the accuracy or any of that. I had to rely on others who were more expert in that.
Q. Such as Dr. Tucker.
A. Correct.
Q. And Mr. Pierle?
A. And Mr. Pierle, for sampling.
Q. Now, this letter deals with one sample that was put in a jar and agitated. Do you see that in the second paragraph?
MR. NASSIF: Before you answer that, Mr. Papageorge, again, Your Honor, he hasn't laid a foundation. The gentleman said he was not involved in anything other than receiving information about sampling. He was not an expert in that area.
THE COURT: Sustained.
MR. RICCI: I'll move on, Your Honor.
Q. In the course of your involvement with the PCB control

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program, Mr. Papageorge, were you familiar with a situation where heavy rains led to increased PCB results at the Sauget waste water treatment plant?

A. I'm having a difficult time recalling exactly such a situation. I just don't remember any report or incident at the moment.

Q. Now, Monsanto had produced PCBs at the Krummrich plant from approximately 1938 to 1977; is that correct?

A. That's close, yes, sir.

Q. And the PCB control program began in around '69 or '70?

A. Yes.

Q. Were you aware of any --

A. Let me --

Q. Go ahead.

A. The PCB control program as it relates to the environmental issue was started in the '69-'70 time period.

Q. Were you aware of any similar efforts by Monsanto to control PCB losses to the sewers prior to 1969 or '70?

A. Well, it was always a given because that's a product that has value, and allowing it to go into the sewer or down the street or out on the pavement, it's just not good operating practice. So that kind of control was in place.

Q. Now, you recall having your deposition taken in this matter, don't you, Mr. Papageorge?

A. Yes, I do.

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Q. Now, in your deposition?

MR. NASSIF: Citation, counsel?

MR. RICCI: Volume 2, Page 261.

Q. I asked you, You are aware, however, of changes to the production process that were implemented after 1970 that reduced the discharge of PCBs into the sewers.

I'm aware of the programs at this point in time. I don't recall the specifics, but I do know that there was a very serious effort to do what was necessary to reduce that loss.

And then I said, Are you aware of any similar efforts to reduce losses to the sewers prior to 1970?

And you said, I'm not aware of any. Now, does that -- is that an accurate statement of your testimony?

A. I think that the key word there is similar efforts. The efforts were not similar. One is sort of, I want to call it a fine tuning of the control, whereas the past was the day-in, day-out practice that industry used to control a valuable product from getting away from its premises and so on.

Q. So the PCB control program that was instituted in 1970 was a fine tuning?

A. That's what I -- it was the start of a fine tuning of the control process, yes.

Q. But the real control process had begun prior to that?

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A. I don't know what you mean by real.
Q. I'm trying to understand your distinction between what was done after 1970 versus what was done before 1970.
A. Well, after 1969-70 period, the degree of attention given to try to prevent material from being lost was much greater because of the environmental issues. There was a different reason other than just saving a grand or two for economic purposes. That doesn't make sense.
Q. So -- I'm sorry. Go ahead.
A. So the program before 1970 addressed pounds of material, really, whereas the programs starting in '70 and extending on was trying to address the levels that parts per billion kind of thing which is an entirely different control program.
Q. So you would agree then that the program in place after -- or in '69 and '70 and thereafter was a lot more aggressive than any programs in place prior to that.
A. I'd have trouble with the word aggressive. There is aggressive as in both programs except that the ultimate goals are different.
Q. The goals in the program after 1969 and '70 were to achieve much lower discharges of PCBs to the sewers than the goals prior to that time; is that --
A. Certainly.
Q. Thank you. And in fact, prior to '69 and '70, the

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purpose of the efforts to control the discharges was to maintain and preserve valuable product.

A. That was the primary thrust, yes, sir.

Q. And one of the purposes of the PCB control program was to assure that Monsanto would be able to stay in the PCB business, wasn't it?

A. No. No.

Q. Mr. Papageorge, in your work at Monsanto, have you become familiar with, generally, with the process of how PCBs are made?

