

1 IN THE CIRCUIT COURT
2 TWENTIETH JUDICIAL CIRCUIT OF ILLINOIS
3 ST. CLAIR COUNTY

4 FRANCES E. KEMNER, et al.,)
5 Plaintiffs,)
6 v.) CAUSE NO. 80-L-970
7 MONSANTO COMPANY,)
8 Defendant.)

9
10 REPORT OF PROCEEDINGS

11 Before the HONORABLE RICHARD P. GOLDENHERSH

12 Testimony of Dr. George Roush

13 Afternoon proceedings only

14 July 25, 1985

15
16 APPEARANCES:

17 MR. REX CARR, Attorney at Law, and
18 MR. JEROME SEIGFREID, Attorney at Law,
On behalf of the Plaintiffs;

19 MR. KENNETH HEINEMAN, Attorney at Law, and
20 MR. JOSEPH NASSIF, Attorney at Law,
On behalf of the Defendant.

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23 PATRICIA A. GANDY, CSR, RPR

24 Official Court Reporter

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WITNESSES:

DR. GEORGE ROUSH

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EXHIBITS:

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1 BE IT REMEMBERED AND CERTIFIED, that heretofore, on
2 to-wit: July 25, 1985, the matter as hereinbefore set forth
3 came on for hearing before the Honorable Richard P. Goldenhersh,
4 Circuit Judge, Twentieth Judicial Circuit, State of Illinois,
5 and the following was had of record, to-wit:

6
7 RECROSS EXAMINATION

8 BY MR. CARR

9 Q Dr. Roush, it is a well known fact that the susceptibility
10 of various animal species to the toxic effects of dioxin varies
11 from species to species, isn't that correct, sir?

12 A Yes, sir.

13 Q It is also known that the effect upon humans varies from
14 person to person when exposed to dioxin, isn't that correct?

15 A I don't know.

16 Q Well, you know, Dr. Roush, that people working in the
17 same department, having the same everyday activity, one person
18 working at that machine can get chloracne and his fellow worker
19 not, you know that from at least not from studies that you
20 performed, at least from studies that Moses/Selikoff performed,
21 do you not, sir?

22 A Yes, sir.

23 Q As a matter of fact, the Moses/Selikoff study showed that
24 of the people with a moderate exposure to dioxin in your plant,

1 49 percent never did get chloracne, isn't that correct, sir?

2 A Yes, sir.

3 Q And for that matter, 24 percent of the people with
4 heavy exposure never did get chloracne, isn't that also correct,
5 sir?

6 A No, sir.

7 Q I'm sorry?

8 A No, sir.

9 Q Would you give the witness Monsanto Exhibit 908, please?
10 And Dr. Roush, please turn to Page 171 of Monsanto's Exhibit 908,
11 and you will see Figure 2 at the bottom of that page is the
12 Moses/Selikoff table dealing with chloracne status, do you see
13 that, sir?

14 A Yes, sir.

15 Q And when you look to the right-hand side of that figure,
16 you will see there the people who have had heavy exposure to
17 2,4,5-T, 24 percent never did get chloracne, isn't that correct,
18 sir?

19 A No, sir.

20 Q Doctor, are you looking at the same--you see where it
21 says moderate exposure 49 percent never did get chloracne,
22 you see that, sir?

23 A Yes, sir.

24 Q And you agree that she did so find that people with

1 moderate exposure, 49 percent didn't get chloracne, never did
2 have chloracne, did you not agree to that, Dr. Roush? Dr. Roush,
3 did you understand my question? I'm asking you did you not
4 agree just a moment ago that according to Moses/Selikoff study,
5 49 percent of the workers who had moderate exposure to it never
6 did get chloracne?

7 A No, sir.

8 MR. CARR: Would you read his answers back to that
9 question that I asked?

10 (The previous question, "As a matter of fact, the
11 Moses/Selikoff study showed that of the people with
12 a moderate exposure to dioxin in your plant, 49
13 percent never did get chloracne, isn't that correct,
14 sir?" was read by the reporter, and the following
15 answer was "Yes, sir."

16 Q And doesn't Moses Selikoff also show, and that's found
17 in this table, that statement that you just agreed with? This
18 table, is it not, sir, on Page 171 of Monsanto Exhibit 908?

19 A Yes, sir.

20 Q And that is the source of your knowledge that 49 percent
21 of the people with moderate exposure to 2,4,5-T or dioxin never
22 did get chloracne, never had chloracne, isn't that the source
23 of that knowledge, sir?

24 A No, sir.

1 Q Do you have other information from your own sources
2 other than the Moses/Selikoff study that 49 percent of the
3 people exposed to dioxin never did get chloracne?

4 A I'm reading from the paragraph above.

5 Q Excuse me, do you have that information from some other
6 source?

7 A This source.

8 Q Then this is the source of your knowledge?

9 A Yes, sir.

10 Q Now, Doctor, the table also in addition to the 49
11 percent in the moderate category also has a heavy category,
12 doesn't it, sir, immediately to the right of that, Dr. Roush,
13 are you looking at the page, do you see that, sir?

14 A Yes, sir.

15 Q And doesn't it show by that table that 24 percent of
16 the workers who had heavy exposure to 2,4,5-T never had chloracne?

17 A No, sir.

18 Q Does it show that 49 percent having moderate exposure
19 never had chloracne?

20 A No, sir.

21 Q Now, Doctor, you just said a moment ago that it did.
22 Doctor, what are you doing? Doesn't this table that I have in
23 front of me, does it have a graph with the words 24 percent
24 above it, sir?

1 A Yes, sir.

2 Q And does it have underneath it heavy?

3 A Yes, sir.

4 Q And is it describing exposure, heavy exposure to 2,4,5-T,
5 sir?

6 A No, sir.

7 Q Doesn't it say 2,4,5-T exposure, sir?

8 A Yes, sir.

9 Q And isn't it describing heavy, moderate, minimal and
10 none?

11 A No, sir.

12 Q Doctor, read the words below the graph. Do they not
13 say none, minimal, moderate and heavy?

14 A Yes, sir.

15 Q And does it not say immediately under that 2,4,5-T
16 exposure?

17 A Yes, sir.

18 Q And are they not referring to the exposure of these
19 workers based upon their recall of their job assignments?

20 A Yes, sir.

21 Q And do they not find that 24 percent of those people
22 with heavy exposure never did have, never had chloracne?

23 A No, sir.

24 Q Doctor, do you see that column there that says 24 percent?

1 A Yes, sir.

2 Q And isn't that a white column?

3 A Yes, sir.

4 Q And is there a table that tells you what the white means?

5 A Yes, sir.

6 Q And what does it say for white for the color white?

7 A Never had chloracne.

8 Q All right. And is there a white column, sir, under
9 the heavy?

10 A Yes, sir.

11 Q And what's the numbers above the white column?

12 A 24.

13 Q 24 percent?

14 A Yes, sir.

15 Q Now, Doctor, isn't that saying the chloracne status for
16 24 percent of these persons who said they had heavy exposure
17 to 2,4,5-T by virtue of their job assignment never had chloracne?

18 A No, sir.

19 MR. CARR: Your Honor, I'd like to take a moment and
20 pass Exhibit 908 to the jury. I didn't expect that response,
21 and I'd like to pass 908 to the jury before I continue.

22 THE COURT: Has 908 been admitted?

23 MR. CARR: It's been referred to by--Monsanto brought
24 it up.

1 THE COURT: Do you have any objection to that being
2 passed to the jury?

3 MR. HEINEMAN: Your Honor, we would certainly move the
4 admission into evidence of this exhibit, Defendant's Exhibit
5 908.

6 (Defendant's Exhibit 908 was offered into evidence.)

7 THE COURT: Any objection?

8 MR. CARR: Well, we certainly would agree to its
9 admission.

10 THE COURT: Fine, 908 is admitted without objection by
11 agreement, since it has been admitted you may pass any part of
12 it to the jury.

13 (Defendant's Exhibit 908 was admitted into evidence.)

14 MR. CARR: I only have the one copy, your Honor. I'd
15 like to have the jury look at it and I direct your attention
16 to the legend that says chloracne status, and then over to the
17 immediate left-hand side where it says heavy, and the graph on
18 that.

19 THE COURT: While that's being done, gentlemen, I'd like
20 to see you at the bench, and I'd like your copy.

21 MR. HEINEMAN: Sure..

22 (An off-the-record discussion was held
23 at the bench.)

24 MR. CARR: And for the record, I've made notes on my

1 copy, so please don't turn to any page other than that page, otherwise
2 you might see something not proper for you to see. Your Honor, we will
3 make copies of that page at the next break.

4 THE COURT: Fine.

5 BY MR. CARR:

6 Q Doctor, Inasmuch as I can't get you to agree to that graph,
7 I'll use that part that you do agree with. 49 percent of those people
8 with moderate exposure according to the Moses/Sellkoff table never had
9 chloracne. Now, Doctor, you also know that from your experience at Nitro
10 that some workers exposed to 2,4,5-T and/or dioxin get liver changes and
11 others don't, you know that too, don't you, sir?

12 A Yes, sir.

13 Q You know that the symptoms that followed your 1949 accident
14 varied that not everybody had the same problem, some would have one
15 problem or two or three or four problems and some might have just one?

16 A Yes, sir.

17 Q Or some might have a half a dozen, they vary?

18 A Yes sir.

19 Q And so the susceptibility to toxic substances like 2,3,7,8 TCDD
20 does vary from human to human, doesn't it, sir?

21 A No, sir.

22 Q Doctor, If 49 percent of the people having moderate exposure never
23 do get chloracne, that is a different variant effect from the effect on the
24 51 percent that do get chloracne, isn't it, sir?

1 A No, sir.

2 Q Doctor, Isn't chloracne different from no chloracne?

3 A Yes, sir.

4 Q All right. And the people that got chloracne--

5 A Yes, sir.

6 Q Got a different health effect from that exposure to dioxin than
7 the 49 percent of the people that did not get chloracne, didn't they, sir?

8 A No, sir.

9 Q Isn't chloracne a health effect?

10 A Yes, sir.

11 Q Some people had it and some people didn't?

12 A Yes, sir.

13 Q Some people had that health effect?

14 A Yes, sir.

15 Q And some people did not have that health effect?

16 A Yes, sir.

17 Q And that's a difference, isn't it, sir?

18 A Yes, sir.

19 Q And that's my question, Doctor, there are different health
20 effects that occurred in the same, from person to person?

21 A Yes, sir.

22 Q As shown by that 49 percent and 51 percent?

23 A Yes, sir.

24 Q Now, Doctor, we do know that dioxin has now been found fairly

1 universally in the United States in the fat of most people at some level.

2 We know that, don't we, sir?

3 A Yes, sir.

4 Q And Doctor, we also know that some people that smoke never, ever
5 get emphysema or lung cancer, we know that, don't we, sir?

6 A Yes, sir.

7 Q And we know that some people that are overweight and that don't
8 exercise never, ever get heart disease?

9 A Yes, sir.

10 Q We know that, don't we, sir?

11 A Yes, sir.

12 Q So there is a difference between the susceptibility, is there
13 not, sir?

14 A Yes, sir.

15 Q Now, is it possible, Doctor, that the reason that one person
16 who is overweight gets heart disease and that another person that is over-
17 weight and doesn't get heart disease, isn't it possible that these people
18 can have a different reaction to the dioxin to which they have been exposed
19 rather than any other cause? Isn't that possible, Doctor, that dioxin
20 makes the difference in whether one gets a heart attack or doesn't get a
21 heart attack being overweight?

22 A No, sir.

23 Q That isn't possible, Doctor?

24 A No, sir.

1 Q And Doctor, we know that people can have different effects from
2 dioxin, chloracne, no chloracne, correct, sir?

3 A Ask that question again, please?

4 (Previous question was read by the reporter.)

5 A No, sir.

6 MR. CARR: Your Honor, I don't feel like spending the rest of my
7 life establishing a point established several times already. Would it be
8 appropriate that the Court might instruct the witness to order him that he
9 has agreed that there are different--that some people get chloracne being
10 exposed to it and others don't?

11 THE COURT: I believe--

12 MR. HEINEMAN: Your Honor, may I comment on that?

13 THE COURT: Yes.

14 MR. HEINEMAN: My objection to what Mr. Carr is posing is that he
15 continually changes the question with this witness and the witness is
16 answering the specific question being asked at a specific time, and he keeps
17 changing back and goes back to another question that he's asked, and I
18 don't think it's fair to instruct this witness to give a particular answer--
19 that he's given a particular answer without giving him a chance to
20 explain this answer.

