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2,4,5-T/Silvex Cancellation Proceeding

November 14 & 17, 1980

W

DEAL TESTIMONY OF  
DR. KENNETH D. GROW

1 to push it any higher than that.

2 Q So, you really don't know at what stage in the  
3 chemical process the explosion occurred in the Coalite  
4 incident, do you?

5 A Perhaps I could put it differently. What I  
6 don't know is that Derbyshire and Amsterdam had the same  
7 amounts of TCDD formed; of course, I don't, I agree.

8 MR. BOZOF: I think we can take a break right  
9 now.

10 JUDGE FINCH: Let's come back at five minutes  
11 of 4:00.

12 (Whereupon, a short recess was taken.)

13 JUDGE FINCH: Back on the record.

14 → MR. BOZOF: I'd like to hand you a cross-  
15 examination exhibit. This document is entitled "Investi-  
16 gation of the Immune Capability of Workers Previously  
17 Exposed to 2,3,7,8-Tetrachlorodibenzo-para-dioxin, TCDD,  
18 by Dr. A. Milford Ward.

19 This document says Strictly Confidential, but  
20 that is not Dow's stamp of confidentiality, it is not  
21 claimed by Dow to be confidential, and all the names of  
22 the patients involved have been blotted out.

23 JUDGE FINCH: Let's mark this 1488.

24 (Whereupon, the document was marked  
25 Cross-Examination Exhibit No.  
1488 for identification.)

1 BY MR. BOZOF:

2 Q Are you at all familiar with this study?

3 A Yes, I am.

4 Q Are you free to -- well, let's turn to the  
5 first page.

6 A The fact that I've gotten to do, in effect, or  
7 have this work done again, doesn't in any way inhibit me  
8 from speaking about it, no.

9 Q Now, on the first page, there is an indication  
10 that the immune capability of three groups of adult  
11 males was examined, is that correct?

12 A Yes.

13 Q And one group was exposed to toxic levels of  
14 TCDD more than ten years previously, showing clinical  
15 evidence of toxicity in the form of chloracne?

16 A That's Group C.

17 Q That's Group C, and I might say that this Group  
18 C was not inked in by EPA. We received the document from  
19 Dow in this manner.

20 Do you agree that that is Group C, from your  
21 knowledge?

22 A Yes, that's Group C, and the others are Group  
23 B -- number 2 is Group B and 3 is Group A.

24 Q And Group B is the group exposed to TCDD, but  
25 not showing evidence of dermatological toxicity?

1           A     That meant no chloracne. It meant that they  
2 were round about the place and could conceivably have  
3 come in contact with TCDD or not, nobody knew; they were  
4 an intermediate group.

5           Q     And the third group, Group A, were the unexposed  
6 controls?

7           A     That's right, who were apparently said to be  
8 certain not to have come into contact with it.

9           Q     Now, the only numbering on this page is the  
10 number in the right-hand corner of these pages, and I  
11 think it's page 046708 that I would like to draw your  
12 attention to.

13          A     I've got that. There's a lot of underlining on  
14 that page.

15          Q     Again, we received the document in this form,  
16 from Dow. Now, the second paragraph states that "Test  
17 Group C shows a significant increase in the proportion of  
18 cases with reduced levels of Immunoglobulin D and Immuno-  
19 globin M, and this group shows an increased proportion of  
20 cases with depressed PHA reactivity".

21                Now, this suggests that there was some immuno-  
22 suppression of the group that was exposed to TCDD and  
23 exhibited chloracne, doesn't it?

24          A     This is debatable. These results have been  
25 discussed with two people who certainly know a great deal

1 about this -- one is Dr. John Moore, from NIEHS, and the  
2 other is Professor Irving Selikoff, and the opinion of  
3 both of those -- I am not an expert on this, and I cannot  
4 evaluate it. I have to go to other people and find out  
5 what they think.

6 And also this is true of the EMAS experts, who  
7 also had to look at this, and they say that they don't  
8 know what the slight changes mean. And I can't really,  
9 Your Honor, say anymore than that, frankly; that's about  
10 the extent of anything I can say about this document  
11 because I don't understand the details of immunology. I  
12 have to be guided by experts.