A. Generally, yes, sir.

Q. And the process begins with the chlorination of biphenyl; is that correct?

A. Yes, sir.

Q. Can you just describe generally what happens after that? You don't have to get into a lot of detail but --

A. It's been decades since I've reviewed some of this, but the biphenyl is of course a molten condition. Under room temperatures it looks like white candle wax. You have to melt it. Then you bubble the chlorine through in the presence of iron. And the chlorine then attaches itself to the biphenyl in a random sort of fashion but consistent. Each and every time it comes out the same. The operator has learned that after so many hours he can expect a certain type of PCB mixture to result. He confirms that by grabbing

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a sample and determining how heavy it is, what they call a specific gravity. If it's close to a given range of numbers, he decided he's finish and he shuts off the chlorine. As the chlorine is added to biphenyl, a hydrogen is removed from the biphenyl group and combines with other chlorine to form hydrogen chloride gas. This is the gas that is dissolved in water to form what is commonly known as muriatic acid, and it has many industrial uses. The batch I'm going to call it, after it's finished with chlorination is purged with air to remove this gas that's still trapped in the liquid, and that's swept out.

Q. Is that part of the operation sometimes referred to as the blow tank?

A. Well, the blow tank refers to a specific piece of equipment that receives entrained a liquid that may come over from this purging of air.

Q. Okay.

A. Like I said, it's been decades since I recall all the specifics, but the intent is to have the gas free of any liquid. The batch then is neutralized with lime, like the kind you use on your garden, that kind of material, because in spite of the sweeping through with air, there's still some acidity, and the lime neutralizes it. This batch then is transferred over into another unit which is called the distillation unit, and a vacuum is pulled on it and heat is

applied, the vapors are generated, and these vapors are condensed and collected, and that's the finished product.

Q. Okay. Now, PCBs at the Krummrich plant were manufactured in department 246; is that correct?

A. That is correct.

Q. I've got on the board next to you a map of the Krummrich plant. Can you identify this as a map of the Krummrich plant?

A. Well, I see the title in the lower right-hand corner that describes it as being a plant sewer map. It does refer to the Krummrich plant. I see some references there to the street names and all that I associate with the plant, so it appears to be a map of the plant.

Q. And this for the record is Plaintiff's Exhibit 424. Can you identify on this map where department 246 was located?

A. No, I can't. I'm not that familiar with that location.

Q. Did you have any knowledge during the time that you were manager of environmental control with the sewer system at the Krummrich plant?

A. Well, I knew there was a sewer system, but details, no.

Q. Now, one of the aspects of the PCB control program was to accurately measure the PCBs that were going into the sewers; is that correct?

A. Yes.

Q. Mr. Papageorge, let me show you a document that's been marked as Exhibit 340-A and ask you to take a look at it. This is a February 11, 1970, memo from Mr. Pierle, and you appear to have been copied on this memo; is that correct?
A. That is correct.
Q. And you would have received a copy of this memo in your capacity as a manager of environmental control?
A. That is correct.
Q. Now, in the first paragraph under the sentence, the group agreed that, in the middle of the first page, do you see that?
A. I see that.
Q. It states that the blow tank is the major source of loss. Is that a conclusion that the author of this memo came up with in February of 1970?
A. That is a conclusion that he reported. I don't know if it's his opinion or came else -- from elsewhere.
Q. Certainly he reported it, though.
A. Yes.
Q. And when he's talking about the major source of law, he's talking about -- the major source of loss, it's your understanding that he's talking about losses of PCBs to the sewers?
A. That's what this memorandum is all about, yes, sir.
Q. Mr. Papageorge, let me show you a document that's been

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marked as Exhibit 401, Plaintiff's Exhibit 401, and ask you to take a look at it. This is a memo dated December 15, 1970, from Mr. Krull to a number of people, and you're copied on this document; is that correct?

A. That is correct.

Q. And again, that's in your capacity of manager of environmental control?

A. It is.

Q. Now, Mr. Krull was an engineer at the Krummrich plant, true?

A. Yes.

Q. And he's reporting on losses of Aroclors to the sewers from department 246 in this memo, isn't he?

A. Yes.

Q. Now, in this memo Mr. Krull reports that at the beginning of 1970 the losses from department 246 were in -- the losses from department 246 were in excess of 300 pounds a day with intermittent large spills of 2 to 4,000 pounds; is that correct?

A. He does report that.

Q. And he's talking about PCB losses to the sewers from department 246.

A. Yes.

Q. And then Mr. Krull reports later in the memo if you turn to, well, actually on the first page Mr. Krull reports

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that with an expenditure of approximately $49,400, Monsanto was able to reduce that loss to about 1 pound per day; is that correct?