21 THE COURT: That was exactly the same question. It was not
22 changed, it was stated clearly in plain English and your objection as to
23 that particular question is not accurate. It's overruled. Doctor, I'm
24 ordering you to assume that you have given that answer. You are to take

1 that as a basis for your further answers unless I instruct you otherwise,
2 do you understand, Doctor?

3 A I don't understand the question. We have to talk about the specific
4 question, then.

5 THE COURT: This specific question that you were last requested--

6 A Could I have that last question?

7 THE COURT: I'll have the reporter read it back for you. You
8 are to assume that you did answer yes to that question.

9 A All right, sir.

10 THE COURT: You have a number of times, and you are to continue
11 that assumption and any further questions that are asked of you, unless I
12 instruct you otherwise. Would you read back that question, please?

13 (The previous question, "And Doctor, we know that people
14 can have different effects from dioxin, chloracne, no
15 chloracne, correct, sir?" was read by the reporter.)

16 A The answer to that is yes.

17 Q Now, Doctor, that being the case, may it not be also possible
18 that one person could be overweight all his life and never get a heart
19 attack except, never get a heart attack, Isn't that possible, sir?

20 A Yes, sir.

21 Q And Isn't it possible that that same person being in that
22 situation could get an exposure to dioxin and that dioxin, because of what
23 it can do to the cardiovascular system, Isn't it possible that that is the
24 cause or at the very least a contributing cause to that heart attack?

1 A No, sir.

2 Q That isn't possible, Doctor?

3 A No, sir.

4 Q Doctor, for you to give that answer, you have to ignore Table 7,
5 do you not, sir?

6 A Yes, sir.

7 Q Yes. And your answer is based upon the fact that you don't agree
8 that cardiovascular disorders can result from dioxin exposure, isn't that
9 correct, sir?

10 A No, sir.

11 Q That isn't correct?

12 A (Witness responded by shaking head negatively.)

13 Q And Doctor, then do you agree that cardiovascular disorder can be
14 caused by dioxin?

15 A No, sir.

16 Q And Doctor, your answer that the cardiovascular problem is not
17 caused by dioxin in a particular heavy person, then, is not based upon a
18 disagreement with the statement that cardiovascular disorders can be caused
19 by dioxin, is that correct, sir?

20 A No, sir.

21 Q Doctor, let me do it one more time.

22 A Yes, sir.

23 Q One person can smoke all his life and not get lung cancer, right,
24 sir?

1 A Yes, sir.

2 Q And people vary in how they react to various toxic substances,
3 don't they, sir?

4 A Yes, sir.

5 Q And that has been demonstrated time and time again, hasn't it,
6 sir?

7 A Yes, sir.

8 Q And Doctor, one person can get a heart attack and another person
9 not simply because of being overweight, correct, sir?

10 A Yes, sir.

11 Q Isn't it possible that a cardiovascular disorder can be caused or
12 contributed to be caused then in an overweight person not because he or
13 she is overweight, but because he or she now, since the 40s that we are
14 now all getting in us from the Lysol, from the 2,4-D, from the 2,4,5-T,
15 from other chemicals that have been manufactured by chemical companies,
16 isn't it possible, Dr. Roush, that that is a contributing factor in the
17 increased cardiovascular heart disease rate?

18 A No, sir.

19 Q Doctor, you know that we have the dioxin in us, you know that,
20 sir?

21 A Yes, sir.

22 Q And you know that some people have more than others, don't you,
23 sir?

24 A Yes, sir.

1 Q Have you ever seen a study, Doctor, that did in fact disprove
2 that dioxin in the tissue, in the fat tissue if you will, can contribute
3 to cause a heart attack?

4 A No, sir.

5 Q Now, Doctor, if you haven't seen the study then, then when you
6 say no, that it can't do it, you're saying it not based upon any scientific
7 study, isn't that correct, sir?

8 A No, sir.

9 Q That isn't correct?

10 A No, sir.

11 Q Then Doctor, I'll ask you again, have you seen a scientific study
12 based upon whether or not people with dioxin in their fat tissue are more
13 or less susceptible to heart attacks?

14 A No, sir.

15 Q Is there any study that would suggest that people in their fat
16 tissue are more or less susceptible to heart attacks?

17 A No, sir.

18 Q And Doctor, you have no scientific study dealing with that
19 subject then, isn't that correct?

20 A Yes, sir.

21 Q Oh, you do?

22 A Not to the dioxin in fat, no, sir.

23 Q All right. And Doctor, if you have no scientific studies that
24 say it cannot cause or contribute to cause a heart attack, then you have

1 no basis other than your speculation to the effect that it may not be a
2 contributing cause?

3 A No, sir.

4 Q Isn't that correct, sir?

5 A No, sir.

6 Q What other basis do you have, Dr. Roush?

7 A The Moses study.

8 Q Doctor, the Moses study supported that heart attacks were caused
9 by exposure to chemicals. The Moses study said exactly the same thing,
10 it said those people living in that valley had a 34 percent or yours was
11 34 percent, she didn't place a figure, she just said the people living in
12 that valley, like the Monsanto workers, have a higher death rate from heart
13 attack than the people in the rest of the United States, that's what she
14 said.

15 A Yes, sir.

16 Q And that's all she said.

17 A No, sir.

18 Q Point out to me where she said something else, Doctor. Let me
19 help you, Doctor. The subject was discussed on Page 178.

20 A Yes, sir.

21 Q Now please point out to me where she said that dioxin or chemicals
22 from these plants did not affect the cardiovascular disease rate in Kanawha
23 Valley.

24 A She found no difference in--

1 Q Excuse me, Doctor. Read the language that she used that says
2 the cardiovascular heart disease rate in Kanawha Valley was not caused by
3 this Monsanto plant and others like it?

4 MR. HEINEMAN: Objection, your Honor. He's changed the question
5 again.

6 MR. CARR: Read the question back exactly.

7 MR. HEINEMAN: May I make my objection? The prior question to
8 Dr. Roush was your allegation that she did say that it does that, and he
9 disagreed--

10 MR. CARR: On the contrary. He was the one--

11 THE COURT: The questions were the same. The only difference
12 was when the witness started to paraphrase. He asked him to read the
13 exact language and that's the only difference in the questions. Your
14 objection is overruled. Doctor, if you have located such language, please
15 read it. Go ahead.

16 A I thought you were going to ask her to reread the exact--oh, I'm
17 sorry. "Failure to find significant differences in coronary heart disease
18 in those without chloracne is not a--" "Failure to find significant
19 difference in coronary heart disease in those with and without chloracne
20 in this study is not a definitive finding due to the cross sectional nature
21 of the study and as stated, no chloracne is not synonymous with no exposure."

22 Q Now, Doctor, that's referring not to the people in the Kanawha
23 Valley, that's referring to the workers comparing the so-called unexposed
24 with the exposed workers?

1 A Yes, sir.

2 Q My question was directed to the Kanawha Valley, do you remember
3 that, sir?

4 A Yes, sir.

5 Q Please find for me the statement in there, and it's in the next
6 paragraph, Doctor.

7 A Yes, sir.

8 Q Please find for me any statement that suggests to you or that says
9 to you that the cardiovascular heart disease in Kanawha Valley was caused
10 by something other than these plants and the Monsanto plant in particular
11 located in that valley?

12 A There is none.

13 Q Indeed, there is none because what she says is, "Mortality from
14 cardiovascular disease is known to be higher than national rates in the
15 Kanawha Valley of West Virginia where the plant is located."

16 A Yes, sir.

17 Q That's exactly what she says, and that's all she says with the
18 Kanawha Valley, isn't that correct, sir?

19 A Yes, sir.

20 Q There is not a single other reference in this document other
21 than the one I've just read, isn't that correct, sir?

22 A You're right, yes, sir.

23 Q Now, Doctor, that being the case, this cardiovascular disease
24 in the Kanawha Valley can be higher there among the people that are overweight

1 because they are exposed to these chemicals that are discharged from the
2 Monsanto plant, among others, isn't that correct?

3 A No, sir.

4 Q And Doctor, is there anything, you said the Moses/Selikoff study
5 supported your statement, is there any other study that you are aware of
6 that you think may support your statement?

7 A I think the Suskind study does it as well.

8 Q Does it as well as what?

9 A As this one, makes the same statement.

10 Q It makes the same statement, but, Doctor, that doesn't in any
11 way support what you say that the cardiovascular disease is not caused
12 by the chemicals, does it, sir?

13 A Yes, sir.

14 Q Doctor, do you interpret this, the single statement made,
15 "Mortality from cardiovascular disease is known to be higher than national
16 rates in the Kanawha Valley of West Virginia where the plant is located,"
17 you interpret that to mean that there is support for your theory that the
18 chemical plants have not caused the cardiovascular disease, right?

19 A Yes, sir.

20 Q Doctor, the plain implication of it is to the contrary, is it not?

21 A No, sir.

22 Q What in that sentence tells you that this cardiovascular disease
23 is not caused by these chemical plants and the Monsanto plant in particular?
24 What in that sentence, sir?

1 A The fact that the mortality in the plant is the same as it is
2 in Kanawha Valley, that's what supports it.

3 Q Doctor, they're all people living in the Kanawha Valley, the
4 people working in your plant and the people living in the Valley, they
5 are exposed to the same chemicals. How does that support your statement
6 that these chemicals have not caused the cardiovascular disease? Your
7 workers have got the problem, the people that live in the Valley have got
8 the problem, how can you say that that statement supports your belief
9 that it hasn't caused it?

10 A Because our exposure is so high. If there was an association,
11 then the higher exposure would have more cardiovascular disease, and
12 they don't.

13 Q What scientific study showed that, Doctor?

14 A The fact that--

15 Q Excuse me, what scientific study showed that you have to have
16 a greater exposure to dioxin or the chemicals to have heart disease?

17 A That's related to the fact that with more exposure you get more
18 effect. That's a dose response--

19 Q The only thing you ever said was you get more chloracne, but
20 we've also shown people working right next to one another in moderate
21 exposure, half will get chloracne and half won't.

22 A No, sir.

23 Q You didn't say that, sir?

24 A No, sir.

1 Q We didn't just go through the table, the Moses/Sellkoff table,
2 and you agreed that 49 percent had chloracne?

3 A Yes, sir.

4 Q Had no chloracne, and 51 percent did?

5 A Yes, sir.

6 Q And they were all people in the moderate exposure group?

7 A Yes, sir.

8 Q Now, Doctor, that being the case, the cardiovascular rate in this
9 study has no connection with anything other than the chemical exposure?

10 A No, sir.

11 Q Where is there something in this study, sir, that says the heart
12 disease rate is different, sir?

13 A It is the same.

14 Q Doctor, and as a matter of fact, it is the same amongst the
15 workers that have chloracne and the workers that don't have chloracne, isn't
16 it, sir?

17 A Yes, sir.

18 Q And doesn't that just maybe support the theory, Doctor?

19 A No, sir.

20 Q That the--that this cardiovascular disease is caused by the fact
21 that there is a variance?

22 A No, sir.

23 Q Even with people, some people get one effect and not another?

24 A No, sir.

1 Q Well, we know that is the case, don't we, sir?

2 A No, sir.

3 Q Doctor, we just established, you agreed with me at the start of
4 this that some people react one way to dioxin, in your own plant they do
5 that. We established that to start with, don't you remember, sir?

6 A Yes, sir.

7 Q Now, keep that in mind, Doctor.

8 A Yes, sir.

9 Q Now, if the dioxin can cause one effect in one kind of person
10 and can cause a different effect in another kind of person, can't it, sir?

11 A No, sir.

12 Q It can't, sir?

13 A No, sir.

14 Q Now, Dr. Roush, then I must admit that I am at a loss how to ask
15 you questions if your experience hasn't taught you that dioxin has varying
16 effects upon different people as you've agreed that it has, and you have
17 agreed that it has?

18 A Yes, sir.

19 Q If it has varying effect on different people, can it not have
20 varying effect on other people as well?

21 A It all depends on what effect you are talking about.

22 Q Health effects, Doctor, one or more, little, big, insignificant,
23 great big ones, little bitty ones, different effects, that's what I am
24 talking about.

1 A Yes, sir.

2 Q Now, Doctor, If it affects different people in different ways,
3 doesn't it, sir?

4 A No, sir.

5 Q Doctor, didn't we establish that it affected your workers in
6 different ways? Your workers are people, aren't they, sir?

