A. That would primarily be the figures that we would additionally want to add and hauling --

Q. Because --

A. Because most of the expenses are fixed expenses.

Q. And the milk price is calculated with the hauling already off; that is the net figure anyway, isn't it?

A. Unless you are using state average figures. If you look at the farmer figures, the hauling is usually out, yes. It's been deducted.

Q. And all the other items of expense related to this dairy farm you might find on Schedule F, really is not going to change?

A. Most of them. Feed is going to change and a few others.

MR. CUBITT: I have no further questions.

MR. HAHN: Nothing further, Your Honor.

MR. DAVIDSON: Nothing, Your Honor.

THE COURT: You may step down.

MR. HAHN: Your Honor, may I be excused from the courtroom?

THE COURT: Yes.

MR. JUNGERHELD: Your Honor, I would call Dr. Emmet Kelly.

EMMET R. KELLY,

a witness herein, produced by and on behalf of the Defendants

having been first duly sworn, testified on his oath as follows:

DIRECT EXAMINATION

BY MR. JUNGERHELD:

Q. Dr. Kelly, will you give us your full name, please?

A. R. Emmet Kelly.

Q. And are you an M.D.?

A. Yes.

Q. Dr. Kelly, what is your home address?

A. One of them is 665 South Skinker, St. Louis, 63105.

Then I have a farm address, Box 238, Defiance, Missouri, 63341.

Q. Doctor, how far is your farm from St. Louis?

A. Between 35 and 38 miles.

Q. What size of farm is that?

A. Well, if I give total acreage, it's a little misleading, it's 750 acres but only 140 acres are tillable.

Q. Are you actually, yourself, farming the property or --

A. No, we have a neighbor who is sort of a partner who furnishes the equipment and does the farming.

Q. Dr. Kelly, are you listed in the phone book there in St. Louis?

A. I'm listed in the white pages, in the yellow pages, in the St. Louis phone book. I have my farm address in the St. Louis phone book and I'm listed in the St. Charles County

phone book.

Q. Are you also listed in the AMA directory?

A. Yes, I am.

Q. And the AMA is what?

A. The American Medical Association.

Q. Dr. Kelly, where and when were you born?

A. In St. Louis, November the 14th, 1909.

Q. Which makes you then at the present time how old?

A. Seventy-four.

Q. You will be 75 then apparently in November?

A. Yes.

Q. Doctor, are you married?

A. Yes.

Q. And when were you married?

A. November the 22nd, 1938.

Q. Do you have any children?

A. Yes.

Q. And could you tell us are your children grown?

A. Yes, they are.

Q. Where do they live?

A. We have a daughter who lives in San Francisco. We have three sons who live in Los Angeles. We have one daughter who lives on our farm and have a son who at present is in New York.

Q. What do those children do?

A. The oldest is a lawyer in San Francisco, she's a judge of,

the Superior Court.

Q. This is your daughter?

A. Yes. Second oldest is a lawyer in Los Angeles. Third oldest is a radiologist in Los Angeles. The fourth oldest is a lawyer in Los Angeles. The boy is a medical -- in medical school in New York. And the girl, the youngest girl, is a veterinarian in St. Charles County.

Q. Dr. Kelly, could you tell us, I assume you graduated from high school, is that correct?

A. Yes, I did.

Q. Did you obtain education beyond high school?

A. Yes.

Q. And where was that?

A. St. Louis University.

Q. In what field, sir?

A. I took a combined course at that time. The first course was a Bachelor of Science, and took two years of regular college work, and then you took two years of medical school. You received a B.S. degree at the end of your second year in medical school. And then at the end of the six years, which was in 1932, I received the M.D. degree.

Q. And from what institution then was it that you received your M.D.?

A. St. Louis University School of Medicine.

Q. I assume by the name that that is in St. Louis, Missouri?

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A. That is correct.

Q. Now, after completing then your medical schooling, if you will, did you do a residency?

A. Yes, I did. That was at the St. Louis City Hospital for three years. The first year was what was called at that time a rotating internship. The second year was a rotating assistant residency. The third year was a residency in internal medicine.

Q. And all of that was in St. Louis City Hospital?

A. That is correct.

Q. And are you licensed to practice medicine?

A. Yes.

Q. Do you have any faculty appointments at the present time?

A. Yes.

Q. And were is that?

A. I'm an Assistant Professor of Clinical Medicine at St. Louis University School of Medicine and I'm also Assistant Professor of Community Medicine at the same school.

Q. St. Louis University School of Medicine?

A. That is correct.

Q. Are you on the staffs of any hospitals?

A. Yes. I'm on the staff of St. Mary's Health Center and St. John's Health Center and Firmin Desloge, which is a university hospital of St. Louis University.

Q. I didn't catch the name.

A. Firmin Desloge, which is a teaching hospital of St. Louis University.

Q. That sounds like a French name, I take it?

A. He gave the hospital.

Q. That is a good reason to name it after him.

A. True.

Q. Are you certified in any fields, Doctor?

A. Yes, I am.

Q. And what field?

A. I'm certified in internal medicine and I'm certified in preventative medicine in the sub-specialty of occupational medicine.

Q. And do you belong to any professional societies?

A. Yes, I do.

Q. They are what?

A. St. Louis, Missouri, Medical Societies, American College of Physicians, the American Heart Association, the American Occupational Medical Association, the American Academy of Occupational Medicine, the American Society of Pharmacology, and Experimental Therapeutic.

Q. Are you a fellow of the American College of Physicians?

A. Yes, I am.

Q. Are you involved with any civic affairs?

A. I have been and I am in some now, too.

Q. Do you have anything to do with the St. Louis Heart

Association?

A. Yes, I'm a lifetime director of the St. Louis Heart Association.

Q. Is there anything in connection with St. Louis University?

A. Well, outside of being on the teaching faculty, I'm on what they call the president's council which is a group of about 40 business and professional men that advise the president of the university in the various fields.

Q. And, Doctor, have you had any posts with the Medical Advisory Committee of the Manufacturing Chemists Association and/or the National Agricultural Chemical Association?

A. Yes. During my stay with Monsanto I was a member of the Medical Advisory Committee of both those institutions. The MCA is the Manufacturing Chemists Association and the NACA is the National Agricultural Chemical Association. I was on there on their medical committee and I was chairman for three years or so. They rotated the chairmanship on both those committees around.

Q. And, Dr. Kelly, have you had any consulting activities with the Poison Control Center in Washington, D.C.?

A. I was a consultant -- unpaid consultant for the Poison Control Center, oh, for 10 or 15 years.

Q. Doctor, when did you retire from Monsanto?

A. In 19 -- when I reached 65 in 1974. Then I stayed on as a consultant for the next year.

Q. Doctor, have you received any awards in your career?
A. Yes, I have. I was in the Medical Honor Society in medical school and I received a distinguished alumni award from the school of medicine some 10 years ago, St. Louis University.
Q. 1976, would that be?
A. It could very well be.
Q. Doctor, following your education and following your residency, could you tell us what employment you assumed?
A. Well, I finished training at the St. Louis City Hospital on June the 30th of 1935, so I started in a solo practice at St. Louis about six months later, which was July the 15th of 1937 -- January the 15th, I'm sorry, of 1937. I became associated with Monsanto Company as the plant physician at their Plant A which was located in St. Louis, Missouri.
Q. What was your job duty, in other words, when you became the plant physician at Plant A in St. Louis?
A. Well, at that time it was to examine the employees to see if they -- see what the state of their physical health was, whether or not there was any ill effects from any chemical exposure, and to treat any occupational injuries or occupational conditions that might occur.
Q. And how long did you serve in that capacity?
A. Well, I really served in that capacity until I went in the service in March of 19 -- I have to remember -- when was Pearl Harbor, was that in 1940?

Q. '41.

A. '41. Well, then it was March of '42 I went in the service. But duties expanded while I continued to be the primary physician at the Plant A in St. Louis. I assumed some activities for the remainder of the company.

Q. What were the duties then that you assumed during that period from '37 to '42 when you went into the service?

A. Well, the company was growing and they would have problems. They decided to build an elemental phosphorus plant, for example. So they had this information from the German people from whom they obtained the plant about what would have to be done for phosphorus-exposed workers.

So there was nobody to explain to the management what the Germans meant or whether it was a good idea or whether their proposals were a good idea or not, so they looked around and found that they had a physician over to the Plant A, which was right next door to the general offices, so gradually -- so they called me over and from then on my duties expanded.

They would have a problem -- well, at that time I think there were eight plants and they would have a problem at some of the other plants, and they would refer it to me. So I became more or less a medical director of these other plants without portfolio, as it were.

Q. And with reference to the various plants at that time, did

your duties call upon you to visit those plants?

A. Yes, it did.

Q. And would this be in addition -- I'm still talking, of course, about before 1942. Did your duties include still physical examinations of the employees at Plant A?

A. Yes, it did. And I was still carrying on this part-time practice at the same time.

Q. And then when you started to go around to these other plants, would you tell us what you would do there?

A. Yes. I would talk to the plant manager and the safety director at each plant to see if there were any problems that they had with their medical organization. I would talk to the doctors, if we had a doctor. We did not have any full-time doctors at these plants, but we had doctors who would either come in one hour a week, two hours a week, three times a week, or there were doctors on call, and I would talk to the doctors and see if they had any problems either with any medical problems as far as either private or occupationally-connected conditions.

I would talk to the safety director and see if there were any particular types of accidents that would cluster in one particular department. I would do a walk through the plant to get some idea for myself of the general manufacturing processes that were going on in the individual plants.

Q. Back then did Monsanto have a policy of annual physical exams

of its employees in those plants?

A. In the plants that had what might be termed chemical exposure, they did. Some of the plants which were purely mechanical departments, they did not. But the majority of the operations there were -- there was a policy of periodic examinations which we tried for to optimize it once a year, but sometimes it was -- the interval was longer, depending on the doctor's hours that were available to us.

Q. You would make your visits to these plants as you have indicated. Would those visits also include an examination of the records of the physical exams of the employees?

A. Yes, they would.

Q. And did your visits include any plants where PCB was made?

A. Yes, it did.

Q. What plants were those?

A. The Anniston Plant, which was in Anniston, Alabama, and the Crummer Plant, which at that time was called the Plant B, that was in the -- across the river in what used to be called Monsanto, Illinois, and now it's called Sauget, Illinois, but it was just opposite the river from the St. Louis location.