A. Yes.

Q. Now, the department 246 was not the only source of PCBs into the sewers at the Krummrich plant, was it?

A. No. There were others.

Q. Was one of the others -- are you familiar with the department 245?

A. Not at the moment, no, sir.

Q. Are you familiar with a product by the name of phosphorus pentasulfide?

A. Yes, sir.

Q. P2S5?

A. Yes.

Q. Is it your recollection that P2S5 was made at the plant?

A. It is my recollection.

Q. Was it your understanding that there was a heat transfer unit in the P2S5 plant at the Krummrich plant?

A. That's my understanding.

Q. And that heat transfer unit used PCB containing heat transfer fluid, didn't it.

A. It did.

Q. Now, is it your recollection that prior to 1970 the

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heat transfer fluid from department 245 was being put into the sewers when it became spent?

A. That was my understanding.

Q. And that program was stopped; is that correct?

A. Yes.

Q. In around 1970, '69?

A. That's close, um-hum.

Q. Mr. Papageorge, I'm showing you a document that's been mark as Plaintiff's Exhibit 284, and I'd ask you to take a look at it. This is a memorandum from a Mr. Paul Hodges to a number of people, and you appear to have been copied on that document; is that correct?

A. That is correct.

Q. Now, this document, if you look at the second page, states in case you discover sewering of large amounts with a low cost alternate disposal method, proceed with the cleanup. One example is the sewering of spent Aroclor from P2S5 operations at W. G. Krummrich. Do you see that?

A. I see it, yes, sir.

Q. Okay. Do you know why Mr. Hodges was focusing on those PCB disposal methods for which there was a low cost alternative?

A. No. You'll have to ask Mr. Hodges.

Q. Okay.

A. I do not know.

Q. Do you have any recollection of where the P2S5 department was located at the Krummrich plant?
A. I couldn't today tell you, no, sir.
Q. Were you familiar with an operation at the Krummrich plant by the name of the Rip track?
A. Yes. I've heard of it.
Q. And the Rip track was used to clean tank cars; is that correct?
A. That was one of the services performed there, yes.
Q. And prior to the time that the PCB control program was implemented, tank cars that were used to haul PCBs were cleaned at the Rip track, weren't they?
A. Yes.
Q. And the washings from those tank car cleanings were discharged to the sewers; is that true?
A. That's my understanding.
Q. Mr. Papageorge, let me show you a document that's been marked as Exhibit 391 and ask you to take a look at it. This is a November 13, 1970, memo to a Mr. Bratch. Who do you understand Mr. Bratch to be?
A. At that time he was the plant manager of the Krummrich plant.
Q. And you are copied on this document?
A. I am.
Q. Again in your capacity as manager of environmental

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control?

A. Yes.

Q. Now, the document described -- it's identified as a major spill investigation, and if you turn over to the second page, I'd like to focus your attention on the October 15, 1970, entry towards the bottom.

A. I see two entries under that date.

Q. Actually, let me bring you up a little bit to the first entry, October 13, 1970. Do you see that?

A. Yes.

Q. There's a statement there that department 239 emptied it's Therminol unit into Rogers' trailer. Do you see that?

A. I do.

Q. Now, what is a Therminol unit?

A. It's a heat transfer device which contains as the heat transfer fluid a material having Monsanto trademark Therminol which contained PCBs.

Q. And when they're talking about department 239 emptying its Therminol unit, they're talking about spent heat transfer fluid; is that correct?

A. I'd be guessing.

Q. Okay. I don't want you to guess. Can you tell from the memo whether they're talking about new product Therminol going into this tank truck or Therminol that's been used in the department 239 heat transfer unit?

A. I forget the first part of your question. Can I do what?
Q. I kind of forgot it myself. I'm sorry. Let me just try again. Can you tell from the memo whether they're referring to in that first entry new Therminol going into the trailer or used Therminol going into the trailer?
MR. NASSIF: I object, Your Honor. He asked the witness I think essentially the same question and the witness said, I'd be guessing. I would object to it calling for speculation.
THE COURT: I would ask that you answer the question. Do you know?
A. I do not know.
THE COURT: Fair enough.
Q. Do you know why Therminol units were flushed with kerosene?
A. Kerosene is a good solvent for PCBs.
Q. Um-hum.
A. And if a Therminol unit is perceived to be highly contaminated, I'm going to call it, with a very distressed type of PCB, where it became tarry and gummy and what have you, the kerosene was used to really flush out the system.
Q. And in that flushing process, you would take the PCBs out as well as the kerosene?
A. Yes.