7 A Yes, sir.

8 Q They have been affected in different ways, haven't they, sir?

9 A Yes, sir.

10 Q Therefore, dioxin does affect different people in different ways,
11 doesn't it, sir?

12 A No, sir

13 Q The people are, your workers are people, aren't they?

14 A Yes, sir.

15 Q And they have been affected in different ways, haven't they, sir?

16 A Yes, sir.

17 Q And it follows then, does it not, sir, that dioxin affects different
18 people in different ways?

19 A No, sir.

20 Q Doctor, do you see the inconsistency in what you are saying?

21 A No, sir.

22 Q You don't see that?

23 A No, sir.

24 Q All right, If you don't see it, Doctor. Doctor--strike that. The

1 people that are sick in a hospital may be affected more intensely or more
2 significantly by exposure to toxic substances than people who are well,
3 Isn't that correct, sir?

4 A Yes, sir.

5 Q And that can affect different people in different ways, can't it,
6 sir?

7 A What can affect different people--

8 Q Toxic substances on sick people.

9 A Yes, sir.

10 Q Some people react differently, some sick people will react differently
11 than other sick people, won't they, sir?

12 A Yes, sir.

13 Q To toxic substances?

14 A Yes, sir.

15 Q And dioxin is a toxic substance?

16 A Yes, sir.

17 Q And will not sick people react differently from person to person
18 to dioxin exposure?

19 A No, sir.

20 Q Doctor, do you see any inconsistency in that answer and your
21 previous answer?

22 A No, sir; no, sir.

23 Q And there is nothing you wish to say in addition?

24 A Yes, sir.

1 Q Sir?

2 A Yes, sir.

3 Q There is something you wish to say in addition to that?

4 A Yes, sir. There is a minimal exposure that's going to produce
5 an effect. There is a level at which you don't see effect from all
6 chemicals, including dioxin. That's the reason most of us don't have any
7 problem with dioxin. The man in the hospital exposed to a level of dioxin
8 that we can't measure is not affecting that man. If there is a sufficient
9 dose, the man who is in the hospital will get sick, whereas a man who is
10 not sick with the same exposure probably will not have an effect.

11 Q That's exactly my point, thank you, Doctor. That's exactly what
12 I have been trying to establish. Different people react differently to
13 the same dose.

14 A Yes, sir.

15 Q A sick person with a dose can get sick. Now, the same thing is
16 true of people that have other things that may affect their health. Given
17 the same dose, that dose can affect one person one way and a different
18 person another way, can it not, sir?

19 A I don't know.

20 Q Doctor, didn't we just get through that, sir? Didn't you just
21 agree that the same dose would affect a sick person one way and a healthy
22 person a different way, or would have no effect on a healthy person?

23 A For the same dose.

24 Q The same dose?

1 A Yes, sir.

2 Q And that holds true in other human beings as well, there are
3 genetic differences, one person goes through their life never being sick,
4 exposed, go to grade school, have the same exposure to the common cold,
5 go everywhere, go through chemical plants, live their whole life without
6 being sick. You know that, don't you, sir?

7 A Yes, sir.

8 Q And other people can be exposed to the same thing, the same
9 lifestyle and be sick, can't they, sir?

10 A Yes, sir.

11 Q Now, because people are made differently and they react differently,
12 don't they, sir?

13 A Yes, sir.

14 Q Now, isn't it possible, sir, that the person who has a heart
15 attack is less resistant to that same dose of dioxin than a person who
16 does not have a heart attack, isn't that possible, sir?

17 A No, sir.

18 Q Now, Doctor, then you have to back off from your original
19 predicate that people react different, different people react differently
20 to the same dose, won't you, sir?

21 A No, sir.

22 Q No? Doctor, is there something different in what I said about
23 my question that would cause for this other response?

24 A Yes, sir.

1 Q All right, would you please explain that, sir?

2 A I don't think that the cardiovascular disease is a result of
3 exposure to dioxin.

4 Q Doctor, my question had in it the hypothesis that dioxin causes
5 cardiovascular disease, there is evidence in this record. Now, assume
6 if you will, please, sir, that dioxin does cause or can cause or has the
7 potential of causing cardiovascular disease, will you do that, sir?

8 A Yes, sir.

9 Q Isn't it possible, sir, that one person then exposed to dioxin
10 can have heart disease, heart attack, whereas another person exposed to
11 the same dose would not have a heart attack?

12 A Yes, sir.

13 Q Yes. And Doctor, that's exactly the circumstance that exists
14 in your plants, isn't it, sir? These people are exposed to the same
15 substance, the same dose?

16 A No, sir.

17 Q They are not, sir?

18 A No, sir.

19 Q Don't they work right next to one another, sir?

20 A Yes, sir.

21 Q And do they not get the same air coming, do they not breathe
22 the same air and work with the same tools in the same plant? Don't they
23 work there day in and day out right next to one another?

24 A Yes, sir.

1 Q And aren't they then exposed to the same thing, Dr. Roush?

2 A No, sir.

3 Q How are they exposed to something different, Dr. Roush?

4 A One man, if you put a personal monitor on him will have 304
5 times a bigger dose than a man doing exactly the same job. So the
6 major problem on everything we talk about, the health effects of dioxin
7 on that list is all related to a dose effect, and as you go down, the dose
8 has to get bigger before you're going to see an effect. So those down
9 at the bottom have not been studied very carefully, those up at the top
10 on that are the ones that are the clearest defined, and those are all
11 related to heavy exposure, without exposure you don't see those things--

12 Q Doctor, I will agree, without exposure you don't see those
13 things. I am not quarrelling about that at all.

14 A And that's what we mean about people who work in Kanawha Valley.

15 Q These people who do live in the Kanawha Valley do have exposure,
16 don't they?

17 A Not measurable.

18 Q Now, Doctor, whether you have the instruments capable of
19 measuring, we know they have exposure.

20 A I don't know.

21 Q Doctor, you know they have it in their fat tissue, dioxin, you
22 know that, don't you?

23 A Yes, sir.

24 Q So they have exposure?

1 A Yes, sir.

2 Q And those people in that valley are exposed to more
3 chemicals than the people in Belleville, you know that, don't
4 you, sir?

5 A Yes, sir.

6 Q And as far as you know, there is no difference between
7 the people in the Kanawha Valley and the people in Belleville
8 other than the fact that the Kanawha Valley is heavily populated
9 with chemical plants, including Monsanto, isn't that correct,
10 sir?

11 A No, sir.

12 Q What other difference is there, Dr. Roush, between the
13 people in the Kanawha Valley and the people here that you know
14 of, sir?

15 A The people in this area have the same amount of dioxin
16 in their fat as the people who live in Kanawha Valley.

17 Q How do you know that, Doctor?

18 A Because studies have been--

19 Q Who has studied the people of the Kanawha Valley?

20 A No one has.

21 Q Then you don't know that?

22 A Not as a fact.

23 Q Then don't give me something you know is not a fact.
24 Doctor, what difference is there between the people in the

1 Kanawha Valley and the people that live in Belleville other
2 than the chemical plants in Kanawha Valley to your knowledge, sir,
3 without speculating?

4 A No, sir, I don't have anything.

5 Q Yes, indeed. But you do know that they have a higher
6 rate of heart attacks, don't you, sir?

7 A Yes, sir.

8 Q Now, Doctor, is it possible that the tremendous onset
9 of lung cancers that we have had and emphysema that we have had
10 has been affected by the dioxin that we are all now exposed to?

11 A No, sir.

12 Q You don't think that's possible?

13 A No, sir.

14 Q All right. And you say it's not possible, so we don't
15 have to go through this examination again, say it is not possible
16 for the same reasons that you say the Kanawha Valley people have
17 a different lifestyle than the rest of us, don't you, sir?

18 A Yes, sir.

19 Q Now, Doctor, to get to another point relating to the
20 Krummrich health study, if you would--

21 (Plaintiff's Exhibit 1516 was marked for
22 identification.)

23 Q I hand you now what has been marked Plaintiff's Exhibit
24 1516 and ask you if you recognize that as the blood work ordered

1 to be done in the Krummrich health study conducted by Dr. Suskind
2 in the fall of 1979.

3 A It looks like it, sir.

4 MR. CARR: I offer that exhibit into evidence, your
5 Honor.

6 (Plaintiff's Exhibit 1516 was offered into evidence.)

7 THE COURT: Any objections?

8 MR. HEINEMAN: What's the number, sir?

9 MR. CARR: 1516.

10 MR. HEINEMAN: Your Honor, it is hard for me to tell
11 based upon this whether or not this is all or part of the docu-
12 mentation setting forth what was to be done. I don't know, I
13 don't have what it was, that this was attached to.

14 MR. CARR: It came by itself, counsel, in this form.

15 MR. HEINEMAN: It came by itself in this form?

16 MR. CARR: Along with the Krummrich documents.

17 MR. HEINEMAN: Well, your Honor, I would have to object
18 to it only on the ground that I don't think sufficient foundation
19 has been established for it, certainly not through this witness.

20 THE COURT: Objection is overruled. I think it has.
21 It is admitted over objection.

22 (Plaintiff's Exhibit 1516 was admitted into evidence.)

23 Q Doctor, you recognize those various tests described there
24 as in fact the tests that were performed, don't you, sir?

1 A Yes, sir, I believe so, I think that's--

2 Q And drawing your attention to the second page with regard
3 to urine. What tests, what's to be tested for in the urine?

4 A The test that we call urinalysis, looking for--

5 Q No, the urine, not the urinalysis. What was to be
6 tested for in the urine? It says uroporphyrins and coproporphyrins,
7 doesn't it, sir?

8 A Yes, sir.

9 Q That's what was going to be tested for in this blood
10 study, this urine study, among others, wasn't it, sir?

11 A Yes, sir.

12 Q And the last page refers, of course, that is the Metpath
13 work, and you have got urine containers there and you have the
14 contact person in Chicago that you are going to contact and all
15 that, doesn't it, sir?

16 A Yes, sir.

17 (Plaintiff's Exhibit 1509A was marked for
18 identification.)

19 Q Doctor, you recognize 1509A as 1509, but not all three
20 test ranges put on one page rather than on three?

21 A Yes, sir. I know these are all Metpath ranges.

22 Q My question is specifically, you recognize 1509A as
23 Exhibit 1509 but put on one page rather than three? We had
24 three separate pages that was 1509, do you recall that?

1 A No, sir.

2 Q You don't recall that?

3 A I remember we talked about that, but I don't know
4 whether it was on one page.

5 Q It was on three pages.

6 A Yes, sir.

7 Q We can dig it out if you--

8 A I just can't recall what the number was or that it was
9 on three pages.

10 Q Accept from Mr. Seigfreid that it was 1509 and accept
11 from me that it was on three pages, all right?

12 A Yes, sir.

13 Q These are the same test ranges that were on 1509?

14 A Yes, sir.

15 Q Now, Doctor, you also know that these ranges were
16 supplied to us and under the request that we wanted to receive
17 from Monsanto the normal ranges used, you know that, don't you,
18 sir? You have been told that by counsel, have you not?

19 A Yes, sir.

20 Q And that these documents were supplied to us by your
21 lawyers when I asked that I wanted something to see that, to
22 interpret the abnormal, to interpret the porphyrins that I
23 wanted, the reference range used for these porphyrins?

24 A Yes, sir.

1 Q And this is what was supplied, you know that, don't you,
2 sir?

3 A Yes, sir.

4 Q And Doctor, you know that in two, in the cases of two
5 persons, the Metpath laboratory gave a value that you accepted
6 as being based upon a normal range, do you recall that, sir?
7 Mr. Riley, one person, he had .20 liters of urine, and another
8 had two liters of urine, do you recall that, sir?

9 A Yes, sir.

10 Q And now .20 liters of urine is approximately one fifth
11 of a quart, isn't it, sir? A liter is just a fraction under a
12 quart, is it not, sir?

13 A Yes, sir.

14 Q And two liters would be two quarts?

15 A Yes, sir.

16 Q Nearly two quarts, wouldn't it, sir?

17 A Yes, sir.

18 Q So the only two urines that were measured there where a
19 measurable amount was given was the Metpath Laboratory gave a
20 result that you accepted as normal or as abnormal, isn't that
21 correct, sir? And it was the only two that you accepted?