Q. That would be across the Mississippi?

A. That's correct, yes, I'm sorry.

Q. And, Dr. Kelly, did your job duties include any customer visits in the event there were any questions or problems

with chemicals?

A. At which time?

Q. We're still talking about before '42.

A. There were some. In other words, if a customer had a particular health problem or any of the employees wanted to talk about something they thought was an ill effect in his customers, they would call, the word would filter down to me, and I would talk to the customer. And if it couldn't be handled on the phone, I would make a trip to their installation.

Q. Did you ever do that in connection with PCB?

A. Yes, to the best of my recollection I know twice I did it. There may have been more but I know twice that I did it. I don't recall any more than that.

Q. What were the complaints in those episodes?

A. One was a hydraulic fluid and that may not have been between -- before 1942, Mr. Jungerheld. That may have been after the service. But I know that the one -- that particular complaint was irriation of the hands from the hydraulic fluid getting on the workers' hands. And I believe that may have been after I returned from the service.

But I do know there was one occasion which I went to a thermometer company. They made sort of like a bellows that you -- like bellow like you blow in an organ. It was a small thing that you would squeeze that would have the PCB's in it, one of the aroclors. It wasn't 1254, it

was 1242, and which was a more liquid compound.

And to assemble the material these people -- assemble the instruments these people were dipping their hands into the material and pull the pieces out and then put them on the table and assemble them.

Well, they developed what was known as chloracne, which is something like teenage acne. And when I saw it I said, "Well, let's stop this. Let's either use gloves or get a different method of bringing the material -- of handling the material."

Q. Dr. Kelly, then is that the only episodes that you can recall before World War II of any contact with customers concerning the problems of PCB?

A. Yes, sir.

Q. How about with reference to Monsanto's own plant and its own employees? Again talking about the pre-1942 period.

Could you tell us whether or not in your experience there was any problems with the health of these -- of the employees in those plants?

A. In my own experience I did not have any problems with the health of the employees in the two departments that I referred to, the one at Anniston and the other one at Plant B. However, historically in one or two years before I came on board at Monsanto, sometime in the mid-'30's, there was a history that at Anniston some of the workers had developed

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chloracne similar to the type of eruption that I said the thermometer people had.

Q. And do you know what was done about that?

A. Yes, they avoided the skin contact or minimized the skin contact. The people -- it was a pretty sloppy operation as far as I could tell from the records.

Q. Did that appear to take care of the chloracne problem?

A. Yes, we never saw any more.

Q. You say you never saw any more. Would that be true up until the time Monsanto stopped making PCB?

A. Yes.

Q. You say the two departments, one in Anniston and one in Sauget, would those be the two departments that manufactured PCB's?

A. That's correct.

Q. Do you have an understanding of what the -- I want to say construction process, I guess that is not quite the word, but what the manufacturing process was for PCB?

A. Yes.

Q. What was that?

A. You take benzine, which comes in tank cars, and run it into an enclosed vessel which is heated by lead, by molten lead up to a temperature of around 600 degrees. And this hooks these two benzine rings together so you make diphenyl.

Q. Now, is the substance then any longer benzine?

A. No, it's diphenyl. If you take sodium and chloride, sodium and chlorine, chlorine is a gas, sodium is a metal that burns easily. When it's exposed to water, you put both of those together, you get table salt, so it's neither chlorine or chloride, it's sodium chloride.

So the same with the -- you put these two benzine rings, what you get is diphenyl, which is not benzine at all. In fact, diphenyl is, if you remember when sometimes you get an orange that came from Israel, the paper that it was wrapped around, it would smell a little funny. That was diphenyl because it was used at that particular time to control stem rod in oranges. But you cook those two together anyway.

And this was placed into a reactor where gaseous chlorine was reacted with the diphenyl, diphenyl then was chlorinated to various levels. If they wanted, I think, what they call Aroclor 1242, that is a diphenyl which is chlorinated to 42 percent. If they want to chlorinate it to 54 percent, they make Aroclor 1254.

They had a whole range of aroclors from 1221 all the way up to 1268. Really the technical name for the chlorinated PCB is polychlorinated biphenyl; that is what the trade name of Monsanto for that is Aroclor, and you have a suffix for the various numbers.

Well, they would pump this over into the chlorine and

chlorinate it and distill it off into 55 gallon drums and pack it and send it out.

Q. All right. Dr. Kelly, in that process was there a possibility of inhalation exposure?

A. Yes, there was, especially at the pumps. Pumps could leak. There could be problems at the filling. In other words, you'd have a 55 gallon drum. You have got an orifice here you put this pipe in and when you are putting this hot liquid in there, obviously some fuming comes out. There was a possibility of inhaling the material.

Q. Was there the possibility of what we know as dermal or skin exposure?

A. Well, yes, whenever you have a leak, and when you have something overflow, if a man has -- and there's also some spillage when he pulls this pump out, I mean, this hose, metal end of the hose, when he pulls it out, if he has to turn it off, there is leakage in the top, there is something dripping down the side of the drum, there is a possibility for skin exposure.

Q. Dr. Kelly, during that period of time, of course, we're still talking before 1942, where you aware of any unusual health problems or unusual problems with absences, if you will, in those departments at Anniston or Sauget?

A. No, not that I can recollect.

Q. And during that period of time, that is, from 1937 to 1942,

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were you aware of any health problems in the employees or of the employees in those departments in those two plants, not just limited to chloracne, but anything else?

A. You mean in the two departments?

Q. Yes, in the two departments. In the two PCB departments. The one in Anniston and the one in Sauget.

Are you aware of any health problems of the employees that related to PCB?

A. None except the historical ones that occurred before I came with Monsanto.

Q. But during your period of time, what is your answer?

A. No, there was none.

Q. Back in that period of time were you aware of anything called the Drinker Studies?

A. Yes.

Q. And what were those?

A. Well, Professor Drinker was Dr. Phillip Drinker of Harvard. He was the man that invented the iron lung. Anyway, this man was a professor at Harvard and he did toxicological work. And there were cable cords. I don't know that any of you people are -- I'm sure not old enough to remember the old insulated wire people would have when you would instead of a big covering over with plastic now, it would be this brown, hard cloth, and you'd pull on it and you got that brown stuff on your hands.

Well, that was the way wires were insulated at that time, to prevent shorts, from electric current going on.

So he insulated it with either chlorinated naphthalene or a mixture of 90 percent chlorinated naphthalene, 10 percent chlorinated PCB, chlorinated biphenyl. That was fairly hot, so these workers would develop chloracne. And some of the workers developed liver problems and there were reports that some of the workers died from the dermal absorption of this material through their skin.

Q. Where was this taking place, by the way. What industry was that in?

A. Either the General Electric organization at Lynn, Massachusetts, was where the cases were, and I think it was in their wire department up there that covered wire. I never went to the General Electric place.

But, anyway, both General Electric and the company that made the chlorinated naphthalene, the Halowax Company, engaged Professor Drinker to run studies on various compounds of either plain halowax, 90 percent halowax, 10 percent biphenyl, some biphenyl and some terphenyls, which is a difference, it's a -- in other words, instead of hooking two of these benzines together, if you hook three or four you get terphenyls. So that is what he did.

He ran some studies with inhalation, I think, as well as feeding. This was in 1937. So I'm up to -- I don't --

'37 or '38. I don't remember too much about the details but he did run studies and he ran them -- mostly inhalation, although there were some feeding studies, to determine what the safe levels of this material could be used at.

Q. All right, sir. Are chlorinated naphthalenes and chlorinated biphenyls the same thing?

A. No, they are not.

Q. Now, what did those studies -- what did the Drinker studies of the electrical people exposed to the chlorinated naphthalenes tell you, if anything, about your employees in the Monsanto plant?

A. Well, he wasn't studying the electrical workers, remember. He was studying the materials that the electrical workers used.

Q. I stand corrected.

A. Now, what was the question?

Q. Yes. Were those studies relevant to you as a plant physician at Monsanto concerned with the health of your employees?

A. Oh, yes.

Q. What did they tell you?

A. Well, first, they told us several things. One, that these people had developed chloracne who used either plain halowax or the 90 percent halowax and 10 percent diphenyl. They produced very serious chloracne, enormously worse than the minor cases that we had had historically at Anniston in

'35, '36, or '37.

They also showed that the liver was the primary organ, target organ of either material. So they gave us a very good bench mark as to how to prevent injury from a person using it.

Q. All right, sir. Were the exposures in the Drinker study higher than you expected or had in your plans?

A. Well, of course, they fed some --

MR. WOODWORTH: Object to the leading question, Your Honor. I think he can ask what the exposures were without leading the witness.

THE COURT: Perhaps you could rephrase that, Mr. Jungerheld. It does sound relatively leading.

MR. JUNGERHELD: All right, Your Honor. I apologize.

Q. Dr. Kelly, can you compare the relative levels of exposure as you understood from the Drinker study versus the exposure to your plants?

A. Yes.

Q. All right. And how would you do that?

A. Well, first of all, the feeding studies. We had no oral exposure in our plants. We did not expect these men to eat the stuff. We expected the men to wash their hands if they did have contaminations, if they were going to eat or smoke a cigarette. So we didn't have oral exposure.

And Drinker fed this to some of the rats to make sure it got in.

Drinker also used the material -- he used it at elevated temperatures for eight hours a day, so that their levels of exposure were enormously higher than our intermittent exposures.

Q. And, Doctor, was the substance then that was involved in the Drinker study, that is the chlorinated naphthalene, the same as what your -- the same substance as what your workers were exposed to in the PCB departments in Anniston and Sauget?

A. No. We had no chlorinated naphthalenes in either Sauget or at Anniston.

Q. All right, sir. And at either Sauget or Anniston, did you have any history or did you have any experience with your employees in those two departments, the PCB departments in those two plants, having the types of complaints reported in the electrical workers or in those Drinker studies?

A. No, they neither had the complaints nor had they had illnesses that had occurred in the electrical workers.

THE COURT: In light of the hour, Mr. Jungerheld, we'll take a brief recess. The Jury will retire to the Jury Room.