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Q. Could those PCBs be used again?
A. It depends on how badly deteriorated the chemist found them to be. Some were recoverable and some were not.
Q. They would have to separate it from the kerosene, though?
A. No. The distillation unit will take care of the kerosene.
Q. Now, in this memo they talk about the kerosene that was used to rinse the Therminol going to a Rogers' trailer. Do you see that? It's under -- well, it's in the first entry and then in the October 16 entry.
A. I don't see it in the first entry.
Q. It says department 239 emptied its Therminol unit into Rogers' trailer?
A. Yes, sir. I'm looking for the word kerosene.
Q. Oh, I'm sorry. That's in the next one. October 16 it says kerosene rinse pumped to Rogers' trailer.
A. I see.
Q. Are you with me now?
A. Yes.
Q. You understand that Roger was a tucking company used by Monsanto; is that correct?
A. Yes.
Q. Now, if you look to the bottom of the page, there's a statement that the Rogers' trailer was unloaded to the waste

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Aroclor storage tanks to be held for incineration. Do you see that?

A. I do.

Q. There was an incinerator at the Krummrich plant?

A. Eventually.

Q. Do you know if it was there at this time?

A. No, it was not.

Q. It was not there at this time?

A. Yes.

Q. Was Monsanto storing waste Aroclors at this time in anticipation of the construction of the incinerator?

A. They were.

Q. And is that the reference there to the waste Aroclor storage tanks?

A. Yes.

Q. Do you understand from that reference that the materials that were going into the Rogers' trailer referenced in this memo were wastes?

A. Yes.

Q. Monsanto also used Rogers to haul product; is that correct?

A. They did.

Q. Did Monsanto require Rogers to arrive at the plant with a clean trailer before they could haul Monsanto products?

A. At one time, yes.

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Q. During the time period -- during what time?
A. Through this time period at least.
Q. And prior to that that was a Monsanto policy, too, wasn't it?
A. Yes.
Q. And after that, too, probably is even today, wouldn't you say? That's all right. I'll withdraw the question. In the course of your involvement in the PCB control program, did you come to learn that the sewer system at the Krummrich plant was contaminated with residual amounts of PCBs?
A. Yes.
Q. And that residual contamination was affecting your ability to measure what the actual losses were from the production operation, correct?
A. It was affecting, yes, sir.
Q. Because you couldn't tell whether you were seeing actual losses or PCBs being removed from the residual contamination in the sewers?
A. Yes. Our analytical method could not distinguish between newly produced and PCBs that were deposited in the past.
Q. In fact, at one point you reported that the PC -- The PCB contamination at the plant was so widespread that all of the plant's effluent would have to be treated in order to achieve the PCB reduction goals that you had set; is that

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correct?

A. That was an understanding I had early on, yes.

Q. And that understanding was in fact accurate, wasn't it?

A. Gee, I don't know how to measure its accuracy. It was kind of widespread. I don't know that I ever had a number in mind.

Q. Um-hum.

A. I don't know quite how to describe the total situation.

Q. Certainly you were never able to isolate specific areas of contamination in the sewers that were contributing to this background -- these background levels of PCBs?

A. In some cases we were able to, yes.

Q. Which cases do you recall you were able to identify?

A. Well, I recall a part of the system where the sewer pipes connect the box if you will, the concrete box. I recall cleanup efforts taking place where the material that's down at the bottom which contained a lot of PCBs was agitated, stirred, and the system was flushed out as an attempt to clean up that concentrated source of PCBs.

Q. It was also true, wasn't it, Mr. Papageorge, that heavy flows in the sewers as perhaps caused by a rainstorm could cause the PCB contamination to be stirred up and washed out.

A. Some of that does take place. But it all depends really on the configuration of the path that this water

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takes and whether it slows down enough to where the heavy material settles or whether it keeps turning and moving along.

Q. Mr. Papageorge, let me show you a document that's been identified as Plaintiff's Exhibit 413 and I'd ask you to take a look at it. This is a memo from Mr. Savage to yourself; is that correct?

A. That is correct.

Q. And this memo was sent to you in your capacity as manager of environmental control?

A. It was.

Q. And Mr. Savage was involved in that effort in the Krummrich plant, correct?

A. Not quite.

Q. Why was he sending you this memo?

A. Mr. Savage at this point in time was the manager of manufacturing, and the Krummrich plant was one of several plants that he monitored and communicated with.

Q. He wasn't at the Krummrich plant, but he was sort of responsible for it?

A. That is -- well, not totally responsible. He was responsible for the technical aspects of manufacturing.

Q. Now, on the third page of this memo on the first paragraph Mr. Savage refers to a project to clean the sewers. Do you see that?

