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DISTRICT COURT IN AND FOR TULSA COUNTY.

STATE OF OKLAHOMA

LANNIS SMITH, et al.,	)	
	)	
Plaintiffs,	)	
	)	
vs.	)	Cause No. CJ-84-07001
	)	
PUBLIC SERVICE COMPANY OF	)	
OKLAHOMA, et al.,	)	
	)	
Defendants.	)	

Deposition of WILLIAM B. PAPAGEORGE, P.E.
On behalf of PLAINTIFFS
MAY 18, 1990

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PUBLIC SERVICE COMPANY OF	)	
OKLAHOMA, et al.,	)	
	)	
Defendants.	)	

DEPOSITION OF WILLIAM B. PAPAGEORGE, P.E.,
produced, sworn and examined on behalf of the PLAINTIFFS,
MAY 18, 1990, between the hours of eight o'clock in the
forenoon and five o'clock in the afternoon of that day, at
the Adams Mark Hotel, 4th and Chestnut, St. Louis, MO
63102, before CATHERINE WINKELER, a Certified Court
Reporter and a Notary Public within and for the State of
Missouri.

A P P E A R A N C E S

The Plaintiff was represented by Mr. J. Michael
Busch, 14 S. Water Street, Sapulpa, Oklahoma 74066.

The Defendant Monsanto and the witness were
represented by Mr. David L. Thomas of the law firm of
Crowe & Dunlevy, 1800 Mid-America Tower, Oklahoma City,
Oklahoma 73102.

The Defendant Monsanto and the witness were
represented by Mr. Anton Rupert of the law firm of Crowe &
Dunlevy, 1800 Mid-America Tower, Oklahoma City, Oklahoma
73102.

The Defendant Westinghouse Electric was
represented by Ms. Deirdre O. Dexter of the law firm of
Conner & Winters, 2400 First National Tower, Tulsa,
Oklahoma 74103.

The Defendant PSO was represented by Mr. G. Michael Lewis of the law firm of Doerner, Stuart, Saunders, Daniel & Anderson, 1000 Atlas Life Building, Tulsa, Oklahoma 74103.

The Defendant I.T. Corporation was represented by Mr. John Tucker of the law firm of Tucker & Gable, 2800 Fourth National Bank Building, 20th Floor, Tulsa, Oklahoma, 74119.

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IT IS HEREBY STIPULATED AND AGREED by and
between Counsel for the Plaintiff and Counsel for the
Defendant, that this deposition may be taken in shorthand
by CATHERINE WINKELER, a Certified Court Reporter and
Notary Public, and afterwards transcribed into typewriting
and signed by the witness.

o-o-o

WILLIAM B. PAPAGEORGE, P.E.,
of lawful age, being produced, sworn and examined on the
part of the Plaintiff, deposes and says:

DIRECT EXAMINATION

QUESTIONS BY MR. BUSCH:

Q. Would you please state your name for the
record?

A. William B. Papageorge.

Q. Is that Mr. or Dr. Papageorge?

A. Mr.

Q. Michael and John, can you hear me okay?

MR. LEWIS: I can hear you.

Q. (By Mr. Busch) What is your current
employment or occupation?

A. Currently, I am self-employed.

Q. What type of work do you do being

1 self-employed?

2 A. Engineering consulting.

3 Q. Now, you understand I'm here representing the
4 Plaintiff's, Coney Island Hot Dog Wieners, Inc., vs
5 Monsanto, Westinghouse, I.T. Corporation and Public
6 Service Company of Oklahoma. If I ask you any questions
7 that you don't understand or are not clear please tell me
8 and I'll rephrase them, and we will try to get some kind
9 of understanding. Do you understand that?

10 A. I do.

11 Q. Are you on any drugs or alcohol today that
12 might affect your thinking?

13 A. I'm not.

14 Q. If I ask you any questions that you don't
15 understand, will you ask me to rephrase those?

16 A. I will.

17 Q. Could you tell us about your educational
18 background?

19 A. I received a Bachelor of Science degree in
20 Chemical Engineering in 1943 from Washington University,
21 St. Louis, Missouri. A Master of Science degree in
22 Chemical Engineering from the same university in 1947.
23 And I also have credits in Chemical Engineering courses
24 aimed at a Doctor of Science or a Ph.D. degree from
25 Oklahoma State. At that time, Oklahoma A & M.

1 Q. How many credits do you have from Oklahoma A
2 & M?

3 A. I believe about 12 hours. That may not be
4 exact but it's close to that.

5 Q. How many hours were required to complete that
6 doctoral degree?

7 A. As I remember, it was 18 plus a thesis.

8 Q. Did you do any work on the thesis itself?

9 A. No, I left Oklahoma before I could do that.

10 Q. Have you taken any continuing education
11 classes since the courses you took at OSU?

12 A. Yes, I took a course at Washington
13 University. It was an advanced business administration
14 course. I don't recall its formal title, name. This was
15 in the early 1960's. That is the only course I recall
16 that is associated -- I did that refresher course in
17 engineering, and again the early 1960's which led to my
18 taking the necessary tests for registration as a
19 professional engineer in the State of Missouri. I then
20 took a series of courses with the American Management
21 Association in New York City. These were primarily
22 business management type topics.

23 Q. When did you take those business management
24 courses?

25 A. Those were the period 1966 to 1968. Sometime

1 in that period.

2 Q. When did you take the courses required to get
3 your professional certification?

4 A. As best I recall, it was 1963. 1962 or 1963.

5 Q. What did those courses entail?

6 A. They were primarily aimed at chemistry,
7 mathematics, engineering courses. Predominantly chemistry
8 engineering in my case. I think that covers it.

9 Q. What is involved in chemical engineering as
10 opposed to civil engineering, or engineering in general?

11 A. Chemical engineering is centered more to
12 chemical properties of materials. Such as their flow
13 statistics, their viscosities, their abilities to react
14 with other chemicals. Whether they are volatile or not.
15 The physical and chemical properties of matter. And we
16 use those properties to conduct processes such as
17 separating of liquid from a gas, or combining chemical to
18 make a new chemical. Some chemical engineering addresses
19 that kind of situation. I don't profess to know an awful
20 lot about the other engineering disciplines, but as I
21 understand it, they are primarily interested in the firm
22 statistics of say concrete and steel. And how they can be
23 used to achieve some sort of desired end point, a bridge
24 or a road, or an engine.

25 Q. How does chemical engineering differ from

1 chemistry, a degree in chemistry?

2 A. It builds on the knowledge obtained in
3 chemistry. Help design the physical facilities required
4 to carry out chemical reactions on a large scale as
5 distinguished from a laboratory bench.

6 Q. Have you taken any other courses, seminars,
7 since leaving OSU?

8 A. I have attended numerous seminars. So many
9 that I frankly can't recall too many specifically. They
10 were depending on work assignment at the time. I would
11 attend seminars that related to the assignment. I have
12 attended seminars, for example, labor relations when I had
13 the responsibility for negotiating with unions. I have
14 attended seminars later on back to some technical matters
15 when I was a supervisor of engineering. I attended
16 numerous when I was involved with environmental matters.
17 These were involved with approaches to clean air and waste
18 discharging, and depositing of solid waste in landfills
19 and the like.

20 Q. Dealing specifically with the environmental
21 seminars, do you recall the environmental seminars that
22 you attended after 1965?

23 A. After 1965, I don't profess to recall all of
24 them. They are all so similar. They blend in my memory.
25 I remember a seminar conducted by the Environmental

1 Protection Agency. I'm going to call it a seminar. I
2 don't know if it's the proper term, on PCB's in the
3 environment in Chicago in 1975. I remember subsequent to
4 that, a seminar in the Los Angeles area put on by The
5 Environment Consultants. That may not be their official
6 name. It's a company that puts on seminars on various
7 topics. And this particular topic had to do with RCRA.
8 The Resource Conservation and Recovery Act. I know there
9 were other seminars per se that I had attended, but the
10 topics and location and timing just -- I don't recall.

11 Q. Now, I want to go into your employment
12 history. Outside of the throwing newspapers and flipping
13 hamburgers, what was your first real meaningful job?

14 A. Does military service count as a job?

15 Q. That is a separate category. We will get to
16 that a little bit later.

17 A. My first meaningful job as I'm going to call
18 this, my employment by Phillips Petroleum Company,
19 Bartelsvilles, Oklahoma, 1947 to 1951.

20 Q. What did you do for Phillips?

21 A. There were two different types of activities.
22 Initially for the first two years of that four year
23 period, I was involved with drilling mud research. And
24 secondary, recovery in oil fields. This last two years, I
25 was involved with designing or making the necessary

1 mathematical calculations to design equipment for.
2 separating the different components in petroleum.

3 Q. And you left Phillips in 1951?

4 A. Yes.

5 Q. Why did you leave Phillips?

6 A. I suppose I was looking for greener pastures.
7 I don't know of any other reason other than that.

8 Q. Where did you go after you left Phillips
9 Petroleum?

10 A. I joined Monsanto Company in St. Louis. At
11 one of their plants in St. Louis.

12 Q. What was your first job with Monsanto?

13 A. It was a design engineer, I believe was the
14 title. Designing equipment for use in manufacturing of
15 chemicals.

16 Q. Before we get into the Monsanto, you said you
17 were talking about military service. Did you serve in the
18 military?

19 A. Yes, I did.

20 Q. Which branch was that?

21 A. The army.

22 Q. How long were you in or what years were you
23 in service?

24 A. I don't know the official starting date. I
25 was put into active service while still completing my

1 schooling. I believe that started about 1942, 1943. And
2 then I was discharged in 1946.

3 Q. Did you see any combat?

4 A. A little bit, yes.

5 Q. Which theater were you in?

6 A. Pacific, Philippines.

7 Q. What kind of job did you have in the
8 military?

9 A. It varied. Initially, I was in the
10 anti-aircraft. I was then transferred to infantry. And
11 during the occupation in Japan, I was transferred into the
12 Corp of Engineers.

13 Q. What kind of discharge did you receive?

14 A. Honorable discharge.

15 Q. Let's go back to Monsanto Company. You said
16 you started off as a design engineer, designing equipment
17 for the chemical manufacturing process; is that correct?

18 A. Correct.

19 Q. How long did you have that particular job?

20 A. About two to three years.

21 Q. What type of equipment did you design, do you
22 recall?

23 A. Yes, this was distillation equipment.

24 Q. What was that distillation equipment used ---
25 what chemicals was it used to manufacture?

4

1 A. Phthalicanhydride.

2 Q. What is that chemical used for?

3 A. It is used primarily in plastics. Either as
4 an ingredient in the plastic itself, or as a component in
5 the further manufacturing of a plasticizer, which is added
6 to plastics to make things flexible, pliable.

7 Q. After your design engineering position, what
8 position did you move to next?

9 A. I became a production supervisor in one of
10 the production units at that same plant.

11 Q. What chemicals were you producing?

12 A. Plasticizers.

13 Q. How long did you have that position?

14 A. A year or two.

15 Q. What position did you have next?

16 A. I was then supervisor of another production
17 unit at the same plant.

18 Q. And what did that production unit produce?

19 A. It produced nitro chlorobenzenes.

20 Q. What are nitro chlorobenzenes used for?

21 A. They are used to make rubber, chemical
22 additives for rubber. They are used to make
23 disinfectants. Those are the primary uses.

24 Q. Were they used in PhisoHex, do you recall?

25 A. What is the word again?

1 Q. Phisohex?

2 A. I'm not familiar with the active ingredient
3 in Phisohex.

4 Q. That was a product that Monsanto put out,
5 decontamination soap used in medical scrub rooms.

6 A. I have never heard of that one.

7 Q. What job did you have after you were the
8 production supervisor for the nitro chlorobenzenes?

9 A. I was made a supervisor in the maintenance
10 department, the same plant.

11 Q. What were you in charge of maintaining?

12 A. That assignment was primarily not one of
13 maintaining as it was of supervising small projects in the
14 plant. For example, adding a pump in the system.
15 Replacing a small tank with a little bit bigger tank.
16 Jobs that could be done by plant personnel as
17 distinguished from calling in an outside contractor to
18 complete.

19 Q. Did you do any maintenance work to maintain
20 your own equipment?

21 A. Not during that assignment, no.

22 Q. How long were you in that position?

23 A. About a year or two.

24 Q. And what job did you go to next?

25 A. I was made a superintendent of the

1 maintenance department.

2 Q. What does a superintendent of the maintenance
3 department do?

4 A. I was responsible for the total maintenance
5 function at that plant. Which meant something like a
6 dozen supervisors and maybe twice as many foremen. And I
7 don't remember, about 300 or so mechanics, maintenance
8 personnel.

9 Q. In that job you were responsible for
10 maintaining the plant equipment?

11 A. Yes.

12 Q. And which particular plant was this that you
13 were the supervisor or superintendent?

14 A. John F. Queeny Plant, St. Louis.

15 Q. Did they have transformers at that facility?

16 A. Yes.

17 Q. Were they owned by Monsanto?

18 A. Yes.

19 Q. You were responsible for the maintenance of
20 those transformer?

21 A. Yes.

22 Q. How long were you in that position?

23 A. Two or three years.

24 Q. What type of maintenance program did you have--
25 for your transformer, if you had one?

1 A. We had a program. I don't recall all of the
2 specifics, but I do know that the electricians were
3 assigned to take a walking tour of the plant, to make
4 visual observations of these units. See if there were any
5 leaks developing, or any flaws that they could see by eye.
6 There were provisions in the program for collecting
7 samples of the liquid in the unit to see if it still met
8 the proper specs, so it would do the job properly. There
9 was a program that included observing the level of liquid
10 in these units to see if it needed topping off, which was
11 done by the plant personnel. And they would also, of
12 course, this is not part of any program so much as if a
13 unit was not performing properly, it would be replaced by
14 a spare unit. Taken out of service and be replaced.

15 Q. During what years were you the superintendent
16 of the plant safety, or the excuse me, superintendent of
17 maintenance?

18 A. I believe as best I recall, it was 1960 to --
19 19 maybe '59, '60 to 1962 or 1963.

20 Q. Okay. Let me go back to this program that
21 you had for your transformer. How often would you send
22 your electricians around to visually inspect the
23 transformer?

24 A. As I recall, about once a month, to make this
25 walk through.

Q. And what would they do when they did that visual inspection? What were they instructed to do?

A. They were instructed to report back to their foreman their findings. Found such and such a transformer with a drip, or I found one with a pretty steady leak, whatever they observed. And the foreman would then put that on his schedule for assigning the proper number of people to go take care of it.

Q. Okay. I don't think my question was clear. What were they looking for when they were out to inspect these transformer?

A. Anything that was visible, apparent, such as leaks. That was the most common observation. Sometimes they would, as I recall, sometimes some of the circulating fans on some of these units, they would observe a fan or two may not be functioning. Or maybe the propellers may be turning, but the fan was not oscillating. This kind of observation they would report that, and have the fan replaced or repaired. There aren't too many -- sometimes they would report back that in their opinion, excessive dust had built up on the unit, because of the powdered product that is made next door. This would affect the performance of the unit. So, they report things like that.

Q. Now, the next thing you talked about was

1 taking samples to test to see if the fluid was functioning
2 properly. Am I phrasing that correctly?

3 A. See that it met specifications to assure
4 proper function.

5 Q. How often would you send electricians around
6 to do that?

7 A. I just don't remember the -- as best I
8 recall, about once a year. It wasn't often, about once a
9 year.

10 Q. What would you do with the samples once they
11 were taken?

12 A. They would be sent to the laboratory. The
13 plant had a chemical laboratory. And the laboratory would
14 test for -- primarily it's what they call the dielectric
15 constant. To see that it was not conducting electricity
16 unnecessarily so. They would also test for its chlorine
17 content. See if there is any free chlorine in it which
18 would indicate signs of deterioration. They would also
19 report on its color. The darker the color, the indication
20 would be that it is deteriorating.

21 Q. Kind of like motor oil in your car?

22 A. Somewhat, yes. Those are the primary things
23 they looked for.

24 Q. Do you know how the dielectric capacity of
25 the oil was tested?

1 A. I can tell you the principles involved. They
2 have an instrument through which they pass electric
3 current. And they measure the resistance through that
4 body of liquid between what is called two wires emersed in
5 the liquid. From that, they can back calculate as to what
6 is the conductivity of that liquid.

7 Q. Okay. Do you know what that instrument looks
8 like? Can you describe that, or did you ever see it, or
9 performed, or --

10 A. I have seen it. It looks like a box that is
11 about double a shoe box size. And it has some dials on it
12 and a needle that indicates current. I don't know what
13 the inner working parts look like. I didn't look at that.

14 Q. If somebody were to want to test the
15 dielectric capacity of a fluid, how would they go about
16 using this box with the dials, and --

17 A. I recall -- there are many ways to do this.
18 But the one I saw, they would put the liquid in a
19 container. Generally it was a beaker, glass beaker, and
20 insert the electrodes a given distance apart and turn on
21 the electricity and watch the needle. And it reached some
22 point on a scale. And take that scale reading and go
23 through the necessary mathamatics to convert it back to a
24 number that is referred to as the dielectric constant for
25 that material at the temperature it was measured.

1 Q. Why was it important to know what the
2 dielectric constant for that fluid is?

3 A. If the dielectric constant is at the proper
4 magnitude, the liquid is not conducting electricity
5 through it, which is the way it is intended to operate.
6 The liquid is only there to serve as a cooling medium to
7 take the heat generated on the internals of the
8 transformer and by natural currents created by the
9 differences in heat. Carry this heat out to the outer
10 walls of the transformer where it is air cooled and cooled
11 and the heat is dissipated. If the liquid has
12 deteriorated and again conducting electricity, the
13 situation deteriorates further to the point where you
14 get -- and I'm no expert on transformers, but this is my
15 understanding. You get to the point where electricity
16 carries across between the components within the
17 transformer which it shouldn't do. And then I am
18 understanding that you get internal arcing. Like
19 lightening bolts through the liquid which further
20 deteriorates the liquid to the point eventually where the
21 transformer is not doing its job any longer, it must be
22 replaced. And the whole intent and purpose here is to
23 avoid total deterioration by making certain the liquid meets
24 the right specs.

25 Q. Now, I realize you're not an electrical

1 engineer but a chemical engineer. But this lightening
2 bolt that is going through this oil, would that have a
3 temperature to it?

4 A. Certainly.

5 MR. LEWIS: Would you say that again Mike?

6 Q. (By Mr. Busch) I said, the lightening bolt
7 that was going through the fluid, would that have a
8 temperature to it. And his response was, I believe,
9 certainly; is that correct?

10 A. Yes.

11 MR. LEWIS: The witness is going to have to
12 speak up. A lot of what he is saying is getting drowned
13 out by the rain on John Tucker's window.

14 Q. (By Mr. Busch) We will try and speak a
15 little louder for you. Do you know approximately what
16 that temperature might be?

17 A. I have no idea.

18 Q. Would it have been hot?

19 A. Well, that is kind of subjective. What is
20 very hot to you may be different to me.

21 Q. Would you want to be exposed to those
22 temperatures?

23 A. Certainly not.

24 Q. So it would be say, over a hundred degrees
25 celsius possibly?

1 A. Oh, yes. Yes.

2 Q. Can you give me a ballpark range of what
3 those temperatures might be?

4 A. Your guess is as good as mine.

5 Q. Just trying to explore your knowledge here.
6 Would it be safer to say, that this lightening bolt going
7 through the fluid, would warm-up the fluid, the dielectric
8 fluid in the transformer if it is allowed to continue?

9 A. Certainly, but the liquid is being warmed up
10 as the unit is in service. So, it's just an increase in
11 warming.

12 Q. So it is like turning the heat up on the
13 grill?

14 A. I suppose you could look at it that way, yes.

15 Q. Now, you're talking about the chlorine
16 contents was another thing that you tested for. Why was
17 it important to test for the chlorine contents?

18 A. Well, the ingredients in most transformer
19 fluids contain chlorine chemically combined, when the --
20 when these liquids are under a stress, such as high
21 temperatures, or they are exposed to some unknown
22 contaminants, it is possible for the chlorine to separate
23 from the original chemical. And exists either as combined
24 with hydrogen, hydrogen chloride as a gas, or it can be
25 free chlorine. The presence of either one of those

1 indicates that the liquid is no longer as pure as it was
2 when originally put into the transformer.

3 Q. Would the presence of chlorine, besides
4 indicating that it is no longer as pure as it originally
5 was when placed in the transformer indicate a diminished
6 capacity for that dielectric fluid to do its job?

7 A. It would indicate a diminishing capacity.
8 The unit will continue to function or the fluid will
9 continue to function well until that level of hydrogen
10 chloride, or chlorine reach some point that I am not
11 familiar with. Once it exceeds that point, then the
12 adverse effect is noticed.

13 Q. Now, you said there is an adverse effect that
14 would be noticed. What is this adverse effect that you're
15 talking about?

16 A. The liquid is beginning to conduct
17 electricity.

18 Q. The lightening bolts going through the fluid?

19 A. Maybe. On the other hand it may be a case of
20 where the transformer is no longer delivering the voltage
21 it was designed to deliver. It's receiving the given
22 amount, but it's not putting out the desired amount.

23 Q. Now, the next thing that you talked about was
24 the color. What should this fluid look like?

25 A. Would you help me with the word "should it

1 look like"?

2 Q. When it is -- that's a good question. When
3 it is first placed in the transformer, what color is this
4 fluid?

5 A. I can't speak for the appearance of the fluid
6 back at the transformer manufacturer's plant. I can only
7 speak for the appearance of the fluid as it left Monsanto.
8 When it leaves Monsanto, the general appearance of
9 transformer fluid is anywhere from clear as drinking water
10 to a slight yellowish tinge.