(Whereupon a recess was taken.)

THE COURT: Be seated please.

Mr. Jungerheld.

Q. (By Mr. Jungerheld, continuing:) Doctor, in the period of time between 1937 and '42, we have been talking about here, could you tell us whether or not the physical examinations of the Monsanto PCB workers included laboratory tests?

A. Yes, they did.

Q. And would you tell us what and why?

A. They were liver function tests which were quite crude by today's standards. We did not at that time have the enzyme tests and there were certain tests which had to be run which are obsolete now. One of them was an invasive test. You had to inject material into a person's vein and do a vena puncture and take some of the material out at 15, or 30 minutes. You had two vena punctures. But we ran those because chlorinated hydrocarbons have been known for years to affect the liver. After exposure, if you have too much, the liver is the target organ. We ran those even though the people had no findings on physical examination or no symptoms referable to the liver.

Q. Did those laboratory tests find anything during that period of time?

A. They were negative.

Q. How long did Monsanto run those liver tests?

A. Probably to the best of my recollection three or four years. We had stopped them by the time I went into the service.

Q. And why had you stopped them?

A. We had no problems. We had no chloracne. They were all coming back negative. And the people were getting disenchanted about getting stuck.

Q. What is the significance of chloracne?

A. That's the hallmark of exposure to PCB. That's the first sign that develops. That's the first thing that develops after chronic exposure.

Now, obviously if there is an acute overwhelming exposure you can die from liver trouble without the occurrence of chloracne. If you have an acute enormous exposure.

Q. I may have asked you this, did you ever have to visit one of your customers, one of your Monsanto customers, I should say, for any health problems other than chloracne related to PCB in that period of time, before '42?

A. No, I did not.

Q. Now, Doctor, you indicated that in 1942 apparently there was a change in your activities, as I guess there were changes in the activities of a lot of people at that time, and did you leave Monsanto?

A. Yes, I did. I took a leave of absence. Military leave.

Q. And when did you return -- well, after your military leave where did you work?

A. You mean after I returned from --

Q. Yes, sir. After you returned from military service?

And this was in 1946?

A. Yes. I returned in either February or March of 1946 and I went back to Monsanto, but then I went back on a full-time capacity and I was medical director of a formalized central medical department.

Q. And what was your job duty, if you will? What was your occupation as the full-time director of the medical director of Monsanto?

A. Well --

Q. After '46?

A. The plant -- obviously, the company had expanded in the four years during the war. They were making -- they had bought some plastic plants. They bought a crude plant on the west coast that made paint and other glues for the plywood industry. They were involved in styrene, which was one of the building blocks for the artifical rubber that was used during the war. So we had a lot more plants and a lot more workers and a lot more potential exposures. So my job was to do full-time what I was going on a sort of catch as catch can basis when I was working part-time work in my own practice. Taking care of the Wheeling Plant and going around to these five to seven plants we had in the time -- we had in the years prior to 1942.

I guess in 1946 we probably had 14, 16, 18 plants at that time.

Q. All right, sir. Did the Medical Department then expand over the years?

A. Oh, yes. It was almost a linear increase in personnel from 1946 until I retired in 1975. '74 or '75.

Q. Did you remain medical director, by the way, during the regular course of your employment with them?

A. Yes.

Q. Did your duties after you returned then from the war then in 1946, did your duties still require you to visit the plants, including those that produced PCB's?

A. Yes.

Q. And did your duties still also -- or let me ask you this: Did Monsanto continue to have a policy of physical examinations of its employees periodically?

A. Yes.

Q. Did Monsanto have a policy of your doing the things you had done before as you described it when you would make your plant contacts?

A. Yes.

Q. And you would do what on those plant contacts?

A. Well, it depends on the years. When I came back in 1946 1 and a secretary was the Medical Department. After about three or four -- two, or three, or four years we engaged in an industrial hygienist and I would go around these plants and I would -- well, an industrial hygienist is a chemical

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engineer whose job it is to evaluate the plant's environmental hazards, fumes, dusts, noise, poor lighting, they're usually chemical engineers, so when I would go to the plant I would check with the doctors, of course, like before the safety people, before the nurses, look over the medical records, but I wouldn't be as -- I wouldn't say as thorough but I wouldn't spend as much time going through the plant to look at the general working conditions as I had to do when I was not -- did not have an industrial hygienist.

Q. All right, sir. Would you still speak with the plant manager and safety director?

A. Oh, yes. Everything else was much the same. I was able to spend more time. I wasn't in any great rush to get back to my private practice, or something that was happening at the Queny Plant.

Q. You say Queny Plant?

A. It was Plant A, and then they finally changed that to Queny Plant who was the founder of the company. Plant B was changed to the Cumar Plant. Because that was a plant manager that had been there for a long time and the workers liked him. So when they changed the Plant A to Queny they changed Plant B to Cumar. Anniston kept on Anniston.

Q. It sounded like you had --

A. It's Q-u-e-n-y, who was the founder. His son was the eventual second president and eventual chairman of the board.

Of course they're both dead.

Q. Dr. Kelly, did Monsanto continue its policy to inform you of occupational illnesses or lost time subsequent --

MR. WOODWORTH: Objection. Leading, Your Honor. And -- I know it's difficult to ask these questions of the witness without leading somewhat but I feel there has been a series of them.

MR. JUNGERHELD: Well, Your Honor, this is sort of kind of foundational, if you will.

THE COURT: I'll allow it.

Q. Did that policy continue?

A. Yes, it did.

Q. And in the years following your return from World War II did you have any health problems, chloracne or otherwise, with the workers in the PCB departments at Chromeric and Anniston?

A. No, we did not.

Q. After 1946 did Monsanto have a policy as it related to whether or not Monsanto's customers have any health defects, complaints?

A. Yes. They had a policy that anything that was written to a customer or an individual or a doctor about the physiological or toxicological properties of any of Monsanto's products would imminate from the Medical Department. If there were any telephone calls relative to the same sort of

information of possible ill effects of a product it would get funneled into the Medical Department. It wouldn't be funneled, it would be directed to the Medical Department.

Q. All right. Dr. Kelly, to the best of your recollection after 1946 were you aware of any customer health complaints or problems regarding PCB?

A. There was one.

Q. Is that the one you alluded to earlier?

A. No. There was one that -- there was a hydraulic fluid. These people had sort of a chapping, or redness of their arms as though you were working with paint remover.

There was also one place where the material had been used -- was sort of a jerry-rigged heat exchange situation where the material leaked at elevated temperature and one or two of the workers developed a -- sort of a jaundice, which is indicative of some liver dysfunction, and they called about that. I talked to them and we were told that they admitted the fact that they knew that the stuff was leaking. They really were interested in what the medical management in the case would be and they got along all right.

Q. All right, sir. Any others?

A. Not that I can recall.

Q. Dr. Kelly, did there come a time when you considered the acute and what we might call the acute or sub-acute

toxicological testing of PCB?

A. Yes.

Q. And why?

A. No reasons.

Q. And I might say, when was this, approximately?

A. Well, we did have some of our PCB's tested by Drinker. That was somewhat confused because he tested one of the materials that was allegedly one of our aroclors but we never sent it to him so we had no idea of what he really tested. He got this material from one of the halo wax companies and we never knew what it was so we wanted at some time to repeat that study. At the same time we -- there came a time when it became -- there was much more interest, awareness of toxicology, we would have more people writing in asking what is the situation with such-and-such a product, so we decided to get a basis of information on most of our products that were in pretty common use. So in those days these -- there was also at that time, along about the '50's, there was a need for information as far as fright classification was concerned. What would be the acute affect of something if it spilled on you, got in your eye, or accidentally you ate it, or drank it, whatever, if it were a liquid. So we started developing a data base, as it were, on our products.

Well, the first thing what a person does is an acute

study. That's what's called an LD-50. That's really the basic primary test that just gives you a rough idea of how toxic this compound is. If you -- how much of it it would take to kill a rat. And the basis they use is so many milligrams per kilogram, or so many fractions of an ounce per pound to put it in. Get away from a metric system -- how many milligrams is a gram, and a gram is a fourth of a teaspoon, how much of that does it take to kill a rat. So that's the basic toxicological -- that's the smallest amount of material you can get, or information you can get. Of course, there are other acute screening things. You can drop it in an animal's eye so that you can be able to tell what sort of a hazard it might cause, it might offer to a worker who would have it sprayed in his eye, or rub it with his hand, or materials on his glove. You can warn him against it if he found out this was a pretty serious high contaminant, pretty serious -- had serious potential for eye damage.

And you would also sometimes put it on animal skin to see if it would cause any irritation to the animal's skin. Now, that's a pretty crude test because animal skin obviously isn't like human skin. They got hair all over them, we don't. Their skin is different. A lot of them don't have sweat glands. Most of them don't. So you don't -- it isn't a true test, but that's the best we have.

There's also a -- it can -- you cannot cause chloracne

in animals without very, very special type of testing in monkeys, rabbits. It's pretty -- it's very hard to do so. That's the basic toxicological screening. Well, what we did first was the LD-50 test.

Q. All right, sir. When was that again?

A. We may very well have done some of that in -- before the war. I don't know that.

Should I say what the LD-50 is? LD-50 -- or has it been explained up to now? You take a group of rats and you give them varying doses until you hit the dose that kills half the rats. It's a lethal dose. Fifty lethal dose, or half the rats.

Q. LD-50 means lethal dose to 50 percent?

A. Yes. That very well may have been before the war. I think we may have done some of that then.

Q. All right. How about after the war? What kind -- did there come a time then when you looked further into going beyond the LD-50, or initial acute testing?

A. Yes. As interest in toxicology grew on the part of the customers, manufacturers, government people, and people in general, other tests were added. In other words, if you had a compound that was going to be used at elevated temperatures you had to -- it wouldn't do you much good to find out how much it took to kill a rabbit eating it if he was going to be breathing fumes of the vapor. So we had to test by

inhalation. If you wanted to know more about the toxicity of a product instead of finding out just what it took to cause 50 percent of the rats to die we would take a smaller portion of that and feed them every day for 90 days and that was called a sub-acute test, but that was the best test they were doing at that time in -- you said the '50's, didn't you?