22 A I didn't accept those as normal.

23 Q No, it was the only two that you accepted as a valid
24 test result based upon these ranges, not that you call them

1 either normal or abnormal?

2 A No, sir, I didn't even accept that.

3 Q You didn't accept that?

4 A No, sir.

5 Q Do you recall Riley, you remember testifying as to
6 Riley?

7 A Yes, sir.

8 Q And Thoman?

9 A Yes, sir.

10 Q And you recall those values there, sir?

11 A Yes, sir.

12 Q And you said there was a test range there?

13 A Yes, sir.

14 Q And so that result can be used?

15 A No, sir.

16 Q What did you say about that, Dr. Roush?

17 A You can't use a 200 ml as a man's excretion of urine in
18 a day.

19 Q You can't do what?

20 A You can't use 200 ml as a man's excretion in one day.
21 That's not right. That's improper.

22 Q Well, what about the two quarts?

23 A Two quarts is possible, but not the fifth of a quart.

24 Q Well, the two quarts you accepted that as test range

1 value, didn't you, sir?

2 A Yes, sir.

3 Q And now, Doctor, the other one you didn't accept because
4 you didn't believe that a man would excrete only a fifth of a
5 quart in a day's time, in 24 hour's time?

6 A Yes, sir.

7 Q Do you know that these urines were to be measured? You
8 know that, don't you, sir?

9 A They were supposed to be measured.

10 Q And they were only in the case of two that they were
11 in fact measured, isn't that right, sir?

12 A Yes, sir, and one was improper.

13 (Plaintiff's Exhibit 1517 was marked for
14 identification.)

15 Q I hand you Exhibit 1517, that's another document furnished
16 us by Monsanto. And tell me whether or not it deals with this
17 particular study, Krummrich health study?

18 MR. CARR: Your Honor, I note this 1509A hasn't been
19 passed to the jury. I'd like to have it passed.

20 THE COURT: Fine. I don't believe you moved its
21 admission yet.

22 MR. CARR: All right. I'll move its admission. It is
23 the same as 1509 with the exception that it's on one page.

24 (Plaintiff's Exhibit 1509A was offered into evidence.)

1 THE COURT: Any objection?

2 MR. HEINEMAN: I'm just looking to see, your Honor. I
3 see that 1509 was admitted over objection.

4 THE COURT: You want me to incorporate the same objections?

5 MR. HEINEMAN: With the Court's permission, I'd like to
6 incorporate the same objections to 1509A, which is a part of a
7 previously admitted exhibit.

8 THE COURT: Fine. Then I will do that. It will be
9 admitted over the same objections. You may pass it to the jury.

10 (Plaintiff's Exhibit 1509A was admitted into evidence.)

11 MR. CARR: And your Honor, I'd like the comments of
12 counsel made in chambers wherein they agreed that these were
13 the normal test ranges given to us at our request, that he agreed
14 in chambers that these indeed were the test ranges that they
15 gave and have so stipulated, I'd like that incorporated at the
16 same time, if the Court would please.

17 THE COURT: So incorporated.

18 MR. HEINEMAN: Your Honor, we did agree that these
19 reference ranges were the Metpath normal ranges that we
20 received.

21 THE COURT: Fine. So incorporated.

22 MR. CARR: You agreed more than that. You agreed that
23 those are the ranges you gave me in response to my request for
24 the ranges used in measuring these porphyrins and determining

1 whether or not these porphyrins were abnormal, that's what you
2 agreed to, because that's what I asked for and that's what you
3 agreed.

4 MR. HEINEMAN: We agreed and I think the record is clear
5 on this that these are indeed the Metpath normal reference
6 ranges which were used in the Suskind Krummrich examination by
7 the Metpath Laboratories and were provided, I assume, to
8 Dr. Suskind and were provided to us by Dr. Suskind and were
9 turned over by us to Mr. Carr in response to his request.

10 MR. CARR: In response to my request for the normal
11 values used, the test ranges used in determining whether or not
12 these porphyrins were normal or abnormal and that has to be
13 added to it.

14 MR. HEINEMAN: I would have to look at the request, your
15 Honor, but I think our stipulation is on the record and is clear.

16 THE COURT: I believe that the record did reflect that
17 in our conference in chambers. It is noted on the record in
18 open Court. Mr. Carr, before you go into examination, is this
19 a good point for a short break?

20 MR. CARR: Sure.

21 THE COURT: Ladies and gentlemen, we will take a short
22 break at this time. I would remind you that the admonishments
23 which I gave you earlier will apply during this break also. The
24 Court is in a short recess.

1 (At this time, Court was in recess.)

2 MR. CARR: Your Honor, we have had copies of the page
3 from Monsanto Exhibit 908 photoed now for the jury, and I'd
4 like to have that page marked 1518 and made a Plaintiff's
5 Exhibit.

6 (Plaintiff's Exhibit 1518 was marked for
7 identification.)

8 THE COURT: That's already part of 908 which has been
9 admitted?

10 MR. CARR: That's correct.

11 BY MR. CARR:

12 Q Doctor, you recognize 1518 as page 171 containing the
13 chart relating to chloracne status, do you not?

14 A Yes.

15 Q From the Moses/Selikoff study?

16 A Yes.

17 MR. CARR: I offer 1518, if it please the Court.

18 (Plaintiff's Exhibit 1518 was offered into evidence.)

19 THE COURT: Fine.

20 MR. CARR: And we have copies to pass to the jury.

21 THE COURT: It is part of 908 which has been admitted
22 by agreement.

23 (Plaintiff's Exhibit 1518 was admitted into evidence.)

24 Q Doctor, I think I previously handed you Exhibit 1517, I

1 don't recall whether it's offered into evidence or not. If it
2 hasn't, I'll now offer--did I get a response from the witness
3 on the exhibit?

4 THE COURT: I don't believe so.

5 Q Doctor, you recognize this as something called communi-
6 cations outline dealing with the Krummrich plant study, and some
7 notes attached to it from some person associated with that study?

8 A I recognize both of these, but I'm not sure they are
9 together.

10 Q They were attached when they were given to me is all
11 I can tell you.

12 A Yes, sir.

13 Q And they have consecutive page numbers, do they not?

14 A Yes, sir.

15 MR. CARR: I offer 1517 into evidence.

16 (Plaintiff's Exhibit 1517 was offered into evidence.)

17 MR. HEINEMAN: Your Honor, I don't think an adequate
18 foundation has been laid thus far with this witness, and I would
19 have to object to it on that basis, lack of foundation.

20 MR. CARR: I'll ask a few more questions.

21 Q Doctor, you recognize by the attachments and by the cover
22 sheet itself that it is dealing with the Krummrich plant study
23 that was conducted in October of '79, do you not, sir?

24 A I have to answer it as I think so.

1 Q Yes.

2 THE COURT: I'm sorry, I didn't hear the answer.

3 MR. CARR: He said he thought so, your Honor.

4 THE COURT: I think a foundation has been laid. It is
5 admitted over objection.

6 (Plaintiff's Exhibit 1517 was admitted into evidence.)

7 (Plaintiff's Exhibit 1517A was marked for
8 identification.)

9 Q Doctor, 1517A is the last--

10 MR. HEINEMAN: Your Honor, I just for clarification of
11 the record, my objection is remade after the other, the additional
12 question that Mr. Carr made.

13 THE COURT: Right. I assumed that it was.

14 MR. HEINEMAN: The same objection applied on foundation.

15 THE COURT: Right.

16 MR. HEINEMAN: Thank you.

17 THE COURT: You're welcome.

18 MR. CARR: The last page of 1517A I'd like to pass that
19 to the jury.

20 THE COURT: It is part of an admitted exhibit. You may
21 do so.

22 (Plaintiff's Exhibit 1519 was marked for
23 identification.)

24 Q Doctor, I now hand you Exhibit 1519 and I ask you if

1 you recognize, well, represent to you, you don't need to
2 recognize it, represent to you that that's the laboratory
3 result from the Charles Beckman, Krummrich plant study results,
4 and you do recognize that as such, don't you, sir, upon my
5 representation?

6 A Yes, sir.

7 MR. CARR: Your Honor, I offer this individual exhibit,
8 it's already part of a group exhibit that's already in evidence.
9 I offer it and I wish to pass it to the jury as well.

10 (Plaintiff's Exhibit 1519 was offered into evidence.)

11 THE COURT: Okay, it's part of an exhibit that's been
12 admitted into evidence. Any objections to it from the prior
13 exhibit are incorporated. It is admitted.

14 (Plaintiff's Exhibit 1519 was admitted into evidence.)

15 Q Now, Doctor, these exhibits, this last group of exhibits,
16 1509 and 1510, that is the instructions of what to do, and 1517,
17 communications outline, and the lab tests all deal with the
18 procedure and the results obtained in this Krummrich plant study,
19 do they not, sir? They all deal with the same subject?

20 A Yes, sir.

21 Q Now, Doctor, again to put it in a frame of reference,
22 the Nitro work had already been done in June of 1979 prior to
23 this work being done in October of 1979?

24 A Yes, sir.

1 Q And the same laboratory was used by Dr. Suskind in both
2 studies, was it not, sir?

3 A I think so.

4 Q The Metpath Laboratory, you recall, was attached to
5 those?

6 A I didn't pay attention whether it was Metpath, but I
7 think they are the same. They look the same.

8 Q They are the same.

9 A All right.

10 Q Page 1517A, the last page that's handwritten there, at
11 the very bottom of the page it says "measure the volume of urine,"
12 doesn't it, sir?

13 A Yes, sir.

14 Q Now, Doctor, that is attached to this document that has
15 several pages describing what could be done, the things discussed,
16 apparently somebody's memo dealing with what's going to take
17 place and how it should take place in this study, isn't that
18 correct, sir?

19 A Yes, sir.

20 Q And he makes a note there that the volume of urine is
21 to be measured?

22 A Yes, sir.

23 Q Now, the volume of urine in fact was not measured
24 except these two people so far as these exhibits that you have

1 seen are concerned, isn't that correct, sir?

2 A I think, yes, sir.

3 Q Now, the results given by the laboratory makes a special
4 note, doesn't it, sir, that there was no total volume given?

5 A Yes, sir.

6 Q In all of these other than the two we discussed earlier?

7 A Yes, sir.

8 Q And therefore the laboratory could not give a result
9 that you would accept as a possible valid result, isn't that
10 correct, sir?

11 A Yes, sir.

12 Q And the Moses/Selikoff study, however, they did measure
13 the urines, they had spot samples just as was had at Nitro by
14 Suskind and by--at Krummrich by Suskind, did they not, sir?

15 A Yes, sir.

16 Q And they made a simple calculation, didn't they, sir?

17 A Yes, sir.

18 Q I think Mr. Heineman described it as a simple ratio
19 calculation, didn't they, sir?

20 A I'm not sure of his characterization of it.

21 Q Well, I wrote it down and that's what he described and
22 you agreed with it that it was a simple calculation.

23 A Yes, it is.

24 Q But neither at Nitro nor at Krummrich did you at Monsanto

1 perform the simple calculation needed to make these porphyrin
2 results valid in your judgment, isn't that correct, sir?

3 A No, sir.

4 Q That isn't correct?

5 A You're right, we did not.

6 Q You did not? And by doing that, you have been able to
7 in this courtroom ignore, and you have ignored all of the
8 porphyrin results reported by Metpath, have you not, sir?

9 A Yes, sir.

10 Q Sir?

11 A Yes, sir.

12 (Plaintiff's Exhibit 1519A and 1509B were marked
13 for identification.)

14 Q Doctor, 1519A is the second page of Exhibit 1519, is
15 it not, sir?

16 A Yes, sir.

17 Q Blown up? And 1509B is a copy of Exhibit 1509 blown up,
18 is it not, sir? 1509A?

19 A Yes, sir.

20 MR. CARR: Offer 1509B and 1519A, if it please the Court.

21 (Plaintiff's Exhibit 1519A and 1509B were
22 offered into evidence.)

23 THE COURT: Do you want me to incorporate your prior
24 objection?

1 MR. HEINEMAN: Yes, your Honor, and I am not sure which
2 is which.

3 MR. CARR: 1509B is a blow-up of 1509A, 1519A is a
4 blow-up of the second page of 1519.

5 THE COURT: The prior objections are incorporated, they
6 are admitted over objection, same ruling.

7 (Plaintiff's Exhibit 1519A and 1509B were
8 admitted into evidence.)