11 Q. The slight yellowish tinge, would it be fair
12 to say it looks like a clear yellowish hydraulic fluid?

13 A. I don't know what you mean by hydraulic
14 fluid. I have seen some kinds -- I have seen clear, water
15 clear hydrochloric fluid, and I have seen some the color
16 of your Coca-Cola there.

17 Q. Would you say it is lighter or darker than
18 iced tea?

19 A. Lighter than most ice teas that I have seen.

20 Q. Can you see through it for a certain
21 distance?

22 A. Yes.

23 Q. It is not perfectly clear, but it has some
24 discoloration, a little bit lighter than iced tea?

25 A. I would say somewhat lighter, not just a

1 little bit. There is a perceivable difference in the two
2 colors.

3 Q. Now, when you're checking for the color for
4 something that is out of line, does it get clearer or does
5 it get darker?

6 A. It gets darker. And in some instances it
7 gets turbid, murky.

8 Q. Like it has particles in it?

9 A. Yes, well something is causing the murkiness,
10 more likely it is particles.

11 Q. Do you know what causes that discoloration of
12 the fluid?

13 A. I don't know specifically what causes it.
14 All it does to me, it reflects that chemically the liquid
15 is changing. Brought about by conditions unknown to me.
16 Temperature and chemical reaction and the like.

17 Q. Okay. When you would find some adverse or
18 abnormal finding, either the dielectric fluid didn't have
19 the proper constant, or the color had changed, or there is
20 excess chlorine or hydrochloric gas in there, what would
21 you then do as the maintenance superintendent, or what
22 would you have your people do?

23 A. This called for a judgement on the part of
24 the foreman, assisted by his supervisor, the electrical
25 supervisor. And if necessary, the laboratory might get

1 involved. The condition may be such that just topping off
2 with some virgin unused material could bring the unit up
3 to some acceptable performance. Not the unit, but the
4 liquid would meet the minimum. Or it may require a total
5 drainage and refill. This is a judgement call on the part
6 of those who were right on the firing line regarding what
7 to do about the unit. And it would vary from situation to
8 situation.

9 Q. As most things do. What sort of factors
10 would go into deciding or making that judgment call?

11 A. Of course, the degree of noted degradation,
12 how badly is it. The performance of the unit. How it has
13 been performing lately. Is it putting out the voltage
14 that it is designed to do, or if not, is the voltage
15 producing exceptable for the needs of that particular
16 system. Experience also comes to play where the
17 supervisor and foreman know from previous experiences that
18 certain conditions noted could lead to problems months
19 from now, and we might as well plan to take care of it
20 before the anticipated self-imposed deadline is reached.
21 So it is condition of the oil, the performance of the unit
22 in your experience on the part of the supervisor and
23 foreman.

24 Q. And you talked about the self-imposed
25 deadline. What is that self-imposed deadline?

1 A. This is again based on experience. From
2 previous experience, these conditions led us to shut down
3 on a holiday at midnight, and we want to avoid that
4 situation. So let's plan to get the necessary replacement
5 fluid or call in a service company, and schedule to shut
6 down this operation or install a standby transformer to
7 take over the duties of the current, one while we work on
8 the existing unit. So in other words, to do all of this
9 planning, you impose on your schedule and your planning a
10 deadline which you try to reach. I would like to get all
11 of this accomplish by this time. That's the self-imposed
12 deadline.

13 Q. That is to avoid an equipment failure?

14 A. An equipment failure that occurs at
15 inopportune times.

16 Q. Now, you were doing this during 19 -- the
17 early 60's, 1961, 1962, 1963?

18 A. Yes.

19 Q. At that time, what dielectric fluid were you
20 using in the Monsanto transformer at that particular
21 plant?

22 A. I don't remember the specific ones. It
23 wouldn't surprise me if we did use Westinghouse fluids
24 and/or Westinghouse specified fluids and General Electric
25 specified fluids, plus some hundred percent PCB fluids,

1 Monsanto product.

2 Q. Now, digress just for a moment. You're
3 talking about the Westinghouse fluids and the General
4 Electric specified fluids. Were those fluids that were
5 designed by Westinghouse or General Electric for use in
6 one of their particular transformers?

7 A. They were fluids designed by the two
8 companies mentioned for use in their equipment and
9 competitor's equipment.

10 Q. Do you know what the chemical contents of
11 those fluids were?

12 A. I used to know. I don't recall all of the
13 ingredients we would get from General Electric and
14 Westinghouse and other companies. What I'm going to call
15 a recipe that called for the ingredients and the amounts
16 of each ingredient that went into the mixture which they
17 would define by their trademark.

18 Q. Do you recall what some of the ingredients
19 were for these -- let me back up just one moment. How
20 many different GE or Westinghouse specified fluids were
21 there?

22 A. I just don't remember, there were many. And
23 some were replaced by different mixtures as the years went
24 on. I don't remember the number, but it would not
25 surprise me if there weren't say a dozen Westinghouse

1 recipes, and about a dozen General Electric. Each with
2 its own designation.

3 Q. Were there any ingredients that were
4 consistent throughout all those recipes?

5 A. Yes.

6 Q. What were those?

7 A. There were PCB's, and chlorinated benzenes,
8 were the two dominant ones used.

9 Q. What were some of the sub-ingredients, if you
10 recall those?

11 A. I don't recall them by their chemical names.
12 I do recall an acronym PPO, and the others escape me. But
13 these were minor amounts of ingredients added to the
14 mixture to scavage, to pick up this chlorine that I
15 mentioned earlier, that might have been forming in the
16 unit as it is in service. That is primarily it. It is
17 PCB's, plus chlorinated benzenes, plus the scavager.

18 Q. And the scavager would go out and pick up
19 these free chlorine molecules that might be floating
20 around?

21 A. Yes.

22 Q. They would go outside there and chemically
23 combine and turn it into some inert or less harmful
24 product, or chemical, is that a fair statement?

25 A. I don't know about the harmful.

1 Q. Harmful as in harmful to the operation of
2 that particular piece of equipment?

3 A. Right.

4 Q. Now, you said the two primary ingredients are
5 PCB's and dichlorinal --

6 A. Chlorinated benzenes.

7 Q. Would dichlorinal benzenes be a subcategory
8 of chlorinated benzenes?

9 A. It could be. It was not used for this
10 purpose.

11 Q. Do you know what sort of ratio there would be
12 between the PCB's and the chlorinated benzenes?

13 A. It would vary. From as best I recall, as
14 high as 70 percent PCB's down to about 55 percent PCB's.
15 And the rest of that fluid would be predominantly tri and
16 tetra chlorinal benzenes. However, there were some
17 transformer fluids that were 100 percent PCB's.

18 Q. Okay. Now, we have been talking about PCB's.
19 What are PCB's?

20 A. PCB's are a family of chemicals made up of a
21 chemical combination of carbon, hydrogen and chlorine. I
22 don't quite know how to describe this orally.

23 Q. If it would help you I'll hand you a piece of
24 paper and we can make it an exhibit to this deposition.

25 A. I will show on this diagram the chemist's

1 graphic designation for benzenes, which is the hexagon.
2 And each corner of the hexagon represents the location of
3 a carbon.

4 Q. Okay.

5 A. And for benzenes, each of carbons has a
6 hydrogen connected to it. So there are six carbons and
7 hydrogens.

8 Q. Could you draw those in for us?

9 A. I'll do that. I'm showing the carbons. And
10 attached to each of those is a hydrogen. And this is
11 graphically used by the chemist to designate benzene.
12 Under heat and pressure, the two benzenes combine where
13 there is -- there are two carbons associated with each
14 other to form a double ring as shown here and as they do
15 so, one of hydrogen, the two hydrogens are released and
16 leave the process and are used elsewhere. That chemical
17 is called biphenyl.

18 Q. Would it be fair to say, that those two rings
19 that you have drawn, each one of those rings is called a
20 phenyl ring?

21 A. Yes, phenyl is another expression to
22 designates benzene ring phenyl. And two of them, of
23 course, are biphenyls. When that biphenyl is now exposed
24 to chlorine, which is the gas used to disinfect water or
25 swimming pools, the hydrogens associated with the carbons

1 are displaced. And the chlorine then attaches itself
2 where the hydrogen used to be in a random fashion.
3 Anywhere from one chlorine for this biphenyl group up to
4 10. One chlorine to 10 chlorines. There are, as I
5 remember, 209 members of that PCB family, varying by not
6 only the number of chlorines from mono, to di, to tri, to
7 tetra, and so on. But also the position of those
8 chlorines with respect to each other. The individuals we
9 chemically separated and isolated are at room temperature
10 crystals, white crystals. But the mixtures which were
11 produced commercially for industrial use were liquids.

12 Q. How is that made possible?

13 A. There is an interaction, a physical
14 interaction that occurs. And I'm not capable of
15 describing it. But the presence of these members of the
16 family in a -- under high temperature would melt the
17 crystal and form the liquid. Once that liquid cools down
18 again to room temperature, the crystals do not separate
19 out. The mixture stays as a liquid at a lower
20 temperature. It's a -- depending on the amount of
21 chlorine present, that liquid is either about the
22 consistency of water, or it can be the consistency of cold
23 molasses. Very viscous.

24 Q. Okay. Now, would the viscosity, that deals
25 with the thickness of the fluid; is that correct?

1 A. Yes.

2 Q. The more viscous something is, is it more
3 fluid or is it more or is it thicker?

4 A. The more viscous in lay terms it would be
5 thicker.

6 Q. Now, does it take more chlorine or less
7 chlorine to make it more viscous?

8 A. More chlorine makes it more viscous.

9 Q. The more chlorine we add to it the thicker
10 the soup gets?

11 A. Correct.

12 Q. Now, you're talking about mono, di, tri,
13 forms of these biphenyls. Do you ever use numbers to
14 designate, do they have any significance when you're
15 describing these molecules?

16 A. Numbers are used, yes.

17 Q. What are those numbers used for?

18 A. To communicate. I don't know how to answer
19 your question.

20 Q. If somebody were to say like a two, three,
21 seven, eight, tetra chlorinal biphenyl, what would that be
22 describing?

23 A. That would be describing the position of the
24 chlorine on these biphenyl molecules. Starting with --

25 Q. If you could draw another ring to describe

1 those numbered positions?

2 A. I will try.

3 Q. And if you need another piece of paper, just
4 holler.

5 A. All right. The numbering system goes from
6 one to six, on the left part of this diagram. And seven
7 to ten on the right part of this biphenyl diagram.
8 Starting with the two carbons, are nose to nose, so to
9 speak. There is position one, two, three, four, five.
10 I'm going to mess this up somehow. I'm not real positive
11 on that, but this is the essence of the numbering system.
12 So when you hear a number mentioned, referring to a
13 specific PCB, that number designates the location of the
14 chlorine on this biphenyl molecule with respect to the
15 other chlorines.

16 Q. So in an PCB, you're always going to have
17 hydrogens carbons and chlorines; is that correct?

18 A. That is correct.

19 Q. But you're talking about the family of
20 chemicals having 200 and how many different --

21 A. As I remember, 209 different members of the
22 family.

23 Q. So 209 different families vary according to
24 the number of chlorines that are attached to the phenyl
25 rings, and by the location of these chlorines attached to

10

1 the phenyl rings?

2 A. That is correct.

3 Q. That is kind of like different combinations
4 on a padlock, basically the same thing, but each padlock
5 is a little bit different?

6 A. Okay. All right.

7 Q. Now, we have described PCB's a little bit
8 here. I kind of got digressed here, when we were going
9 through your job descriptions of where you were
10 superintendent of plants maintenance, what job did you
11 have after that?

12 A. I was a general superintendent in the plant
13 engineering department.

14 Q. Okay. What were your job duties in that
15 position?

16 A. Supervising the activities of engineers and
17 technicians. Working on engineering problems associated
18 with a given group of production units in the plant.

19 Q. What type of problems would you be confronted
20 with?

21 A. Problems such as we wished to increase the
22 capacity of the unit, what will it take? Bigger pump,
23 bigger tank, bigger pipeline or better instruments, or
24 better training maybe. Whatever it took. Or it might be
25 a case of, we have a tank here that is corroding rapidly

1 on us. We need better material. What do you suggest?
2 Should we go to aluminum, stainless steel or plastic. It
3 might be a case of we wish to try and produce a new
4 chemical in small quantity. Initially which of the
5 existing equipment can be used to make this new chemical.
6 Or it could be that for reasons unknown, the production
7 unit can no longer produce as many pounds as it used to.
8 What happened. So I would send out engineers to evaluate
9 the problem. Or it might be also a case of we are making
10 the pounds, but this product is dirty. It's coming up
11 gray instead of white. What is causing my problem.

12 Q. How long were you in that position?

13 A. Couple of years.

14 Q. What position did you move onto after that?

15 A. I then became a general superintendent of --
16 it had a multiple title; warehousing, distribution,
17 utilities. I'm certain that is not the exact title. But
18 it involved those functions that the plant -- that
19 supported the manufacturing function. Such assets of raw
20 materials, shipping out the finished product and providing
21 the electricity and the water, garbage pick up. Anything
22 that helped the ongoing operations.

23 Q. Which plant were you general superintendent
24 of -- would it be fair to say support of production?

25 A. That was still the same, John F. Queeny

1 plant.

2 Q. How long were you in that position?

3 A. A couple of years.

4 Q. About what time frame are we talking about
5 now?

6 A. We have now reached about -- let me think,
7 1964. Early 1964.

8 Q. What job did you go to after this support,
9 general superintendent of support?

10 A. I then was assigned as general superintendent
11 of manufacturing at Monsanto's plant in Sauget, Illinois.

12 Q. And what did that plant manufacture?

13 A. It manufactured several hundred chemicals. I
14 don't propose to remember all of them.

15 Q. No, I don't think that is necessary. Thank
16 you for keeping it short. How long were you at that
17 particular plant?

18 A. About a year, year and a half.

19 Q. What were your duties at that particular job?

20 A. I managed -- I was one of several general
21 superintendents of manufacturing. I was assigned a given
22 set of products. And I was responsible to produce them at
23 the right quality, the right amounts, at the right time,
24 at the right costs.

25 Q. Okay. And you were in that position for

1 about a year?

2 A. About a year, year and a half.

3 Q. What job did you go to next?

4 A. I was then made plant manager of the Monsanto
5 plant at Anniston, Alabama.

6 Q. What did that plant manufacture?

7 A. We manufactured PCB's, biphenyls, phosphorus,
8 Pentasulfide.

9 Q. Just out of curiosity, what is that last
10 chemical used for?

11 A. That is used as a starting material for
12 plasticizers, and pesticides. Those are the two principal
13 applications. We also made a pesticide at the plant. Two
14 of them for cotton bowl weavels. Parathion and
15 metaparathion. We made chlorine, hydrochloric acid. That
16 is all I can recall at the moment.

17 Q. How do you make chlorine? I always thought
18 back in my high school days in chemistry, that chlorine
19 was an element that just occurs.

20 A. It is not quite that easy. We make chlorine
21 by taking salt water, and introducing electrodes and
22 putting electricity through the salt water. And chlorine
23 pulls off of one of the electrodes and that is captured.
24 And that is the chlorine you see in cylinders and tank
25 cars, and so you used commercially and domestically.

1 Q. So you're actually breaking down a more
2 complex compound being the salt water into its elements?

3 A. Well, into one element, the chlorine. The
4 sodium in the salt is made into sodium hydroxide, which is
5 caustic.

6 Q. What is sodium hydroxide used for?

7 A. It's used for making some, for example, you
8 have seen it as flasks of lye perhaps in a hardware store
9 for drain unblocking and so on. It's used in the
10 ingredient in some of the drain cleaners.

11 Q. Like Drano?

12 A. Like Drano. It has a very, very wide use in
13 the industry for conducting chemical reactions for
14 neutralizing acids and so on.

15 Q. Is it true when you take that caustic
16 material and you mix it with an acid, you end up with salt
17 water again?

18 A. Yes. Well, I don't want to mislead you. You
19 end up with a salt. If the acid has chlorine in it, it
20 will be like the salt we started with. If it has sulfuric
21 acid in it, it will be a different type of salt. It would
22 be sodium sulphate.

23 Q. Salts are another family of chemicals?

24 A. Correct.

25 Q. How long were you plant manager at, what is

1 the name of the town?

2 A. A-n-n-i-s-t-o-n. From 1965 to the end of
3 1969.

4 Q. What job did you take in 1969?

5 A. I was appointed manager of environment
6 control located in the headquarters of Monsanto in St.
7 Louis.

8 Q. What were your duties in that position?

9 A. I was to coordinate primary information and
10 as a side line some of the activities relating to the,
11 then the evolving PCB environmental issue.

12 Q. Did you have any other duties in that
13 position besides dealing with the PCB problem?

14 A. Not at that time.

15 Q. How long were you in that position?

16 A. The responsibilities relating to PCB's,
17 lasted until early 1976. The title that I had changed
18 during that period of time from manager of environment
19 control, to manager of environment protection, to manager
20 of product acceptability. Starting in about 1973, I in
21 addition to the PCB's, I was assigned other products
22 manufactured by Monsanto, and managed by this particular
23 group that I was assigned to.

24 Q. How many employees were there in this
25 particular group?

1 A. Which group is that?

2 Q. This group that you were manager of
3 environment controls, you're saying that is the group that
4 you were assigned to?

5 A. Oh, I don't profess to know the total number.
6 It included the business director, and his managers of
7 research manufacturing, marketing. And then in addition
8 to that, the research manager had many chemists and
9 technicians reporting to him. I don't know how many.
10 They would change according to need. The marketing
11 organization included field representative, area manager,
12 district office manager, secretary and the like. That
13 whole group, plus personnel, must have exceeded 500
14 people.

15 Q. So Monsanto thought this was a fairly
16 significant problem to devote 500 people to it?

17 A. I'm sorry, I misunderstood you. This is not
18 only -- PCB's was one little product in this total
19 business group.

20 Q. Okay. I'm sorry if I misunderstood you. As
21 the manager, were you in charge of just PCB's in a bigger
22 network or a bigger organization?

23 A. That is correct.

24 Q. How many people were in your PCB group?

25 A. I was the only individual concerned with

12

1 PCB's -- that is not quite correct. I was concerned with
2 the management of the PCB information. How it was
3 disseminated within Monsanto and to its customers. And to
4 the adversities, and to the public, and to the government.
5 Assisting me within that business group were other
6 individuals that addressed PCB's in very specific terms.
7 An example, the research person, would have as I recall,
8 about three people, as a minimum looking at PCB's in terms
9 of do they degrade or not. Is there a substitute that can
10 be used. Is there a better way to make them so they don't
11 contaminate the environment. The manufacturing man also
12 looked at ways to improve the manufacturing process, to
13 avoid loss at the vent stack, or down the sewer, or at the
14 waste dump. That does not mean that the manufacturing
15 manager only had PCB's on his mind. He had one hundred
16 other chemicals. PCB's were part of it. The sales
17 marketing people, there were at least three individuals
18 that concentrated totally on PCB's. But the rest of the
19 marketing staff would address PCB's as part of a bigger
20 assignment, along with other products.

21 Q. What was that bigger assignment?

22 A. They would sell other chemicals in addition
23 to the PCB type chemicals. I don't know how to describe
24 it. It may include a list of 50 chemicals that he
25 represented as he made his calls, PCB's being one of them.

41

1 Q. Now, you said -- did your title change from
2 1969 to 1976 you said, did your responsibilities change
3 during that period of time?

4 A. With respect to PCB's?

5 Q. No, with respect to your job duties?

6 A. As I explained initially, it was I addressed
7 my time totally to PCB's until 1973. I was then given
8 additional products to follow. Some of them were
9 innocuous and some could be environmental problems. But I
10 was given a broader assignment.

11 (Whereupon, a short recess was taken.)

12 Q. Back onto the record. You dealt with PCB's
13 exclusively until 1973, and then they added additional
14 chemicals to your responsibilities?

15 A. Yes.

16 Q. Okay. What additional chemicals did they
17 add? First let me ask you, how many additional chemicals
18 did they add approximately?

19 A. I don't know that I ever counted the total
20 number.

21 Q. Are you talking about a manageable number
22 that we can talk about or is it several hundred?

23 A. It's closer to 50.

24 Q. Do they breakdown into any groups?

25 A. It's really --

1 Q. I think 50 chemicals, are we all going to get
2 a little tired here.

3 A. I don't know how to talk about it in terms of
4 groups. They were referred to within Monsanto as the
5 functional fluids type as well as the paper chemicals
6 category. Roughly 25 specific industrial chemicals for
7 each of those two groups.

8 Q. So these would be -- the PCB's would be in
9 the functional fluid group?

10 A. Yes.

11 Q. What would be an example of paper
12 manufacturing chemicals?

13 A. There was a chemical that Monsanto sold, that
14 was called sodium pentachlorophenate, which I understand
15 was used in the paper industry for bacteria control in
16 essence, in their pulp processing plants. A chemical
17 associated with that was pentachlorophenol, which you may
18 be familiar with as the material used to preserve wood.
19 Telephone posts for example are treated to prevent the
20 posts from deteriorating rapidly. Those are just two
21 samples of the kinds of chemicals in that group.

22 Q. What caused the chemical to be put over in
23 your group, for you to take control of the dissemination
24 of the information about these chemicals?

25 A. The group I was assigned to from the very

1 beginning sold many chemicals. PCB got the attention
2 initially for about two or three years, because it is
3 important to so many parts of our society. And once
4 Monsanto felt that it was fairly well under control in
5 terms of information, dissemination and the like, my
6 supervisor felt that I wasn't able to take on additional
7 responsibilities. Because the telephone didn't ring as
8 often, I didn't have to make quite as many trips and the
9 like, so time became available. So in other words,
10 they just gave me more to do to fill in that time.

11 Q. I think you told me about why you were given
12 more chemicals, but how did a chemical happen to come in
13 under your jurisdiction?