Q. I was asking you when that was done.

A. It would be in the '50's sometime.

Q. All right, sir.

When Monsanto commenced to do these things, commenced to have those tests done, was there any government requirements that you have those done?

A. No. There were not that I remember.

Q. All right, sir. Did Monsanto do those tests themselves or --

A. No.

Q. And who did them?

A. Well, it varied.

Q. By the way, were these tests then contracted for, if you will, by the Medical Department? By your department?

A. Yes. That's right.

Q. All right. Then tell us who did these tests.

A. Well, at first -- now, we're going back -- pretty far back in toxicological history. In the '30's, the late '30's,

Professor Drinker's group at Harvard, Professor Kettering's group at Cincinnati, they were the two premiere academic university toxicological laboratories. I don't know. They call them Drinker's Laboratory. Harvard School of -- public school laboratory. And other laboratory at the University of Cincinnati was called the Kettering Laboratory.

Q. You used the word what?

A. Kettering.

Q. No. You described these -- the word premiere or something like that?

A. Premiere, yes.

Q. What do you mean to convey with that?

A. Well, they were the most knowledgeable and the most respected groups.

Q. At that time?

A. At that time.

Q. I see. All right. And what then did your -- what then did you have the University of Cincinnati do? We're still talking about the '50's.

A. Yeah. We had them carry out --

MR. WOODWORTH: Objection, Your Honor.

THE COURT: I'll sustain the objection. He was talking about the '30's.

MR. JUNGERHELD: Oh, I'm sorry. I'm sorry. I was off on a different track.

A. Well, then I'll have to --

Q. All right. I'm sorry. Still talking about the '30's then, Dr. Kelly, you were talking -- telling us about the University of Cincinnati and I think you mentioned -- well, go ahead. You mentioned Kettering Laboratories there.

A. There was one other laboratory, Saranac Laboratory in New York, which was -- did work with dusts. That was connected with one of the upstate New York hospitals. Pretty tangential sort of way. Saranac Laboratory, which was the old Trudell Foundation. Here's a fellow who really did more on tuberculosis than anyone else that was interested in lung diseases, and that particular organization did pulmonary inhalation studies. That was their specialty. If we wanted to find out about skin irritation on people to see whether the material -- either a material per se or a material in the film irritated people, we contacted the Bernard Free Skin and Cancer Hospital, which was connected with Washington University in St. Louis. They did these tests on human volunteers to see whether there was an irritating potential or a sensitization similar to what you would get if you would -- remember back in the days of the rayon pants? A lot of people developed -- the finish on rayon, when they first came out, they developed a lot of dermatitis and that caused people to test compounds that went on to material that would be used in human contact with the skin. So that was Washington

University. Saranac University did dust inhalation and Drinker in Cincinnati did general toxicity information. We funneled most of our stuff to Cincinnati because it's easier to get to Cincinnati than Boston by airplanes.

Q. All right, sir. And were those laboratories then considered to be specialists in those particular areas as you described them.

A. Yes. I think so. I believe Cincinnati was pretty general but they were -- I think there were specialists in inhalation of vapors.

Q. Was there some reason Monsanto didn't use their own laboratory the same way?

A. Yes. At least two big ones. One, as I mentioned, we had to have a bunch of specialized groups to run the tests that we wanted to carry out. We didn't have a volume of materials going through all the time that would require three or four groups of specialists that you'd have to have, so it would be much more -- much easier to go to a facility that already had -- was ready to do this right away than to try to set up yours and keep it on standby for six months before a problem came along that you wanted to solve. And there was a third reason, which may or may not have any validity, at that time quite awhile ago there was some thinking by the government that maybe they would look a little askance at industries doing their own testing. That proved false, that

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government doesn't look askance any more.

Q. Did they, however?

A. I don't know if they did or not. But there was some feeling that they might.

Q. When Monsanto, through your department, arranged these tests, studies, these laboratories, did you have any control over the outcome of the studies?

A. No. We would go and say here's our problem, will you -- we'd sit down with the man who is going to be doing the test and say here is what we want to find out, how do you think we ought to do this? We tell them the exposure. We tell them what its eventual use was going to be, and then he would come up with his idea and he would say okay, this is the way we're going to test it. From then on it was his own. We had no power of veto if he wanted to publish it and our tests show it was quite toxic. If he wanted to publish it he went ahead and published it.

Q. I was going to ask you if you had any control over the publication as opposed to the result.

A. No, sir.

Q. All right, sir. Did you have occasion to observe these tests being conducted?

A. Yes. I would go to Cincinnati once or twice a year. Saranac go once in a ski season. It was up in New York. And near Lake Placid, and probably once a year because in pulmonary

inhalation studies you run them a long time and you don't need to go so often. I mean for dust exposure you had to go pretty long times. Cincinnati I went two or three times a year. Probably Saranac once every six months. Maybe once a year sometimes. After awhile when we developed -- sometimes when Mr. Wheeler came who was an industrial hygienist, he would come and do some of the visiting even thought he was not a toxicologist. He was sort of almost a do-it-yourself type. I was not a toxicologist either.

Q. All right, sir. What species were involved in these tests?

A. Well, the Bernard Free Skin and Cancer used humans.

Q. Were these volunteers?

A. Yes.

Q. I agree with that.

A. We used rabbits at Saranac Lake. They used usually rats at Cincinnati. I don't think they used primates, monkeys, at all at any time during those times and it was only later that people started using dogs. They didn't use those much in the '40's or the '30's.

Q. All right, sir. Did there come a time then when you considered studies for chronic effects?

A. Yes.

Q. Why was that?

A. In any chemical? Or in PCB's?

Q. PCB's I'm talking about, sir.

A. Okay. Well, it turned out that PCB's were found in the environment. That surprised everybody because at that time biodegradability was not known. I mean it certainly wasn't known commonly.

Want me to explain biodegradability?

Q. That's not necessary. We have had some testimony on that.

MR. WOODWORTH: Excuse me, Your Honor, could we have a time from when he's speaking of?

THE COURT: Yes. Could you establish that, Mr. Jungerheld?

MR. JUNGERHELD: I was leading to that, Your Honor.

THE COURT: All right.

A. Sometime in the '50's.

THE COURT: Let him ask the question.

Go ahead, Mr. Jungerheld.

Q. When was this that the environmental presence became known and you considered these chronic effect studies?

MR. WOODWORTH: Well, I object to the question. What the witness said, he said PCB's being found in the environment and there was a question about biodegradability. That's when I wanted to know the time frame. Not as to the chronic studies. I think what he's saying the environmental thing came first, then the chronic studies, it would logically seem.

MR. JUNGERHELD: Your Honor, he'll have an opportunity --

THE COURT: I realize that but I think it would all fit together a little bit if you could supply a date that he's referring to when he says it became known they were found in the environment. So I would ask that you inquire of that time. It is his testimony.

MR. JUNGERHELD: I know, Your Honor. I thought that's what I just asked him and he stood up and objected again.

Q. (By Mr. Jungerheld, continuing:) What time frame are we talking about here, Dr. Kelly?

A. I think that's the late '60's. Either late '60's or early '70's. I think it's the late '60's.

Q. Okay.

A. To the best of my recollection. I have been gone, remember, from Monsanto for nine years. It's the best I can remember.

Q. All right. Then I will ask you if there came a time then that you had considered the concept of chronic testing for chronic effects? And is that the time frame they were talking about?

A. In PCB's, yes, sir. We had tested for chronic effects in herbicides and direct food additives. We had done that. Pharmaceutical chemicals, we had done that. But for industrial chemicals we had not done long-term feeding. PCB,

of course, was an industrial chemical. We tested that because it showed up in the environment and it showed up in a bio-magnification system that the material we thought was a soluble, dropped in water and stayed down on the bottom like a piece of gravel. We found that that wasn't true. It could be picked up with the pieces of -- by the water. They would be eaten by the shrimp and they would be eaten by the minnows and eaten by the bigger fish. The Mallard ducks or the Eagles or something. So we had problems. I mean they were finding what eventually proved to be PCB's in some of these species at the top of the food chain. There was no long-term effects, no long-term toxicity testing done, so we decided to test it in the same manner that the Food and Drug Administration asked for testing on a food additive, even though we had no idea at all of asking for PCB as a food additive.

Q. Were such studies then accomplished by your department?

A. Yes, they were.

Q. Who did them?

A. The Industrial Bio Test Laboratory in Chicago.

Q. And could you tell us what was the reputation of Industrial Bio Test back at that time?

A. Excellent in the '60's.

Q. And to your knowledge did IBT do work for others including government agencies?

A. Yes, they did.

Q. And did you have information from sources you considered reliable as to the quality of work that was done by IBT?

A. Oh, yes. Because my conferers in the large chemical companies and the food companies had done work there I would take Dr. Calandra, who was the president of IBT, on my visits to the Food and Drug Administration and he was accepted as a very respected scientist.

Q. Now, there's been testimony here that somebody from IBT got into trouble with the law, apparently, because of falsifying some records, Dr. Kelly. Did the IBT work that got into that kind of a situation with IBT -- or with the government, did that involve PCB?

A. No, it did not.

Q. What did the IBT work involve?

A. Well, this occurred after I left the company. But I do know.

MR. WOODWORTH: Objection. It sounds like hearsay. Or foundation.

Q. Well, let me ask you this --

THE COURT: Go ahead. Go ahead, Mr. Jungerheld.

Q. Would you explain how you do happen to know that?

A. Yes. Because I saw reports of work that had been done by outside laboratories to check on the IBT work that was called in to question by the government. There were herbicides, some of our crop chemicals, TCC, which is a bacteria

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stat, and I've seen reports from other laboratories following the government's questioning of the IBT studies.

Q. Any of the IBT work deal with PCB?

A. No.

Q. Now, were the studies that were questioned -- I realize they were not PCB's, were those studies repeated at another laboratory?

A. Yes.

Q. What were the results?

A. They were the same. Generally the same. Because none of the clearances for food additive petitions that we had asked for during my stay were revoked. This other information validated the safety of the products.

Q. Now, regarding the IBT PCB work -- this gets complicated with all these initials.

Regarding the IBT PCB work did there come a time when that work -- that is to say the reports on that work and the actual slides were submitted to the U.S. FDA?