9 Q Doctor, the laboratory, notwithstanding the fact that
10 no volume was given, first of all they point out that no volume
11 was given and thus they are expressing the results, are they
12 not?

13 A Yes, sir.

14 Q And you see this line with the stars all across from it,
15 they separate with that line and you have used it before to
16 separate the normal values from the abnormal?

17 A Yes, sir.

18 Q Yes. Now, in that abnormal line they have iron reported
19 as abnormal, it is outside that reference range, is it not, sir?

20 A Yes, sir.

21 Q And the report, the lipids total serum lipids, as
22 abnormal, it is in fact outside that reference range, isn't it,
23 sir?

24 A Yes, sir.

1 Q And they also put the coproporphyrin range and the
2 uroporphyrin range 27 and 10, in each instance those values are
3 outside the ranges shown in 1509B, aren't they, sir?

4 A Yes, sir.

5 Q Now, Doctor, when you went through the group of exhibits
6 1504 with Mr. Heineman, he asked you for, oh, perhaps ten,
7 eleven different ones and I won't go through those same ones,
8 but he asked you whether or not they were the appropriate or the
9 proper number of checks placed in the slot for, well, for all
10 the findings there and for lipids and other, isn't that correct,
11 sir, as well as lipids and other?

12 A Yes, sir.

13 Q And you responded in many instances that in the other,
14 about eleven times I think you responded that there was a check
15 mark there and no value to support that check mark, do you
16 recall that, sir?

17 A I recall, not the number, but we did that.

18 Q And I won't hold you to that number, Doctor, not
19 suggesting that that is not a correct number because I haven't
20 counted them, but there was a large number of, and in each of
21 those, and the vast majority of those instances where you said
22 there was a checkmark in the health study that we prepared when
23 you said that there should not be a particular check mark, it
24 was the creatinine value that you were striking out from there,

1 isn't it, sir?

2 A I don't recall that.

3 Q Dr. Roush, you don't recall the number of exhibits you
4 went through?

5 A Yes, sir. But I didn't remember it was the creatinine
6 that was the one that we were talking about. But if the creatinine
7 was abnormal and it was recorded, then I would know it, but
8 I'm not saying how many of those were creatinines, I can't talk
9 about that.

10 Q Now, Doctor, you know from your study of the exhibits
11 that we listed as abnormal and gave a check for any time the
12 coproporphyrin or the uroporphyrin or the creatinine was outside
13 the test range values shown by Exhibit 1509B, you knew that and
14 know that, don't you, sir?

15 A No, sir.

16 Q You don't know that?

17 A No, sir, I didn't think, those three were not those that
18 we talked about as being the ones that were out of normal range.

19 Q Doctor, you don't remember that we talked about the
20 coproporphyrin and the uroporphyrin values?

21 A Yes, sir.

22 Q And you did not agree that that check mark should be
23 there?

24 A Yes, sir.

1 Q Did you say the check mark shouldn't be there?

2 A Yes, sir.

3 Q And you know that each time it was there it was because
4 there was a value in that lab result, in that lab report that
5 was outside the ranges given to us by Monsanto's counsel as
6 shown by 1509B, you know that, don't you, sir?

7 A No, sir.

8 Q You don't know that?

9 A No, sir. I didn't think we were talking about copro-
10 porphyrins and uroporphyrins when we called them abnormal or not
11 abnormal.

12 Q Doctor, you're talking about the examination, just the
13 examination by Mr. Heineman, aren't you?

14 A Yes, sir.

15 Q You're not talking about the examination that I
16 conducted, are you?

17 A No, sir.

18 Q All right. So I won't confuse you, you recall when I
19 examined you about the porphyrins?

20 A Yes.

21 Q You would not agree that they were abnormal?

22 A Yes, sir.

23 Q And you wouldn't agree because we were calling them
24 abnormal if they were outside of these ranges and you would not

1 call them abnormal, do you recall that, sir?

2 A Yes, sir.

3 Q All right. Now, when Mr. Heineman examined you,
4 Dr. Roush, he went through the lipids and the other, did he
5 not?

6 A Yes, sir.

7 Q And in the case of the other, whenever you saw a
8 check mark there, you did not use the creatinine finding to
9 determine whether or not that check mark was valid, did you?
10 You disregarded this finding for the creatinines, didn't you,
11 sir?

12 A Disregard it in relationship to what?

13 Q You said the check mark should not be there.

14 A For creatinine?

15 Q Yes.

16 A Yes, sir, but I don't recall those three being a part
17 of the check list because we didn't have a reference range for
18 those.

19 Q Doctor, you have had this reference range from the
20 beginning. The reference range was Exhibit 1509, it was put
21 into evidence.

22 A Yes, sir.

23 Q During my examination of you.

24 A Yes, sir.

1 Q You had it during the time Mr. Heineman examined you?

2 A Yes, sir.

3 Q And didn't you disregard those values set out in 1509
4 at the time you were interrogated by Mr. Heineman and gave your
5 response relative to the creatinine finding in the other column?

6 A I don't recall that.

7 Q Doctor, assume that when Mr. Heineman examined you that
8 you would not give credence to the creatinine finding in these
9 various columns, could you do that, sir?

10 A Yes, sir.

11 Q Now, in fact, that creatinine was reported as abnormal
12 and was abnormal in accordance with the reference ranges given
13 us by your attorneys, then your testimony in that respect would
14 be inappropriate, would it not, sir? It would be wrong?

15 A Could I have that repeated?

16 Q Sure.

17 (Previous question was read by the reporter.)

18 A If we reported the creatinine as abnormal, that would
19 be wrong.

20 Q I'm sorry?

21 A If we reported the creatinine as abnormal, that would
22 be wrong.

23 Q So what you said was in each, for instance, in the case
24 of Carter, Conte, Crame, Esmon, Fay, Gary, Harper, Herman--or

1 Heumann, Herman as well, Huntley, Jenkins, Karsteter, Kirk,
2 Labonsky, Lewallen, Moore, Picarella, Purkey, Rensing, Richardson,
3 Schrock, I can't read Jerry's handwriting, Sumoski, Turner, C.,
4 H., and J., Weber, Wilcox, in all of those instances you
5 testified that the creatinine finding in all those men should
6 not be considered abnormal, did you not, sir?

7 MR. HEINEMAN: Objection, your Honor. He was not
8 asked specifically about creatinine, he was asked to look at
9 all the others, at least by me.

10 THE COURT: Objection is overruled.

11 A Would you repeat the question for me?

12 (Previous question was read by the reporter.)

13 A Yes, you can't tell whether they're abnormal or normal.

14 THE COURT: Doctor, you've got to concentrate on these
15 questions and remember them through objections. I've asked
16 you this before, we can't be repeating every question that's
17 been objected to, so you have to remember them over the course
18 of the objection. If need be, purposely don't listen to the
19 objection, but you have to listen to the questions.

20 A My mind gets caught up on the objection.

21 THE COURT: Why don't you just ignore the objections
22 because I am the one who has to take care of that. You can't
23 do anything about that one way or the other. Mr. Carr, you
24 may proceed.

1 Q Doctor, if in the instance of all those persons that
2 Mr. Heineman went through and what I am trying to do is to save
3 some time--

4 A Yes, sir.

5 Q --by not going through each of those exhibits again.

6 A Yes, sir, right.

7 Q And let me just show you Carter, for instance, look at
8 Carter's, I don't have the Court's exhibit here, look at my
9 exhibit on Carter and see whether or not you would agree as to
10 how many abnormalities G. Carter had. I take it that's G. Carter
11 in the other column.

12 A Carter, G.

13 Q Yes.

14 A Yes, sir.

15 Q Now, in the other column, sir, under G. Carter on
16 Exhibit 1509, there is one check mark, is there not, sir?

17 A Yes, sir.

18 Q Now, how many other abnormalities do you find according
19 to your reading of Carter's record?

20 A Yes, sir. The cholesterol was the normal range.

21 Q Doctor, that's a lipid. Now, there is a column here for
22 lipids, and I am not asking you about lipids, I'm asking you
23 about the column for the other.

24 A I would not call these abnormal.

1 Q Right. And so the creatinine finding there is what?
2 What's the numbers they give for the creatinine for G. Carter?

3 A 2180 milligrams per liter.

4 Q Now, is 2180 above or below the range of 800 to 1900?

5 A It's above.

6 Q All right. So when you went through that exhibit, if
7 you saw 2180, would you say that's not abnormal, and therefore
8 there should be no checkmark in Exhibit 1507, isn't that correct,
9 sir?

10 A Yes, sir.

11 Q All right. And now to save time, the same thing is
12 true wherever one of these check marks in Exhibit 1507 is
13 represented by creatinine number that's outside this test range
14 that's shown in 1509B, you would say that's not an abnormality,
15 would you not, sir?

16 A Yes, sir.

17 Q And that is the basis for your testimony that all those
18 persons that I read off to you that you said they should not
19 have a check mark in the other column, isn't that correct, sir?

20 A I don't think so.

21 Q You don't think so?

22 A No, sir.

23 Q Now, I'm just talking about if the check mark only
24 refers to creatinine. I'm not saying where there may be other

1 check marks, I don't want you to get confused, but simply said
2 you gave no credit or credence to the Metpath report on creatinine
3 value, isn't that correct, sir, when you testified under
4 questioning by Mr. Heineman?

5 A Yes, sir.

6 Q All right. And Doctor, if your testimony is wrong,
7 that is, if you eliminated the creatinine finding by mistake
8 in these number of men, then the check mark should be in that
9 place in that column, should they not?

10 A I don't know how you determine abnormal or normal.

11 Q Doctor, that isn't what I am asking you. All I'm
12 saying, if you are mistaken, then the check mark should be
13 there, shouldn't it, sir?

14 A If I am mistaken, yes, sir, yes, sir.

15 Q Yes. And Doctor, that is the overwhelming majority
16 of places where you disagreed with the presence or the absence
17 of check marks, it deals with the creatinine finding, doesn't
18 it, sir?

19 MR. HEINEMAN: Objection. You mean in the other column
20 only?

21 MR. CARR: Yes, in the other column.

22 A I don't recall it that way.

23 Q Doctor, just look at the last ten, look from Lewallen,
24 Moore, Picarella, Purkey, Rensing, Richardson, Schrock, Sumoski,

1 Turner, H., C., J., Weber and Wilcox, and see if that isn't
2 true, could we have that exhibit, the Group Exhibit 1504? The
3 only way we can do it, Doctor, is to go through one by one.
4 Now, Doctor, you looked at Carter and you said you didn't use
5 it, look at the next one, Conte, after Carter.

6 A They're out of order.

7 Q They are? Then we will be here all--

8 A I can't find Conte, but they are somewhat in order
9 but not one hundred percent.

10 Q What about Andrews, is he on top?

11 A Yes, sir.

12 Q Look at Andrews and see if there isn't a, there is one
13 check mark in Andrews for other on 1507, is there not?

14 A The second page is missing from that one.

15 Q Here it is.

16 A I'm sorry.

17 Q It just came off.

18 A Your question, sir?

19 Q I want you to look at the Exhibit 1507 and see if
20 there is one check mark in the column 1507 in other. You're not
21 looking at 1507, Doctor, this is 1507 here. There is one
22 check mark for Andrews.

23 A Yes, sir.

24 Q Now look at the Andrews lab report and see how many

1 abnormalities there are other than the creatinine value in the
2 other column.

3 A One.

4 Q And what is that, sir?

5 A Triglyceride.

6 Q That's a lipid, Doctor.

7 A Yes, sir.

8 Q Now, are there any--

9 A All right, no.

10 Q All right. And therefore when you testified with
11 Mr. Heineman, you disregarded the check mark in 1507 because it
12 relates to creatinine, isn't that true, sir?

13 A Yes, sir.

14 Q And the next one would be Bady. You disregarded a
15 check mark for Bady as well, did you not, sir? They're really
16 out of order. Well, let's jump to Bickford. Look at Bickford.
17 There is one check in 1507 for other for Bickford, is there not?

18 A Yes, sir.

19 Q Now, look at his lab report. Creatinine is below the
20 line of asterisks, is it not, sir?

21 A Yes, sir.

22 Q And it is outside the range given in Exhibit 1509D, is
23 it not, sir? It is either lower than 800 or higher than the
24 1900, is it not?

1 A Yes, sir.

2 Q And you did not, you testified then that there should not
3 be a check mark in the other column for Bady, did you not, sir?