14 A. It was part of the responsibilities of the
15 group that I was assigned to. The business group which
16 did the research, the manufacturing, the marketing.

17 Q. Okay. But why would a chemical be assigned
18 to you particularly; you were manager of environmental
19 controls?

20 A. Yes.

21 Q. To me that implies you're in charge of how
22 that chemical interacts in the environment. Would that be
23 part of the information you would disseminate?

24 A. Yes.

25 Q. Now, I might be assuming wrong, but was very

1 chemical manufactured by Monsanto assigned to a manager of
2 environment control?

3 A. Eventually, yes.

4 Q. When did this process begin?

5 A. Well, it began of course with my initial
6 assignment, and the managers of Monsanto perceived that to
7 be a wise approach regarding all of its products. And
8 eventually, other managers of environment protection, and
9 later we were all called managers of product acceptability
10 were appointed to cover the many product groups within
11 Monsanto. So I would suggest from the period 1970 when I
12 was first appointed the PCB's until about to this day,
13 there are people assigned to monitor and manage the
14 environment impact of Monsanto's products.

15 Q. But in 1970, when you started in on PCB's,
16 the only chemical manufactured by Monsanto that had this
17 particular type of specialist assigned to it was PCB's; is
18 that correct?

19 A. In the specific way that is correct. But
20 there were other people in Monsanto who are responsible
21 for products that were regulated by federal departments.
22 They didn't have this title, but they had the
23 responsibilities that were similar. Such as the
24 agriculture products that are registered under the
25 Department of Agriculture and later by EPA. The products

1 that went into food that are regulated by the Food and
2 Drug Administration. Some chemicals that are monitored by
3 the Department of Agriculture. So those products had
4 individuals in Monsanto that were involved. The
5 difference when it comes -- chemicals like PCB's that --
6 this now begins to cover industrial chemicals which was
7 something new at the time.

8 Q. Okay. So, let me go back over it. PCB's
9 were the only non-regulated chemical that had an
10 information specialist assigned to it, or an environmental
11 control specialist assigned to it?

12 A. That is correct.

13 Q. Why did Monsanto decide to assign an
14 environmental control specialist to that particular
15 chemical as opposed to one or the other couple hundred
16 that they manufactured?

17 A. There were several reasons. One, is that
18 PCB's were being discovered at a fairly rapid rate by many
19 laboratories to be present in environmental type samples.
20 The types of samples that were being reported were to
21 Monsanto's people surprising. We just could not, knowing
22 what we knew about the use of PCB's, we could not relate
23 the presence of PCB's in some of the samples with the
24 industrial uses that we knew PCB's were being applied to.
25 Another internal situation was the situation where PCB's

1 were marketed by two groups in Monsanto. One, was the
2 functional fluids group we talked about. And the other
3 was the plasticizers group. That particular use involved
4 its use in paints and lacquers, and plastic and carbonless
5 copy paper and the like. And it was important -- it was
6 perceived to be important within Monsanto, the two groups
7 ought to incorporate their efforts. The best way to do
8 that is to have one person bridge that gap and let the
9 left hand know what the right is doing, and saying, and to
10 help manage this more responsibly.

11 Q. Okay. So at the time you took over this
12 other position, what was the uses of PCB's?

13 A. The principle use was as an insulating fluid
14 in electrical equipment. Or more properly, as an
15 ingredient in many insulating fluids in electrical
16 equipment. It was an ingredient in industrial hydraulic
17 fluids. It was used as a heat transfer medium. It was
18 used in high speed turbines as a lubricant. It was used in
19 paints, lacquers, caulking and sealants. Some floor tiles
20 had it in it. The carbonless copy paper had PCB's as an
21 ingredient. It was also used in some special rubber
22 products to make the rubber more pliable, flexible. I
23 believe that covers the areas of use.

24 Q. Okay. Now, in terms of the total volume of
25 PCB's that were manufactured in say the year 1976, what

1 percentage of those PCB's would have been used for
2 electrical power equipment? I think you said that the
3 majority was used that way.

4 A. I would suggest that it was close to 50
5 percent.

6 Q. What was the next largest percentage and what
7 was that used?

8 A. If I recall correctly, the next largest use
9 was in industrial hydraulic fluids, followed very closely
10 by heat transfer applications.

11 Q. Now, those last two applications, what
12 percentage of that total production would go to those two
13 others?

14 A. I am guessing a little bit here. It's
15 somewhere in the order of 20 percent.

16 Q. Now, I think you were describing your duties
17 in this position of manager of environmental control. You
18 were in charge of dissemination of information. Were you
19 in charge of any other responsibilities while you were in
20 that position?

21 A. No.

22 Q. Were you in charge of gathering information
23 together to be disseminated, or was the information
24 already in one spot for you to hand out?

25 A. There are examples of both. When I initially

1 entered the assignment, there was information that already
2 accumulated through the years prior to my arrival in St.
3 Louis. As time went on, I made it a point to keep abreast
4 of new adoptments by working very closely with the proper
5 people within Monsanto as well as outside, to get that
6 information flowing to my desk, in hopes that something
7 important would not go unnoticed. And it was my duty to
8 make a decision regarding this new and relevant
9 information. If so, who should hear about it and in what
10 form. What format, under what conditions.

11 Q. Now you're talking about keeping in touch
12 with the relevant people within Monsanto and people
13 outside of Monsanto. Who did you keep in touch with
14 outside of the company?

15 A. I can describe them by categories, I suppose.
16 Representatives of State and Federal regulatory agencies.
17 Representatives of governmental laboratories.
18 Representatives of universities that were conducting
19 studies. I was even in touch with representatives of
20 groups that had concern with the environment. Such as the
21 Audubon Society. The Wild Life Group and the Iassic
22 Walton League. And the Garden Clubs of Michigan and a
23 variety of people.

24 Q. You talked about governmental labs. What
25 governmental labs did you keep in touch with?

1 A. There was the -- well, let me start with the
2 East Coast. The FDA laboratory, which monitored food for
3 presence of PCB's. The water laboratory in Athens
4 Georgia. The water laboratory in Duluth, Minnesota. The
5 Fish and Pesticide laboratory in Columbia, Missouri. The
6 Commercial Fisheries laboratory in Gulf Breeze, Florida.
7 The water laboratory in Corvallis, Oregon. I can't recall
8 any others.

9 Q. Okay. What agencies of the Federal
10 Government did you keep in contact with?

11 A. The Food and Drug Administration. The
12 Department of Agriculture. Department of Commerce.
13 Department of Interior. Department of Defense. The
14 Counsel in Environmental Quality. The Office of Science
15 and Technology. The EPA eventually when they got
16 organized, EPA, OSHA, Occupational Safety and Health
17 Administration, and NIOSH. I believe that covers it.

18 Q. What is NIOSH?

19 A. That is the National Institute of
20 Occupational Safety and Health, which is the technical
21 group that studies work place health situations. Some of
22 it in the area of chemical exposure.

23 Q. And you said EPA when they finally got
24 together?

25 A. Yes.

1 Q. Was EPA in existence when you first took over
2 your position?

3 A. EPA was in existence on paper. They had been
4 approved and they were in the process of recruiting staff
5 and people, and finding offices and the like." About the
6 first six months of 1970, it was very difficult to find
7 people who could speak for PDA. I'm sorry, for EPA. It
8 was only in the later part of 1970, that individuals
9 within EPA were assigned PCB's to the point where I could
10 start a dialogue with them, and get to know them better.

11 Q. Now, when you started in the later part of
12 1970, when individuals were assigned PCB's and you had
13 dialogues going on, from your experience, what were their
14 assignments at EPA? What did those concern with regard to
15 PCB's?

16 A. Their initial assignments were not very
17 specific. It was primarily oriented to pollutants in
18 water systems. And it then became a focus. Their focus
19 of attention centered on PCB's as a toxic pollutant to be
20 especially regulated for presence in water waste.

21 Q. When did that transformation take place?

22 A. It was gradual and occurred during 1970. And
23 of course, continued on in subsequent years.

24 Q. I think -- were there any other duties that
25 you had as the manager in environmental controls for

1 Monsanto that we haven't talked about?

2 A. We haven't talked about my duties regarding
3 relationships with customers, and my duties relating to
4 producers of PCB's.

5 Q. Okay. What relationship did you have with
6 customers?

7 A. I think the primary one was my responsibility
8 to make certain that all the information Monsanto had,
9 that was thoroughly evaluated and considered to be
10 relevant and validatable, was good data, would be passed
11 quickly onto the customers of Monsanto that used PCB
12 products. I did this primarily through the marketing
13 people, who were the primary contact with the customer. I
14 also did it in a secondary fashion by making myself
15 available to groups of representatives of customers. I
16 also participated in, and managed to get in a few plant
17 trips where I could go to customers' plants and review the
18 status of PCB's in the environment with them. I made
19 myself available over the telephone, or through mail, in
20 the event any, not only customers, but anybody had any
21 questions relating to PCB's, they could contact me. And I
22 would make it a point to contact the right people to get
23 the more highly technical data. Like the medical
24 director, or the research director, or whatever was
25 appropriate.

1 Q. Okay. Now when you're talking about the
2 information being -- I don't recall the exact terms you
3 used, being verifiable is that -- how did you go about
4 determining the quality of the information you're passing
5 out? You seem to imply in your answer that you are
6 handing out good quality, clear, no questions about it
7 information?

8 A. That was of course the intent. Because of
9 the popularity of the subject, there were many, many
10 reports that would arrive at Monsanto. Some of which were
11 not truthful. And we had to be very careful that indeed
12 it was a valid fact that should be transmitted. The
13 validity of this information we would run by any in-house
14 experts that Monsanto had. If it was a medical problem,
15 that would be to the medical director and his staff. I
16 would never pose as a medical expert and wait for his
17 evaluation. Or if it is a chemical research kind of
18 information, I would run that by the research director.
19 If Monsanto did not have the in-house expertise, I'd make
20 certain we got an outsider to help us. Of course, this
21 again would be done through the right people. If it's a
22 medical problem, the medical director would find the
23 toxicologist, or a laboratory, or whatever was appropriate
24 to evaluate. That is really the general way we had of
25 verifying. There were activities such as verifying

16

1 analytical results that Monsanto had its expertise. We
2 would request a sample of the material and in many cases
3 we were able to get a sample. We would run it through our
4 inventory and compare notes with the outside laboratory
5 that reported it initially. We try to work very closely.
6 If the results we were identifying are virtually so, we
7 felt that we validated it. It was a valid comment.
8 Sometimes the data would just be in our opinion,
9 erroneous. And we would challenge it, and try to help the
10 laboratory's analyst and the outside laboratory, redo his
11 work and see if he could come up with another answer.
12 Those are just some examples of how we tried to validate.

13 Q. Now, you're going to have to help me out on
14 this, because I was a social science manager in college.
15 Is it what you just described to me the sort of constant
16 testing that information in a scientific community is put
17 under to make sure that the current theories and
18 hypotheticals and laws are valid, that constant
19 microscopic or evaluation of information is out there?

20 A. Yes.

21 Q. Is there a name for that?

22 A. If there is, I'm not aware of it. It just
23 becomes aware of life. This is the way it is done.

24 Q. I am going to use a term of art here. This
25 is to make sure that that information you are handing out

1 is free from any serious or substantial error?

2 A. The intent is to avoid error because
3 transmitting erroneous information is irresponsible, and
4 we didn't want to be in that position.

5 Q. You want to make sure there was no doubt
6 about its correctness?

7 A. As best as you could. That doesn't mean we
8 succeeded all the time, but we certainly strived for it.

9 Q. So would it be fair to say, at some point in
10 time if you disseminate information, at that point in
11 time, you believed that there was no doubt as to its
12 correctness or its free from error?

13 A. As free as is realistically practical on the
14 state of the science, or the art available at the time.

15 Q. You said you got to go on plant trips. What
16 were some of the different plants that you visited that
17 you recall?

18 A. I visited primarily electrical equipment
19 manufacturer plants, capacitor plants and transformer
20 plants. I don't know what else to say, it is primarily
21 that. And also visited a few metal die casting shops. I
22 also visited a few heat transfer applications.

23 Q. What would you do when you went on one of
24 these plant visits?

25 A. Normally, I would ask for an audience of key

1 people at the plant in a conference room. And I insisted
2 in every case I got the presence of the top man at the
3 plant, the plant manager. I would open up the discussion
4 with a status report on what Monsanto knew about PCB's.
5 And in many cases, I had to go back to very basics. How
6 they are manufactured, what kinds there are, where are
7 they used.

8 Q. A lot of what we have done right here today?

9 A. Very much so. And then go into reports we
10 were getting from government labs, government agencies,
11 universities, foreign producers. Where ever the
12 information came from we would divulge that. And then we
13 would talk about Monsanto's experiences in terms of
14 controlling losses at its plants. Pointing out to them
15 they may or may not be able to take our approach,
16 Monsanto's approach and apply it to theirs. Because we
17 don't know everything in their plant so we could not be in
18 a position of specifically telling them how to do it. But
19 to give them some ideas that they could explore. We
20 shared with them our ideas -- not our ideas, our status
21 reports on the animal testing that Monsanto was
22 sponsoring. We would share with them our analytical data,
23 and our analytical method in those customers who had
24 laboratories. We would leave with them copies of the
25 analytical procedures, and names of people in Monsanto

17
1 they could call for a dialogue. A comparing of notes as
2 they went through this. And I tried as best I could to
3 emphasize on them the need to keep the material from
4 entering the environment as best they could. Recognizing
5 all along that I couldn't guarantee every molecule. But
6 the idea was to control it in such a way that if any got
7 away from them, the environment could eventually cope with
8 it without any permanent effects. That was the end point.

9 Q. When these plant trips began, I believe they
10 began in late May or June of 1970. And went on through
11 the summer, into the fall of 1970, primarily. And then
12 there were support visits during 1971, 1972. During all
13 these visits, did you stress the importance to try and
14 maintain control over the PCB's, so that they would not be
15 released into the environment to the best of their
16 ability?

17 A. That was the main purpose of the visits, yes.

18 Q. How strongly was that message conveyed?

19 A. As strong as I could make it. I would look
20 into the plant manager's eyes as I talked. And of course,
21 they didn't like to hear a lot of this. It meant higher
22 cost for them. But that was the real world we were living
23 in, and I would remind them that they were telling me they
24 had no substitute material. They had to have the PCB's.
25 And I told them that if it's that important to you and to

1 society, we then have an obligation to handle it properly.
2 Otherwise, it will be taken away from us. That was the
3 gist of the conversation.

4 Q. Okay. Did you -- in 1970's on, what was the
5 general state of the art in terms of controlling discharge
6 of PCB's?

7 A. Are you asking for state of the art in actual
8 practice or in availability?

9 Q. No. Let's start off with -- let's start off
10 with actual practice, and then we will talk about what was
11 available.

12 A. In actual practice, I found examples at both
13 extremes. Frankly, there were those that had no method of
14 control, based on the, by then misconception. But
15 earlier, it was perceived to be innocuous material,
16 harmless so the disposal methods were rather loose. Just
17 flush it down the sewer with soap and water, and it won't
18 do any harm. On the other extreme where some of them by
19 1970 had already implimented programs and had projections,
20 and were spending money to capture leaks and spills, and
21 treat their waste water before they discharged to it the
22 public systems. So to summarize, there were extremes of
23 both good and bad here.

24 Q. You were talking about disseminating
25 information about animal studies that Monsanto had

1 sponsored. Who did those animal studies for Monsanto?

2 A. The long term feeding studies; rats, dogs and
3 chickens, were conducted by Industrial Biotest
4 Laboratories in Northbrook, Illinois.

5 Q. Was that the only subcontractor that did that
6 type of work for Monsanto?

7 A. For Monsanto, yes.

8 Q. Were there any other animal studies being
9 conducted at the time -- or in the general time frame as
10 the Monsanto studies?

11 A. Not to my knowledge.

12 Q. When did these animal studies begin?

13 A. The preliminary work as I best recall,
14 started at late 1968. And this was -- these were studies
15 conducted to establish what the long term feeding dosage
16 should be. And also establishes or helps to establish the
17 number of animals tested and the number of doses of the
18 different chemicals and the like. The long term feeding
19 studies per se, were started in middle, about the middle
20 of 1969.

21 Q. How long did those studies go on for?

22 A. They are the traditional two year study for
23 the rat. The dog was an 18 month study. And the chicken
24 I believe, it varied. But I think it took about a year
25 and a half total. This is the time the animals were

1 exposed. It took several months after that before all the
2 analysis were made and the reports published. So it takes
3 about three years total from start to report.

4 Q. So you had dogs and chickens?

5 A. Dogs, chickens and rats.

6 Q. Rat. Why did you test three different
7 animals?

8 A. Well, the rat is the traditional animal used
9 for such testing. But as I understand it, there is a
10 difference between the rat and other mammals. There is
11 always the problem of extrapolating rat data onto human
12 data. But then as I understand it, the rat, as an
13 example, it cannot vomit. It keeps the chemical in its
14 digestive system, so they went to the dog as an example of
15 an animal that can vomit objectionable materials. See
16 what difference there is in the results there. That's the
17 reason the dog was picked, as I understood. The chicken
18 was an attempt to duplicate the results that were being
19 reported recording the pelicans of California. And the
20 peregrine falcons out of the university and the
21 laboratories in Maryland with wild birds. The intent
22 initially was to find wild ducks and conduct the study.
23 But wild ducks hatch only at a specific time of the year
24 and we missed that opportunity. And didn't want to lose
25 another year and waiting and getting enough eggs with wild

ducks, so we settled for the leghorn chicken which was the traditional animal used by the Food and Drug Administration for poultry. That's how the animals are picked.

Q. Do you know whether the rat is the traditional animal used in these testing procedures?

A. No, I don't.

Q. Do you know if there is any similarity between the system, organ system in a rat and those of a person?

A. Or human? I am led to believe that there are some similarities. And yet caution must be made in drawing conclusions.

Q. Obviously, a rat is not a person, but in 1976, you said that you left your position as the manager of environmental control which had changed its name. What position did you go to at that point in time?

A. I didn't leave the position so much as Monsanto underwent a reorganization. PCB's as a product stayed with the functional fluids group, and it was moved over into a part of an operating part of Monsanto. I was in turn transferred to another part. PCB's had no involvement in this other part of Monsanto. I initially attempted to keep PCB's as one of my responsibilities and address the totally new assignment here with other

1 chemical products. And it became rather difficult because
2 I had two supervisors. Each one wanted my total devotion
3 to my job and time commitment. And it was decided to put
4 PCB's back with the other functional fluids products and
5 take it away from me. And this was eventually done in
6 February.

7 Q. Of 1976?

8 A. 1976. The reorganization took place in
9 September of 1975. So I kept PCB's for an additional four
10 or five months.

11 Q. What was your new job assignment after PCB's
12 were taken away from you?

13 A. It was still manager of product
14 acceptability, which was the new title for chemicals that
15 Monsanto called intermediate chemicals. These are
16 industrial chemicals used by chemical companies to make
17 another chemical.

18 Q. How long did you stay in that position?

19 A. I had that assignment until about September
20 of 1976, I think.

21 Q. What did you do after that?

22 A. I am hesitating, because I don't know if it
23 is 1976 or 1977. Right after that, I was made director of
24 environmental operations for one of the operating units in--
25 Monsanto.

1 Q. Which operating unit was that?

2 A. This is the intermediate chemicals company
3 Monsanto -- I'm sorry, industrial, intermediate chemical
4 company, yes.

5 Q. What changes did you have in your job from
6 the one you previously had to this new position?

7 A. I was now responsible for the supervision,
8 not only the product acceptability function, which another
9 individual was given, but I was also responsible for
10 environmental control at manufacturing plants. A group of
11 plants was assigned to me to monitor in terms of their
12 emissions waste disposal and the like. And there was a
13 third category that had to do with the work place,
14 industrial hygiene. Those three functions, the product
15 the work place, and the waste disposal.

16 Q. How long did you have that position?

17 A. From about 1976 -- 1977 until 1983, I
18 believe.

19 Q. And what job or position did you go onto
20 after that?

21 A. I then had the same title for another
22 reorganized group. I was now with the Monsanto Industrial
23 Chemicals Company.

24 Q. What did Monsanto Industrial Chemicals
25 Company do?

19 1 A. They made chemicals used by industry in
2 general. The kinds of things I had before. Like the
3 paper chemicals, and rubber chemicals, plasticizers, these
4 kinds of chemicals.

5 Q. How long did you have that position?

6 A. Until the end of 1985.

7 Q. What position did you go to then?

8 A. Monsanto underwent another reorganization. I
9 was then made manager of occupational health for all of
10 the Monsanto chemical operations.

11 Q. And what were your job duties there?

12 A. I was concerned with industrial hygiene in
13 the work place for about over 40 plants. 40, 50 plants.

14 Q. Is that all of Monsanto's plants?

15 A. All of the chemical plants, not the
16 agricultural product plants or the other subsidiaries,
17 this is just chemicals.

18 Q. Okay. How long did you have that position?

19 A. Until I retired at the end of 1986.

20 Q. Have you been self-employed since 1986?

21 A. Yes.

22 Q. Who has been your primary client or customer?

23 A. Monsanto really.

24 Q. Okay. I'm sorry, I may have already asked
25 you this. When you were head of the industrial chemical

1 environmental portion, how long were you in that position
2 for?

3 A. Industrial chemicals, from 1983 to 1985.

4 Q. Now, during this entire time that you have
5 been working with varying degrees of environmental, either
6 compliance or dissemination of information, did you ever
7 write any articles or write any textbooks, or treatise or
8 anything at all other than letters and reports and
9 internal memos?

10 A. I don't quite know how to respond to that.
11 Because I did write papers on the subject of PCB's that I
12 would present to appropriate groups. Is that the kind of
13 document you're thinking of?