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A. I do see it.
Q. Do you have any recollection of Monsanto considering cleaning the sewers in order to remove the residual PCB contamination?
A. That was a topic of discussion, yes, sir.
Q. And that project was never undertaken, was it.
A. Not in total.
Q. Was it undertaken in part?
A. Some portions of the sewer system were cleaned out, yes.
Q. Do you know which portions?
A. No, I don't.
Q. Now, in this memo he refers to an estimate to clean the sewer from the chlorine department to the plant fence. Do you know where the chlorine department was located?
A. Not anymore, sir.
Q. And how about the plant fence? Do you know what he's referring to there?
A. I know he's referring to the perimeter fence of the plant, but I can't -- since I don't know where the chlorine department is today, I can't tell you which fence he's referring to, which part of the fence he's referring to.
Q. The program that Mr. Savage refers to here was never undertaken, was it?
A. You mean the one we just talked about, the chlorine

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department program?
Q. Yeah.
A. Not to my knowledge.
Q. And then Mr. Savage states that both main plant sewers appear to be contaminated with PCBs and in parentheses there's a 30 W and a 24 W. Do you know what that refers to?
A. It refers, as I understood it, to sections of the sewer system.
Q. Do you know which sections?
A. No.
Q. Now, production in the PCB department, in the department 246 was basically 24 hours a day, seven days a week?
A. Yes.
Q. So when that -- we saw that memo that talked about 300 pounds a day going into the sewers, that would be a fairly constant figure; is that correct?
A. No, I wouldn't call it constant. It depends on what activity's taking place during that 24-hour day.
Q. How would it vary?
A. Well, let me give an example. While the biphenyl's in this pot and chlorine is bubbling through it, you could be generating some PCBs in the gases we talked about earlier. That could find their way into the -- to the sewer. If, however, the day is being spent just distilling that batch

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with no gases forming that end up in the sewer, then you could get a different number for that day's observation. I don't know. I can't think of any other examples.

Q. Okay.

A. But the operations do vary from day to day, hour to hour, so you can have different amounts detected.

Q. So it could be more; it could be less.

A. Yes, um-hum. And keep in mind this number is a best guess arithmetic calculation.

Q. Which number is that?

A. This -- didn't I see a number here? I thought a saw a number, so many pounds a day.

Q. Are you referring to --

MR. NASSIF: Counsel gave you a number of 300 pounds per day.

A. That's the number I recall. I can't find it again.

Q. I'll see if I can find it for you because I wanted to ask you about that. I believe that was Mr. Krull's memo. Yes, it's Exhibit 401 which is the December 15, 1970, memo from Mr. Krull. Do you have that up there?

A. I have it. I have it here.

Q. And it's your testimony today that this is a best guess arithmetic calculation?

A. It's not only as it applies to that number, all these other numbers we see where pounds per day are reported.

Q. Um-hum.
A. They are the best numbers that the individuals close to the problem can come up with based on what the analytical chemist tells them and what they're able to estimate in terms of the flow of the water, and that flow is not constant through a 24-hour period as we all know, so you come up really with a number arrived at by good arithmetic based on the best data available. At the same time that data could be right on the money, so to speak, or it could be off.
Q. Um-hum. Now, Mr. Krull doesn't say he estimated, he said he measured the losses to be in excess of 300 pounds a day; isn't that true?
A. That's the wording he used, but there were no devices that could measure those losses that way.
Q. But you would agree, wouldn't you, that Mr. Krull was somebody who is very close to the situation.
A. Yes.
Q. And he would be in a good position to do the estimating that's reported in this memo.
A. He would be one of several, yes, sir.
Q. And there are a number of people copied on this memo who worked at the Krummrich plant; is that correct?
A. Yes.
Q. And those individuals as well would be in a good

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position to evaluate the accuracy of Mr. Krull's reported losses.

A. Some of them. The plant manager could for example.

Q. But at least like Mr. McCutchan who is the, I believe the foreman in the department, or supervisor?

A. Supervisor might be, if he had the time and the information available, yes.

Q. And this was an important program to Monsanto at the time, wasn't it?

A. Yes.

Q. So Monsanto wanted to do everything it could to make sure it was measuring its losses as accurately as possible.

A. That is the intent, yes, sir.

THE COURT: Gentlemen, we'll break for lunch and we'll ask you to be back at a quarter after. Thank you.

REPORTER'S CERTIFICATE

I SALLY A. NAAS, CSR, RPR, Official Court Reporter for the United States District Court for the Southern District of Illinois, do hereby certify that the foregoing is a true and correct transcript of the proceedings had in this cause as same appears from my stenotype notes made personally during the progress of said proceedings.

Sally A. Naas, CSR, RPR

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