4 A Yes, sir.

5 Q All right. Now, Doctor, does that now--

6 A I understand.

7 Q So now wherever there was a creatinine finding, you
8 disregarded that when you testified when Mr. Heineman was asking
9 you questions, didn't you, sir?

10 A Yes, sir.

11 Q Did he not ask you to identify the abnormality that
12 was, that you were eliminating, you simply said in those instances
13 there should not be a check mark there, didn't you, sir?

14 A Yes, sir.

15 Q And you didn't tell us that it was the creatinine that
16 you were eliminating, did you, Doctor?

17 A I didn't even realize it.

18 Q Sir?

19 A I didn't realize it.

20 Q You didn't realize what Mr. Heineman was doing?

21 A I didn't realize we were eliminating creatinine.

22 Q You didn't realize when you went through a long litany
23 of this check mark shouldn't be there and this check mark shouldn't
24 be there that in those instances you and Heineman were talking

1 about creatinine?

2 A No, sir.

3 Q Doctor, do you think it would have been a more expeditious
4 use of our time if you and Mr. Heineman had simply said you are
5 disregarding the creatinine range as normal or abnormal instead
6 of going through all these exhibits as you and Mr. Heineman did
7 when all you were doing was eliminating in the overwhelming
8 majority of cases the finding for the creatinine? Don't you
9 think it would have been a better use of our time for you simply
10 to have said that?

11 MR. HEINEMAN: Objection, your Honor, maybe it would
12 have been helpful if Mr. Carr had identified on the form what
13 the check marks were for.

14 MR. CARR: Well, counsel, you are not that ignorant of
15 the facts of this case.

16 THE COURT: Objection is overruled. It was a proper
17 question.

18 A I didn't know that was creatinine we were eliminating.

19 Q Doctor, you looked at the value on each of these instances
20 that creatinine is below this line for normal or abnormal, was it
21 not?

22 A Yes, sir.

23 Q You knew the significance of that line, didn't you, sir?

24 A Yes, sir.

1 Q And you knew creatinine was down there when you
2 eliminated in each of these instances, didn't you, sir, you could
3 see it was down there below the line, couldn't you, sir?

4 A Yes, sir.

5 Q So you did know that you were eliminating something
6 below that line for abnormal?

7 A No, sir, I did not.

8 Q Dr. Roush, how can you read the records as is put out
9 here as plain as can be when you looked at that record, you
10 looked at these things that were below the test line, didn't
11 you, sir?

12 A Yes, sir.

13 Q And you can see on this one creatinine is below the test
14 line, can't you, sir?

15 A Yes, sir.

16 Q And you see the copro below the test line, lipids, total
17 and serum and iron is below the line?

18 A Yes, sir.

19 Q And when you testified in the case of Mr. Boeckman, you
20 eliminated the creatinine, didn't you, sir?

21 A Yes, sir.

22 Q But you did not eliminate the iron or the total lipids,
23 did you, sir?

24 A That's right.

1 Q And you did not know what you were doing when we spent
2 the afternoon going through those exhibits?

3 A No, sir.

4 Q Doctor, did anybody ever tell you why they did not measure
5 the urine so that they could use the spot sample given just as
6 Moses/Selikoff used the spot sample given for the porphyrins?

7 A I'm sorry, would you repeat that? Would you repeat
8 that question for me?

9 (Previous question was read by the reporter.)

10 A You don't have to measure the urine to do spot samples.
11 You don't need--

12 Q Doctor, then you don't need to measure the urine?

13 A No, sir, not to do spot sample.

14 Q You did a spot sample, didn't you?

15 A Yes, sir, but you don't need to measure volume to do
16 that.

17 Q So these values then that were reported were proper then?
18 These values that were reported we can use those as indicating
19 abnormalities?

20 A No, sir, you can use a spot sample to get those concentra-
21 tions as presented there, yes, sir.

22 Q And can you do that calculation as presented here just
23 as Moses/Selikoff did?

24 A Yes, sir.

1 Q Did you ever do it?

2 A I've done it since the trial has started.

3 Q Oh, you have now done it since the trial has started?

4 A Yes, sir.

5 Q And where are those results, Doctor?

6 A In my office.

7 Q May I have a copy, please?

8 A Yes, sir.

9 Q Did you do it for the Nitro people as well?

10 A No, I haven't got around to do that, but I will.

11 Q Now, Doctor, to do this, don't you need to know the
12 muscle mass of the person?

13 A Not to do it like Elkins did it.

14 Q Like who did it?

15 A The correction of, Moses corrected using the Elkins
16 procedure and doing the Elkins procedure you take the concentration
17 of 1800 is the number of milligrams excreted per day in the
18 Elkins procedure and you divide that by the observed creatinine
19 which in this case would be 640, I can't read it well, I can't
20 read it.

21 Q 640?

22 A You divide the 640 into 1800 and multiply it times the
23 observed porphyrin. That report came out, I think, in 1971 and
24 there are so many generalizations in the Elkins procedure that

1 you really should do it as you suggested doing it, based on
2 muscle mass, and that adds a complication because muscle mass is
3 somehow going to have to do it with body surface area, with body
4 weight and change it to kilograms because it is reported in 20
5 to 26 milligrams per kilogram per day. But I have done it, what
6 I have done is I've repeated the Moses approach to this and I
7 do have a copy of that.

8 Q Doctor, did you ever discuss with Suskind why he didn't
9 do something else with these porphyrin values other than use them
10 once and then eliminate them?

11 A No, sir.

12 Q Doctor, you have testified as to the Moses/Selikoff study
13 on these spot urines, did you ever, well, let me put it a
14 different way. You knew, you've always known that porphyrins
15 are important in determining whether or not livers have been
16 damaged by dioxin exposure, isn't that correct, sir?

17 A Yes, sir.

18 Q And you knew that the urinary porphyrins were to be
19 measured in both of these studies?

20 A Yes, sir.

21 Q And in fact, Suskind used them in one instance, didn't
22 he, sir, came up with a high number of abnormalities, didn't
23 he, sir?

24 A In his draft report he did.

1 Q Doctor, those findings could be important in any kind of
2 health study, can't they, sir?

3 A They can be.

4 Q But they can't be in this health study, according to
5 your reckoning because you won't give them validity, isn't that
6 correct, sir?

7 A Depends how they're used.

8 Q Well, you haven't given them any validity thus far, have
9 you, sir?

10 A I've told you I have done them recently.

11 Q Doctor, that's something that you have done since the
12 start of this case, that's something that you have prepared for
13 a particular motive in mind, it is something that you have done
14 so to speak after the horse got out of the barn, or rather, the
15 stable.

16 A No, sir.

17 Q Sir?

18 A No, sir.

19 Q You haven't done it in response to that attack that we're
20 making on Monsanto because of these abnormal porphyrins?

21 A We did them because of the question of these, yes.

22 Q Yes, indeed. Doctor, when you went through the Krummrich
23 health study, did you add up how many of your workers make complaints
24 of being tired all the time?

1 A Yes, sir.

2 Q How many, sir?

3 A I don't recall, but I did tabulate it.

4 Q It was a third of your people, 33 complained about having
5 fatigue, being tired all the time, didn't they, sir?

6 A I don't recall the number.

7 Q Sir?

8 A I don't recall the number.

9 Q Well, how many had sleep difficulty?

10 A Twenty percent.

11 Q Sir?

12 A Twenty percent.

13 Q Is 35 twenty percent of 108?

14 A Is 25 what?

15 Q Is 35 twenty percent of 108?

16 A I thought there was less than that, I thought there was
17 25.

18 Q Did you tabulate them, Doctor? Did you bring anything
19 with you?

20 A No, sir. I've got it back in my office.

21 Q What about the headache problem? How many did you find
22 had headache problems?

23 A About fifty percent.

24 Q Seventy-four responded they had headache problems.

1 A Could well be.

2 Q Sir?

3 A Could well be.

4 Q And you say that's 50 percent?

5 A I don't recall, I don't have it with me.

6 Q All right, Doctor. Doctor, if you, and it is a simple
7 mathematic calculation to check off the numbers that have headache
8 complaints or sleep difficulties or fatigue and neurobehavioral
9 problems?

10 A Yes, sir.

11 Q I take it from your response that it gives you no concern
12 if a sizable percentage of your plant, of your people that have
13 been exposed to these chemicals in 237 and 236 have these complaints,
14 I take it that does not concern you at Monsanto?

15 A Yes, sir.

16 Q It does concern you?

17 A Yes, sir, if they write down an answer, yes.

18 Q Now, Doctor, these symptoms that were there, they were
19 there for a purpose?

20 A Yes, sir.

21 Q You cannot really analyze that study without taking into
22 account those symptoms, can you, sir?

23 A No, sir, you can't.

24 Q But Suskind did exactly that, didn't he, sir?

1 A No, sir.

2 Q Doctor, was there any place that he responded to the
3 complaints these people made? Is there any place in that exhibit
4 where he even mentions the questions asked and the responses
5 made?

6 A No, sir.

7 Q Now, Doctor, he didn't deal with it if he didn't mention
8 it, did he, sir?

9 A No, sir, he didn't. You can't say he did or he didn't,
10 based on what's there.

11 Q Now, Doctor, based on what's there, you can say that
12 he did not because it isn't there.

13 A No, sir.

14 Q Is it, sir?

15 A No, sir.

16 Q Are you saying it is there? You are agreeing that it
17 is not there?

18 A Yes, sir.

19 Q Yes. And you have no evidence at all that he dealt
20 with if he doesn't even mention it, do you, sir?

21 A No, sir.

22 Q Doctor, you talked about setting up your own TLV for
23 your exposure to your chlorophenols, do you recall that, sir?

24 A Yes, sir.

1 Q And that was at your Krummrich plant?

2 A Yes, sir.

3 Q And Doctor, you said as a level for your TLV, an
4 irritation of the skin, didn't you, sir?

5 A Or the respiratory tract.

6 Q Some irritation?

7 A Yes, sir.

8 Q Now, Doctor, that's an acute effect, isn't it, sir?

9 A Not necessarily.

10 Q Well, is irritation of the skin something that you can
11 see?

12 A Sometimes.

13 Q You're saying that you have an irritation of the skin,
14 and Doctor, what good is your TLV, your TLV you said is when it
15 will cause an irritation of the skin?

16 A Or eyes or nose or throat.

17 Q So as far as you're concerned, there is no limit to which
18 a person may not be exposed to, and there's chlorinated phenols,
19 so long as it doesn't irritate his eyes, nose, or throat, that's
20 what you are saying, isn't that correct, sir?

21 A No, sir.

22 Q What are you saying? What is the limit to which, where
23 you're going to draw the line that they can't be exposed to?

24 A We are saying that this is so sufficiently irritating

1 that you must keep it down or they will have irritation, and
2 that's what we've observed.

3 Q Now, Doctor, you were testifying for Mr. Heineman, you
4 were talking about your TLV. He asked you what was the TLV set
5 for different toxic substances and you said that none had been
6 set for chlorinated phenols and that you have set your own TLV?

7 A Yes, sir.

8 Q And that TLV was the irritation level?

9 A Yes, sir.

10 Q So what that means is, so long as they are not irritated
11 by exposure there, eyes or nose or throat are not irritated by
12 exposure to the chemical, that anything below that, as long as
13 they are not irritated they are okay, that's what your TLV level
14 means, isn't that right, sir?

15 A Yes, sir.

16 Q Now, Doctor, what that means is that one can be exposed
17 to chemicals in doses that's not high enough to cause actual
18 observable irritation in the eyes, ears, nose, or throat, and
19 you will disregard it, you will say for dioxin or a chemical
20 containing dioxin that it's safe to work in those chemicals as
21 long as it doesn't, as long as there are not some overt physical
22 manifestations of irritation, that's what you are saying, isn't
23 that correct, Dr. Roush?

24 A No, sir.

1 Q Well, then, what are you saying if you are not saying
2 that?

3 A We are saying that the first thing that will happen to a
4 man with exposure in the chlorophenol unit will be irritation of
5 his eyes, nose, mouth or throat or less likely of his skin.

6 Q Doctor, are you--

7 A That's the thing that will, that's the first thing that
8 you will see, and we have to protect them from that.

9 Q Doctor, are you saying that any exposure that he has
10 to these chemicals will cause that irritation?

11 A No, sir, at a certain level it will.

12 Q That's what you are saying, Doctor?

13 A Yes, sir.

14 Q Now, you're not saying that no exposure, you can have an
15 exposure and always get irritation, it has to be a certain dose,
16 doesn't it?