14 Q. I'm thinking of that, in addition to articles
15 that may have, or books that may have been published?

16 A. I did not publish anything.

17 Q. What papers -- I'm assuming when you're
18 talking about papers, they were given to groups. Were
19 they different scientific groups or customer groups, or
20 groups with a particular focus?

21 A. The papers I have in mind dealt with PCB's.
22 I recall one that I wrote that I presented to a group of
23 representatives primarily of electrical equipment
24 manufacturers. At the first meeting or organizational
25 meeting of a group that eventually became ANSI, guidelines

1 group. I also composed a report that was given before a
2 sub-committee of congress, that also dealt with PCB's and
3 Monsanto's role in its manufacturer, sales and control. I
4 also composed a report again on PCB's that was given
5 before a toxic pollutants advisory committee, or some such
6 title to the EPA, which was addressing water pollutants.
7 I can't recall any other papers.

8 Q. When were these papers given?

9 A. The paper before the ANSI group was given in
10 September of 1971, I believe.

11 Q. What is ANSI?

12 A. The American National Standards Institute.
13 The paper before congress was presented sometime in 1974
14 is the best I can recall on that. The paper before the
15 advisory committee to EPA, 1973.

16 Q. Do you recall which sub-committee of congress
17 you gave the paper to?

18 A. All I recall, is that in its title the
19 reference to marine, there's a -- they had concerns about
20 marine matters. And as part of their mandate, they
21 interpreted this as referring to commercial fishing, and
22 extrapolated that into ocean pollution and PCB's and bay
23 of Boston and New England primarily. And the chairman of
24 that sub-committee was a representative out of
25 Massachusetts so he called this meeting.

1 Q. That is all I have on that particular point.

2 (Whereupon, a short recess was taken.)

3 Q. Do we have everyone there on the telephone?

4 MR. LEWIS: This is Mike Lewis. I'm here.

5 MR. TUCKER: John Tucker is here. I am going
6 to cover my microphone so as to not disturb you.

7 Q. (By Mr. Busch) When we left off, we were
8 talking about your last job description. While we were
9 out on the break, you mentioned that in retrospect
10 everything looks like everything is going real smooth, but
11 really things were pretty frantic. Could you describe
12 that a little bit for us?

13 A. The number of entities interested in PCB's,
14 kept increasing at a rapid rate. The questions being
15 raised seemed endless. It also of seemed that we had
16 created more questions. Everyone in my opinion, was
17 sincerely trying to do the best they could with a
18 situation that was totally new to the industry. In many
19 respects, there were some hectic moments in terms of
20 ability to respond quickly to so many telephone calls and
21 requests for visits and requests for meetings. The
22 continual request by those coming on board recently, to
23 bring them up to speed. So there were some busy days
24 involved.

25 Q. When did this frantic pace first begin?

1 A. It was, as far as I was concerned, it began
2 early 1970.

3 Q. When did it begin to let up?

4 A. It relaxed a bit after Monsanto had withdrawn
5 from its sales to many applications, and it seemed to let
6 up about 1973.

7 Q. Okay. What type of groups are you saying
8 people are calling you, and people are asking for --
9 asking for meetings. Who was calling you up and who was
10 asking for those meetings?

11 A. Customer representatives, government
12 representatives, university individuals. People
13 interested in the environment. The activists as we call
14 them today. Monsanto employees throughout the world.
15 Those are examples of the kinds of people that were
16 interested.

17 Q. Monsanto has produced a number of documents
18 under a request for production of documents. I am going
19 to go through some of these documents with you. But
20 before we do that, I have what has been marked as
21 Plaintiff's Exhibit No. 1, and want to know if you can
22 identify that for us?

23 (Whereupon, Plaintiff's Deposition Exhibit No. 1
24 was marked for identification.)

25 A. This exhibit is the sheet on which I

1 previously drew the chemical diagrams for benzene.
2 biphenyls and sample of PCB. And the final diagram shows
3 the numbering system to designate the location of the
4 chlorines around the biphenyl structure.

5 Q. Do you believe that would be helpful for
6 somebody to understand what we are talking about earlier
7 in this deposition, if they could review that document
8 either during or after hearing your testimony?

9 A. I -- yes, it will be helpful.

10 Q. Okay. I am going to hand you what has been
11 marked as Plaintiff's Exhibit No. 2, for the purpose of
12 this deposition, can you identify that?

13 (Whereupon, Plaintiff's Deposition Exhibit No. 2
14 was marked for identification.)

15 A. This appears to be copies of a report
16 entitled Comments on Proposed Rules on the use of
17 polychlorinated biphenyls and electrical equipment,
18 submitted by the Utilities Solid Waste Activities Group.
19 The Edison Electric Institute and the National Rural
20 Electrical Co-op Association to the U.S. Environment
21 Agency and dated May 24th, 1982.

22 Q. Are you familiar with that document?

23 A. No, I'm not.

24 Q. Have you ever seen that document before?

25 A. No.

1 Q. I'm going to hand you what has been marked as
2 Exhibit 3. Can you identify that for us?

3 (Whereupon, Plaintiff's Deposition Exhibit No. 3
4 was marked for identification.)

5 A. This appears to be a copy of a report
6 entitled, Comments and Studies on the use of
7 Polychlorinated Biphenyls in response to an order of the
8 U.S. Court of Appeals from the District of Columbia
9 Circuit. The Edison Electric Institute and the National
10 Rural Electric Co-op Association to the U.S. Environmental
11 Protection Agency, dated February 12, 1982.

12 Q. Are you familiar with that document?

13 A. No, I'm not.

14 Q. Do you know the author of that document?

15 A. I do not.

16 Q. Do you know his reputation by chance?

17 A. No, I do not.

18 Q. I hand you what has been marked Plaintiff's
19 Exhibit No. 4. Can you identify that for us?

20 (Whereupon, Plaintiff's Deposition Exhibit No. 4
21 was marked for identification.)

22 A. Copy of a report entitled, Comments and
23 Studies on the use of Polychlorinated Biphenyls in
24 response to the order of the U.S. Court of Appeals for the
25 District of Columbia Circuit, submitted by the Utilities

1 Solid Waste Activities Group. The Edison Electric
2 Institute and the National Rural Electric Co-op
3 Association to the U.S. EPA, dated February 12, 1982.
4 Volume 3. Report of the study of PCB's in equipment owned
5 by the Electric Utility Industry, Reserve Planning
6 Corporation. I can't read, looks like 19th Street,
7 Northwest 650, Washington, D.C.

8 Q. Are you familiar with that document?

9 A. I'm not.

10 Q. Have you ever seen it before?

11 A. No, I have not.

12 Q. If you'll do the same for Plaintiff's Exhibit
13 No. 5, which I have just handed you.

14 (Whereupon, Plaintiff's Deposition Exhibit No. 5
15 was marked for identification.)

16 A. Copy of a report entitled, Comments and
17 Studies on the use of polychlorinated biphenyl, in response
18 to an order of the U.S. Court of Appeals for the District
19 of Columbia Circuit committee had by the Solid Waste.

20 Q. Have you ever seen that document before?

21 A. No, I have not.

22 Q. Are you familiar with the consulting firm
23 that prepared it?

24 A. I'm not.

25 Q. Handing you Plaintiff's Exhibit No. 6.

1 (Whereupon, Plaintiff's Deposition Exhibit No. 6
2 was marked for identification.)

3 A. This is a copy of the report, appears to be a
4 copy of a report, Comments and Studies on the Use of
5 Polychlorinated Biphenyl, in response to an order of the
6 U.S. Court of Appeals for the District of Columbia
7 Circuit. Submitted by the Utility Solid Waste Activity
8 Group, Electric National Rural Electric Co-op Association,
9 to the U.S. Environment Protection Agency, February 12,
10 1982. Volume I, executive summary and integrated
11 comments.

12 Q. Are you familiar with that document?

13 A. I'm not.

14 Q. Have you ever seen it before?

15 A. I have not.

16 Q. Are you familiar with the people that may
17 have prepared it?

18 A. You mean the groups identified on the title
19 page?

20 Q. I'm sorry, no. I was thinking if there was
21 any one particular author of that. I don't think that is
22 clear.

23 A. I don't see any reference to any particular
24 author here. I do not, no.

25 Q. I am handing you Plaintiff's Exhibit No. 7.

1 (Whereupon, Plaintiff's Deposition Exhibit No. 7
2 was marked for identification.)

3 A. This appears to be a copy of a report
4 entitled, PCB Technical Report from EPRI, No. 5, dated
5 February 3, 1983.

6 Q. Are you familiar with that document?

7 A. I'm not.

8 Q. Okay. What does EPRI stand for? Would it
9 been Electrical Power Research Institute?

10 A. That is what I am told. I don't know this
11 organization.

12 Q. I'm going to hand you Plaintiff's Exhibit No.
13 8. Can you identify that document?

14 (Whereupon, Plaintiff's Deposition Exhibit No. 8
15 was marked for identification.)

16 A. It appears to be a copy of a report entitled,
17 Disposal of Polychlorinated Biphenyl, (PCB), and PCB
18 Contaminated Materials, Volume 4. Test Incineration of
19 Electrical Capacitor Containing PCB's. Should I read all
20 of this?

21 Q. No, I think if you can just briefly identify
22 it. Are you familiar with that document?

23 A. I have not seen it before. No, I'm not
24 familiar.

25 Q. In an effort to kind of speed this up, if you

1 could just look at it, you don't have to read the title.
2 I'm going to hand you Plaintiff's Exhibit No. 8. Are you
3 familiar with that document?

4 (Whereupon, Plaintiff's Deposition Exhibit No. 8
5 was marked for identification.)

6 A. I'm not familiar with this document either.

7 Q. I am going to hand you --

8 MR. LEWIS: Mike, we need to know what they
9 are.

10 (Whereupon, Plaintiff's Deposition Exhibit No. 9
11 was marked for identification.)

12 Q. (By Mr. Busch) Okay, Michael. No. 9 is
13 Disposal of Polychlorinated Biphenyls (PCB), and PCB
14 Contaminated Materials. Volume 3, Sample Preparation of
15 Materials, PCB Spill Prevention Control and Counter
16 Maintenance. Could you identify that for us, No. 10?
17 October 1979.

18 (Whereupon, Plaintiff's Deposition Exhibit No. 10
19 was marked for identification.)

20 A. This appears to be a copy of a report,
21 Disposal of Polychlorinated Biphenyls (PCB's), and PCB
22 contaminated materials. Volume II, Suggested Procedure
23 for Adpotment of PCB's Spill Prevention Control and
24 Counter Measure Plans.

25 Q. Are you familiar with that document?

1 A. I'm not familiar with this document.

2 Q. Identify that.

3 (Whereupon, Plaintiff's Deposition Exhibit No. 11
4 was marked for identification.)

5 A. This appears to be a copy of a report
6 entitled, Disposal of Polychlorinated Biphenyls (PCB's),
7 and PCB Contaminated Materials, Volume I.

8 Q. Are you familiar with that document?

9 A. I'm not.

10 Q. I hand you what has been marked Plaintiff's
11 Exhibit No. 12. Can you identify that document?

12 (Whereupon, Plaintiff's Deposition Exhibit No. 12
13 was marked for identification.)

14 A. This appears to be a copy of an article
15 entitled, The PCB Problem for Utilities and EPRI's
16 Research Response from a publication. Public Utilities
17 Fortnightly, dated January 21, 1982.

18 Q. Are you familiar with that particular
19 document?

20 A. I am not.

21 Q. I am going to hand you what has been marked
22 Plaintiff's Exhibit No. 13. Can you identify that for us?

23 (Whereupon, Plaintiff's Deposition Exhibit No. 13
24 was marked for identification.)

25 A. This appears to be a copy of a letter on

1 letterhead, EPRI, Electric Power Research Institute, dated
2 September 15, 1983. Signed by Jim Addis and Ralph Komai.
3 Addressed to Technical Colleague with attachments. Part
4 of attachments appears to be a response sheet for
5 attending a seminar. And the last two pages are an agenda
6 for a PCB seminar.

7 Q. Are you familiar with that document?

8 A. I'm not. J-J-if on or the had if on.

9 Q. Plaintiff Exhibit No. 14, can you identify
10 that?

11 (Whereupon, Plaintiff's Deposition Exhibit No. 14
12 was marked for identification.)

13 A. Appears to be a copy of a report entitled,
14 State of the Art Review, PCBB's and PCBF's in Utility PCB
15 Fluid.

16 Q. Are you familiar with that document?

17 A. I'm not.

18 Q. I'm going to hand what has been marked
19 Plaintiff's Exhibit No. 15. Can you identify that for us.

20 (Whereupon, Plaintiff's Deposition Exhibit No. 15
21 was marked for identification.)

22 A. PCDF's in Utility PCB Fluid. State of the
23 Art review PCBB's, and PCDF's in the Utility PCB's.
24 Proceeding 1981 PCB Seminar, and it has the EPRI logo on
25 the cover page.

1 Q. Are you familiar with that document?

2 A. I'm not.

3 Q. I'm handing you what has been marked
4 Plaintiff's Exhibit No. 16. Can you identify that
5 document for us?

6 (Whereupon, Plaintiff's Deposition Exhibit No. 16
7 was marked for identification.)

8 A. It's a copy of a report entitled, Proceeding
9 1983 PCB's seminar, with the EPRI logo.

10 Q. Are you familiar with that document?

11 A. I'm not.

12 Q. To speed this process up a little bit, I'm
13 going to hand you a file folder marked Plaintiff's Exhibit
14 No. 17. That contains some documents. Could you review
15 those documents and describe them for us?

16 (Whereupon, Plaintiff's Deposition Exhibit No. 17
17 was marked for identification.)

18 A. The first document I'm looking at is a copy
19 of a label. Dimensions approximately three by five inches
20 with the wording: "This package contains Aroclor,
21 chlorinated biphenyls technical. Avoid repeated contact
22 with skin and inhalation of the fumes and dusts.

23 MR. THOMAS: On these why don't you give the
24 Bates Stamp No. on these individual pieces of paper?

25 A. The particular paper is SMI 000001.

1 Q. (By Mr. Busch) Are you familiar with that
2 particular document?

3 A. Yes, I am.

4 Q. Tell me about that. How was that used?

5 A. This label was affixed on products of PCB's
6 manufactured by Monsanto in the 30's and 40's. 1930's,
7 1940's.

8 Q. Do you know why it says avoid repeated
9 exposure to vapors and dust, or fumes and dust?

10 A. Yes. It's known that repeated skin contact
11 will result in a damage to the skin to the point where it
12 becomes initially reddened like chapped skin. And the
13 continued exposure and it varies from person to person,
14 can result in a chloracne out break to the exposed person.
15 Inhalation of the fumes and dust initially manifests it as
16 a symptom similar to a severe sore throat and cough.
17 Again, continued breathing over an extended period of
18 time, which again varies from person to person. The next
19 set of symptoms to appear again would be the chloracne
20 developed on the skin. So noting that, and this was
21 demonstrated initially with acute toxicity studies with
22 animals and rats with some industrial experiences in the
23 early days, this was believed to be the appropriate
24 warning statement for that product.

25 Q. You described a condition there called

1 chloracne. What is chloracne?

2 A. It's an acne skin condition very much like
3 teenage acne. But it is stimulated by chemicals that
4 contain carbon hydrogen and chlorine, chlorinated
5 hydrocarbons. Not all of them will create this skin
6 condition.

7 Q. And this was first found through animal
8 testing the chloracne --

9 A. It's my understanding, yes.

10 Q. And then you said that later those findings
11 were confirmed by some industrial incidents or exposures?

12 A. There was some exposures in industry in the
13 early days, where employees had chloracne condition that
14 was traced back to prolonged exposure to chlorinated
15 biphenyls.

16 Q. So the PCB's caused this skin condition?

17 A. This was the conclusion at the time, yes.

18 Q. Is that still the conclusion today as far as
19 you know?

20 A. As far as I know. If the right conditions
21 exist it can occur again.

22 Q. Has it always been the generally accepted
23 knowledge that PCB's will cause chloracne or can cause
24 chloracne?

25 A. Yes.

1 Q. Move to the next.

2 A. SMI with five zero's and a 2. Is it a copy
3 of a label. The label wording is, "Chlorinated biphenyls
4 technical. Caution. Avoid prolonged or repeated contact
5 with skin. Avoid prolonged breathing of vapor and fumes."

6 Q. When was that warning used?

7 A. This is 1940's into the early 1950's.

8 Q. Why was the label changed?

9 A. Someone felt that by repeating the word avoid
10 and breaking up that sentence that appeared in the earlier
11 label, would make it much clearer to the reader of this
12 message.

13 Q. Was that done because your company felt it
14 was important for people to avoid this contact?

15 A. Certainly.

16 Q. What is the next document we have?

17 A. The next document, SMI five zero's and a
18 three. Copies of two labels. It's the same wording,
19 different size. The one is a three by five, the other
20 appears to be about a two by four label. The wording is
21 as follows, "Caution. Contains chlorinated hydrocarbons.
22 Avoid prolonged breathing of vapors or mists. Avoid
23 contact with eyes or prolonged contact with skin. If skin
24 contact occurs, remove by washing with soap and water.
25 Following eye contact, flush with water. If clothing

1 becomes soaked with fluid, launder before wearing again."
2 That message appears also in the second label copy.

3 Q. When was this particular warning used?

4 A. This was the latter part of 1950.

5 Q. Why was the one label changed again?

6 A. Two reasons. One, is it was perceived that
7 the reference to, as in the earlier documents on the
8 chlorinated biphenyls, might have been a little too
9 technical for the average worker. Whereas up at that
10 point in time, the words chlorinated hydrocarbons was
11 becoming more widely used to cover a broad family of
12 chemicals. So that change was made. And the other
13 changes are attempts to really elaborate a little bit more
14 about what is meant by -- not what is meant, but what to
15 do in the event eyes are affected. Or what do you do when
16 you get it on your skin. It goes on to say, "Wash it with
17 soap and water and don't wear dirty clothing any longer
18 then you have to." So, it's an attempt to emphasize the
19 message a little more about exposure.

20 Q. Now, you add in the part about the eyes.
21 Were there any medical findings or tests that indicate
22 that there could be problems with exposure of the eyes to
23 these PCB's?

24 A. Yes, there were animal studies made that
25 indicated in the presence of PCB's in the animals eyes,

1 caused a severe irritation. A reddening of the eyes and
2 also from practical work place experience. The workers
3 also reported that PCB's in the eyes could cause severe
4 stinging and tearing of the eye. And they were seeking
5 suggestions on how do I help myself if I do get some PCB's
6 in my eyes?

7 Q. So once again, the animal studies were
8 validated by incidental human exposure?

9 A. Correct.

10 Q. That was used in the late 1950; is that
11 correct?

12 A. Yes, as best as I can recall.

13 Q. What is our next one?

14 A. The next one is, SMI with the five zeros and
15 a four. A copy of a label with the wording, "This product
16 contains polychlorinated biphenyls, which some studies have
17 shown may be an environmental contaminant. Extreme care
18 should be taken to prevent any entry into the environment
19 through spills, leakage.. Use disposal vaporization or
20 otherwise."

21 Q. When was that warning label used?

22 A. This was used starting in about May of 1970.

23 Q. So, maybe I misunderstood when we were
24 talking about the No. 3. The one that we just previously
25 talked about. Was that used you said late 1950, did you

1 mean late 1950's?

2 A. Yes.

3 Q. I may have misunderstood you.

4 A. The decade 50's.

5 Q. Let's let's go back to No. 4 then. I'm
6 sorry, repeat again when this label was used?

7 A. May 1970.

8 Q. Just during the month of May?

9 A. It started, we began using it in May 1970 and
10 with modifications as time went on was used until we
11 stopped making the product.

12 Q. Why were changes made in the warning label
13 again?

14 A. Which changes?

15 Q. Obviously, this one reads differently than
16 the 1950, the 003 label?

17 A. It does read differently, but they were not
18 meant -- this was not meant to replace the previous. This
19 is in addition to.

20 Q. So you had the Bates No. 3 and then you
21 supplimented that with No. 4; is that correct?

22 A. The message on No. 3, was also included on
23 other labels, bigger labels with the trademarks and so on.
24 And this No. 4 message was in addition to that initial
25 message.

1 Q. Okay. Why were these additions made?

2 A. This No. 4 message reflects the recent
3 information regarding potential impact on the environment
4 as distinguished from the previous message which was work
5 place exposure.

6 Q. Did this develop because they were finding
7 PCB's were turning up in places that you normally wouldn't
8 expect them to turn up, or were they really ought not be?

9 A. That is correct.

10 Q. So you're trying to minimize the release of
11 these things out into the environment?

12 A. Yes.

13 Q. Earlier in the deposition, you talked about
14 some of the people you go in and meet with different plant
15 personnel management. And say if we don't do a good job
16 of controlling this, we are going to lose the ability to
17 use this product. Was this warning also an effort to get
18 people to take better care of their plants and equipment,
19 and not replace PCB's, so there would be a continued use
20 of PCB's? If that is not a convoluted question, I don't
21 know what is.

22 A. This is one of the intentions here. Whatever
23 is out in the many systems, should not be allowed to drip
24 into the environment. Following any ban or restricted
25 use.

1 Q. Was there any ban or restricted use at the
2 time this warning went into effect?

3 A. No.

4 Q. Let's go on to No. 5.

5 A. SMI five zero's and a five, is a copy of a
6 label with the wording, waste disposal. Use poly
7 chlorinated biphenyl fluids may be returned freight
8 prepaid for proper assimilation at 38 cents per pound.
9 Shipped to supervisor department at 246 Monsanto Company,
10 Sauget, Illinois, 62201. This was placed on the
11 containers in the beginning about 19 -- early 1971.

