

1 created for the first time after July the 8th, 1985. The only
2 other thing this man has said is he doesn't know whether it
3 was ever done before that. But all he knows is that the only
4 time that the two, the data from the two studies was put
5 together was after the -- the only thing he knows about it was
6 that it was after July the 8th, 1985. Obviously, there isn't
7 any dispute, as Mr. Carr has told the Court, there isn't any
8 dispute that the data itself was available to him and that he
9 had it. The same data that's in the machine that was put
10 together after July the 8th, 1985.

11 MR. CARR: Your Honor, now counsel is making a
12 representation that isn't out in the record. He pushed the
13 button after July 8th, 1985. He doesn't know how long this
14 information has been in the computer. He has so said under
15 oath he doesn't know when Marcie Strauss put it together and
16 created the program.

17 THE COURT: Do you have anything further? Either
18 of you?

19 MR. HEINEMAN: That's all we have, Judge.

20 THE COURT: Okay. I'm sustaining the objection.
21 I think the production of this at this time and it's use under
22 these circumstances violates the discovery rules and the
23 statute and violates the orders of Court for prior production,
24 and under those circumstances, I am sustaining the objection

1 made by Mr. Carr. Mr. Heineman, you may proceed.

2 CLARIFICATION EXAMINATION

3 BY MR. HEINEMAN:

4 Q Dr. Roush, in the course of your examination by Mr.
5 Carr and/or clarification examination, we have discussed, have
6 we not, sir, the Times Beach situation?

7 A Yes, sir.

8 Q Times Beach, Missouri. There have been a number of
9 articles written, have there not, which have discussed Times
10 Beach as well as other dioxin exposure incidents?

11 A Yes, sir.

12 Q Have any of those articles discussed the levels of
13 exposure at any of these -- on any of these occasions, whether
14 it be Seveso or Times Beach?

15 A At Times Beach there was a study of the people who
16 had been involved in that exposure and they used one
17 population with exposure from 20 up to 100 parts per billion
18 as defined by the measurements of going around in the area
19 where they live and taking core samples and using that as a
20 base for deciding what the level of exposure was and they
21 compared that population.

22 MR. CARR: I object. He's talking about they and
23 what they did. There's been no identification.

24 THE COURT: Can you clarify that?

1 MR. CARR: Study by Monsanto, a study by CDC?

2 MR. HEINEMAN: Let me pull Defendant's Exhibit 55.

3 Q Doctor, let me hand you what's been marked as
4 Defendant's Exhibit 914 and ask you if you can identify that
5 for me, please?

6 A This is an article that was written by Dr. Dunagin.
7 He's a Professor of Dermatology at the University of Missouri
8 in Columbia and his paper was title, "Cutaneous Signs of
9 Systemic Toxicity Due To Dioxins and Related Chemicals".

10 Q And this was the publication from what journal?

11 A It was published in the Journal of American Academy
12 of Dermatology in April of 1984.

13 Q And, sir, is that a peer review journal?

14 A Yes, sir.

15 Q And do you regard this document as being
16 authoritative?

17 A Yes, sir.

18 Q Now, Dr. Dunagin in his article, sir, does he
19 address the subject of Times Beach?

20 A Yes, he does.

21 Q Does he address the subject of Seveso?

22 A Yes, he does.

23 Q Does he address the subject of other occasions of
24 human exposure to dioxin?

1 A Yes, sir.

2 Q Now, I'd like to direct your attention, if I may, .
3 sir, to Page 691.

4 A Yes, sir.

5 Q There's a paragraph there entitled "Absorption", is
6 there not?

7 A Yes, sir.

8 Q There's a sentence there that begins there with the
9 word "Actually", do you see that?

10 A Yes, sir.

11 Q Would you read that sentence and the next two
12 sentences out loud, please?

13 A "Actually, dioxin does not have distant effects such
14 as the public perception of radiation. The vapor pressure is
15 so low (1.7×10 to the minus 6 millimeter of Mercury) that
16 vapors are not a problem. Dioxin must first be absorbed into
17 the body before any effect on health can occur."

18 Q Now, sir, if you turn to the next page on 692 --

19 A Yes, sir.

20 Q In the first column, the last paragraph --

21 A Yes, sir.

22 Q Would you read beginning "Of course", there, would
23 you read that paragraph, please?

24 A "Of course, the absorption of dioxin by dermal

1 contact would also depend on frequency and duration of
2 contact. There have been several situations in which humans
3 had daily exposure to dioxin; some idea of the levels necessary
4 to cause toxicity by dermal absorption can be gathered from
5 this information. In 1971 waste oil containing dioxin was
6 applied to settle dust in horse arenas in Missouri. The
7 people who lived at these sites had daily exposure in their
8 occupation and play for three months. The level of dioxin in
9 a soil sample taken after three months was 32 ppm."