17 A Yes, sir.

18 Q And what you are saying, it's safe to work with, those
19 chemicals that contain dioxin, so long as you don't have an
20 irritated effect upon your ears, eyes, nose, or throat or lungs,
21 that's what you are saying?

22 A Yes, sir.

23 Q Doctor, do you conceive in your wildest imagination that
24 that level protects your workers from dioxin?

1 A Yes, sir.

2 Q Doctor, there is a whole village in Times Beach, they
3 didn't even know they were living in dioxin until they had a
4 flood and somebody tested the water that was coming from Times
5 Beach, they had no idea that it was there.

6 A Yes, sir.

7 Q They didn't get their eyes, ears, and nose irritated,
8 did they, sir? Now, the whole community has been bought out
9 because those levels are toxic levels, according to the EPA that
10 bought it out.

11 MR. HEINEMAN: Objection, your Honor, the testimony
12 about TLVs and irritation had to do with chlorophenol levels.

13 MR. CARR: Indeed it did.

14 THE COURT: Objection is overruled.

15 Q Now, Doctor, you can have exposure to dioxin and never
16 have the faintest idea that you're being exposed to that dioxin
17 at very toxic levels?

18 A No, sir.

19 Q That's not correct?

20 A No, sir.

21 Q Doctor, then you're disagreeing because by your definition
22 there is no toxic level until you get chloracne, that's what
23 you're saying and that's the reason you're saying no, sir, isn't
24 that right, sir?

1 A No, sir, the dose that they get from working that
2 chlorophenol unit of exposure to dioxin is so small--

3 Q Excuse me, Doctor. Could you answer the question that
4 I am asking you now, please, sir?

5 A I thought I was. Would you repeat the question?

6 Q Would you read the question to him, please?

7 (Previous question, "Doctor, then you're
8 disagreeing because by your definition there
9 is no toxic level until you get chloracne, that's
10 what you're saying and that's the reason you're
11 saying no, sir, isn't that right, sir?" was read
12 by the reporter.)

13 A The answer is no, sir.

14 Q Then there is a level of toxicity that you can have from
15 exposure and not show chloracne, do you agree with that, sir?

16 A No, sir.

17 Q Doctor, again I'm at a loss. Is it not your position
18 that if there is not enough there to cause chloracne, it's
19 nothing you need to worry about, if it doesn't cause chloracne,
20 forget about it, don't worry about it, isn't that what you said,
21 isn't that your position here and by you I mean not just you
22 personally but Monsanto's position?

23 A No, sir.

24 Q Well, then, do you have a position that there can be

1 exposure to dioxin at levels not sufficient to cause chloracne
2 but at levels that can be injurious to the human being?

3 A No, sir.

4 Q You don't agree with that, either?

5 A No, sir.

6 Q Doctor, do you see a certain inconsistency between your
7 answers there, sir?

8 A No, sir.

9 Q They are perfectly consistent?

10 A Yes, sir.

11 Q All right. And Doctor, the dioxin level that you have
12 set for exposure to your people in your Krummrich plant has to
13 do with what, chloracne, irritation of the eyes, ear, nose, or
14 throat or what, sir?

15 A No, sir. We've got it also as related to the magnitude
16 of the dioxin that's going to be in the work environment if we
17 keep the chlorophenol concentration below the TLV.

18 Q Doctor, do you have a level for dioxin exposure, a TLV
19 level?

20 A Yes, sir.

21 Q And what is the level? How do you measure it?

22 A It would be related, somehow related to 100 parts per
23 million.

24 Q Somehow related to?

1 A Yes, sir.

2 Q How can you have a level and say it is somehow related
3 to it, sir?

4 A I don't have the data here, but the levels we found
5 were so small in the chlorophenol unit there was no problem.

6 Q Doctor, what I am asking you is what is the level?

7 A I don't remember it, but it was so small it was
8 infinitesimal compared to--

9 Q Doctor, isn't it a fact that you have used and continue
10 to use the presence or the absence of chloracne as a measuring
11 device for dioxin levels?

12 A Yes, sir.

13 Q Yes. And you use that measuring device by determining
14 whether or not a person has chloracne, don't you, sir?

15 A That's part of it.

16 Q Well, what's the other part of it?

17 A The fact that we did compare or considered the concen-
18 tration of the dioxin present in the chlorophenols, and they are
19 so low in parts per million because of the low volatility of the
20 chlorophenols, there couldn't be hardly any dioxin--

21 Q Doctor, you're not answering the question that I am
22 directing. Chloracne, you said, is the measuring device that
23 you use to determine whether or not one is exposed to too much
24 dioxin, isn't that correct, sir?

1 A That's one measure.

2 Q What is the other measure?

3 A The measured concentration of the dioxin based on the
4 concentration of the dioxin in the chlorophenol.

5 Q Well, what is that level, Doctor?

6 A I don't have it here, but the level was so low we didn't
7 consider it a hazard.

8 Q Doctor, what you are saying is you didn't establish a
9 level for dioxin other than does a person have chloracne.

10 A No, sir. We considered both aspects.

11 Q I know you considered it, Doctor, but I'm asking about
12 what you used as a measuring device for dioxin exposure.

13 A We used the chlorophenol as a marker for determining the
14 dioxin in the air.

15 Q You used the chlorophenol--

16 A Yes, sir.

17 Q --to determine whether or not the dioxin is in the air.

18 A And the magnitude of what will be in the air.

19 Q And if it doesn't cause chloracne and if it doesn't cause
20 irritation of the eyes, ears, nose, and throat, then it's okay?

21 A No, sir.

22 Q Now, Doctor, what other method do you determine whether
23 it's okay? You have the TLV for the chlorinated phenols is
24 whether or not it causes irritation, and that's the only TLV you

1 have.

2 A And we didn't need one for dioxin.

3 Q And your TLV for dioxin is connected with your chlorinated
4 phenols and chloracne, is it not, sir?

5 A Not chloracne.

6 Q Then it is connected only with your TLV for the chlorinated
7 phenols?

8 A Yes, sir.

9 Q Then what I said to start with, Doctor, if it's not
10 going to cause an irritation of your eyes, ears, nose, or throat,
11 it is okay then, isn't it, sir?

12 A No, sir.

13 Q Well, Doctor, what other testing device do you have?
14 What other TLV, rather--strike that. What other TLV do you have
15 except irritation in the case of your chlorinated phenols?

16 A If we know that the--

17 Q Excuse me, Doctor, that isn't what I asked you. I'm
18 asking you specifically, what is your TLV for chlorinated phenols?

19 A I think it's three milligrams per cubic meter.

20 Q And that's--

21 A But I'm not sure.

22 Q And that's established by what you determine whether or
23 not it will cause irritation?

24 A Yes, sir.

1 Q So it is directly connected with whether it does or
2 does not cause irritation?

3 A No, sir.

4 Q Well, what is it connected to?

5 A It is based on the amounts of chlorophenol in the air.

6 Q Doctor, the amount of chlorinated phenol in the air, is
7 that, you say it's too much when it causes irritation?

8 A Not to measure it.

9 Q I'm not talking about measurement. You've testified
10 under oath in front of this jury, and that's the reason I'm going
11 down this path is that you testified here under Mr. Heineman's
12 questioning that the TLV level for chlorinated phenols is the
13 irritation level.

14 A That's the basis for the TLV.

15 Q That's the basis for your TLV?

16 A Yes, sir.

17 Q And what that means is if it irritates you, it is too
18 much, if it doesn't irritate you, it is not too much, isn't
19 that correct, sir?

20 A It means that we're below that--

21 Q Excuse me, Doctor, please answer my question.

22 MR. HEINEMAN: Objection, your Honor, the man was trying
23 to tell him what he meant.

24 THE COURT: Objection is overruled. That was a clear yes

1 or no question and he was not answering it as such, it was not
2 responsive, he was properly interrupted.

3 A The answer is no.

4 Q The answer is no?

5 A Yes, sir.

6 Q And what you testified when Mr. Heineman, if I understood
7 you to say that the TLV level for chlorinated phenols was whether
8 it does or does not cause irritation, then I misunderstood you?

9 A Yes, sir.

10 Q And what has irritation got to do with it, then?

11 A Irritation is a basis for setting the standard.

12 Q Doctor, isn't that what I am asking you?

13 A No, sir.

14 Q You determined how much chlorinated phenol it would take
15 to cause irritation, didn't you, sir?

16 A Yes, sir.

17 Q And that's the amount that you have set?

18 A Yes, sir.

19 Q It is that amount that will cause irritation?

20 A Yes, sir.

21 Q That is your TLV for chlorinated phenols?

22 A Yes, sir; yes, sir.

23 Q Sir?

24 A Yes, sir.

1 Q And anything less than that amount is okay, anything
2 less than an amount sufficient to cause irritation is okay,
3 isn't it, sir?

4 A Yes, sir.

5 Q All right. Now, Doctor, within that amount, the irritation
6 is caused by the caustic substances in the chlorinated phenols,
7 isn't it, sir?

8 A Yes, sir.

9 Q It is not caused by the dioxin, is it, sir?

10 Q Dioxin doesn't do those things, dioxin if it is there
11 sufficiently will cause chloracne.

12 A Yes, sir.

13 Q So the only overt sign you have is whether or not
14 chloracne is there for dioxin, because you can have a lot of
15 dioxin. You can have hundreds and hundreds parts per billion
16 of dioxin in a chlorinated phenol and never reach the irritation
17 level if you don't let enough out to cause irritation from the
18 phenols, isn't that right, sir?

19 A If they are not related.

20 Q Well, Doctor, they are not related, you've testified
21 they are not related, you can have 200 parts per billion of
22 dioxin in your chlorinated phenols, and the chlorinated phenol
23 released will not be sufficient to cause you irritation, won't
24 it, sir?

1 A Yes, sir.

2 Q You can have in that amount of chlorinated phenol that's
3 released, you can have five parts per billion or five million
4 parts per billion in that same chlorinated phenol, can't you,
5 sir?

6 A No, sir.

7 Q You can't?

8 A No, sir.

9 Q Why not?

10 A Because that isn't the levels that are found.

11 Q Now, Doctor, I'm not talking about what you say you
12 found or not found. We've got the exhibits here, I'm giving
13 you hypothetically as a scientist you know that one batch of
14 chlorinated phenols can contain high levels of dioxin and another
15 batch can contain very low levels of dioxin, you know that,
16 don't you, Dr. Roush?

17 A No, sir.

18 Q Dr. Roush, have you completely ignored the plaintiff's
19 exhibits in this case and the reports of your own scientists
20 specifically 1301A, have you completely ignored it in your
21 answer, sir?

22 A No, sir.

23 Q You see high levels of tetras in some batches and low
24 levels in others, don't you, sir?

1 A The only one I see that's high is the 2700 parts per
2 billion.

3 Q Doctor, you see two here which is--and you see another
4 that's got 450, that 450 is 225 times higher than 2, isn't it,
5 sir?

6 A Yes, sir.

7 Q And you can have varying, you can have high amounts in
8 some batches of chlorinated phenols and low amounts in others,
9 can you not, sir?

10 A I don't call those levels high except for the 2600.

11 Q Well, let's even call that, sir, you can have it high
12 in some and low in others, can't you, sir?

13 A I don't think any of them are high except that one
14 value.

15 Q Well, that one is in existence, isn't it, Doctor? It
16 is there, is it not, sir?

17 A If that number is right.

18 Q Yes, if that number is right. That's what the University
19 of Nebraska reported, sir.

20 A But I don't believe that number.

21 Q Doctor, I'm not asking you to believe it.

22 A Yes, sir.

23 Q It is in evidence, it is not your function to believe or
24 disbelieve it, it is the jury's function to decide that. Now,

1 you can have high levels of dioxin in one batch of chlorinated
2 phenol and low in another, can't you, Dr. Roush?

3 A In that range, yes, sir.

4 Q And Doctor, you know that in your 2,4,5-T, for instance,
5 you had in parts per million, Doctor?

6 A Yes, sir.

7 Q And you had some 2,4,5-T that had little dioxin, too,
8 you know that, don't you, sir?

9 A I don't know what we mean by little.

10 Q Well, you had fifty parts per million in some batches,
11 you had six parts per million in other batches, indeed it is
12 not little, but they widely--range widely varied, did it not,
13 sir?