12 Q. Was this in addition to the warnings that
13 were found in three and four?

14 A. Correct.

15 Q. And why was there additions made?

16 A. This is to remind the customers that a
17 service for disposing of liquids was available at Monsanto
18 through the use of an incinerator.

19 Q. Move on to No. 6.

20 A. No. 6, is a copy of a label with Monsanto
21 logo. The product name Aroclor 1260, with the message,
22 "Caution, avoid prolonged and repeated contact with skin.
23 Avoid prolonged breathing of vapor and dust. Manufactured
24 by Monsanto Chemical Company, St. Louis, Missouri." This
25 label was in use starting in the mid 30's to -- through

1 1940's. And maybe in the early 1950's.

2 Q. Why is this one different from the other
3 earlier --

4 A. This one is different in that the trademark
5 which designates the specific PCB mixture is included
6 along with the cautionary words about contact with skin
7 and breathing. It's combined, whereas the previous label
8 just had the precautionary wording and the product label
9 was a separate label. Or it isn't so much a label, let me
10 correct that. It was stenciled on the drum, and then the
11 precautionary label was affixed to the drum. This
12 contained -- No. 6 contains both the product trademark and
13 the previous cautionary statement.

14 Q. Was that stenciled on the the drum, or --

15 A. This is a label with adhesive backing that is
16 glued onto the drum.

17 Q. Now, you reviewed 1 through 6 with us so far.
18 Are the labels that you reviewed so far actual sizes that
19 occurred on the drums or have they been reduced for
20 purposes of copying?

21 A. No, these are exact actual sizes.

22 Q. Let's take a look at No. 7.

23 A. No. 7, the copy of a Monsanto product label,
24 Monsanto logo. "Aroclor 1260 chlorinated polyphenyls.
25 Caution, contains chlorinated hydrocarbons. Avoid

1 prolonged breathing of vapors and mist. Avoid contact
2 with eyes or prolonged contact with skin. If skin contact
3 occurs, remove by using soap and water. If clothing
4 becomes soaked with fluid, launder before wearing again."
5 And it has the net weight in reference to Monsanto
6 Company, St. Louis.

7 Q. Is there some changing in that from the
8 original one, or are those changes made for basically the
9 same reasons that you had the changes made between one,
10 two, and three, the earlier ones?

11 A. The changes in the cautionary statement, the
12 other change is the logo. Monsanto changed its logo.
13 That is a change, and of course, the address change.

14 Q. It says 600 pounds. Is that how much a drum
15 of this stuff would weigh?

16 A. A 55 -- so called 55 gallon drum, which is a
17 chemical drum, will weigh 600 pounds of Aroclor 1260. No.
18 8, is a copy of a label, which in all respects except one
19 is similar to No. 7. The difference is in the inclusion
20 of the statement referring to the environment that we
21 talked about earlier.

22 Q. Okay. Now, when was this particular label in
23 use?

24 A. This is shortly after May 1970. The previous--
25 label we saw was affixed to product and inventory with the

1 previous label. As soon as that inventory was sold and
2 moved out, this new label was designed and used.

3 Q. Take a look at No. 9.

4 A. No. 9, is a copy of a label for Aroclor 1260.
5 The exposure statement is identical to what we previously
6 saw. The environmental statement is included on this
7 particular label. However, there's a reference and I'd
8 read it. "Contact your Monsanto representative regarding
9 reclamation of used fluid." And this one also includes
10 the previous paragraph regarding return of fluid for
11 proper incineration.

12 Q. If someone were to contact Monsanto to ask
13 questions about the reclamation of the reused fluid, what
14 would they have been told?

15 A. They would have likely have been questioned
16 about the quality of the fluid they were considering
17 reclaiming. If it appeared to be grossly contaminated,
18 the chances are they would have been told we cannot
19 reclaim it. If it is only slightly contaminated they
20 would be given instructions on how to package it. How to
21 label it, where to ship it. What destination, some idea
22 of the cost, and some idea of the time it took to
23 accomplish all of this to return the material.

24 Q. Now, you say grossly contaminated. What kind
25 of contamination are we talking about?

1 A. I don't remember the exact numbers. There is
2 a threshold. That I have forgotten frankly what it is in
3 terms of chlorine contents, metal content. The dielectric
4 constant we talked earlier, color. All of these things.
5 There are criteria that are looked at. And if they are
6 exceeded, the experience shows that reclamation cannot be
7 made. I don't recall the specifics any longer.

8 Q. What did Monsanto do to try and reclaim that
9 used fluid?

10 A. There were two approaches. The principal one
11 was the treatment with a special kind of clay that had the
12 ability to absorb the undesirable contaminants. And the
13 product that went through this clay bed would generally be
14 acceptable. Another approach, which was not often done,
15 but was done on occasion, would be to redistill the
16 material, and attempt to recover a useful distillate and
17 the tars that remained would be discarded, because that is
18 where the contaminate would remain.

19 Q. How long was that particular warning in use
20 or when was it in use?

21 A. This label was in use beginning about 1971,
22 and was continued in use -- this particular label which
23 refers to Aroclor 1260 was in use only briefly in 1971.
24 Because Aroclor 1260 production was terminated.

25 Q. When was the 1260 terminated?

6

1 A. About 1971, as I remember.

2 Q. So this was used for only a few months. What
3 does No. 10 say?

4 A. No. 10, is a copy of a product label,
5 Monsanto logo, product Aroclor 1254. It contains the
6 precautionary statement about prolonged and repeated skin
7 contact. And avoid prolonged breathing of vapor and dust.
8 Manufactured by Monsanto Chemical Company, St. Louis,
9 Missouri. This was -- this is a copy of an early label in
10 the 30's, 40's.

11 Q. That was for a particular product line is it
12 not?

13 A. Yes.

14 Q. You would still with that product have the
15 same concerns with the exposure to the fumes and the dust?

16 A. I'm sorry?

17 Q. The exposure to the fumes and dust by the
18 skin?

19 A. Yes.

20 Q. Okay. What do we have on No. 11?

21 A. No. 11, a copy of a label for, looks like
22 1254 again. Aroclor 1254.

23 Q. Is there anything different about that label
24 in terms of the environmental warnings, are the
25 occupational warnings, or any of the warning on that as

1 opposed to changes due to the product?

2 A. No, the warnings on this particular label are
3 identical to those that appear on SMI -- five zero's 7.
4 The only difference is it refers to a different PCB.

5 Q. Had the same concerns about exposure to the
6 PCB's?

7 A. Yes.

8 Q. What is on No. 12?

9 A. No. 12 again, refers -- I can't read this
10 number here. It is one of Aroclor's. It contains the
11 cautionary state regarding human contact breathing and
12 skin contact. This also includes the environmental
13 statement. The potential for contaminating the
14 environment, and the proper control.

15 Q. Okay. And what would the date be for the use
16 of No. 12 there?

17 A. This one is middle of 1970's, to about -- I
18 want to say, for about a year, middle of 1971.

19 Q. Let's take a look at No. 13.

20 A. No. 13, a copy of a label for Aroclor 1254.
21 Includes the same statements regarding the human exposure,
22 skin and eye, and laundering of clothing. It contains the
23 environmental statement. This also contains, contact
24 Monsanto representative for reclamation. And includes
25 the statement regarding returning material for

1 incineration.

2 Q. Are the warnings on that particular label
3 identical to the warnings found on some of the previous
4 labels we have talked about?

5 A. Yes, they are identified on the Exhibit that
6 is SMI five zero's 9.

7 Q. Let's take a look at No. 14.

8 A. No. 14, this is a copy of a product label.
9 The product is Aroclor 1254, referred to as a dielectric
10 fluid by Monsanto. It refers to the cautionary statements
11 that are lithographed on the drum in seven languages. It
12 also refers to the availability of an incineration service
13 by Monsanto. And refers to the appropriate person at
14 Monsanto to contact. It again indicates the weight of the
15 container. It contains also on this label the
16 international -- I understand that's the cross of St.
17 Andrew that is used universally to designate a material
18 that requires cautious handling. And attached to that is
19 a reduced copy of the seven language message, which
20 includes the environmental statement. The employee
21 exposure cautionary statements that we read in the
22 previous copies.

23 Q. Are there any in the warning statements? Are
24 there any other changes from any of the previous warning
25 statements?

1 A. Yes, there are.

2 Q. What would those be?

3 A. These are the major differences have to do
4 with reference in addition to preventing entering an
5 environment. And I read this on the applications in which
6 it cannot come into contact with food, animal feed items
7 or pharmaceuticals. That's the new addition to this
8 environmental statement.

9 Q. When was this label put into effect?

10 A. 1973.

11 Q. Why were the changes made on this particular
12 one, regarding avoiding PCB contact with food items and
13 animal feed?

14 A. By that time, we had learned quite a bit
15 about the presence of PCB's in some food items. The FDA
16 was conducting an analytical survey. There was an
17 incident in which PCB's were found in ingredients that
18 were essentially used in animal feed. And that explains
19 the reference to animal feed in the message. And I don't
20 know a specific example that relates to pharmaceuticals,
21 but we were aware of heat transfer systems in the
22 pharmaceutical industry. And we wanted to make certain
23 that we didn't get any PCB's in pharmaceuticals
24 inadvertently.

25 Q. You didn't want people injecting or eating

1 PCB's, did you?

2 A. Not really. No, that is true.

3 Q. You talk about PCB's getting into, I'm sorry,
4 feed for livestock. What kind of feed did the PCB's get
5 into?

6 A. I am only aware of two examples. No, I take
7 it back. Three examples of the introduction inadvertently
8 into materials that ended up in animal feed. One, was the
9 PCB's in the fish meal, which was being sterilized. And
10 that fish meal ended up as an ingredient in poultry food.
11 The chickens consumed the feed and it showed up in their
12 ability to hatch eggs. And some of the birds did get ill.
13 Another incident was PCB's used in a baking unit that
14 leaked on the floor, were swept up with bread crumbs and
15 the like from the slicing machines. And those
16 contaminated bread crumbs were collected in a trash
17 container with stale bakery goods all of which ended up in
18 poultry feed. That got into some flocks of chickens.
19 Another source of PCB's was in the dairy cattle, because
20 of the coating used in concrete silos being rubbed off got
21 into the silage and the cattle ate the silage. And it
22 showed up in their milk. Those are the three incidences
23 that I'm aware of that PCB's got into animals feed and
24 eventually showed up.

25 Q. When did these three incidents occur?

1 A. As best I recall, about 1971.

2 Q. All three in 1971?

3 A. Just about 1971, 1972. About a year period
4 in there.

5 Q. Where did these occur?

6 A. The poultry fish meal incident occurred
7 throughout the southeast, the Holly Farms operation. The
8 other poultry incident occurred up in the New York area.
9 And the silage incident in Michigan.

10 Q. Was this different than that big outbreak
11 that occurred in like 1975 with the fire retardant in
12 Michigan TPPB's?

13 A. That is a totally different situation.

14 Q. Were there any animal studies done as a
15 result of these exposures?

16 A. No, the studies were completed. I'm sorry,
17 they were underway. The chicken studies that I talked
18 about earlier and the rat, and dog studies were underway
19 in 1971.

20 Q. I'm sorry, I don't think you understood my
21 question. I didn't phrase it properly for you.

22 MR. THOMAS: Were those inadvertently
23 contaminated animals actually studied?

24 A. Yes.

25 Q. (By Mr. Busch) Were the incidents where the

1 animals were exposed by accident, studied to see what
2 health effects occurred?

3 A. Yes, the Holly Farms people conducted their
4 own studies and reported PCB's in eggs. And they reported
5 their poultry, some of the sick flocks had PCB's in their
6 tissue. The flesh of the animal, the bird. The Michigan
7 case, the Department of Health in Michigan, the Dairy
8 Department I'm sorry, the dairy section of the Department
9 of Agriculture, in the State of Michigan, analyzed the
10 milk and found PCB's in that milk. The New York incident,
11 I think there too -- let me recall this. It was similar
12 to the Holly Farms in terms of hatchability of the eggs
13 and sick birds.

14 Q. Okay. Did you review these studies as part
15 of your position?

16 A. Certainly I hesitate only because it was
17 sometime later that I was able to get written reports. It
18 took a couple of years, so the actions we were taking
19 predated the time I got the reports.

20 Q. Just to be on the safe side?

21 A. We believed what we were hearing and we
22 took -- we didn't wait for the formal dated stamped
23 reports to come by.

24 Q. When you got the formal dated stamped reports
25 and you had a chance to sit down and review them, did you

1 find them accurate?

2 A. As best I could tell, yes.

3 Q. Let's talk about the Holly Farms ones. What
4 kind of findings did they find in the Holly farms report?

5 A. I have forgotten the levels of PCB's found,
6 but they were fairly easily detectable. So, it was not a
7 matter of a very small amount. It was a respectable
8 amount in the eggs. They also reported the inability of
9 those eggs to hatch.

10 Q. Do you happen to know what percentage of
11 these eggs didn't hatch?

12 A. I don't remember the numbers, but it was not
13 a matter of even being close. The whole incubator system
14 was not producing chicks. So it was quite dramatic. I
15 don't remember the exact percentages, but it was quite
16 high. Some of the flocks, the chickens I remember, they
17 had a build up of fluid in their bodies. Which I'm told
18 is referred to in the early days of chickedema factor,
19 which was used then. I don't think they are using that
20 any longer to describe this symptom. There was a buildup
21 of fluid in those birds that were highly exposed. I don't
22 remember any other specifics, other than some of the
23 flocks were listless. They seemed to have lost their
24 appetite. They started losing weight. These kind of
25 general sick flocks.

1 Q. Kind of a general malaise?

2 A. Malaise, that is a good word. Yes, sir.

3 Other than that I don't recall anything more.

4 Q. Did they do any autopsies or biopsies of
5 these chickens to see if there were any effects on the
6 organ systems?

7 A. I don't recall any report that described
8 that, no.

9 Q. Is there any doubt in your mind that the
10 PCB's caused the problems that were complained of in those
11 reports?

12 A. When you say any doubt, there's a little bit
13 of doubt. I'm wondering personally and this is a personal
14 opinion, was there something else involved. Because it
15 didn't appear all flocks that ate the same fish meal were
16 affected the same way. There seemed to be some variety
17 out there, which was never fully explained to this day.
18 And to this day, I personally don't know why the
19 difference, there's a little bit of a question. On the
20 other hand, why the PCB's were there. They must have
21 contributed.

22 Q. Let me rephrase that question. Is there any
23 doubt in your mind that the PCB's contributed to the
24 problems?

25 A. No.

1 Q. We talked about Holly Farms. What sort of
2 findings were found in the New York chicken feed studies?

3 A. I don't recall a formal report on that. The
4 information I got resembled the kind of symptoms observed
5 in the Holly Farms incident; is all I recall on that one.
6 It was not as large or as widespread. That is all I
7 frankly remember about that New York incident.

8 Q. How large was the Holly Farms? How many
9 flocks of birds or how many birds?

10 A. I don't remember.

11 Q. Do you know how large the New York study was?

12 A. No.

13 Q. Basically had the same sort of findings that
14 you saw in Holly Farms?

15 A. Yes.

16 Q. Were these two reports done in conjunction
17 with each other, or were they done by two independent
18 groups? Do you know if they consulted with each other?

19 A. I do not know if they consulted with each
20 other. The study by Holly Farms, I don't know of any firm
21 other than Holly Farms with some outside laboratory help
22 did their own study. I don't know which laboratory they
23 used for analyzing for PCB's. The New York situation, I
24 just don't recall any formal report. That doesn't mean
25 one doesn't exist. I have never seen it.

1 warning labels, with the primary difference being this is
2 for a Westinghouse product as opposed to a Monsanto
3 product?

4 A. That is correct.

5 Q. The PPO is that the chlorine scavenger that
6 you told me about earlier?

7 A. The PPO is used as the acronym for that
8 scavenger. But it is also used to identify this particular
9 blend for Westinghouse. So it has a little different
10 meaning in this use than in the previous use.

11 (Whereupon, a short recess was taken.)

12 Q. We last talked about No. 20, didn't we?

13 A. No. 20; correct.

14 Q. What does No. 21 deal with?

15 A. 21 deals with the same product Interteen PPO.
16 It has the same employee exposure cautionary statements.
17 This label includes the environmental statements
18 cautioning again entry into the environment and the need
19 to control.

20 Q. And what years was that label in use?

21 A. This is 1970 to about 19 -- the end of 1971.

22 Q. I don't think I asked you this question
23 before. These copies you have here are black and whites
24 because of coming off a Xerox machine. What were these
25 labels -- what color were they in their original form, if

1 Q. Now, what do you recall about the Michigan
2 silage problem?

3 A. All I recall is that the dairy division of
4 the Department of Agriculture in the state, found PCB's in
5 samples of milk from some of the dairy farms in Michigan.

6 Q. Do you recall how high a level of PCB's were
7 found in the milk?

8 A. Only that it exceeded the then permissible
9 level, which I think was something like -- 5 -- it
10 exceeded the FDA guideline for PCB's in milk.

11 Q. Who set that standard? Is that the FDA?

12 A. It was an FDA guideline as distinguished from
13 a regulation or standard.

14 Q. Are you familiar with how they came up with 5
15 parts per million? Is that the permissible level of
16 PCB's?

17 A. I personally don't know how they came about
18 it. I am led to believe they mimicked the DDT level.

19 Q. Is there any similarities between PCB's and
20 DDT?

21 A. The similarities are there, yet they are not
22 really chemically significant. They both contain carbon,
23 and hydrogen, and chlorine. The configuration is
24 different. They don't degrade readily. They do cause
25 some problems with analytical chemists, in that they seem

1 to come out in the process at about the same point on the
2 chart. Those similarities are there, and because of that
3 analytical similarity, many of the analysis that one -- in
4 a period of time were rather confusing in terms of is it
5 really DDT. Is it PCB or is it some of each. So in the
6 minds of many in the early days before so much information
7 was available, they were treated in a similar fashion in
8 terms of how to control it in the presence of food as an
9 example.

10 Q. At that point in time in your job, was that
11 disseminating information -- what were you telling people
12 to do to help prevent PCB's getting into food, or food
13 products or pharmaceuticals or feed?

14 A. I was using just those words when I spoke to
15 them at every opportunity I had. Don't let it get into
16 those places. I don't know of any unique statements other
17 than that.

18 Q. Did anybody ever ask you this is my
19 situation, what should I do to prevent it from getting
20 into food items?

21 A. The obvious one is we terminated sales of
22 PCB's into heat exchanged systems that handled food. For
23 example, baking of potato chips or fried fish. And in a
24 bakery where they bake bread, we pulled it out of those
25 applications. So that was a very dramatic withdrawal to

1 prevent it from getting into food. In those cases where
2 we weren't certain of the eventual use of the PCB's, all
3 we could do is remind them if you have PCB's don't get it
4 near food. Such things as a transformer that is hanging
5 over a conveyor belt on which food is carried. If that
6 thing starts leaking and gets on the food, that's a no,
7 no. Avoid that, relocate the transformer. And put a drip
8 pan under it or take some action. That's the kind of
9 message we were trying to get across.

10 Q. How far away would you have suggested at that
11 point in time, to keep a PCB transformer from food?

12 A. I was in no position to even talk distances
13 like that. I haven't -- I had no personal knowledge
14 exactly what the total circumstances were. All I could
15 say is, whatever you do, don't let it get in the food.
16 Now, they could have moved the transformer, or they could
17 have put a shield over the conveyor. There are several
18 ways to approach this.

19 Q. We kind of digressed there for a moment.
20 What do we have on -- I think you have identified No. 15.
21 Take a look at No. 16.

22 A. I don't have a 15. I'm sorry. The
23 attachment to 14, which is the reduced copy of the seven
24 language message.

25 Q. Now, you say that is a reduced copy. How

1 large was it actually?

2 A. If you took the top half of the page, which
3 shows four boxes with four different languages
4 represented, that could cover half of a steel drum. The
5 bottom half could cover the other half. And the drums are
6 about 30 inches wide, a yard maybe. I'm guessing.

7 Q. You're talking about the standard --

8 A. 55 gallon chemical drum. So, these would go
9 all the way around the drum.

10 Q. Why did you put them in seven different
11 languages?

12 A. Well, primarily because we were still
13 shipping PCB's out of our English or Wales operation into
14 many, many countries with many languages involved. That
15 was the primary reason. And once we did that for Europe,
16 why not do it in this country. And we were thinking
17 really of the Spanish and English versions in this
18 country, but since we had them, we just ordered the drums
19 this way.

20 Q. What language is it found in?

21 A. We have Dutch, German, Italian, Spanish
22 Portuguese, English and French.

23 Q. What is No. 16?

24 A. No. 16?

25 Q. Actually 16 and 17?

1 A. It is a copy of a label. Virtually identical
2 to the previous No. 14. The only difference is the
3 reference to the department in Monsanto, to which the
4 request for waste disposal by incineration could be
5 accomplished. The department number was changed and the
6 label reflects that.

7 Q. Were there any changes on the seven language
8 warnings found on No. 17?

9 A. I don't know of any, no.

10 Q. Let's take a look at No. 18.

11 A. No. 18?

12 Q. First, let me back up a second. When was 16
13 and 17 in use?

14 A. Starting in 1973 until 1977. No. 18 appears
15 to be a duplicate of No. 16. I'm sorry, No. 18 has an
16 additional piece of information included on the label. In
17 the right-hand corner is the statement, "In case of spill
18 or leak call collect, 618-271-5835."

19 Q. Was that your telephone number?

20 A. This is the plant's telephone number.

21 Q. Let's say that if somebody called up and said
22 there's a spill, what would you have told them to do?

23 A. Depends on their description of the type of
24 spill they had.

25 Q. Let me back up then. What would be the goals

1 or what type of things would you be trying to achieve if
2 this had been a spill?