10 Q What does p-p-m mean?

11 A Parts per million.

12 Q 32 parts per million. Would you go ahead, sir?

13 A "The original level in the waste oil may have been
14 higher, because of some dissemination over the 3-month
15 interval. The humans exposed to these levels on a daily basis
16 developed chloracne and other symptoms typical of dioxin
17 toxicity. When re-examined five years later, these patients
18 had no laboratory abnormalities, chlorache resolved, and
19 there were no apparent sequelae from dioxin."

20 Q What does the word sequelae mean, sir?

21 A There were no obvious effects that could be related
22 to the dioxin.

23 Q Would you read the next paragraph, please, sir?

24 A "It is also known that workers involved in spraying

1 2,4,5-T herbicide in the 1960s and 1970s came in contact with
2 1-30 ppm dioxin in the concentrate. There is no evidence that
3 people with daily exposure to these levels developed chloracne.
4 Currently, the use of 2,4,5-T is restricted and the level of
5 dioxin in the concentrate is less than 100 ppb."

6 Q For parts per billion?

7 A Pardon?

8 Q P-p-b meaning parts per billion?

9 A Right.

10 Q Would you go ahead, sir?

11 A "From these two examples, it appears that the amount
12 of dioxin necessary to cause objective effects is in the 10-30
13 ppm range in an oily vehicle assuming daily exposure. In a
14 soil-water vehicle, the level would probably be 10 to 100
15 times as much. If the patients in these examples absorbed
16 some dioxin orally, the calculated levels would be even
17 higher. Even with daily skin contact, soil concentrations of
18 dioxin necessary to produce objective toxicity as shown by
19 chloracne most likely exceed 100 ppm."

20 Q Would you read the next paragraph, please, sir?

21 A "Another possible route of exposure is inhalation.
22 This may be an important route in some industrial accidents
23 where aerosols may be released into the atmosphere. However,
24 inhalation of dust does not seem to be important. If the

1 level of dioxin in dust is one ppb, the daily amount inhaled
2 has been calculated as 1.4 picograms/day. This level is
3 insignificant. The FDA has calculated a no-effect level of
4 70 ng/man/day."

5 Q All right. What is the relationship between a
6 picogram and a nanogram?

7 A A thousand-fold.

8 Q Which is larger?

9 A A nanogram.

10 Q So there's a thousand picograms in a nanogram, is
11 that right?

12 A Yes.

13 Q And the FDA have calculated a no-effect level of
14 70 nanograms per man per day?

15 A Yes.

16 Q Now, what is the amount that the CDC established
17 or calculated would be consumed on a daily basis by a child
18 at a one part per billion concentration in the soil?

19 A They assume that the child could eat someplace
20 between one and ten grams of soil per day.

21 Q Now, a child eating the soil, they don't just pick
22 it up and stuff it in their mouth, do they?

23 A No, sir.

24 Q How does that happen?

1 A Well, they're assuming that the child is playing in
2 the dirt and he puts his hands in his mouth rather than just
3 eating the dirt. Every time he puts his hands in his mouth
4 he could get some exposure. They're overestimating that but
5 they want to be on a conservative side.

6 Q And on 10 grams of soil, one to 10 grams of soil,
7 with a concentration of one part per billion of dioxin in it,
8 how many -- how much dioxin do they estimate that that child
9 would consume per day?

10 A Ten nanograms.

11 Q The information -- let me show you, sir, that
12 computation, if I may. Let me hand you Plaintiffs' Exhibit
13 1255 and I'd like to direct your attention to Page 48 of
14 that Exhibit.

15 A All right.

16 Q Do you see there in Plaintiffs' 1255, that is the
17 CDC article we were talking about?

18 A The CDC and Department of Agriculture both.

19 Q All right. Sir, on the second page of that
20 Exhibit they tell you the computation that they have made,
21 do they not?

22 A Yes, sir.

23 Q And what do they say is the amount of dioxin that
24 a child would take in if consuming one part -- one to 10 grams

1 of soil contaminated with one part per billion of TCDD?