13 This is what I was saying, that if I don't  
14 know -- I have to know a little bit, but, in fact, I have  
15 to know -- in fact, one of the things that surprises me  
16 is that why did they do immunoglobulins and check T- and  
17 B-cells with phytohemagglutinin and then omit the intra-  
18 dermal skin tests, which seems an extraordinary thing to  
19 do. It's doing two-thirds of the thing and not the other  
20 third.

21 So, there are a lot of things funny about this,  
22 and I think this is why everyone feels that it should be  
23 repeated. I don't want to be in the slightest degree  
24 obstructive, but I cannot comment on any details in this,  
25 I regret to say.

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1 Q But in any event, the results do show, they  
2 report some departure from normal.

3 A They report a departure from normal, and my  
4 understanding is that experts who do understand these  
5 things, don't really know what that departure from normal  
6 means, in these terms. And, secondly, the point is taken  
7 that it is not a complete test, it is partial. It misses  
8 out a third aspect of this kind of testing, which is  
9 regarded, as I understand it, to be quite important.  
10 That really is about the extent of my knowledge on this.

11 Q This document, though, on that same page, does  
12 report a departure from normal among Group B also, doesn't  
13 it, which is intermediate between Group C and Group A?

14 A Yes.

15 Q And Group B, presumably, was exposed to TCDD  
16 but did not exhibit chloracne, is that correct?

17 A That's right. It is thought to have been ex-  
18 posed to TCDD, but didn't have chloracne, yes.

19 Q So, this study reports some departure from  
20 normal in some immunological parameters, among people  
21 exposed to TCDD but who did not exhibit chloracne, is  
22 that correct?

23 MR. SCHROETER: Objection, misstating the  
24 evidence. That would be not parameters in the plural,  
25 but one of three mentioned; the other two having been

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1 called normal in this instance.

2 MR. BOZOF: Your Honor, I posed the question.  
3 The witness can correct me if I'm wrong. I don't think  
4 it's up to counsel to correct me in that manner. I simply  
5 asked him whether this was true and, if it wasn't true,  
6 the witness could provide me with that answer.

7 JUDGE FINCH: Ask the question again.

8 BY MR. BOZOF:

9 Q This study does report a departure from normal  
10 in at least one immunological parameter, among persons  
11 exposed to TCDD who did not show any signs of chloracne,  
12 isn't that correct?

13 A Test Group B shows an increased proportion of  
14 cases with IgD levels only, but I am given to understand  
15 that IgD is something about which virtually nothing is  
16 known, or very little, and the significance of slight  
17 departure from normal, in that respect, leaves experts,  
18 I'm told, quite unable to interpret it.

19 So, I'm really only repeating what I've said  
20 before.

21 Q This study reports that IgD is thought to be  
22 associated with a transfer of immune capability from T-cell  
23 to B-cell and with short immunological memory, is that  
24 correct?

25 A The emphasis is on the words "thought to be",

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1 not known to be.

2 Q And the author concludes, does he not, that  
3 these results suggest that toxic exposure to TCDD induces  
4 a lasting effect on B-cell memory and immune capability,  
5 and suggests that the intermediate position of test  
6 Group B, which is the group which did not exhibit chlor-  
7 acne, was consistent with previous exposure to TCDD?

8 MR. SCHROETER: Objection, Your Honor, that is  
9 complex and mostly paraphrasing.

10 THE WITNESS: I could answer it, if I may. I  
11 was just going to say that Dr. Ward has every right to  
12 his opinion, and he's written it here.

13 BY MR. BOZOP:

14 Q Can you tell me where the study was conducted?

15 A I believe that it was at Sheffield University,  
16 as far as I know. Yes, it says so here, Hallamshire  
17 Hospital, Sheffield; that's Sheffield University, Depart-  
18 ment of Immunology. It's on the front page, bottom-right

19 Q Now, do you know how long after exposure these  
20 tests were conducted?

21 A Yes. They must have been -- I know that this  
22 investigation took from April, 1977 until September, 1978,  
23 so it was within that span of time, and so that would  
24 mean that it was between 9 and 10½ years after the  
25 occurrence.