3 A. Keep it out of the environment. Don't let it
4 get on the roadway. As you travel to your destination,
5 use absorbing materials, sand, sawdust something to
6 capture it. If it is minor, when you go to your next
7 destination, unload it and make certain it is in an area
8 where it can be well controlled. And we'll arrange to
9 have somebody drop by and look at it, and transfer it, or
10 clean up if necessary. If it is major to the point where
11 the truck bed is saturated, pull off the side of the road
12 and wait, and we will send a crew out of Monsanto people
13 to look at it, and arrange whatever it takes to control
14 it. Ripping out the floor boards, replacing new ones.
15 Taking the floor boards to a proper landfill. Whatever is
16 appropriate for the situation. So we would get personally
17 involved if necessary. If it is just a drum that is a
18 little bit oily, then you tell the person to get -- if you
19 can find one, quickly get an over sized drum and put the
20 shipping drum inside another drum. And take it on to its
21 destination, or return it to Monsanto. Whatever is the
22 closest. Those are just some of the approaches that would
23 be considered.

24 Q. What kinds of crews would you send out on the
25 major spills?

1 A. I don't know how to answer. This would be a
2 person who knew the materials. First of all, it would be
3 at a minimum a foreman. Any time it could be a
4 supervisor. If it was quite extensive, we would send out
5 a guy that is familiar with shipping arrangements to
6 arrange for a truck, or a railroad, or whatever is
7 involved.

8 A. And the person that would be sent out would
9 of course, have access to resources like a commercial
10 clean up contractor that he could call to help him with
11 whatever bulldozers or pumps and the like.

12 Q. What other resources besides commercial clean
13 up contractor?

14 A. This is Monsanto resources, but that again is
15 a judgement call. If it is several thousand miles away,
16 it is better to go contract. If it is only 50 miles, send
17 the Monsanto team. Pick up the truck and its shovels, and
18 rakes, and sawdust, and drums, whatever it takes.

19 Q. When was that label in effect?

20 A. This label here is 1974, 1975 period.

21 Q. If there had been a spill, would there have
22 been any charge to the person that had the drum that was
23 leaking for this response by Monsanto?

24 A. Not to my knowledge, no. Monsanto would pick
25 that up.

1 you know?

2 A. Some were black and white. Some were red.
3 Red background behind the logo with black print on a white
4 background.

5 Q. Were any of the warnings ever printed in red
6 or yellow, or some other color other than --

7 A. The warnings as best I recall, were always
8 black on some other background. Black on white primarily
9 and the multi language label was black on yellow. The
10 whole drum was yellow.

11 Q. But every warning label was clear and
12 visible, and there should not ever have a problem reading
13 the label?

14 A. I agree, yes.

15 Q. What is No. 22?

16 A. 22 is a copy of a label again for Interteen
17 PPO. This copy contains the statements that appeared on
18 the previous Exhibit. But this time it includes the
19 statement referring to the opportunity to dispose via
20 incineration, and to contact Monsanto at a given address.

21 Q. Contacting Monsanto in this case, are you
22 talking about contacting for incineration or contacting in
23 case of a spill?

24 A. This is contacting for incineration.

25 Q. What date was that label in use?

1 A. This is 1971 to 1973.

2 Q. What do we have on the label No. 23?

3 A. No. 23, this is a copy of a label referring
4 to a Westinghouse blend Interteen 70-30. It contains the
5 employee exposure cautionary statements that we had seen
6 before. The label was in use in 1950 and 1960 up to early
7 1970.

8 Q. Okay. Is that substantially similar to the
9 other warnings that were found?

10 A. It is exactly the same wording.

11 Q. What is on No. 24?

12 A. 24 also see refers to Interteen 70-30. Is
13 identical to the previous Exhibits, but this one contains
14 the environmental statement cautioning about entry via
15 spills, leakage, disposal and so on. This went into use
16 in the middle of 1970, and up to about 1971.

17 Q. Okay. What do we have on No. 24, or 25?

18 A. 25 again, referring to Interteen 70-30. Is
19 identical to the previous Exhibits, but contains in
20 addition the statement referring to incineration disposal,
21 and gives the Monsanto contact address. This label was in
22 use from 1971 to 1973 roughly.

23 Q. How about No. 26?

24 A. 26 is a copy of a label that refers to
25 Interteen 70-30. Has attached to it the seven language

1 precautionary statements regarding release to the
2 environment, and exposure to workers. On the face of the
3 label, there is reference to disposal via incineration and
4 a Monsanto address to contact. This particular label went
5 into use in 1973. As best I recall was in use in 1974 or
6 so.

7 Q. I have a question on this. The saying is
8 that St. Andrew's cross?

9 A. Yes.

10 Q. Is that an international equivalent of what
11 we commonly see as a skull and cross bones?

12 A. That is my understanding, yes.

13 Q. Their label also contains that St. Andrew's
14 cross?

15 A. Yes.

16 Q. How did they happen to pick the St. Andrew's
17 cross for that?

18 A. I don't know.

19 Q. Do you happen to know if that was black or
20 white, or in the original version the cross itself?

21 A. I have only seen black on white, yes.

22 Q. What do we have on No. should be 28?

23 a. No. 28, is identical to 26. Except that the
24 reference to the disposal department at Monsanto is
25 changed to show a different number. Instead of 831 it's

1 790. This particular one, label was in use 1974 to 1975,
2 1976.

3 Q. Okay. What do we have on No. 29?

4 A. 29 was a copy of the --

5 Q. I'm sorry, it should be 30. 29 was the seven
6 language.

7 A. Seven language precautionary statement. No.
8 30, is a copy of a label for another Westinghouse product,
9 Interteen 54201KA. Contains the same employee exposure
10 cautionary statement. And this label was in use in the
11 1950's and 1960's.

12 Q. What do we have on 31?

13 A. 31 refers to the same Interteen as the
14 previous Exhibits. But this version of that label in
15 addition to the employee exposure cautionary statements
16 includes the environmental statement. And also includes
17 the disposal by incineration information.

18 Q. What do we have on 32?

19 A. 32 is a label for Interteen 54201KA, which
20 includes the seven language precautionary statements, and
21 on the front of the label we again have the St. Andrew's
22 cross. And the reference to disposal by incineration and
23 gives the Monsanto contact for that service.

24 Q. What do we have on 34?

25 A. 34 is virtually identical to 32, except that

1 the disposal reference department number has been changed
2 from 831 to 790.

3 Q. That is also a seven language warning?

4 A. Correct.

5 Q. Would you read those warnings for me just one
6 more time?

7 A. I'll read you the English version.

8 Q. That's fine.

9 A. The English section of this seven language
10 message. "Chlorinal biphenyls (42 percent-54 percent), or
11 60 percent (PCB). This product contains polychlorinated
12 biphenyls (PCB's), which some studies have shown may be
13 persistent in environment contaminant and possible
14 injurious to certain form of birds, aquatic and animal
15 life. Prevent entry into the environment through spills,
16 leakages, disposal, vaporization, reuse of containers or
17 otherwise. Spills, leakages and waste product must be
18 collected. Use of this product must be restricted to
19 applications which can be controlled, so that entry into
20 the environment does not occur. And to applications in
21 which it cannot come into contact with food, animal feed
22 items or pharmaceuticals. Harmful substances if taken
23 internally or if in prolonged contact with the skin,
24 causes irritation of skin and eyes. During shipment,
25 avoid spills and leakage into inland water ways and the

1 sea. Store away from food, animal feed items and
2 pharmaceuticals. Keep container tightly closed. Do not
3 eat or smoke when using. Avoid breathing vapors mist or
4 fumes. Do not wear contaminated clothing. Wash product
5 from skin with soap and water. Wash eyes by flushing with
6 water."

7 Q. From my recollection, there's a change in
8 that one from some of the others that we have talked
9 about. About do not smoke or eat while using this
10 product. Is that a change from some of the others?

11 A. I neglected to read that particular change in
12 the previous seven language version, but all seven
13 languages includes that statement.

14 Q. Why was that change made?

15 A. It was an attempt again to reduce human
16 exposure. And this is one way that was brought to our
17 attention as a possible source of entry into the human
18 body. People eating with dirty hands or smoking without
19 washing their hands. So we decided to include it. No
20 incident occurred to create this need, it was just another
21 example of the entire desire to prevent problems.

22 Q. Take a look at No. 36.

23 A. I have it.

24 Q. Can you identify that document for us?

25 A. This is a copy of a invoice from Monsanto

1 Company, billed to Westinghouse Electric. Material was to
2 be shipped to Public Service of Oklahoma, 52nd and
3 Granite, Tulsa. Dated, the invoice is dated the 15th of
4 December 1975.

5 Q. Are there any warnings on that invoice?

6 A. Yes.

7 Q. Could you read those for us?

8 A. "This product contains polychlorinated
9 biphenyls, (PCB's), which some studies have shown may be
10 persistent in environmental contaminate and possible
11 injurious to certain forms of bird, aquatic and animal
12 life. Prevent any entry into the environment through
13 spills, leakages, disposal, vaporization, reuse of
14 containers or otherwise. Spills, leaks and waste product
15 must be collected. Use of the product must be restricted
16 to applications that can be controlled so that entry into
17 the environment does not occur. And to applications in
18 which it cannot come into contact with food, animal feed
19 items or pharmaceuticals."

20 Q. Do you know if that invoice was in fact
21 shipped or sent to PSO?

22 A. I have no reason to believe otherwise.

23 Q. Could you take a look at document, is 38 our
24 next document?

25 A. Yes.

1 Q. Can you identify that for us?

2 A. This is a copy of a invoice Monsanto Company,
3 billed to Westinghouse Electric in Kansas City. And
4 shipped to Public Service of Oklahoma, dated November
5 19th, 1974.

6 Q. Are there any warning on that invoice?

7 A. Not on this invoice.

8 Q. Would there have been any warnings sent along
9 with this shipment of materials?

10 A. At this time, the warnings would be 1974, it
11 would be on the product label.

12 Q. When did you first start adding a warning to
13 the invoices?

14 A. Sometime in 1975, it was decided to be a good
15 idea to repeat the message on the invoices.

16 Q. Were warnings given to the purchasers of this
17 product in any other way besides on the product and the
18 invoices?

19 A. The billing of lading contained the same
20 messages. I believe that was instituted about 1974 also.

21 Q. Did it contain the same warning?

22 A. Yes. I can't recall any other warning
23 messages to customers, except that there were product
24 bulletins that included the same messages in a different
25 section of the bulletins.

1 Q. What else did these product bulletins
2 contain?

3 A. What else?

4 Q. Yes?

5 A. At what point in time, maybe that would help?

6 Q. I'm not thinking in exact context, but what
7 general subject matter was in it?

8 A. They would refer to waste of proper handling,
9 the degree of emphasis increased with time so that the
10 later versions emphasize that quite a bit. They refer to
11 method of disposal. They refer to -- they even refer to
12 laboratories that could be used to help analysis if
13 necessary. Such things as what kind of hand cream
14 employees could use to protect their hands. References to
15 wearing gloves, washing of clothing, just like the labels
16 do. Also references how to reclaim material that isn't
17 too badly contaminated. Of course, it bragged about the
18 fire resistant properties. Why its use was looked upon as
19 being proper, the smart thing to do. Those kinds of
20 messages were in a product bulletin.

21 Q. Kind of it's a responsible product if it is
22 used responsibly?

23 A. Correct.

24 Q. You last described number 38. What is that
25 38?

1 A. We just talked about 38.

2 Q. Let's took a look at 39.

3 A. 39 is a copy of an invoice Monsanto. Looks
4 like sold to and shipped to the same. Public Service
5 Company of Oklahoma, dated November 10th, 1970, referring
6 to Interteen 70-30.

7 Q. Now, you have reviewed all of these documents
8 that were found in the file folder No. 17. Are you
9 familiar with these documents?

10 A. Yes.

11 Q. From your work?

12 A. Yes.

13 Q. Are these true and accurate representations
14 of the documents that were sent to PSO?

15 A. Yes.

16 Q. Are the warning labels contained on the
17 product?

18 A. Correct.

19 Q. Are there any other warnings that were given
20 for PCB's or PCB containing the products that we haven't
21 talked about?

22 A. I can't think of any.

23 Q. During the 1970's when you were in the -- in
24 your position as manager of environmental control you're
25 also going out to customers and giving them little talks

1 on these warnings also?

2 A. I went to some customers, not the thousands
3 that are out there.

4 Q. You were doing everything in your power to
5 get the information out?

6 A. Yes.

7 Q. I am going to hand you what has been marked
8 Plaintiff's Exhibit No. 18. See if you can identify that
9 for us.

10 (Whereupon, Plaintiff's Deposition Exhibit No. 18
11 was marked for identification.)

12 A. This exhibit is a three page document. The
13 last two pages are copies of a letter on Monsanto
14 letterhead, dated February 28, 1972, signed by T.L.
15 Gossage, Marketing Director, Specialty Products Group.
16 One is addressed, attention, purchasing Agent. The other
17 is addressed, attention, the plant engineer. These are
18 form letters made on or about that date. The front sheet
19 is a copy of a page on which labels with adhesive were
20 typed for mailing purposes. And photographed before the
21 labels were peeled off and affixed to. And the reference
22 on this particular page is to Public Service of Oklahoma,
23 Post Office Box 201, Tulsa, Oklahoma, 74102, and Interteen
24 70-30.

25 Q. What is the general content of the letters

1 that were sent to the purchasing agents?

2 A. The general contents, this is information on
3 the recipient that PCB's, PCB containing fluids that at
4 one time were available directly from Monsanto to
5 companies represented by the recipient, would no longer be
6 available directly from Monsanto. And that the recipient
7 of this letter must go to his equipment manufacturer to
8 get replacement liquids.

9 Q. Now, how did this letter come about?

10 A. Earlier, a few months preceding this letter,
11 Monsanto entered a program whereby those remaining
12 electrical equipment manufacturers who still purchased PCB
13 containing fluids, must sign a hold harmless agreement
14 with Monsanto, before Monsanto would continue to supply
15 them with PCB liquids.

16 Q. Okay. Why did Monsanto do that?

17 A. Well, the primary reason was to make certain,
18 as I recall, make certain that the customer who insisted
19 that he had no suitable replacement for the fluid,
20 understood the need for properly controlling the use
21 disposal of these fluids. So they didn't create any kind
22 of environmental problems. And one way to make certain
23 that the message was understood, we believed, was to force
24 them to look at a document which an individual high up in
25 the customer's organization was to sign. And by so

1 signing, we felt that the commitment to do what is proper
2 was going to be there. That was really the intent at the
3 time. It didn't change the customer list any, it just
4 forced people within these companies, vice presidents and
5 even presidents to sign off. By doing so, we felt that
6 these individuals were in a position to provide the
7 necessary resource and incentive to handle these materials
8 properly.

9 Q. Okay. Prior to this letter, was there any
10 discussion at Monsanto about the discontinuation of the
11 sale of PCB products?

12 A. Oh, yes, many times.

13 Q. Tell me a little bit about those.

14 A. Of course, we had discussion about
15 discontinuing PCB sales to several users early on. And
16 many of those users have discontinued the paints, lacquer,
17 varnish, sealants, carbonless copy paper, on and on. By
18 the time we got to 1972, the only applications still being
19 supplied was dielectric equipment use. There was serious
20 talk about discontinuing even that application, but we
21 were told emphatically by the industry, that there was no
22 suitable replacement. That if we -- that if we
23 arbitrarily stopped supplying it, it would create brown
24 outs and all kinds of power disruptions. And this is
25 something that our society, our economic system could not

1 tolerate. Based on that strong assertion on the part of
2 our customers, we felt obligated. We felt obligated to
3 continue to supply. But we kept telling them as soon as
4 you find a suitable replacement, we are going to get out.

5 Q. When did Monsanto get out?

6 A. We finally stopped in 1977.

7 Q. What suitable replacements was found?

8 A. Well, the word suitable, I'll call it
9 acceptable with some disadvantages. As I understood it,
10 some applications went to mineral oil with a different
11 type of installation, volts and dielectric systems, and
12 remote locations. Others went to dry gas filled
13 transformers. Still others went to silicone fluids, which
14 performed fairly well as dielectric correct, but at lower,
15 as I understand it, lower ratings if the unit could no
16 longer do what it used to do when it retrofitted. Also, I
17 understand that there is some sacrifice of fire
18 retardancy. I don't know just how much, but it was not
19 quite as fire resistant as the old fluids used to be.
20 Those were the replacements that I understood were finally
21 developed.

22 Q. What caused Monsanto to finally decide enough
23 is enough, we need to stop making this?

24 A. I really can't speak for those who made that
25 difficult decision. Obvious to me, was the fact that the

1 amount of material now being used had dropped to such a
2 low level, that it could not sustain the monstrous plant
3 that stood there to create that trickle of material. At
4 the same time, some of the equipment needed replacement,
5 such as the incinerator. That created a need for a high
6 capital expenditures, and the cost of these units that
7 multiplied tremendously since the original one. So it
8 became an economic consideration eventually. In spite of
9 that, we continued to make the product until our customers
10 eventually said, okay, we are rid, because it wasn't just
11 a case of finding a new liquid, they had to change their
12 production lines. Some of their tankage, you change some
13 of their design features, and so on. So it isn't as
14 simple as it might appear on the surface.

15 Q. But Monsanto didn't stop production until you
16 felt confident that the electrical power industry was
17 ready for the --

18 A. They told us.

19 Q. When you say they told us, who is they?

20 A. The Westinghouse House's, the General
21 Electric's. I forget all the names. The dozen or so that
22 were still in the business.

23 Q. These are the people that manufactured the
24 transformers, capacitors, heavy electrical equipment?

25 A. Yes.

1 Q. What other discussions were going on at
2 Monsanto concerning -- Strike that. When was the selling
3 of PCB's for non-electrical pumps discontinued?

4 A. This depends on the particular application.
5 On August 30th of 1970, we terminated all sales to
6 distributors for one, this is a case where a person in the
7 business of distributing chemicals would buy a few drums.
8 We stopped that because we never knew the end use of that
9 material. We stopped all sales to the varnish, the paint
10 industry, the sealant, the caulking industry, the rubber
11 industry. We began phasing out the carbonless copy paper.
12 But that took a lot more research to find a suitable
13 substitute. So the carbonless copy paper was phased out
14 by mid 1971, as best I recall. The use in hydraulic
15 fluids began phasing out in the middle of 1970, and as
16 best I recall, we succeeded in getting out of the PCB
17 versions about the third quarter of 1971. Had a little
18 delay there of about a quarter. The heat transfer
19 systems, we got out of those by early 1971.

20 Q. Were there any other uses that we haven't
21 talked about?

22 A. I can't think of any at the moment.

23 Q. And if it had been a perfect world and you
24 had your druthers, you would have be out of the PCB
25 business altogether at that point in time?

1 A. Yes. That was the intent, yes.

2 Q. Now, you talked about having a hold harmless
3 agreement signed by all the different customers. Why did
4 you then discontinue the sale of the product to all these
5 different customers that have purchased PCB's after they
6 signed the hold harmless agreement? It looks like I lost
7 you.

8 MR. THOMAS: I think you're confused. Only
9 about a dozen or so companies actually signed the hold
10 harmless agreement and continued to purchase it. We
11 required a substantial financial wherewithal before we
12 would even consider it.

13 A. I didn't mean to confuse you. The hold
14 harmless agreements were signed by those remaining
15 electrical equipment customers on record as of September,
16 October of 1971. All the other uses were terminated.
17 There was no one else. It's was just the electrical use.
18 And as you mentioned, to establish equipment wherewithal,
19 financial wherewithal, in addition Monsanto had to be
20 satisfied they had gotten the message regarding the need
21 to be careful, control these materials. And we
22 underscored that by having a high level representative of
23 the company involved in signing off.

24 Q. (By Mr. Busch) Did you ever have direct
25 shipments of PCB fluids or direct sales to different power

1 companies?

2 A. Oh, yes.

3 Q. Why were they not included among these groups
4 of people that could buy with hold harmless agreement?

5 A. We sincerely believed it was easier to
6 influence the dozen or so equipment manufacturers in
7 making sure proper control was instituted. Rather than
8 try to cope with a larger number of companies like
9 utilities, who would on a rare occasion buy a drum or two,
10 we thought cost control under those conditions might slip.
11 And we also suspected that many of them would be reluctant
12 to sign off on these agreements and would create some
13 delays. And we just wanted to do this quickly and
14 efficiently. And we concluded that the best way to do it
15 was through the dozen or so current customers.

16 Q. What kind of financial wherewithal did these
17 companies have to come with up with?

18 A. There was an amount stated, I have forgotten
19 it frankly.

20 Q. Do you have a ballpark idea of how much it
21 was?

22 A. Gosh, a million. I just don't recall
23 exactly.

24 Q. Did they have to post a cash bond, or --

25 A. Some of them did post bond, some of the big

1 ones. Of course, we knew that they were -- they had the
2 wherewithal.

3 Q. Westinghouse has one or two dollars in the
4 bank?

5 A. It's that kind of company that didn't have to
6 impress us with any documents. But the smaller ones had
7 to post bonds or come up with some document certifying
8 that they were capable of doing so.

9 Q. After this program was implimented in
10 February of 1972, did you get many calls from the
11 utitilies saying, why are you doing this to us, or did
12 they kind of just go along with the program?

13 A. We got some calls. I don't know how to
14 quantify the amount. There were some calls, some
15 disappointment, some reluctance to find themselves
16 dependant on their supplier. And there were some cases
17 where the supplier of the original unit had gone out of
18 business. That created the biggest emotion.

19 Q. What did you do in those cases?

20 A. We referred them to General Electric, at
21 Westinghouse, who had commercial departments that did
22 servicing as a business, and they were willing to pick
23 this up.