A. Yes.

Q. And would that then enable the FDA to verify the IBT results?

MR. WOODWORTH: Objection. This is leading. Calling for a conclusion and calling for what the FDA was able to do. I think the witness already stated, I think, this was after the time he left.

MR. JUNGERHELD: No, it is not.

MR. WOODWORTH: Then, Your Honor, we never had any testimony as to the slides. That's the first time I heard it is from Counsel.

THE COURT: I believe you're leading him, Mr. Jungerheld. I'll sustain the objection.

MR. WOODWORTH: Also, if we could have have the foundation established further as to what -- I think we have a problem as to what is in this witness's mind about what the FDA does. I imagine they're bringing someone in from the FDA, or at least they have told us they were.

MR. JUNGERHELD: He can imagine anything he wants --

THE COURT: I'll sustain the objection as to leading.

Go ahead.

Q. Okay. Doctor, with reference to the IBT PCB study would there be something generated by that?

A. Yes.

Q. What would that be?

A. A report.

Q. And would there be anything else generated?

A. In the course of a report there are pathological slides of the variety of the organs of the animals that were sacrificed at the conclusion of the experiment.

Q. All right, sir. And did there come a time that those

materials, the reports and the slides, were submitted to the FDA?

A. Yes.

Q. All right. Approximately when was that, if you can tell us that, by the way?

A. I think approximately 1972. Around that.

Q. Now, would that material have enabled the U.S. FDA to verify the IBT results?

A. Yes.

Q. Could you tell us what were the studies that were done at the request of your department by IBT as they concerned PCB?

A. We did two year testing in dogs and rats of both species. This is a test for seeing if there are any chronic effects that would occur following low level feeding. What we wanted to do was get a level that would have no demonstrable pathological effects. We also wanted to give a high level that would cause pathological effects so that we could tell what particular organ, material, it would affect. We also wanted to give a level that would be high, as high as we could get without getting the animals sick, so it would live for a full two years, which is a lifetime of a rat, of course a dog lives longer than that, but it's rare that people would run over a two year testing of dogs either, in order to determine whether or not the compound would be a

carcinogen or not. See whether or not it would cause cancer. So those were those tests.

There was also a test for teratogenesis. That's to see if the material would cause abnormal offspring. And we would do a three generation study. The parents, or the males and females, then their litter dropped, you feed the litter and make them, the litter mates, brothers and sisters, not litter mates, feed them to the second generation and take a look at the third generation and see if you got any deformities.

Q. And what were the results of this effort?

A. To start off there was no cancer found. There was no teratogenesis found. We did find 10 parts per million was a safe level for male and female rats, male and female dogs. We found that a hundred parts per million -- talking now about 1254 aren't we?

Q. Yes.

A. We found a hundred parts per million was negative except for some weight loss or increased liver size in female rats. Female rats. Negative in the male rats.

I believe I could be wrong on some of these figures but I know 10 parts per million was negative for everything. I know there was no cancer found even at the high levels of a hundred parts per million. I know there was no teratogenesis found in the three generation study.

Q. When you say at a hundred parts per million, a hundred parts per million what?

A. Of the diet. A hundred parts of PCB in the diet of the rat.

Q. Would that be in the total diet?

A. That's right.

Q. That's not just a portion of the diet?

A. No. Everything they ate for two years had a hundred parts of PCB in it.

Q. Dr. Kelly, how did you interpret those results?

A. Well, I think we interpreted it a variety of ways. One, we thought, well, we're happy we don't have a carcinogen here; two we have found a safe level of 10 parts per million in the total diet; three, it reinforced our point of view that the target organ was the liver because that's where the pathology showed up.

Q. Dr. Kelly, there's been some earlier testimony in this case, and indeed I believe some exhibits, that indicated that on Monsanto's containers of Aroclor 1254 there were warnings about skin contact and warnings regarding inhalation. Could you tell me why such warnings were on those containers?

A. Yes. Because the aroclors are an industrial chemical. The exposure to be expected would either be contact with the skin or inhalation of the vapors at elevated temperatures. Because in room temperature there is no appreciable Aroclor 1254 involved. At elevated temperatures, there are. So I

think we said on the label -- I don't know if we said at elevated temperatures, but we said not breathe the vapors in confined spaces or at -- whether we put elevated temperatures or not, I don't know.

Q. What could you anticipate then regarding the -- the anticipated route of exposure?

A. Would be the skin contact or inhalation.

Q. Dr. Kelly, there has been a memorandum or letter or something like that introduced here that's been marked Plaintiff's Exhibit 179A. I'll ask you if you have seen a copy of that?

Read that and see if you have ever seen a copy of that?

A. Out loud or --

Q. No. Read it to yourself. You don't have to -- but just --

A. Yes, sir, I have read that.

Q. All right, sir. Does that exhibit refer to a communication between you and a Dr. Hill of the Ohio State Board of Health?

A. Yes, it does.

Q. What did that deal with?

A. He called me on either March 30th of 1970 or March 29th. Right around there. He called me and said --

MR. WOODWORTH: Objection. Hearsay.

Q. Don't tell us what he said.

A. Oh.

Q. You can tell us your understanding of the conversation as to it dealt with.

A. My understanding of the conversation with Dr. Hill dealt with findings of PCB in samples of milk from some herd in Ohio.

Q. Did Dr. Hill report to you the concentrations that were found?

A. In the silage.

Q. Anything else?

A. Yes. He reported the concentration of silage -- of PCB in the silage from a minimum of two-tenths of a part per million in the material in the center of the silo up to 20 parts per million next to the walls. He said he had found --

Q. You're not supposed to tell us what he said.

A. I'm sorry.

Q. I'm just asking you if he did inform you what the concentrations were?

A. He did inform me what the concentrations were in the silage and in the material next to the walls. He also informed me what the concentrations of PCB's were in the milk from these herds.

Q. Now, Dr. Kelly, tell us, was this the first you had known of PCB in milk?

A. Yes.

Q. Was this the kind of call that would be referred to you concerning, for instance, PCB's?

A. Yes, it would.

Q. All right, sir. And upon receiving this call and learning this information for the first time what did you do?

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A. I wrote a letter to Mr. Papageorge and to the four people that are listed as receiving copies of the letter.

Q. Would you tell the Jury why did you send this memorandum to Mr. Papageorge upon learning of this situation from Dr. Hill?

A. Yes. Mr. Papageorge was an individual who is quite knowledgeable in PCB's. In fact he was the plant manager at our Anniston Plant where PCB's were made for a matter of -- I don't know how long he was there. He was there at least two years. He was at the time the material was found in the food chain. Not in the milk but food chain, in the water food chain, from shimp to fish to Mallard ducks. There was a great deal of analytical and investigative work had to be carried out. So it was decided to put a knowledgeable individual in what was called the Organic Division at that time. That was the division that manufactured PCB's. So Mr. Papageorge was in a sense then the environmental chief of the Organic Division and it was his job to follow-up any problems with PCB until a final solution was made.

Q. Was that then the -- was this then the purpose of this memorandum?

A. Yes.

Q. And was he then the person who would be in charge of looking into this kind of situation?

A. That's correct.

Q. Doctor, we have also had admitted into evidence Defendant's Exhibit 325, which is a letter from Mr. Robert Egan of the Michigan Silo Company to a Mr. Rex Autry of the Bloomfield Silo Company down in Indiana.

I'll ask you to read that to yourself for just a moment please.

A. Yes, sir, I have read it.

Q. Now, Dr. Kelly, did you have a conversation with Mr. Egan Michigan of the Michigan Silo Company in what -- Massillon, Ohio?

A. I guess it was Bloomfield. I don't know where he was.

Oh, yes. He's in Massillon. That's right. I don't remember the city. I know it was in Ohio.

Q. All right, sir. And what do you remember, if anything, about that telephone conversation? Or about that conversation? I didn't -- I don't know if you can tell us how it occurred. In person, or whatever.

A. Yes. He called me the same sort of information that Dr. Hill had developed. He also -- he talked to me about what I knew about it and what my recommendation was and I said -- he told me or --

Q. Just say what you told him. You can't report what he said to you. But what did you tell him?

A. I told him that if the material is extracted or flakes off from the silo, don't use Aroclor 1254 in the silo paint.

Q. And while I think of it, the earlier exhibits that we talked about, which is the memorandum from you to Mr. Papageorge, a 179A, refers to in the last sentence here -- last sentence -- the last sentence is -- or a last sentence is, it may be that some of the customers will assure themselves on the basis of non-extractability that a particular formulation might be safe, but I think we should make a blanket recommendation against these uses.

What do you mean by non-extractability?

A. Non-extractability means you cannot remove elements of a coating, or elements of a fiber, or elements of a film by chemical means.

Let me explain a little further. The Food and Drug Administration approves various compounds for food reps. If somebody has a polyvinyl wrap and they put it in a plasticizer, which is to make the film more pliable, you would have to know two things. One, what is the toxicity of that particular plasticizer and, B, is it extracted by the food. So the Food and Drug Administration --

Q. When you say is it extracted by the food what do you mean? What happens?

A. That the material is drawn out by the food.

And the Food and Drug Administration had a series of tests. They would use a acid -- slightly acid compound, or solution, to simmilate saurkraut, or pickles in it. They would

use an oil base in case you were wrapping butter, or oleo in it. They would use water in case there was an aqueous solution. They might use a sugar solution. They might have had one or two other types of extractors. So they would either put the film into these solutions, or put the film into a sack and put the simulated food solvent in there and test the solvent to see if they draw any of the materials out of the plastic. That's what I mean by extractability.

Q. And when you wrote that memorandum to Mr. Papageorge informing him of what you just learned from Dr. Hill, did you specifically bring to Mr. Papageorge's attention this concern about non-extractability of the coating?

A. Yes. I said that we don't know anything about extractability and if somebody is going to use it we ought to be sure that it isn't extractable and it would be up to them to find out about it.

Q. That is it won't come out of the coating?

A. That's right.

MR. JUNGERHELD: Your Honor, may I have just a moment?

THE COURT: You may.

MR. JUNGERHELD: Your Honor, with your indulgence, just a few more questions.

THE COURT: Go ahead.

Q. Doctor, we had talked at some length about the studies that

were conducted. What was the period of time of these chronic toxicity studies?