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1 Q So, this suggests then that there is some  
2 long-lasting effect on certain immunological parameters,  
3 among people exposed to TCDD, is that correct?

4 A Only if we accept that Dr. Ward is right, and  
5 I think we must remember that on page 1, it says "The  
6 studies conducted on the children exposed at Seveso have  
7 shown no difference in this respect", and perhaps that  
8 highlights the fact that Dr. Ward's view is not shared  
9 by some other immunologists because, after all, the  
10 Seveso cases were examined a very short time after their  
11 poisoning.

12 If you are going to have something 10 years  
13 later, how much more likely, surely, as Dr. Fara to  
14 have found it after one year.

15 Q I'd like to draw your attention to page 23 of  
16 your witness statement. You cite an article, in the  
17 last paragraph of page 23, you cite an article by Gold-  
18 mann, is that correct?

19 A Yes.

20 Q This is the reference that we got from the  
21 Reference Repository, and the title is Hearing of Chlori-  
22 nated Dibenzodioxin, Working Group of the NIEHS and the  
23 IARC, Lyon, 10 and 11 January 1978. Is that the same  
24 Reference 23 that you have?

25 A That's right, Lyon, 10 and 11 January 1978, yes

1 may be asked by trade unions. I think that's about it,  
2 really.

3 → Q Talking about the trade unions, the study that  
4 was discussed here, namely, that by Dr. Ward on immunolog-  
5 ical matters, I refer specifically to Exhibit 1488, would  
6 you turn to that with me?

7 A (Perusing documents) Yes, I have it.

8 Q It's entitled, "The Investigation --

9 A Yes, I've got it.

10 Q Now, the blood that Dr. Ward examined there in  
11 the immunological investigations, was that taken from  
12 people at the Coalite plant of which you spoke earlier?

13 A Yes, it was.

14 Q And is it the investigation of the men working  
15 at the Coalite plant that you meant when you said Friday  
16 that the trade unions had asked you to re-do that study?

17 A Yes, it is.

18 Q Now, speaking of that trade union, is that the  
19 trade union that represents those people working in that  
20 plant, among others?

21 A Yes, there are two trade unions under whose --  
22 whose members make up the total work force involved.

23 Q And is that re-study that you mentioned that you  
24 were going to embark upon when you get back home?

25 A Yes, it is. I've got to discuss it with the

1 Q That's what burned you and scarred you?

2 A That's what I believe, yes.

3 Q And do I understand correctly that the other  
4 thing that was in that process, produced was pure 2,4,5-  
5 Trichlorophenol?

6 A Yes.

7 Q And, as you understand it, from everything else  
8 you know about what came out of that reactor, that pure  
9 2,4,5-trichlorophenol in fact contained TCDD as well?

10 A A small amount, it must have, yes.

11 Q And did I understand you correctly to say that  
12 this has not been the only incidence, but there have been  
13 other incidences throughout your career when you have, in  
14 fact, done experimentation on your own body?

15 A Well, one does it all the time, in a minor way,  
16 of course.

17 → Q Going back briefly to Exhibit 1488 -- you may  
18 still have it there --

19 A Would you give me some identification?

20 Q Yes, it's the Dr. Ward --

21 A Oh, yes, I've got it. Thank you.

22 Q Now, this work done by Dr. Ward of the Coalite  
23 workers, first of all, it was by way of examining drops of  
24 blood only, is that correct?

25 A Yes.

1 Q He did not examine the men themselves?

2 A No.

3 Q And was his immunological investigation one of  
4 a number of other things, in fact, that were done with these  
5 workers?

6 A Oh, yes, a lot of things were done.

7 Q And, again, these were the same workers regard-  
8 ing whom you were asked by the trade union to do in your  
9 study?

10 A Yes. Basically, what was done, these immunological  
11 studies were chromosomes studies, hematological and a wide  
12 range of bio-chemical.

13 Q Now, regarding this study that is represented  
14 in a fashion by Exhibit 1488, in addition to what was done  
15 in the immunological investigation and the look at the  
16 B-cells and T-cells, was there another aspect that, in your  
17 opinion, was not done, but should have been?