24 Q. Did you help General Electric and
25 Westinghouse after they signed these hold harmless

1 agreements, and get the information out to some of their
2 customers about the safer handling and useage of PCB's?

3 A. I don't know that I helped Westinghouse and
4 even General Electric, not in a direct sense. I got
5 involved with their people in the ANSI committee we talked
6 about earlier. But I did not get on the telephone or make
7 any trips to utilities, and do anything that directly, no.

8 Q. Did you review their information programs,
9 how they are disseminating this information to their
10 customers?

11 A. I reviewed earlier than this, drafts of
12 proposed informational letters they were sending to their
13 customers, which included utility companies as well as
14 industrial plants, motels, hotels, commercial buildings.
15 A variety of customers. I did participate in reviewing
16 their documents. Their message was so much like
17 Monsanto's that I didn't find a need to alter it in any
18 way.

19 Q. What is the number on that document there?

20 A. 0028 -- I'm sorry Exhibit 18.

21 Q. Is that a true and correct copy of the
22 letters that were sent out to the different public
23 utilities?

24 A. Yes.

25 Q. Do you have any doubt that that letter was

1 sent to PSO?

2 A. No, I do not.

3 (Whereupon, Plaintiff's Deposition Exhibit No. 19
4 was marked for identification.)

5 Q. I am going to hand you what has been marked
6 Plaintiff's Exhibit No. 19. Can you identify that for us?

7 A. Yes. This is a copy of a letter dated April
8 of 1972, authored and signed by me on Monsanto letterhead,
9 informing the recipient that the federal government
10 through its EPA agency was seeking information that
11 Monsanto considers quite important to the customer. And
12 we were reluctant to divulge it, that we were taking a
13 stand, that included refusal to cooperate. But we felt
14 the pressure mounting and we suspected that we would
15 eventually be forced to divulge that information. And we
16 wanted our customers to be aware of this because many
17 customers are quite sensitive about this sort of data,
18 which reveals an awful lot to the commission. This is why
19 they were sensitive. At the same time, I took an
20 opportunity to again remind them, let's be careful how we
21 handle and store and dispose of this material. The front
22 page is again a copy of the address labels that were typed
23 up to be affixed to the envelopes. And this particular
24 copy shows the reference to Plant Manager, Public Service
25 of Oklahoma, P.O. Box 201, Tulsa, Oklahoma, 74102.

1 Q. You talked about mounting pressure. What
2 kind of mounting pressure were you getting from EPA?

3 A. There were -- there was a lot of, I'm going
4 to call it, table thumping on the part of EPA
5 representatives. They went to the office of Science and
6 Technology and got Dr. Ed Berger to write us a letter.
7 This is from the office of the President, implying that
8 Monsanto was uncooperative and shouldn't be so, and that
9 we should divulge that data. We agreed to send him a copy
10 if he treated it confidentially. And used it very careful
11 and he refused. We sent it to him registered certified
12 mail, receipt requested. He refused to accept it. We got
13 pressure from congressmen calling our Washington Office,
14 that we were unreasonable in our stand. When I got
15 personal pressure from -- I am going to call them the
16 Environmental Activists, the Berry Commoners, the Audubon
17 Society, which at one time thought we were doing a great
18 job. Came around and said, you did it great, but up to
19 now, why are you so difficult to work with? We need that
20 information so we can go out and find out who is dirtying
21 the environment, that kind of comment. I don't know how
22 else to describe it. But it came from inquiries primarily
23 oral rather than written.

24 Q. In your letter you mention that the potential
25 use a federal prosecutor or federal district attorney, I

1 don't recall the exact language right now, how is that
2 information conveyed to you?

3 A. Over the telephone. I got this call from an
4 individual in the Kansas City office of EPA, and he
5 threatened me to turn this office to the Judicial
6 Department for legal action. So I just passed that on for
7 what it was worth. I didn't know if that was a saber
8 rattling, or if there was any substance to his threat.

9 Q. Is that a true and correct copy of the letter
10 that was sent to PSO?

11 A. Yes.

12 Q. Do you have any doubt that PSO received that?

13 A. No.

14 (Whereupon, Plaintiff's Deposition Exhibit No. 20
15 was marked for identification.)

16 Q. I hand you what has been marked as
17 Plaintiff's Exhibit No. 20. Can you identify that for us?

18 A. It's the copy of a letter Monsanto on
19 letterhead signed by James A. Alley. And informing the
20 recipient that starting the last day of August 1977,
21 Monsanto would no longer receive PCB's for incineration.
22 And it listed two companies that were in the business of
23 incinerating as an alternate facility for handling waste
24 PCB's. And the first page is a copy of the mailing label
25 addressed to, Public Service Company of Oklahoma, P.O. Box

1 201, Tulsa, Oklahoma, 74102, with the date of August 1st,
2 1977.

3 Q. Why was that done? Was that because you were
4 shutting down your PCB operations and you had a backlog of
5 material that needed to be incinerated?

6 A. Those were two good reasons, in addition the
7 unit had reached a point where it needed replacement. It
8 was worn out. And since we were going out of the
9 business, expected to clean up all of the material we had,
10 we decided since there were commercial incinerator
11 services now available, we should not be competing with
12 those. They were in a better position to do the job
13 properly.

14 Q. Are you familiar with that document?

15 A. I had seen it before, yes.

16 Q. Is that a true and correct copy of the letter
17 that was sent?

18 A. I believe so, yes.

19 (Whereupon, Plaintiff's Deposition Exhibit No. 21
20 was marked for identification.)

21 Q. I am going to hand you what has been marked
22 Plaintiff's Exhibit No. 21. Can you identify that for me?

23 A. The first page of this document is a letter
24 on Monsanto letterhead, dated April 20, 1976. Addressed
25 to Public Service Company Oklahoma, Tulsa, Oklahoma,

1 attention Floyd Barnes. The contents of the letter
2 includes information on how to label drums of material
3 being returned to Monsanto for disposal by incineration.
4 It also designates that the charge will be at 10 cents a
5 pound, and there will be an eight dollar drum handling
6 charge. I do not see a closing page with any signatures,
7 so I have to assume something is missing on that letter.

8 MR. THOMAS: We can't find the signature
9 page.

10 A. The second page appears to be a note of a
11 telephone conversation, and it includes Mr. Barnes' name.
12 The fact that two drums of Askarel and gave him the cost
13 10 cents. He said he needed a letter of instructions, and
14 it is dated April 8, 1978. Telephone call 9:05.

15 Q. Do you have any idea what would have been on
16 the second page of that document?

17 A. The second page; certainly the title and
18 signature of the author of this letter would have been
19 there. And typically would be again, a closing statement
20 of, I hope this is helpful. If you need more information,
21 call us. In the meantime, be careful what you do with
22 this stuff. Or words to that effect. That is the
23 typical. I have no way of knowing if that was truly on
24 the original.

25 Q. Are you familiar with this document at all?

1 A. I had seen it before, yes.

2 Q. Do you have any doubt that that document was
3 sent to PSO?

4 A. I have no doubt.

5 Q. Do you have any doubt about its authenticity?

6 A. No.

7 (Whereupon, Plaintiff's Deposition Exhibit No. 22
8 was marked for identification.)

9 Q. I'm going to hand you what has been marked
10 Plaintiff's Exhibit No. 22. Can you identify that please?

11 A. This is a copy of a document entitled,
12 Polychlorinated Biphenyl and the Environment. Issued by
13 the Environmental Task Force on PCB's, Washington, D.C.,
14 May 1972.

15 Q. Are you familiar with that document?

16 A. Yes.

17 Q. What kind of standards were put forth in that
18 document? Or what did that document deal with?

19 A. This document attempted to document in
20 summary fashion the available information on PCB's. The
21 uses, the quantities, the toxicity data, the employee
22 health data. Whatever was available as of May 1972. Put
23 together by a task force composed of representatives from
24 many of the federal regulatory agencies. The conclusion
25 was, as I remember, was that with withdrawal by Monsanto

1 from many of the uses was supported by this document. But
2 the continued use in electrical equipment was understood
3 as being quite necessary. That the benefits from that use
4 far outweighed the risks involved, assuming proper care
5 and control was instituted. But at the same time, if I
6 remember correctly, they were encouraging the aggressive
7 studies leading to finding substitutes for these
8 materials.

9 Q. Did it make any recommendations concerning
10 disposal or treatment of PCB's?

11 A. Yes. There were some in there, yes. I have
12 forgotten all the details, but they are in here.

13 Q. Did it make any recommendations about what an
14 acceptable level of PCB would be?

15 A. It's been almost 30 years since I read this.
16 If I remember correctly, there was a reference to a
17 possible acceptable level in water, public water. I don't
18 know -- and there were references to FDA guidelines as to
19 the amounts in milk, baby food as I remember. And in some
20 other food products, a limited list.

21 Q. Was this document later used when they were
22 drafting the Toxic Control Substance Act?

23 A. I don't know personally. But the people who
24 participated in both of those activities, some of them
25 were the same person. They were very much aware of all

1 this.

2 Q. Do you understand what the Toxic Control
3 Substance Act is?

4 A. I believe I do.

5 Q. Okay. I don't mean to demean you by that, I
6 just want to explore what your knowledge is. What
7 chemicals are mentioned by name in that? Or first let's
8 back up. What is the purpose for that act as you
9 understood it?

10 A. The purpose of the act was to give the
11 federal government, through the EPA, the authority via
12 this law, this act, the authority to monitor chemicals to
13 define which of these chemicals can be classified as
14 toxic. And therefore, set standards regarding the amounts
15 that are tolerable in waterways and the air and so on.
16 There were of course many sections to the act and some of
17 them were really intended to document what is now being
18 used by industry. How many chemicals are known to be in
19 commerce, and a starting point, and then there were
20 provisions for controlling the introduction of new
21 chemicals into commerce, and procedures for doing so.
22 There is also a provision in this act for informing the
23 authorities of any new information regarding the toxicity
24 of a chemical or harm it may have done. New data. The
25 only chemical mentioned specifically was PCB's.

1 Q. Of all the chemicals in the world?

2 A. Correct.

3 (Whereupon, Plaintiff's Deposition Exhibit No. 23
4 was marked for identification.)

5 Q. I am going to hand you what has been marked
6 Plaintiff's Exhibit No. 23. Can you identify that for us?

7 A. This appears to be a copy of the American
8 National Standard Guidelines for handling and disposal of
9 capacitor and transformer grade Askarels, containing
10 polychlorinated biphenyls. With the ANSI logo and address
11 in New York.

12 Q. Now, did you participate in this preparation?

13 A. I did.

14 Q. What was your position?

15 A. I was chairman of the group that drafted
16 this.

17 Q. Who sat on the committee with you?

18 A. There were representatives of the Electrical
19 Equipment Manufacturers. Representatives of the companies
20 that service electrical equipment. There were
21 representatives from utilities. Representatives from the
22 government, some of the department agencies. I think that
23 covers the general make up of the group.

24 Q. Of the members that were there representing
25 utilities, were any of those members employees or

1 principals in the Central and Southwest Power Group of
2 Public Service of Oklahoma?

3 A. Not to my knowledge.

4 Q. Do you know how the information in these
5 standards were disseminated?

6 A. In each of the representatives that
7 participated, and they are listed in the forward to this
8 document. Plus others ordered copies of this document and
9 enough were printed, and I remember box loads being
10 shipped to these people. And the intent was to distribute
11 them to their organizations for further distribution.

12 Q. Do you know if that document ever reached
13 Public Service Company of Oklahoma?

14 A. I don't know personally that a copy actually
15 reached them, no.

16 Q. Do you believe a copy was given to PSO?

17 A. I have no reason to believe a copy was not
18 available to either that utility or its associate parent
19 companies.

20 Q. Did your committee publicize the fact that
21 these standards had been developed?

22 A. I don't know how to define publicized. It
23 was no big secret. The government knew what we were
24 doing. In fact, had representatives sitting in on this.
25 I was the talk in the industry so to speak. Everybody was

1 asking what is going on and hurry up. These kinds of
2 comments. We did not buy any newspapers to advertise it
3 or publicize, no.

4 Q. I was talking more about the public
5 utilities, power utilities?

6 A. I personally know Mr. Langenfeld who was one
7 of the utility representatives. And there is nothing in
8 our contacts with each other to lead me to believe he was
9 not communicating back to the group that he represented.

10 Q. Which group did he represent?

11 A. Electric Light and Power Group, which I'm
12 told represented utilities.

13 Q. What kind of standard development was the
14 substance of those standards?

15 A. They are quite complex. It addressed --

16 Q. Let me back up. Is it broken down into
17 different categories?

18 A. Well, there are two primary categories. One
19 addresses the transformer application. And the other, the
20 capacitor application. There are many sections that apply
21 to both. The circumstances are identical. It attempts to
22 highlight the need for control. It refers to changes of
23 leakages during shipping and during use, during disposal,
24 during servicing. It tries to give some idea of proper
25 method of disposal. It cautions against improper

1 disposal. It touches on reclamation where possible. It,
2 off course, touches on employee exposure. Where I said it
3 even talks about the hand cream they use, or the gloves
4 they use. I don't know how else to describe it, other
5 than from just reading from this. It talks about
6 sampling.

7 Q. Since we are dealing with transformers here,
8 let's just strictly stick with the transformers. What
9 kinds of sampling requirements did it place on
10 transformers.

11 MR. LEWIS: Mike, your voice is almost gone.
12 I can hardly hear you.

13 Q. (By Mr. Busch) I was asking him what kind of
14 sampling requirements were placed upon transformers?

15 A. Since it has been over 20 years since I have
16 read this, I would have to browse through it and find the
17 section and read it, which speaks for itself really. I
18 don't know -- should I do that?

19 Q. No, I think that would probably take too much
20 time. Do you consider that document to be authoritative
21 as to that 1972, as to the standards that were in the
22 industry and throughout the country concerning
23 transformers, and the different topics that you have
24 talked about concerning the transformer?

25 A. Definitely, yes.

1 Q. How much time and effort went into the
2 preparation of that document?

3 A. Two years of elapsed time. I would guess
4 that there were 50 individuals involved, some more than
5 others. The two chairman plus their, let me call them
6 secretaries of the committees, who did all of the writing,
7 spent many, many hours. It was never documented we never
8 clocked this, but I don't know how to quantify it, except
9 that it was a major effort. It's got to be at least a
10 dozen man hours of effort.

11 Q. You're talking about a major project then?

12 A. It was as major project. It was a first, you
13 had to consider many, many different view points and
14 interests.

15 Q. Do you consider the conclusions that were
16 made in that document at that point in time, to be free
17 from serious doubts or mistakes as to the accuracies of
18 the statements that are made in there?

19 A. I do, yes.

20 Q. In preparing Plaintiff's Exhibits No. 23, did
21 you use what has been marked Plaintiff's Exhibit No. 22,
22 the Polychlorinated Biphenyls in the Environment
23 Interdepartmental Report?

24 A. Yes.

25 Q. Did you consider it to be authoritative?

1 A. Yes.

2 Q. Are there any other works written that you
3 consider to be authoritative?

4 A. I'm not aware of any documents that would
5 have covered this total area. This is the very reason
6 this document was proposed, frankly. There's an absence
7 of such a document. As to authoritative documents, there
8 were documents that were consulted in the sessions held by
9 the committees, that were in-house documents of the
10 participant's companies. I remember seeing those. In
11 fact, Monsanto's bulletins on the use of Askarels in
12 electrical equipment, was a source document. But the data
13 in that had predated 1970, so it had to be updated. So in
14 a way, I would suggest that there were other in-house
15 documents that could be referred to as authoritative.

16 Q. Now, would it be fair to say, that the
17 substance of these ANSI guidelines would be to minimize
18 the possibility as much as humanly as possible of the
19 release of PCB's into the environment; whether into water,
20 air or surface?

21 A. That is it exactly.

22 Q. Why was that being done?

23 MR. LEWIS: Mike, are you on another document
24 there, or are are you on the ANSI Standards?

25 MR. BUSCH: We are on the ANSI Standard,

1 Michael.

2 MR. LEWIS: Is that 23?

3 MR. BUSCH: 23, yes.

4 A. There was a growing perception and the need
5 for a document that could be used by anyone involved with
6 PCB containing electrical equipment. Some of the bigger
7 electrical manufacturing companies attempted to do this on
8 a one-on-one personal basis with each of their customers.
9 And they have found it somewhat awkward, in that there was
10 just so many varying problems that they couldn't -- they
11 didn't feel comfortable that they were communicating
12 adequately as much as they tried. At one point, it was
13 decided that perhaps we ought to get together as an
14 industry, the electrical manufacturing industry, and put
15 together our collective thoughts, and get wide
16 circulation. And then it dawned on them that just talking
17 to each other, the electrical manufacturers under the
18 auspices of NEMA, the National Electrical Manufacturers
19 Association was not good enough. They had -- they felt
20 they had to have representation from the utilities, as an
21 example, and from government and from the service
22 companies, and Monsanto. Many of these were not members
23 of NEMA. They couldn't be. This is why the ANSI
24 organization was selected. To get the lowest possible
25 coverage and also the opportunity for introducing the

1 standards to the International Standards Institute, for
2 world wide use. That was the thing when it was first
3 started. I don't know if that answered your question, but
4 there was a need felt for a document of this kind. And it
5 became a matter of which is the best way to go about
6 preparing such a document. And making certain that the
7 distribution was as widespread as practical.

8 Q. What documents did you review in preparing
9 for your deposition today?

10 A. I reviewed the labels that we just looked at.
11 And I saw from across the table the copy of the
12 Interdepartmental Task Force Report and the ANSI reports.
13 And I recognized them from that distance. That is all.

14 Q. Are you familiar with the facts in this
15 particular lawsuit at all?

16 A. I am familiar with some of it. Frankly, I
17 don't remember all the details, no.

18 Q. Could you refresh me on what you're familiar
19 with?

20 A. I'll try. It seems there are some
21 individuals who feel that in either being present in a
22 building, or responding to a fire, or explosion in that
23 building, they were exposed to fumes and smoke, and soot
24 and chemicals unknown to them. And they feel that they
25 have been harmed. I also understand there's a restaurant,

1 a small restaurant nearby, the owners of whom feel their
2 business has been permanently harmed and their source of
3 income has been damaged. And that is about all I really
4 understand of this situation.

5 Q. Okay. Have you reviewed any of the samples
6 that were taken from the soot that was a result of the
7 aftermath of this particular fire?

8 A. No.

9 Q. Are you familiar with dioxins and furans,
10 dibenzofuras?

11 A. To a point, yes.

12 Q. Assuming that there was the Interteen 70-30
13 being used in that transformer, would you expect to see
14 dioxins and dibenzofurans produced?

15 MR. THOMAS: Produced from what?

16 MR. LEWIS: I didn't hear what you said.

17 Q. (By Mr. Busch) I'm sorry, John. I said,
18 assume that there was Interteen 70-30 being used in this
19 particular transformer that faulted. Would you expect to
20 see dioxins and dibenzofurans to be produced as a result
21 of this transformer failure?

22 A. You're asking me to speculate?

23 Q. Yes.

24 A. Because I frankly don't know the conditions.
25 Temperatures, air pressure, so many other things that --

1 and even if I knew more detail, that still would be
2 speculating. In a situation like that, gosh, you can
3 almost reach the point where almost anything is possible.

4 Q. That really doesn't answer the question.
5 What type of conditions need to be present to produce
6 dioxins and dibenzofurans?

7 A. Well, I can't claim that I'm a total
8 authority on dioxins and furans, but you need the biphenyl
9 group as a configuration, and you need oxygen, and the
10 oxygen has got to be able to attach itself in the right
11 positions to form dioxin and furan. I personally don't
12 know the conditions in terms of temperatures and pressures
13 it takes to do that. I am personally convinced that you
14 can't go from PCB to dioxin. Because oxygen cannot get in
15 the right position to form the dioxin molecule. The PCB
16 would break up into some other chemicals. I thought of
17 this long and hard, and I pursued all the literature and
18 no one has demonstrated this can be done, which
19 re-enforces my belief that it is not possible via that
20 route. I don't know what else to add to this. There just
21 to my knowledge, have not been any studies to establish
22 the conditions it takes to create these kinds of chemicals
23 with transformer fluids.

24 Q. Now, you said it's not possible to produce
25 dioxins and furans from PCB's?

1 MR. THOMAS: No.

2 A. I didn't say furans.

3 Q. (By Mr. Busch) Dioxins. Is it possible to
4 produce dioxins with the -- I'm sorry, it's the end of the
5 day. The 30 percent portion of energy that's the
6 chlorinal benzenes, do they allow the oxygen to get into
7 the right position?

8 A. There is no interference with the benzenes
9 sitting there with the chlorines. And depending again on
10 the position of those three and four chlorines around the
11 six carbon ring, it's possible that you could add an
12 oxygen to one of the benzenes. And that benzene connects
13 to the other benzenes to form the dioxin, but that is
14 never been to my knowledge demonstrated this way. This is
15 not the way dioxins are formed in the laboratory for study
16 purposes.

17 Q. How are they formed in a laboratory for study
18 purposes?

19 A. I used to know. Frankly, I've forgotten.
20 It's a very complex, arduous procedure to get a few grams.
21 I don't remember.

22 Q. In your experience in working with the
23 dielectric fluids, when there's a failure of a
24 transformer, would you expect to find dioxins and furans?
25 Even though you may not in your mind be convinced of the

1 method of production?

2 A. Would I expect, again, depends on the
3 conditions.

4 Q. Let me ask you this. Are you familiar with
5 any of the PCB transformer failures like the one at Market
6 Plaza or Binghamton, New York?

7 A. I am familiar that the incidents occurred.
8 I'm aware of some of the allegations. I have not
9 personally been involved, or regarding the products of all
10 this reaction and combustion, or partial combustion,
11 whatever happened.