A. I think they were finished in late '71 or early '72 and they were started probably two and a half years before that. Because if you do a two year study, obviously you have to feed them for two years. But before you start it you have to run some range finding tests with these various animals. But first of all you have to get the animals. You got to watch them for awhile to be sure they're going to get well. Because if you're going to keep these things for two years you want to be sure they aren't dying of diabetes, or whatever. Dogs get distemper halfway along the way they'll foul up your experiment. So you got to put them in quarantine for awhile. Then you got to do range finding studies, which may be 30 days, or 60 days, to see what sort of level you can feed them so that they will live for two years. And then when you sacrifice them at the end of two years you got to run slides on 26 different organs, and so they look at this under a microscope. So really you're talking about a three year duration. That's about as fast as you can do a two year study.

So I think this was finished in either early '72, or late '71. So that would put it sometime in '68.

Q. Doctor, during the period of time of these chronic toxicity studies did they include studies for mutagenicity as well?

A. Yes, they did.

Q. You also talked about some studies in the 1930's. Were there PCB studies conducted in the 1950's?

A. Yes.

Q. And in brief summary what were those?

A. We did inhalation studies at the Kettering Laboratory because in the '50's this material started to be used and heat transfer agents, hydraulic fluids, and there was a question then of exposure in leaks, as I said the one in Indiana had. And in hydraulics there are all kinds of leaks in dye casting and things like that. So we ran inhalation studies for prolonged -- I think three months, which is about as long as you can run paper studies, to decide what was safe levels to advise the workers in these various installations what would be the safe level at which these things could be used.

Q. Doctor, you mentioned the Kettering lab. Is that the one at the University of Cincinnati?

A. That's correct.

Q. And did you deal with the Kettering lab and did you deal with these other labs during that period of time, during the 1950's? I think you mentioned that Saranac and --

A. We didn't have PCB's ever at Saranac. We had a silica compound up there. They were big on silicas, and this was a silica compound, which Monsanto doesn't make anymore, and

we had that run up at Saranac. We never had PCB's at Saranac.

Q. I understand. What labs did you deal with for PCB's?

A. Well, we ran some at Younger labs.

Q. No. I mean in the 1950's.

A. Well, I think only to the -- to the best of my recollection only the Kettering lab.

Q. And again the reason you would only use the Kettering lab in the 1950's was what?

A. They had inhalation chambers. They had the expertise for carrying out the analytic work on amounts of material in the air. You have to have -- you have got to have the analytical group that can pick up minute quantities of PCB. Anything in the air. And the 1950's were not like they are now. Like in the 1980's we can get down to a part quadrilian. Then you were lucky to get two parts per million, something like that. It was a little -- had a very excellent group for inhalation studies.

MR. JUNGERHELD: All right. Your Honor, thank you. That's all with this witness.

THE COURT: Mr. Davidson?

MR. DAVIDSON: No questions, Your Honor.

THE COURT: Mr. Woodworth.

MR. WOODWORTH: Yes, Your Honor.

Your Honor, I still have my motion. I don't know if the Court desires to hear the motion later.

THE COURT: It's noted for the record.

MR. WOODWORTH: I still desire to assert it.

THE COURT: It's noted and preserved.

MR. WOODWORTH: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. WOODWORTH:

Q. Dr. Kelly, how do you do. I'm Jim Woodworth. I represent the Plaintiffs.

A. Woodword?

Q. No. Woodworth.

We have met before, have we?

A. No.

Q. When was the first time you were informed of the existence of this particular lawsuit, Doctor?

A. I think it was within the last two months.

Q. And who contacted you?

A. I believe it was Mr. Jungerheld.

Q. Okay. And by telephone or in person?

A. No. Telephone.

Q. And what information were you conveyed at that time, Doctor?

A. That there is a lawsuit over the presence of PCB in silage and there were allegations of both effects on cattle and some health effects.

Q. Okay. Human health effects?

A. Human health effects.

Q. Had you heard of these types of claims before?

MR. JUNGERHELD: I'm sorry, Your Honor. Could we perhaps specify what types of claims he's talking about?

MR. WOODWORTH: I'm talking about claims of what you just said. Human health effects and animal health effects.

A. I have heard.

Q. Relating to silage, more specifically?

A. I have heard of animal effects but I'm not -- I do not recollect whether health effects were included in those particular instances.

Q. Did Mr. Jungerheld subsequently come to see you?

A. No, sir.

Q. Okay. When he first contacted you by telephone had the case in fact started then? Gone to trial, do you recall?

A. Gone to trial?

Q. Yes. Had it started? Did he tell you?

A. I don't know.

Q. Okay. Did anyone else from Monsanto contact you or follow it up then?

A. Well, Mr. Jungerheld isn't from Monsanto, is he?

A. Well, put it this way, let me rephrase it then, Doctor.

Mr. Jungerheld, or attorneys representing Monsanto?

A. Mr. Nassif talked to me sometime I think within the last month. Whether Mr. Nassif talke to me before Mr. Jungerheld

or not I just don't know.

Q. And did you have any meetings with anyone besides Mr. Nassif? I'm presuming Mr. Nassif's contact was in person. Maybe I'm wrong.

A. Yes. I had a meeting with Mr. Jungerheld.

Q. Okay. And when was that meeting?

A. Sometime in April I believe.

Q. And where was that? At St. Louis?

A. No. At his office here.

Q. And you flew up to Saginaw?

A. That's correct.

Q. And did they talk -- discuss at that time -- how long ago was that about?

A. Three or four weeks.

Q. And did they discuss your possibly being a witness in this case?

A. Yes, they did.

Q. Did Mr. Jungerheld ask you when he made that phone call to you about two months ago, did he discuss with you the possibility of you being a witness, or requesting you to be a witness?

A. I don't know. I don't know, Mr. Woodworth, whether it was two months ago. I mean I'm not certain about the dates. I know that I saw Mr. Jungerheld sometime in April. I saw Mr. Nassif sometime in the last three or four weeks. I don't

know when Mr. Jungerheld made that call. Whether he made it subsequent or prior to Nassif's talking with me. I don't know.

Q. Fair enough. Thank you, Doctor.

When Mr. Jungerheld -- after he talked to you did he convey any additional information to you in the form of writings besides that telephone call?

A. I don't know what you mean by --

Q. Did you get any materials? Any documents? Letters from him? Explanation of anything?

A. No. I got no letters from him.

Q. How about from Mr. Nassif, or from Monsanto?

A. I received no letter from Mr. Nassif and no letter from Monsanto.

Q. Besides any letters, sir, did you receive any materials? Any documentation? Any pleadings? Any information?

A. I received no pleadings. I received some photostats of some old toxicological work on chlorinated naphthalenes and I think on -- chlorinated napthalenes and chlorinated biphenyls. I did receive a few pieces of a deposition by Dr. Chase. That's all I received.

Q. And who furnished this material to you?

A. To the best of my recollection, Mr. Jungerheld.

Q. Was that the last material you received, or did you have any other communication or contact up until the time that you

flew up to Saginaw to confer with Mr. Jungerheld.

A. You got two questions there, sir.

Q. Okay.

A. First, that's the last information I received. And secondly, I did have communication because I wrote him a letter after I got back explaining some questions that had arisen.

Q. And was that the last of the communications then until you came up?

A. Well, he called me a couple times. Get a ticket and be ready to come sometime.

Q. And did you do that?

A. Yes, I did.

Q. And you flew up to Saginaw and who did you meet with besides Mr. Jungerheld?

A. When?

Q. When you flew up to meet with them. You said -- I believe you said --

A. The first time?

Q. Yes.

A. Mr. Hahn.

Q. Is that all? Mr. Hahn and Mr. Jungerheld?

A. Mrs. Jungerheld and Mrs. Hahn.

Q. Okay.

A. That's all.

Q. And what was that meeting about?

A. It was to discuss what I might be able to contribute as far as my knowledge. What if any ill effects were present in Monsanto workers, and to describe some of the toxicological information Monsanto had developed.

MR. WOODWORTH: Excuse me a minute, Doctor.

In order to save time, Your Honor, may I have Mr. Mc Graw go through these exhibits?

THE COURT: Sure.

MR. WOODWORTH: I'm sorry for the interruption.

Q. You said the first time. Did you come up again?

A. Yesterday.

Q. Okay. And who did you meet with after coming up yesterday?

A. Mr. -- well, a paralegal met me at the plane in Saginaw. I forget her name. And she drove me up to the Franklin Hotel and I met Mr. Jungerheld and Mr. Nassif and Mr. Hahn.

Q. And at that meeting that you had in Saginaw, going back to that, not yesterday but the meeting when you flew up, were you provided any materials or any additional documentation regarding this case?

A. Additional to what I mentioned?

Q. Yes. Additional to the part of Dr. Chase's deposition and some of the old studies.

A. No. To the best of my recollection that's all I got.

Q. And did you review any other documents during the meeting?

A. Then, no.

Q. Have you since?

A. I have looked up some literature on PCB's.

Q. And your appearance here today, were you subpoenaed or did you appear?

A. I appeared.

Q. You appeared by being requested by Mr. Nassif or Mr. Jungerheld.

A. Yes. Mr. Jungerheld, I believe.

Q. You retired in 1979, stayed on and consulted in 1975, and after that, Doctor, did you continue any relationship with Monsanto in an indirect type of manner?

A. I went to the old folks' dinner.

Q. Okay. Besides social-type functions? Any business --

A. I was called in to give a couple of depositions in cases.

Q. What cases were those?

A. The one you talked about this morning. I forget his name.

Q. Howell and Parsons versus Monsanto?

A. Yes. I didn't remember the name but --

Q. And that was out of Wayne County, Detroit?

A. It was down in St. Louis.

Q. The deposition was down in St. Louis?

A. Yes.

Q. And do you remember when that was? When that deposition was?

A. Well, I looked at that this morning and I thought it was in

1975.

Q. And how did you happen to get a copy of that deposition to look at this morning?

A. Well, I heard everybody talking about the depositions that I had given and I thought I better look at it and see what it was about because I didn't remember it. So Mr. Nassif had a copy and I said I'd better look at it.

Q. And he said look at it?

A. Uh-huh.

Q. You didn't have one before that, is that right?

A. No. Not that I recollect.

Q. And so this morning prior to your testimony today did you go through that deposition and have an opportunity to refresh your recollection as to that case?