18 A Well, yes. Again, I have to say only what I  
19 am informed by my immunological colleagues, but it is  
20 really essential to do three types -- to attack the problem  
21 in three ways. And the third way is by the skin responses  
22 to injected antigens, of which there is a whole group --  
23 I don't think it's relevant to go into the nature of them,  
24 Your Honor, and the response or non-response, as the case  
25 may be is a factor which has to be taken into consideration,

1 unrelated to these other two parameters.

2 Q Now, the skin testing of these Coalite workers  
3 with a series of these antigens, was that one thing that  
4 you would consider and shall consider important to do when  
5 you get to doing the study?

6 A If we can't do it, we shall not do any immuno-  
7 logical testing at all, I don't think. There's no point,  
8 if you can't do it properly.

9 Q So, you consider that antigen testing on the  
10 skin is essential?

11 A I think so, yes.

12 Q Now, you said Friday, in response to questions  
13 by Mr. Bozof that Dr. Selikoff and Dr. Moore had expressed  
14 doubt that they could tell what really any of this means  
15 that Dr. Ward had produced in this study, which is repre-  
16 sented by Exhibit 1488. And my question to you is now --

17 A I'm sorry, may I interrupt you. The prefix is  
18 not correct, I think you said -- something you said wasn't  
19 right, I didn't they said the incorrectness of the inter-  
20 pretation.

21 Q No, I meant to convey that -- I meant to say  
22 that I understood your testimony on Friday, Dr. Selikoff  
23 and Dr. John Moore had said that -- or have said that they  
24 don't know what these results Dr. Ward has reached really  
25 mean?

1 A Oh, no, that's correct. I'm sorry, yes, that's  
2 right.

3 Q Now, my question to you is please tell us who  
4 is Dr. Selikoff and who is Dr. John Moore?

5 A Doesn't everybody know?

6 Q We cannot assume these things.

7 A I'm sorry, Professor Selikoff is the head of  
8 the -- I think -- well, it's one of the biggest environmental  
9 research laboratories in this country, I think, and he's  
10 at Mt. Sinai Hospital in New York. And I have very high  
11 regard for him as a scientist, indeed.

12 Dr. Moore, is -- I don't know exactly what Dr  
13 Moore's position is, but he's one of the world's greatest  
14 experts on the whole subject of poisoning by chloracnegens.  
15 And he and his co-workers, like Dr. McConnell, for example,

16 --  
17 Q Dr. John Moore, to take the last one first, is  
18 he the same Dr. John Moore who is the Chairman of the  
19 Inter-Agency Work Group that is looking at certain Agent  
20 Orange and related matters under appointment and charge of  
21 the President?

22 A Yes, that is true, because he happened to visit  
23 the department when I was with Dr. Selikoff, when I was  
24 there last, and this was discussed. So, I do know that, yes.

25 Q Is Dr. Selikoff the same Dr. Selikoff who on the



1 steel workers unions has examined in recent times all of  
2 the Monsanto workers involved -- or possibly involved in  
3 that long ago accident in Nitro?

4 A Yes, and the GEC workers and the Arkansas workers  
5 again, at the request of the unions, yes.

6 Q And is he the gentleman who asked you to help  
7 in that, dermatologically?

8 A Yes, yes.

9 Q You spoke on Friday of the fact that TCDD  
10 effects -- of certain TCDD effects follow, if one were to  
11 represent the relationship graphically, a straight line?

12 A Yes.

13 Q My question is does this straight line, first of  
14 all, represent, essentially, a dose-response kind of  
15 relationship?

16 A Yes, but I think what I meant was if you --  
17 again, you can only speak in general terms; medicine has  
18 its exceptions for the simple reason that the variability  
19 of individuals to any given situation, whether it be  
20 poisoning or disease is tremendously variable.

21 But having said that, it is, for example, true  
22 that the more TCDD that you paint on, or put on a chap's  
23 skin, or expose it to, so will the severity of his chloracne  
24 drop in proportion. And this is true of certain other  
25 effects. And it's just another way of saying -- of course

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