12 Q. You're not familiar with the by products of
13 those combustions?

14 A. No. I have no reports, no.

15 Q. Are you familiar with any of the people that
16 did the sampling and the surveys in those particular
17 incidents?

18 A. No.

19 Q. Is it possible to produce furans from the
20 combustion of PCB's?

21 A. I could speculate and say it is possible,
22 yes. But I have no concrete chemical evidence this could
23 be demonstrated.

24 Q. So, would it surprise you if furans were
25 found as one of the combustion by products of this

1 particular transformer incident? You haven't been asked
2 that one before.

3 A. You asked me if it would surprise me.
4 Probably not, but I would feel much better if I had an
5 analysis made personally.

6 Q. What do you mean by an analysis made?

7 A. If the belief that some chlorinated furan are
8 present, there are ways to sample and analyze. And
9 somebody determining without a doubt in truth, this is the
10 kind of furans that was there.

11 Q. I'm sorry, I missed -- I got you confused on
12 my question. If I were to show you test results that show
13 that there was the presence of dioxins and furans, and at
14 this time, I'm talking just about furans and the standard
15 EPA sampling methodology and then that sample was run
16 through a high resolution gaspromatograph, and was found
17 to have produced furans, would that surprise you?

18 A. I would tend to believe the laboratory report
19 if I was comfortable that. They also conducted
20 appropriate validations as to confirm that they weren't
21 seeing an artifact. I have no reason at that point to
22 doubt that a good laboratory did a good job, and their
23 report. Yes, I would have to believe that.

24 Q. Are you familiar with the laboratories that
25 I.T. Corporation uses? Are you familiar with I.T.'s

1 laboratories?

2 A. I am family with I.T. I am familiar with
3 only one of their labs in Knoxville. I'm not familiar
4 with their other facilities.

5 Q. Are you familiar with Patell labs?

6 A. Which ones, the Columbia?

7 Q. The Columbia Ohio lab?

8 A. Yes, I have had some contact with that lab.
9 It's a reputable laboratory.

10 Q. How about the I.T. labs in Knoxville,
11 Tennessee?

12 A. When I was working with them I had high
13 respect for them.

14 Q. Now, we talked earlier about jumping on you
15 about the studies that were done on the Holly Farms
16 chickens, where you had a low birth rate or a low hatch
17 rate of the eggs, as well as some other problems found
18 with the chickens after their expose to your the PCB's.
19 Are you familiar with the YUSHO oil, rice oil incident?

20 A. Yes.

21 Q. Are you familiar with the studies that came
22 from that particular?

23 A. Somewhat.

24 Q. When did that exposure occur?

25 A. 1968.

1 Q. What type of problems were experienced by the
2 people that were exposed to the that rice oil?

3 A. There was nausea. There was some infants
4 born with brown pigmentation. There was some skin
5 eruptions. This chlorance we talked about earlier. A
6 tired, fatigued feeling was reported. A general malaise
7 among many of the people exposed. I don't recall any
8 others. Doesn't mean there weren't some more.

9 Q. Which are the findings that were documented
10 in the YUSHO reports, did they confirm findings that had
11 been found with animal studies?

12 A. Animal studies with what chemical?

13 Q. I'm sorry, good question. With PCB's?

14 MR. LEWIS: I didn't hear that question. Was
15 that a question?

16 Q. (By Mr. Busch) Did the human systems found
17 in YUSHO, confirm findings that were of the disabilities
18 of the animal studies that the animal studies produced?
19 That is a poor paraphrasing of it.

20 MR. LEWIS: Are you talking about PCB's here?

21 Q. (By Mr. Busch) We are talking about PCB's.

22 A. No.

23 Q. How did they differ?

24 A. In the rat studies as an example, at the high
25 dose levels as I remember, a hundred parts per million in

1 their food everyday of their lives, the rats exhibited a
2 slower gain in weight. That doesn't mean they didn't gain
3 any weight, they weren't as heavy as the control group.
4 They also had enlarged livers. Those were the symptoms
5 noted with the rat. With the chickens, at the higher --
6 at a fairly low level of exposure of the lower chlorinated
7 PCB's, we saw this thin egg shell hatchability problem,
8 which is difficult to equate to a human condition. We did
9 not get any reports from the laboratory that the rats were
10 exhibiting any malaise. That they were inactive or sickly
11 looking, or their fur -- that they looked bad, or had any
12 of the symptoms you might associate with human actions,
13 not feeling quite right.

4
14 Q. Let me stop you just a second. But weren't
15 those findings found in the Holly Farms chickens exposure
16 and the New York chicken exposure?

17 A. Which findings?

18 Q. Of the general malaise of the chickens?

19 A. Yes, they did. But again we have no idea of
20 the levels of exposure. But those findings were not
21 evidence in the Monsanto chick studies.

22 Q. I'm sorry, when I was referring to the animal
23 studies, I was referring to all the animal studies in
24 general, as opposed to just the Monsanto.

25 A. I was referring to the formal control studies

1 as distinguished from the infected flocks.

2 Q. If we go back and say we take all the
3 studies, do the findings that were found in the humans,
4 understand that you can't have a perfect match up because
5 people are not chickens, but are the findings relatively
6 similar?

7 A. I find it hard to agree with that, because I
8 know that the FDA sent Dr. Herbert Blummenthal to Japan to
9 personally study this YUSHO incident. And also know that
10 the final report there came out of the Japanese studies,
11 implicated clorinated furans as being the source of the
12 sicknesses that were described as distinguished from
13 PCB's. So, I really don't know if the Holly Farms cases
14 were entirely PCB's, as I kind of wanted to imply earlier,
15 PCB's was part of it. But in my mind, I'm suspicious of
16 other things that are unknown to us.

17 Q. Were there any formal studies done on furans
18 and animals that you know of?

19 A. I don't know of any.

20 Q. Let's back this up then. The YUSHO exposure,
21 whether it is PCB's or furans, are the symptoms relatively
22 the same, or the findings relatively the same as to the
23 animal studies, whether formal or informal, that you know
24 of?

25 A. Concerning either PCB's or furans, I find it

1 kind of hard to equate human ailments with observed
2 symptoms in a flock of chickens. I suppose one could see
3 some similarities, but it's very difficult to ask a
4 chicken how it feels and is it nauseated.

5 Q. Understanding the limitations the --

6 A. The two populations were sick is really all
7 we know. And this did not appear in the controlled
8 studies.

9 Q. Is there any doubt in your mind that either
10 the PCB's or some other potential by product, as an
11 example being furans or some of the other products of
12 PCB's, caused the illnesses seen in these groups?

13 A. Well, the only doubt is that I don't know
14 what other chemicals were there not associated with PCB's
15 at all. I don't know enough about what was in that oil.
16 Because it could be chemical reactions between the
17 ingredients in the oil itself, and the PCB's, and the
18 furans, or whatever else is there. I just have never seen
19 anywhere the total analysis of what was in this rice oil.
20 rice bran oil.

21 Q. Were any other chemicals found in there
22 besides PCB's, and benzofurans?

23 A. I's like to know that was in mercury metal --

24 Q. I'm not talking about the hypothetical
25 questions that you would like to have answered. If the

1 study was done was anything else found in there besides
2 the PCB's and the furans and dioxins?

3 A. In the Japanese studies?

4 Q. In the Japanese studies?

5 A. I have not seen any reports, looked at
6 anything else.

7 Q. Do you know how much time was spent on
8 preparation of those particular reports?

9 A. I would say that -- the accident occurred in
10 1968, the final reports didn't come out until 1972, 1973.
11 It took a long time, and they were still coming out even
12 after that. There were follow-up reports. I believe they
13 are still following or studying the people exposed. So,
14 it's not finished.

15 Q. Can you agree with this statement that it is
16 important not to allow PCB's to be relayed into the
17 environment?

18 A. Definitely.

19 Q. Can you agree with the statement that it is
20 important not to allow PCB's to get into feed, food
21 stuffs, or pharmaceuticals?

22 A. Yes.

23 Q. Can we agree that there has been both in
24 animal studies and some human studies, some indication of
25 harmful side effects from either PCB's or furans?

5 1 A. We can agree. If we keep in mind that we
2 have to know the levels, the conditions of exposures.

3 Q. Given all that and how many years of
4 experience you have had with PCB's, since 1969 your
5 working with PCB's, do you have an opinion as to whether
6 or not it would be a breach of a standard to allow PCB's
7 to escape from a transformer vault given the body of
8 knowledge that was out there in 1983, late 1983, early
9 1984?

10 A. To allow -- the whole thrust of these
11 programs was to keep PCB's out of the environment.
12 Recognizing that this could not practically be defined as
13 every single molecule, which implies that there must be
14 some minimal amount that is tolerable. And that is
15 supported by the fact that after 40 years or so of PCB's,
16 many workers in the manufacturer of PCB's and the
17 transformation, and the use and equipment and so on out
18 there -- must have been exposed to PCB's at some levels.

19 Q. But I'm talking about just the release of
20 PCB's from an open vault, or a -- let me rephrase that. A
21 grated vault?

22 A. Well, the whole intent purpose of the program
23 was to control it so that would not happen.

24 Q. So if there were relatively simple measures
25 that could have been taken to sealing that vault off or

1 contain that vault similar to your taking that smaller
2 leaky barrel of PCB's and putting it into a larger steel
3 drum to help control that, do you have an opinion as to
4 whether or not there was a breach of your standards?

5 A. I find it awkward to second guess. But I
6 would suggest that if I used your expression, if I believe
7 your expression or take into account your expression of a
8 relatively simple way to do it, yes. I would say if it is
9 relatively simple and is obvious, it would be helpful, it
10 should have been done. But I --

11 Q. Let me ask you this. Do you find a grate to
12 be an effective retaining instrument for a cloud?

13 A. No, I can't say I do.

14 Q. Can you think of some other relatively simple
15 method to contain fumes within a vault? You being an
16 engineer and I'm not.

17 A. I have a definition of a vault that may
18 differ.

19 Q. What is your definition of a vault?

20 A. A vault to me, is a totally enclosed sealed
21 room. Like a bank vault or a vault designed for
22 controlling fires and the like, which have limited entry
23 ways and limited venting capacity that is controlled.
24 Otherwise, the definition of vault doesn't seem to apply.
25 It becomes just another room or a pit, or a trench. There

1 are many other words that would --

2 Q. Let me rephrase it then.

3 MR. THOMAS: Your definition would be an open
4 grated transformer. It's referred to as a vault here.
5 Meets the criteria of a vault according to you?

6 A. Not as I understood it, no.

7 Q. (By Mr. Busch) Would you consider a grated
8 pit to be -- to comply with your standards to minimize the
9 release of PCB's into the environment?

10 A. Yes, but I have to qualify that. In my
11 thinking at that time, when we were active in those
12 programs, we were addressing PCB's in normal use, normal
13 disposal. This committee at no time addressed the
14 situation of an explosion of a unit. And this was
15 discussed and deliberately set aside for the equipment
16 manufacturers to address this as a separate issue.

17 Q. Do you know if the equipment manufacturers
18 did in fact do that?

19 A. I have not seen any documents that would
20 support this, but I was continued to be lead to believe
21 that they were addressing it. That is all I know.

22 Q. From 1972, up through 1983, December of 1983,
23 was there a continuing growing body of knowledge
24 concerning the use of PCB's and the handling of PCB's, and
25 the disposal of PCB's in general?

1 A. The body of knowledge was continuing to grow,
2 yes.

3 Q. Did the industry, whether the electrical
4 power industry, or the electrical manufacturing industry
5 become more sophisticated over that period of time?

6 A. I don't know that I'm qualified to comment on
7 that. I did not follow that intimately. I can only speak
8 for the years 1972 to 1976. And I know, if you will, that
9 there was a lot of interest, a lot of knowledge. Not only
10 generated, but disseminated. Whatever after that, I do
11 not know.

12 Q. I am going to make one more run at this and
13 then I'll be through. A transformer pit, can we agree, a
14 transformer pit, an open transformer pit could potentially
15 allow the escape and release of PCB's into the
16 environment?

17 A. Once the PCB's left the sealed unit, the
18 potential is there for escape.

19 Q. Given that possibility, is an open vault the
20 best state of the art method to contain PCB's in that
21 vault in that transformer?

22 A. In my considered opinion, I find open vault
23 kind of -- it doesn't seem to fit. Because in my mind, a
24 vault can't be opened.

25 Q. An opened pit, a grated pit?

1 A. A grated pit. As I said previously, once the
2 PCB's left the confines of the piece of equipment, an open
3 pit could lead to escape to the environment.

4 Q. Do you feel that it is very difficult to
5 transform a grated pit to a proper vault?

6 A. Again, you're asking me to speculate not
7 following all the details. Just the physical facilities
8 in themselves, what they consisted of, whether it is
9 practical at all.

10 Q. What information would you need to know?

11 A. Gosh, I need to know once you seal that vault
12 is there enough cooling capacity in the area to cool that
13 transformer down. Would you have to enlarge it to get
14 enough air in there to cool that unit, because it is going
15 to get over heated. And you might say, let's add fans.
16 Well, the minute you put blowers in there, and if there's
17 a leak, you're going to start moving vaporized material
18 with that air. There again, it's going to go somewhere
19 unless at the end of that stack, or vent, you have got a
20 capturing device of some kind so the PCB's don't get into
21 the atmosphere. I don't know what else to add except that
22 I need more information. Just putting a roof over that
23 pit may create other problems.

24 Q. Okay. Is a grated pit state of the art?

25 A. In as far as what?

1 Q. A transformer facility? How can a pit be --
2 state of the art, a grated pit? You just mentioned a
3 number of different things that could be done. Having
4 something to capture the PCB's at the end of a -- can it
5 realistically be state of the art?

6 A. If it is only intended to catch liquid drips,
7 and these liquid drips are managed properly, they are
8 picked up frequently, the drip is repaired, or the seal,
9 that sealed off, and it could go on for decades and no
10 problem occur. But as I said earlier, if the liquid
11 leaves the confines of that sealed unit and it is hot
12 enough to cause vapors, or it is propelled by something,
13 it is going to go through that grate. Then it gets into
14 this environment.

15 Q. It is possible for transformers to have
16 vapors leave them?

17 A. Only if they have a fault of some sort. Not
18 when they are working properly.

19 Q. But we can agree it is possible for the PCB's
20 to leave the transformer?

21 A. When some defect occurs.

22 Q. So given the fact that it is possible that
23 the vapor can leave the transformer, is a grated pit the
24 state of the art?

25 A. No.

1 Q. Thank you. I have no future questions.

2 MR. RUPERT: Does anyone have any questions
3 on the telephone line there?

4 MR. LEWIS: I am not going to ask any
5 questions at this time.

6 MR. RUPERT: Are you John?

7 MR. TUCKER: Same for IT.

8 MR. RUPERT: I believe that means we are
9 done.

10 MR. THOMAS: We have no questions. The
11 witness will read and sign it.

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WILLIAM B. PAPAGEORGE, P.E.

Subscribed to before me this _____, 1990.

(Notary Public.)

My commission expires: _____.

NOTARIAL CERTIFICATE

STATE OF OKLAHOMA)
)
CITY OF ST. LOUIS)

I, CATHERINE WINKELER, a Certified Court Reporter and a duly commissioned Notary Public within and for the State of Missouri, do hereby certify that pursuant to agreement there came before me at the offices of Adams Mark Hotel, 4th and Chestnut, St. Louis, MO 63102.

WILLIAM B. PAPAGEORGE, P.E.,

who was by me first duly sworn to testify to the truth and nothing but the truth of all knowledge touching and concerning the matters in controversy in this cause; that the witness was thereupon carefully examined under oath and said examination was reduced to writing by me; that the signature of the witness was not waived by agreement of all parties; and that this deposition is a true and correct record of the testimony given by the witness.

I further certify that I am neither attorney nor counsel for nor related nor employed by any of the parties to the action in which this deposition is taken; further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto or financially interested in this action.

IN WITNESS WHEREOF, I have hereunto set my hand and seal on June 28, 1990.

My commission expires February 22, 1991.

[Notary Public]

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William B Papageorge
NAME OF WITNESS

DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page	Line	Should read:
6	7	--- Predominately chemical

Reason for change: *Incorrect word.*

Page	Line	Should read:
6	13	characteristics, their viscosities - - -

Reason for change:
Incorrect word

Page	Line	Should read:
6	17	--- or combining chemicals to

Reason for change:
Incorrect word

Page	Line	Should read:
6	21 & 22	--- in the physical characteristics of ---

Reason for change: *Incorrect words*

Page	Line	Should read:
7	10	were selected depending - - -

Reason for change: clarity

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page Line Should read:

14 18 & 19 --- it was 1957 to 1959

Reason for change:

Incorrect dates

Page Line Should read:

16 14 --- dielectric

Reason for change:

spelling (applies to all subsequent appearances of
this word)

Page Line Should read:

16 18 --- signs of deterioration ---

Reason for change:

Spelling

Page Line Should read:

18 10 --- it is air cooled.

Reason for change:

Clarity

Page Line Should read:

18 11 --- heat is dissipated ---

Reason for change:

spelling

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page	Line	Should read:
22	15	Clear hydraulic fluid - - -

Reason for change:

Incorrect word

Page	Line	Should read:
24	22	and the experience - - -

Reason for change:

clarity

Page	Line	Should read:
28	16	tetrachloro benzenes - - -

Reason for change:

Spelling

Page	Line	Should read:
36	14	- - - cotton boll weevil - - -

Reason for change:

Spelling

Page	Line	Should read:
36	15	methyl parathion

Reason for change:

Spelling

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page Line Should read:
36 25 cars, and is used - - -
Reason for change:
 clarity

Page Line Should read:
37 8 - - - as flakes of lye - - -
Reason for change:
 Incorrect word.

Page Line Should read:
40 4 the universities - - -
Reason for change:
 Incorrect word

Page Line Should read:
43 6 - - - that I was able - - -
Reason for change:
 Incorrect word

Page Line Should read:
46 7 ought to coordinate - - -
Reason for change:
 Incorrect word

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In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

DEPOSITION CORRECTION SHEET

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page Line Should read:
47 4 --- was 100%

Reason for change:

Incorrect answer. Answer given was for period 1970-197

Page Line Should read:
48 4 of new developments by ---

Reason for change:

Incorrect word.

Page Line Should read:
53 23 becomes a way of life. ---

Reason for change:

Incorrect word

Page Line Should read:
55 23 --- method with those customers ---

Reason for change:

Incorrect word

Page Line Should read:
57 19 --- and had projects

Reason for change:

Incorrect word

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page	Line	Should read:
68	2	biphenyls and example of PCB ---

Reason for change:
Incorrect word

Page	Line	Should read:
75	8	(Delete second sentence)

Reason for change:
clarity

Page	Line	Should read:
75	14	--- PCDD's and PCDFs ---

Reason for change:
Spelling

Page	Line	Should read:
75	23	Art review PCDD's ---

Reason for change:
Spelling

Page	Line	Should read:
79	2	--- It is a copy

Reason for change:
clarity

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page	Line	Should read:
84	8	--- proper incineration at 3cents ---

Reason for change:

Incorrect words

Page	Line	Should read:
86	25	--- to product in inventory ---

Reason for change:

Incorrect word

Page	Line	Should read:
106	18	--- Inerteen PPO ---

Reason for change:

Spelling

Page	Line	Should read:
115	19	The bill of lading ---

Reason for change:

Incorrect word

Page	Line	Should read:
116	8	--- to ways of proper ---

Reason for change:

Incorrect word

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page	Line	Should read:
119	2	--- information to

Reason for change:

Incorrect word.

Page	Line	Should read:
121	11	--- installation, vaults and deluge systems and

Reason for change:

Incorrect words

Page	Line	Should read:
121	14	--- well as dielectric fluids, but ---

Reason for change:

Incorrect word

Page	Line	Should read:
121	15	---, lower ratings. The unit ---

Reason for change:

clarity

Page	Line	Should read:
121	16	--- when it was retrofitted ---

Reason for change:

clarity

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page	Line	Should read:
122	10	---, we are ready, ---

Reason for change:

Incorrect word

Page	Line	Should read:
123	3	--- non-electrical uses discontinued?

Reason for change:

Incorrect word

Page	Line	Should read:
124	18	---, to established equipment manufacture with

Reason for change:

clarity

Page	Line	Should read:
125	10	we thought control under ---

Reason for change:

clarity

Page	Line	Should read:
126	20	--- General Electric and

Reason for change:

Incorrect word

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page	Line	Should read:
128	18	--- to the competition

Reason for change:
Incorrect word

Page	Line	Should read:
130	5	--- turn this over to ---

Reason for change:
Incorrect word

Page	Line	Should read:
137	25	It was the ---

Reason for change:
Incorrect word

Page	Line	Should read:
138	22	--- It refers to the chances of

Reason for change:
Incorrect word

Page	Line	Should read:
139	2	--- Here I see it

Reason for change:
clarity

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page ^{was} ~~140~~ Line 10 Should read:
thousand man - - -

Reason for change:
Incorrect word

Page 142 Line 24 Should read:
--- To get the largest possible

Reason for change:
Incorrect word

Page 149 Line 2 Should read:
I am familiar with I.T.

Reason for change:
Incorrect word

Page 149 Line 5 Should read:
--- with Battelle labs

Reason for change:
Spelling

Page 153 Line 23 Should read:
I'd like to know there was no mercury metal.

Reason for change:
Clarity

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DEPOSITION CORRECTION SHEET

In Re: Lannis Smith, et al vs Public Service Company of Oklahoma et al

In re: Upon reading the deposition and before subscribing thereto,
the deponent indicated the following changes should be made:

Page Line Should read:
155 17 transformers and the use of this equipment

Reason for change:
clarity

Page Line Should read:

Reason for change:

Page Line Should read:

Reason for change:

Page Line Should read:

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Reason for change:

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