A. I went through it in about three minutes and I --

Q. Well, it's a short deposition?

A. Yes. So I -- I couldn't recollect what I said in it. I don't know anything more about the case. I don't even know what he's alleging.

THE COURT: In light of the hour, Mr. Woodworth, why don't we take a 10 minute recess?

Members of the Jury, we'll call for you in about 10 minutes.

(Whereupon a recess was taken.)

(Whereupon a legal discussion ensued outside the presence of the Jury.)

THE COURT: Go ahead, Mr. Woodworth.

MR. WOODWORTH: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. WOODWORTH CONTINUING:

Q. In this Howell and Parson's case that you gave the deposition in, do you recall when that deposition was?

A. I just heard now it was 1979.

Q. And what chemical was involved in that particular suit?

A. Aroclor 4465, which is a condensation production of chlorinated terphenyls and 1268 which is Aroclor PCB chlorinated to 68 percent.

Q. And 1254 would be chlorinated to 54 percent?

A. That is correct.

Q. And this -- I'm sorry, what was the number, 44 --

A. 4465.

Q. Okay. Is Aroclor 44 --

A. That is, to the best of my recollection. As I say, I just saw this this morning for a period of --

Q. Okay.

A. -- three or four minutes.

Q. Now, Aroclor 4465 is composed of -- is there a nickname for polychlorinated terphenyls? Like PCB is polychlorinated biphenyl, that is what we've been calling the PCB's.

A. You could call it PCT's but they're entirely different things.

Q. The PCB's and PCT's were mixed together?

A. They weren't mixed like you mix sand and sugar. They entered into a chemical condensation, both of them are lost, and they came out like -- just as solid as this (indicating).

Q. What was that material used for in that particular case?

A. The best of my recollection it was heated up and used in some sort of a dental wax. That is the best of my recollection.

Q. Doctor, I'm going to show you what's been marked as Plaintiff's Exhibit No. 296 and ask you if you can identify this, ignoring these writings up here.

A. That is diphenyl.

Q. Okay. And could you then, please, explain how this would become a chlorinated biphenyl or diphenyl?

A. You would change one of the H's and put a Cl.

Q. And you can do that to any number of them, is that correct?

A. That's correct.

Q. And I believe I have a marker, I think this might show up sufficiently, Doctor.

Could you draw for us a PCB?

THE COURT: It's really not very visible.

Q. Here we go.

A. I'm not so sure if I can, but I'll see.

Q. We've established that -- like that is a biphenyl or diphenyl.

A. Yes. But I do not know if this is hooked on there or if it's hooked on down here. You realize I'm not an organic chemist. In other words, you got three phenyl rings. When you get them all like one, two, three, or whether they're hooked on here or not, I don't know.

Q. And to make it a polychlorinated terphenyl, the difference from a biphenyl and a terphenyl would be the extra ring, would it not?

A. Yes.

Q. And the polychlorinated terphenyls were part of the aroclor series?

A. Yes, they were.

Q. I'm going to show you Defendant's Exhibit No. 31 and ask you if you have seen that before.

MR. JUNGERHELD: I think Counsel said 31. I doubt that the number is that low.

MR. MC GRAW: Yes, it is.

MR. WOODWORTH: Is it 31?

MR. MC GRAW: (Mr. Mc Graw nods head.)

A. I don't see any number on it at all.

Q. There is on the back here. It is, in fact, 31.

A. I might very well have seen this.

Q. And what is that?

A. This is a technical bulletin put out by Monsanto, entitled "Aroclor Plasticizers."

Q. And does that include terphenyls?

A. Yes, it does.

Q. And it includes biphenyls?

A. No, not biphenyl.

Q. Are biphenyl --

A. Chlorinated biphenyl.

Q. Chlorinated biphenyls. All right.

Doctor, is there a way of looking at that publication someplace you can tell us when that was published?

A. Yes, in 1970.

Q. And when in 1970?

A. 3-70.

Q. In March of 1970, correct?

A. That's correct.

Q. And who is this for? This is a technical bulletin, is it not?

A. That is correct.

Q. And how was that used in your business back then?

A. To the best of my knowledge this went to technical people that were going to use aroclors in a plasticizer function.

Q. Other industrial people?

A. That is correct.

Q. And, in fact, besides being entitled a technical bulletin,

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it is rather technical, is it not?

A. Yes, it is.

Q. And this was printed in March of 1970. How can you tell that?

A. It says 3-70 on it.

Q. Okay. And is that a standard type of dating for this document?

A. I don't know. To the best of my knowledge, I don't know if it's standard. I don't know if they still do that, but that seems to be common in other people's documents as well as this.

Q. I'm going to direct your attention, Doctor, to just this last paragraph there, the very last paragraph.

Would you read that out loud, please?

A. This bottom one or the top?

Q. Bottom.

A. "Some specific applications where the use of PCB should definitely be avoided are in paints and solvents for swimming pool paints and waterproofing agents in silos and other compounds where food products for human or animals are stored and as a component of any container or wrapping used in the packaging of food products."

Q. Thank you very much, Doctor.

Now, if we can go back to your exhibit, this is dated March 30th, 1970, in fact, is it not?

A. Yes, it is.

Q. And this is referring to some PCB's being found in silos?

A. Yes, sir.

Q. I'm going to show you Plaintiff's Exhibit No. 217 and ask you if you have ever seen that before or anything along this line, if you can recognize what that is.

A. No, sir, to the best of my recollection I've never seen it before.

Q. Doctor, that's been -- you can keep it for a moment. That's been identified as one of the formulations for a product called Cumar.

Have you ever heard of Cumar before?

A. Yes, I have.

Q. And to your knowledge what was Cumar?

A. Cumar was a product that was used for painting silos.

Q. And that particular product there, does that look like it is a chemical formula to you?

A. I haven't the slightest idea.

Q. But, nevertheless, there are ingredients on there; there is a couple of aroclors, are there not?

A. Yes, there is.

Q. And what are the aroclors listed on that?

A. Aroclor 5460 and Aroclor 1254.

Q. And 5460 is what? Is that a PCT, a polychlorinated terphenyl?

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A. I'm not sure about it. It's certainly a mixture of something. I cannot tell you -- 5460 is a product that I just don't recall.

Q. Could you look in here and see if you could tell what 5460 is?

MR. JUNGERHELD: Your Honor, I don't know how far Counsel wants to go with this line of questioning, but I would object inasmuch as there's no claim in this case for anything to do with Aroclor 5460.

Plaintiff's complaint is very specific in talking about 1254 in numerous points in the complaint, and never is 5460 mentioned. I will object on the grounds of relevancy to any --

THE COURT: What is the relevance?

MR. WOODWORTH: The relevance is to tie this into Howell and Parson's deposition. Also to show that there was more than one product going into the material. And also the testimony of the salesman at Monsanto that is in fact selling products to the silo company and the testimony of a silo company buying Monsanto products.

THE COURT: I'll allow it.

A. Yes, 54 is -- indicates it is chlorinated triphenyls by itself, so 60 is very probably triphenyl chlorinated to 60 percent.

Tri and ter are used interchangeably.

Q. As are bi and di?

A. Yes.

Q. Thank you.

Doctor, who is H.S. Bergin or Bergin?

A. I can tell you who he was. I mean --

Q. Yes, who was he?

A. When I was with Monsanto, Howard Bergin was either a product director or a chief of sales for either plasticizers or aroclors. I can't tell. I can't answer that.

Q. And H.L. Minkler?

A. H.L. Minkler was the chief -- or the vice president in charge of the Organic Division which manufactured -- it was called the Organic Division and that manufactured PCB or aroclors.

Q. And P.S. Park?

A. He was our lawyer who was in charge of environmental problems.

Q. And J.E. Springate?

A. Either Springate was Bergin's boss or Bergin was Springate's boss. I don't remember who was who. But they were both involved in -- as manager of the -- whether it was the plasticizers or whether it was -- I just -- they were dealing with aroclors.

Q. Thank you.

You made reference to a Wheeler and was Wheeler the -- I don't see his name on there, but was Wheeler the person who became the industrial hygienist, I believe you said?

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A. Yes, he was the first industrial hygienist we engaged.

Q. Do you know when he came into the employment with Monsanto, about? I know that it's difficult to have a precise time.

A. I would say sometime between the close of World War II and 1950. I'm not sure.

Q. In 19 what?

A. 1950.

Q. Are you collecting a pension from Monsanto?

A. Yes, I am.

Q. And have you been collecting that since the time of your retirement?

A. Yes, I have.

Q. And do they mail you a check periodically?

A. They mail it to the bank monthly.

Q. And after you retired from Monsanto, you carried on with your own consulting business, didn't you?

A. Yes, I did.

Q. And what type of consulting did you do?

A. I did consulting for Consolidated Aluminum Company. They have a -- two aluminum smelters and six extrusion plants. I sort of function as their medical director.

I'm consulting with the Sudder Industrial Clinic in St. Louis where I handle -- I thought you were leaving.

Q. Trying to do two things at once, Doctor.

A. Where they handle -- I would handle the occupational cases.

Does this man have lead poisoning? Does this man have any problems with various agents?

I've consulted with both plaintiff and defendants' lawyers on various cases where there was an occupational -- possible occupational connection.

Q. Do you still consult to this day?

A. Yes.

Q. And when you gave your deposition, you had your own business and do you still have your business?

A. Yes, I do.

Q. And what is the name of that?

A. R. Emmet Kelly, M.D. & Associates.

Q. And going back to the time that you were with Monsanto, have you testified in other cases or since then but for Monsanto? I'm not talking about your own private consulting business. But besides the deposition in the Howell and Parsons' case, was there other depositions or testimony that you might have given over the years?

A. Well, I'll have to clarify this, if I may. I don't testify for anybody. I mean, I testify what the facts are. So if you -- with that change in semantics --

Q. Well, the semantical difference perhaps to me is, Doctor, the number of witnesses were in fact subpoenaed to appear here and that you in fact were not subpoenaed, is that correct?

A. Okay. Well --

Q. And that you did in fact appear pursuant to a request by Monsanto?

A. That's correct.

Q. Now, what other cases have you testified in for or in relation to Monsanto Company?

A. I do not believe I have testified in any cases for Monsanto in any cases in which Monsanto was a party, with the exception of some workmen's compensation cases 30 years ago. I do not believe I have testified in Monsanto cases.