14 A From six to fifty, yes, sir, parts per million.

15 Q Sir?

16 A Parts per million.

17 Q And Doctor, the documents in chlorinated phenols can
18 be low enough that it will not cause irritation, whereas the
19 chlorinated phenol can cause irritation, isn't that correct,
20 sir?

21 A Yes, sir.

22 Q And the people at Times Beach and the people at Sturgeon,
23 the people any place where they have a community that's contaminated
24 with dioxin, they can be having effects from that dioxin without

1 having irritation from the chlorinated phenol, can they not,
2 sir?

3 A No, sir.

4 Q You don't believe they can, sir?

5 A No, sir.

6 Q Then wherever they are going to have an effect, they
7 are going to have irritated eyes, nose, and throat?

8 A No, sir.

9 Q Then what is the criteria?

10 A The concentration of the dioxin in that site has to be
11 high enough to cause an effect.

12 Q And what is the effect it's got to cause?

13 A First of all you'll find chloracne.

14 Q So it has got to be high enough, we're back to
15 chloracne, it's got to be high enough to cause chloracne?

16 A Yes, sir.

17 Q Doctor, how many people at Times Beach actually ever got
18 chloracne?

19 A I don't--my impression is none.

20 Q Yes, indeed, none. And Doctor, half of the people that
21 have moderate doses at Nitro, according to Moses/Selikoff, never
22 got chloracne, did they, sir?

23 A Yes, sir.

24 Q So we're back to the, again, the criteria of Monsanto

1 if it doesn't cause chloracne, it is not a high enough dose to
2 cause any other trouble, is it, sir?

3 A Yes, sir.

4 Q You don't believe then that you can have low dose
5 exposure and it can have any long range effect, do you, sir?

6 A No, sir.

7 Q Doctor, on the testimony that you made with respect to
8 what you told Paget or somebody to tell the EPA--

9 A Yes, sir.

10 Q You said that you told them to tell the EPA that they were
11 to assume that that 37 parts per billion was all 2,3,7,8 TCDD,
12 did you not, sir? Have I given the gist of what you told
13 Dr. Paget to tell the EPA?

14 A Yes, sir.

15 Q And Doctor, I think we've established that neither you
16 nor Dr. Paget nor the EPA or anybody else has any memo to that
17 effect, have we not, sir?

18 A No, sir.

19 Q We haven't established that?

20 A I thought--

21 Q Is there some writing in which you have told the EPA to
22 assume that that 37 parts per billion was all 2,3,7,8 TCDD?

23 A I think so.

24 Q Doctor, where is it, because the exhibits that you had

1 in evidence are the ones that tell them that you believe it could
2 only be a small fraction, it could be 2,3,7,8 TCDD, are you
3 actually under the impression that you have something in
4 writing--

5 A Yes, sir.

6 Q --where you told the EPA that they are to assume--

7 A I thought so.

8 Q And was your testimony then as the testimony that you
9 gave Mr. Heineman based upon your thought that there was such
10 a memo, or a letter in existence?

11 A Yes, sir.

12 Q Who told you that there was such a letter in existence?

13 A As I recall, I read it.

14 Q Doctor, perhaps you read the memo that Dr. Kaley made
15 in which he estimated that 90 percent of what was in that reserve
16 sample was 2,3,7,8 TCDD, perhaps that's what you read.

17 A I thought it was Paget had written to them and said
18 that.

19 Q Let me show you Plaintiff's Exhibit 1142, and this is a
20 blow-up. Have you ever seen that exhibit before?

21 A Yes, sir.

22 Q And you saw it where it said he estimates that 90 percent
23 of the tetra molecules is the 2,3,7,8 isomer?

24 A Yes, sir.

1 Q Did you keep a copy of it by any chance, Dr. Roush?

2 A Of this?

3 Q Yes.

4 A No, sir.

5 Q Did you get a memo from Dr. Mieure telling you to
6 destroy this memo?

7 A No, sir.

8 Q During the overnight break, would you check your records
9 and see if you can find your memo where Dr. Kaley estimates that
10 90 percent of this tetra is the 2,3,7,8 isomer?

11 MR. HEINEMAN: Objection, your Honor, he never established
12 that Dr. Roush ever got one.

13 THE COURT: Objection is overruled.

14 A Yes, sir, I'll look.

15 Q And Doctor, is it based upon this memo that you believe
16 that Dr. Paget, is it based upon the finding there that you
17 believe that Dr. Paget told the EPA to assume that it's all
18 2,3,7,8 TCDD?

19 A No, sir.

20 Q There is some other memo other than that?

21 A I don't recall specifically. All I know is what
22 Dr. Paget and I agreed, and I thought it was written as such.

23 Q Well, and it's not this one?

24 A No, sir.

1 Q But you have seen this one?

2 A Yes, sir, but that was after the trial was started. I
3 don't recall having seen that before.

4 Q Now, Doctor, I'm not talking about this exhibit, this
5 blow-up here, I'm talking about the one from Wednesday, the
6 original memo, the original Kaley memo.

7 A Yes, sir.

8 Q You've seen the original Kaley memo?

9 A I don't remember the name on it.

10 Q Well, it doesn't have a name on it, but I've identified
11 it by handwriting as Dr. Kaley's.

12 A I wouldn't remember it as such.

13 Q I don't want to confuse you, I don't want to mislead
14 you, but do you think that you have seen the exhibit of Kaley's
15 without any changes on it such as this one, sir?

16 A Since I have been in the trial.

17 Q Who showed it to you?

18 A In the documents that I reviewed in preparation for
19 this trial.

20 Q Okay, who gave those documents to you to review?

21 A Heineman.

22 Q Well, is it that he told you that this was an exhibit
23 in Court?

24 A No, sir.

1 Q It wasn't marked as an exhibit?

2 A I don't remember that.

3 Q Do you have a copy of that exhibit, did Mr. Heineman
4 leave a copy with you, sir?

5 A I have very--of the documents that were given to me, I
6 have had very few of them, 90 percent of them, I don't have.

7 Q But you do remember seeing an exhibit that Mr. Heineman
8 showed you that had no changes on it and that he told you that
9 it was, what did he tell you about that exhibit?

10 A I just read it, I just went through.

11 Q Doctor, back at the time of the occurrence itself, at
12 the time of the spill in January of '79, did you have discussions
13 with people then in which it was discussed that it was your
14 chemist's thought that 90 percent of that tetra isomer was
15 2,3,7,8?

16 A May have, but I don't recall it.

17 Q What you do know, from a medical viewpoint, and that's
18 the reason you told Dr. Paget to tell it to the EPA, what you do
19 know from a medical viewpoint is that you should assume that
20 it's one hundred percent 2,3,7,8, even though your chemists
21 says that he estimates that it's 90 percent.

22 A It's an exercise in toxicology to consider, if you've
23 got a chemical and you are not sure whether it is one or another
24 derivative of it is to assume that it's all one.

1 Q That's to be on the safe side, isn't it, sir?

2 A Yes, sir.

3 Q Now, that same philosophy applies not just with the
4 chemicals spilled in Sturgeon, but that same philosophy applies
5 to the chemicals that go out to other customers, it applies to
6 the people that buy your Santophen or your 2,4-Dichlorophenol,
7 doesn't it, sir?

8 A Yes, sir.

9 Q They have to be told that of the tetra isomer, that unless
10 you can specifically say and definitely say that it is not
11 2,3,7,8 TCDD, that they should act and assume that it is all
12 2,3,7,8 TCDD, shouldn't they, sir?

13 A It depends on what the purpose they're going to use it.

14 Q Well, if humans are going to be exposed to it, sprayed
15 on the lawns or used on the tables or the floors, anything like
16 that, your customers should all be told to assume that it's all
17 2,3,7,8 TCDD, if you cannot assure them that you've tested it
18 and that it's not 2,3,7,8 TCDD, isn't that correct, sir, from
19 a toxicological viewpoint?

20 A If I think it's hazardous, I would tell them that.

21 Q Now, Doctor, you didn't think the 37 parts per billion
22 was hazardous?

23 A No, sir.

24 Q In Sturgeon, have you, sir?

1 A No, sir.

2 Q But yet you told Dr. Paget to tell the EPA that they
3 should assume that it is all 2,3,7,8, did you not, sir?

4 A No, sir.

5 Q I thought you just testified to that that you instructed
6 Paget to tell the EPA that you are to assume that it's all
7 2,3,7,8 TCDD?

8 A No, sir.

9 Q What did you say then, sir?

10 A We told them that even if it were all 2,3,7,8, we didn't
11 think there would be any hazard from it.

12 Q Well, then, you didn't tell them to assume that it was
13 2,3,7,8 TCDD, did you, sir?

14 A We assumed it, and that's the basis for our statement.

15 Q Doctor, you didn't tell them that, did you, sir?

16 A I think we did.

17 Q Now, Doctor, you either, you testified with Mr. Heineman
18 under oath that you told Dr. Paget, you instructed him to tell
19 the EPA that they were to assume that it was all 37 parts per
20 billion, was all 2,3,7,8 TCDD, did you not testify to that, sir?

21 A If I said to assume, then I was wrong.

22 Q Yes, indeed. Because you have no memo and you have no
23 recollection, and you didn't tell Dr. Paget nor anyone else to
24 tell the EPA to assume that it was all 2,3,7,8 TCDD, did you, sir?

1 A I think we did. Not to assume--

2 Q Make up your mind, please, sir.

3 A Not to assume, but act as though it were.

4 Q That's something else?

5 A Yes, sir.

6 Q My question is, you didn't tell anybody to assume that
7 it was all 2,3,7,8 TCDD?

8 A No, sir.

9 Q And so when you testified to that earlier with Mr.
10 Heineman, you were mistaken?

11 A Yes, sir.

12 Q Because you didn't tell them that, did you, sir?

13 A No, sir.

14 Q What you told them was you believe the 2,3,7,8 isomer
15 is just a small fraction of the tetra isomers present, didn't
16 you, sir?

17 A No, sir.

18 Q Doctor, there is a letter in evidence signed by Mr. Metcalf
19 in which you say exactly that, don't you recall that, sir, by
20 you, I mean Monsanto.

21 A I remember a memo from Mr. Metcalf, but I don't remember
22 what it said related to it.

23 Q Doctor, I can dig it out of the file, but would you
24 accept for the moment my statement to you that what you actually

1 told the EPA in writing is that it is your belief that the
2 2,3,7,8 isomer is just a small fraction of the tetras present,
3 would you assume that for a moment, sir?

4 A Yes, sir.

5 Q Now, that's not the same thing as telling them that
6 they are to assume that it's all 2,3,7,8 is it, sir?

7 A No, sir.

8 Q As a matter of fact, it's telling them the opposite,
9 that in your belief just a little bitty bit of 2,3,7,8 TCDD,
10 isn't it, sir?

11 A No, sir.

12 Q It is not? If you are telling them that you believe
13 it is only a small fraction is 2,3,7,8, is that the same thing
14 as telling them that it's all 2,3,7,8 or that they are to assume
15 that it's all 2,3,7,8?

16 A No, sir.

17 Q It isn't the same, is it, sir?

18 A No, sir.

19 Q Sir?

20 A No, sir.

21 Q Obviously isn't the same.

22 A No, sir.

23 Q Now, Doctor, when it comes down to telling your customers,
24 if you do know that it's not 2,3,7,8 TCDD, isn't your best bet

1 to go from a toxicological viewpoint to go on the assumption
2 that it is all 2,3,7,8 TCDD? Let me put it a different way,
3 Doctor. If you've got a bottle with ten aspirins in it--

4 A Yes, sir.

5 Q And somebody has told you that one of those things that
6 look like aspirin may be cyanide, isn't it best for you to
7 assume that it's all cyanide when you use that bottle?

8 A Yes.

9 Q And the same thing is true for the 2,3,7,8, is it not,
10 sir?

11 A At some level.

12 Q But Doctor, back to whatever the level may be--

13 A Yes, sir.

14 Q If you don't know that it's not 2,3,7,8 for the sake of
15 safety's sake, it is best to assume that it is all 2,3,7,8,
16 isn't it, sir?

17 A For safety's sake, yes.

18 Q Now, Dr. Roush, did you ever, ever, ever at Monsanto
19 tell anybody, your customers, the people at Sturgeon, the public,
20 anybody at all that they were to assume that the tetras that you
21 knew were present in your chlorinated phenols, they were to assume
22 that it's all 2,3,7,8 tetra?

23 A No, sir.

24 Q And they haven't to this day been told that, have they,