2 A Up to 44 picograms per day.

3 Q Forty-four picograms per day?

4 A Right.

5 Q Now, that would be ingested, taken into the
6 stomach?

7 A That's total.

8 Q Total. That includes inhalation?

9 A Yes.

10 Q Now, according to Dr. Dunagin, inhalation could be
11 expected if the dust were contaminated to one part per billion
12 to be a total of 1.4 picograms per day, is that right?

13 A Yes, sir.

14 Q Now, how long can they say that a child could
15 consume 44 picograms per day?

16 A It isn't very well stated here, but they're talking
17 about through the time when the child is going to be eating
18 dirt rather than when he becomes an adult.

19 Q So that would be what? What period of time does
20 that occur?

21 A Ten to 12 years, something, I suppose.

22 Q Now, the Dunagin article further says, does it not,
23 sir, that the FDA --

24 MR. CARR: Objection to the leading form of the

1 question.

2 THE COURT: Rephrase the question.

3 BY MR. HEINEMAN:

4 Q What does the Dunagin article say about an FDA
5 calculation of a no-effect level, sir?

6 A The FDA had calculated their no-effect level at 70
7 nanograms per man per day.

8 Q Seventy nanograms per day?

9 A As no-effect level.

10 Q No limit on how many days?

11 A No, sir.

12 Q And how many times is that compared to the 44
13 picograms per day in the CDC?

14 A Oh, someplace around 40 percent higher than the
15 CDC.

16 Q If you've got 70 nanograms, that would be 70,000
17 picograms?

18 A Yes.

19 Q So 44 picograms would be something in the area of
20 a little less than 2,000 times less?

21 A Say that again. Repeat that.

22 Q If you have 70 nanograms per man per day.

23 A Right.

24 Q That's 70,000 picograms?

1 A Right.

2 Q Per day, correct?

3 A Right.

4 Q And if 44 picograms can be eaten per day would that
5 not be in the neighborhood of a little less than 2,000 times
6 more than the FDA is saying is a no-effect level?

7 A Yes.

8 Q Now, if you turn to the next page of the Dunagin
9 article, sir, which is Page 693, there's a portion of the
10 article devoted to the question of "Dose Response", is there
11 not, sir?

12 A Yes, sir.

13 Q Would you read that paragraph, sir?

14 A "All animal experiments show that dioxin toxicity
15 is dose-related, as would be expected by analogy with most
16 other known toxins. At very low doses, there are no observed
17 effects in animals. In rats, there is about a one hundred-
18 fold difference in dose between the "no observed effects
19 level" and the mortality levels. Dose-response was also
20 established for Yusho disease in humans where the severity
21 correlated with the amount of rice oil (containing dibenzo-
22 furans) consumed. People with low levels of consumption
23 showed no effects. Although the dose relationship seems
24 obvious, a great deal of public consternation has been caused

1 by statements that any amount of dioxin, no matter how small
2 the dose, is dangerous."

3 Q Sir, he then goes on to talk about the toxic effects
4 in humans, doesn't he?

5 A Yes, sir.

6 Q And in the next column on Page 693, he refers to the
7 importance of chloracne, do you see that?

8 A Yes, sir.

9 Q Would you read that to the jury, please?

10 A "The importance of chloracne is that it seems to be
11 the most likely objective sign to occur at the threshold dose
12 for humans. In other words, chloracne is the most sensitive
13 clinical indicator of dioxin exposure in population groups.
14 In most studies, 85 percent to 100 percent of patients who have
15 any of the more severe objective effects also have chloracne.
16 This is an extremely important fact in evaluating large groups
17 of people exposed to unknown chemicals, or where the magnitude
18 of exposure cannot be determined. However, there does seem to
19 be a small percentage of patients who are resistant to getting
20 chloracne. So for any given individual, one cannot determine
21 with absolute certainty whether a toxic dose has been
22 absorbed by the presence or absence of chloracne alone."

23 Q All right. Now, if you look at Page 695, sir.

24 A Yes, sir.

1 Q You have a portion of the paper that deals with
2 chloracne as a marker as indicated by the previous page,
3 correct?

4 A Yes, sir.

5 Q Now, on 695 he talks about the Seveso, Italy
6 incident, does he not?

7 A Yes, sir.

8 Q And he says -- or would you please read what he says
9 in the first full paragraph in the first column, beginning
10 "Several thousand people"?