Q. Did any of those workers' compensation cases have to do with the aroclors?

A. No.

Q. You mentioned on direct examination, Doctor, some reference to your knowledge of PCB's and some testing that was done with them. And you talked about the time that you were involved with the company but you asked something back to Mr. Jungerheld about historical knowledge and there was no information given as to that when you came into the company.

What historical knowledge was there in the earlier '30's about PCB's, if any?

A. Well, the historical knowledge was that when I came to the company, the first time I went down to Anniston I was -- I would look over what particular products were made at this plant and I would look over what files were present in the

group that had something to do with Anniston. And there were records of some few cases of chloracne in workers at Anniston in sometime in the middle '30's.

I went to Anniston, I talked to the doctor who was there, Dr. Martin who had been with the Anniston Plant long before, well, several years before I came aboard.

Q. Doctor, in your historical data that you obtained and your review of the records, were you familiar with an employee of the Anniston Plant, a black person who had rather serve cloracne, had complaints of lassitude, lack of energy, and, I believe, I'm not sure, perhaps you could assist, that he might have even been referred by the name of just plain Joe.

Are you familiar with that incident?

A. I have no recollection of any employee with those symptoms or any black worker by the name of Joe.

Q. Did Anniston Plant have a rather -- back in the '30's, a high number of employees who were black?

A. I would think a good amount were.

Q. When you came to work for Monsanto back in the '30's, were there just Plant A and Plant B?

A. No, there was Anniston, there was Norfolk, West Virginia, there was Nitro, West Virginia, there might have been another one or two. Oh, there is Merrimac outside of Boston. I think that's all.

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Q. After World War II and after you returned, it had expanded considerably?

A. Yes.

Q. And that, I would assume, would be a result of the war and its stepped up industry?

A. Well, stepped up industry and the fact that they bought a couple companies that had plants.

Q. Before the war were there plants overseas or in other countries with Monsanto?

A. Yes. There was a plant in Aubrun, Wales, and Sutherland, England.

Q. When you came back and you became head medical director -- or is that the proper term, medical director?

A. Just medical director.

Q. But you were in charge of the Medical Department?

A. That's correct.

Q. And as such would you receive documents and requests and have to sign things and execute things as medical director in your capacity as medical director?

A. Can you be more specific, please?

Q. If there was correspondence directed to the medical director of Monsanto, would that not mean, in fact, you, when you were there?

A. Yes.

Q. You stated, I believe, that any complaints -- any complaints

regarding, and I want to clarify this, would it be -- regarding any chemicals would always be noted by your department or referred to your department?

A. If there were a health aspect to it.

Q. That is, I didn't say that in my question, but that is what I meant.

And would your company keep health records?

A. I don't know what you mean by health records.

Q. If a complaint came in, say, this fellow who had the hydraulic fluid exposure back whenever it was, late '30's, early '40's, when that complaint came in or you went out and checked on it, would you make a record of that and retain it at the -- at Monsanto?

A. That varied with the amount of secretarial help I had. If it were a letter that didn't need an urgent call, I would answer it with a letter. If it looked to me like it ought to be handled by telephone, I would call them. If it were a telephone call, sometimes I would make a record of the telephone call, but the majority of the time I would not.

Q. However, if there was, in fact, a verified type of complaint or a -- what appeared to be a bonifide type of complaint regarding an exposure or contact with one of your company's chemicals, would you not want to make a notation of that for the medical records of the corporation?

A. Yes, I would want to.

Q. And was that a corporate procedure that you do that?

A. Yes. But then, again, Mr. Woodworth, it depends on what the person had and how serious it was. If a farmer called up and said, "Look, I got Lasso on me and I've got a rash, what should I do?" I would tell them what to do and I wouldn't -- I may or may not, depends on how busy I was, make a notation so that we'd find out how many people with Lasso had rashes or how many -- I would try to.

I'm sure there are cases where I did not. There were calls I would get at home, I would not make that type of a notation. I would try to, but I'm sure there are a lot of times I slipped up.

Q. As to PCB's, if they were in industry or other companies calling up and saying that they were having problems with them, would you make a notation on it?

A. Again, I may and I may not. I said this morning that this man in Indiana that called up about the jerry-rigged heat transfer agency that they had -- or heat transfer system and I don't know if that record is ever available. I don't know if I made a record of it. I haven't looked for it. I don't know.

Q. Was there a manager of epidemiology while you were at Monsanto?

A. No, there was not.

Q. Is there a medical director for -- at Monsanto now?

A. Yes.

Q. And who is that person?

A. Dr. George Roush.

Q. And, Dr. Kelly, do you know the present manager of epidemiology at Monsanto?

A. Yes.

Q. And who is that?

A. Dr. William Gaffey.

Q. And Mr. Gaffey is not in fact a medical doctor, is he?

A. No, he is a Ph.D.

Q. If I were to tell you that we sent out interrogatories directed to the Medical Department of Monsanto, do you think there is any question that Monsanto knows exactly what the Medical Department is?

A. In whose mind?

Q. Well, within the corporation. Is the Medical Department clearly defined as to what it is?

A. It's clearly defined. It's called Medical and Environmental Health.

Q. And is a medical director in charge of the Medical Department?

A. Yes.

Q. Dr. Kelly, we sent out interrogatories to the director of the Medical Department of Monsanto and we received answers back but they were signed by Dr. Gaffey.

Now, to your knowledge was Dr. Gaffey ever the medical

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director at Monsanto?

A. To my knowledge he never was.

Q. Would the director of -- or custodian -- not custodian, the director of the medical records regarding all or any records at Monsanto regarding health effects, that have been logged and accumulated, in fact be the medical director, the chief of those records?

A. I wouldn't have any idea.

Q. During the time --

A. This all happened after I left. I mean, we had no epidemiologist when I was there, so I don't know what they're doing with their records now.

Q. Could you draw for us, as you drew a PCB, Doctor, could you get up and draw a chlorinated naphthalene?

And are there chlorines --

A. These are all hydrogens around here, of course, and you knock those hydrogens off and put a chlorine on depending how much you chlorinate it.

Q. Were PCB's used at any time while you were at Monsanto as extenders in pesticides?

A. I do not know if they were.

May I explain a little bit of that?

Q. Did you manufacture pesticides?

A. Yes.

Q. Yes -- I'm not trying to cut you off, Doctor. Yes, you may

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explain.

A. Yes, there is a statement made by the Department of Agriculture that one of the PCB's -- one of the aroclors could be used as an extender in insecticides to make them last longer.

When I say extenders, that doesn't mean like Hamburger Helper, it means to extend the action of it. And nobody at Monsanto ever knew where they got that idea because at that particular time I was the medical director and I was interested in the Pesticide Department.

And I would write to the Department of Agriculture and say "Okay, where did you get this?" And so to the best of my knowledge, no one in Monsanto ever volunteered or proposed PCB's for use as an extender in pesticides.

Q. And, Doctor, you were contacted by the Department of Agriculture?

A. I contacted them after I saw this little note in one of the government fliers or brochures or something like that.

Q. And what type of note was it?

A. It wasn't a note, it was one of their publications they put out on something or other. And there is a litte footnote says aroclors something or other can be used as an extender in this particular operation.

So I said I don't know about that, because we don't know anything about it. They didn't know, either.

Q. And when was this?

A. I don't know.

Q. In the '60's?

A. I don't know.

Q. Doctor, are you familiar with the federal regulation that came about in 1970 banning the use of PCB's and pesticides? Were you familiar with that while you were at Monsanto?

A. No, it wouldn't have been of any interest to us. We didn't use it.

Q. Now, after the war did you -- and Monsanto acquired these new plants, and it was expanding, and you said it was a linear rise or -- in answering the question as to whether it was a linear rise up till the time you left, were you medical director over everything?

A. Yes, with the exception of some foreign subsidiaries where Monsanto might have half ownership or 49 percent ownership or 50 percent ownership in a Japanese company. I had no responsibility over the Japanese company.

Q. And what Japanese company? Do you recall what they were?

A. Monsanto Michibishi or something like that. I don't know.

Q. Did they make cantaclors over there?

A. No, they did not. They made fibers.

Q. And you made reference, Doctor, to prior to 1942 you were aware of two incidents of contact of PCB complaints. One was the hyrdraulic fluid and the other was the bellows.

You said, and I made a note, there may be more but you couldn't recall.

Have you been able to recall since?

A. No. And I believe I changed my statement.

Q. I note hydraulic, you said it might have been after.

A. It was after the war, I'm sure, because I do not believe aroclors were used in hydraulic fluids until sometime in the '50's. No, I don't recall anymore.

Q. Were you personally aware as medical director of Monsanto that your company was selling PCB's to silo companies in the '50's and '60's?

A. I was not.

Q. And perhaps even in the '40's?

A. I was not.

Q. Are you familiar or have you been made aware of the testimony of the -- I guess he is still a present employee of Monsanto, former salesman --

THE COURT: Excuse me, Mr. Woodworth. We'll take a recess. In fact, I think we'll break for the day. It's late. I have something I have to take care of.

Members of the Jury, if you'd retire, we'll call for you tomorrow morning at 9:00 o'clock.

(Whereupon at 4:40 o'clock P.M., on Wednesday, May 2, 1984, the Hearing was adjourned.)

STATE OF MICHIGAN)
) SS.
COUNTY OF HURON)

We, James R. Fritzler, a Notary Public and Court Reporter in and for Saginaw County, State of Michigan, and Donald E. Pearson, a Notary Public and Court Reporter in and for Midland County, acting in and for Huron County, State of Michigan, do hereby certify that we stenographically recorded the proceedings had and testimony taken in the above-captioned cause on Wednesday, May 2, 1984, before the Honorable M. Richard Knoblock.

We also certify that the attached typewritten pages, or parts of pages, constitute a true record of our notes then and there taken.

James R. Fritzler, RPR, CSR-2067

Notary Public, Saginaw County
My commission expires: 8-30-87

Donald E. Pearson, RPR, CSR-0279

Notary Public, Midland County
My commission expires: 11-18-87

bmg: 5-2-84

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