11 A "Several thousand people were exposed to dioxin in
12 Seveso, Italy, and panic developed after the deaths of rabbits
13 and other herbivores which consumed dioxin-tainted vegetation.
14 An extensive health survey by the Lombardy Regional Govern-
15 ment examined dermatologic, neurologic, hepatic, renal,
16 reproductive, and immunologic parameters. They found 187
17 cases of chloracne, mostly in Zone A, the most heavily
18 contaminated area. However, no other objective toxicity could
19 be attributed to dioxin. Most of the cases of chloracne
20 resolved in a short period of time. There were some cases of
21 peripheral neuropathy, but only in people over the age of 55
22 who had diabetes or alcoholism. These cases were not
23 attributed to dioxin. Some surveys showed an increase in
24 spontaneous abortions after the accident in Seveso. However,

1 it is also known that many women left Italy to have therapeutic
2 abortions in other countries because of fear engendered by all
3 the media publicity following the accident. Some of these may
4 have been misinterpreted as spontaneous abortions in post hoc
5 surveys. Most experts now believe there was no increase in
6 abortion or birth defects."

7 Q Now, sir, I'd like you to turn to Page 696, if you
8 would where there's a portion of the paper that deals with
9 Teratogenesis and Carcinogenesis. Do you see that, sir?

10 A Yes, sir.

11 Q Let me direct your attention to some statements in
12 the paper beginning around the middle of that paragraph,
13 beginning with the sentence "Similarly". Do you see that?

14 A Yes, sir.

15 Q Would you read that, please?

16 A "Similarly, an increased incidence of cancer has
17 been observed in most species of laboratory animals given
18 dioxin; however, the doses required also produced overt signs
19 of direct toxicity. The covalent binding of dioxin to
20 deoxyribonucleic acid (DNA) is four to six orders of magnitude
21 less than values for most known chemical carcinogens. Most
22 authorities believe that dioxin is unlikely to initiate
23 somatic mutation, but may act as a promoter. The calculation
24 of relative risk for chemicals that may be promoters is not

1 as well established as for initiators of carcinogenesis. There
2 is controversy about models used to extrapolate to lower doses
3 than available experimental data. In some studies, dioxin
4 and related chemicals have actually inhibited the formation of
5 skin cancers induced by dimethylbenzanthracene (DMBA) in rats."

6 Q Now, if I could direct your attention to the last
7 two paragraphs of that portion on Teratogenesis and
8 Carcinogenesis which are in the next column. Would you read
9 those, please, sir?

10 A "Populations with less exposure as shown by absence
11 of chloracne would have a lower risk for carcinogenesis than
12 workers. Still most newspaper articles have implied that
13 people with no evidence of dioxin toxicity today nevertheless
14 have a ticking time bomb that may strike as cancer any day.
15 Similarly, studies of teratogenesis are continuing, but so
16 far studies from Seveso, New Zealand, and Alsea, Oregon have
17 not shown a greater incidence of birth defects than expected."

18 Q Now, sir, he relates, does he not, that there are
19 studies that talk about the inhibition of skin cancers by
20 using dioxin, is that right?

21 A Yes, sir.

22 Q Let me hand you, sir, what's previously been marked
23 as Defendant's Exhibit No. 165. Can you tell me what that is,
24 sir?

1 A This is an article by a group for the University of
2 Wisconsin titled, "Time-dependent Inhibition by 2,3,7,8-
3 Tetrachlorodibenzo-p-dioxin of Skin Tumorigenesis with
4 Polycyclic Hydrocarbons". This was by J. DiGiovanni, Barry,
5 Gleason, Kishore and Slaga, and it was published in
6 McArdle Laboratory for Cancer Research in May of 1980.

7 Q And is this a peer reviewed study, sir?

8 A Yes, sir.

9 Q And published in 1980, you said?

10 A Yes, sir.

11 Q If I can direct your attention, please, to the
12 abstract on the first page.

13 A Yes, sir.

14 Q There's a sentence that begins on about a third of
15 the way down. It starts with the words "In contrast". Do
16 you see that?

17 A Yes, sir.

18 THE COURT: Before you get into this article, is it
19 a good time for a short recess? Ladies and gentlemen, we'll
20 take a break for a short time. This will go for any other
21 breaks we take, not to discuss this matter amongst yourselves
22 or anyone outside the jury panel or form any opinions or
23 conclusions about the matters on trial. The Court will be
24 in a short recess.

1 (A short recess was taken.)

2 BY MR. HEINEMAN:

3 Q Doctor, at the time of the break we were looking at
4 Defendant's Exhibit 165 which is the article by Dr. DiGiovanni
5 and Drs. Barry, Gleason, Kishore and Slaga. Do you see that,
6 sir?

7 A Yes, sir.

8 Q What is the McArdle Laboratory for Cancer Research?

9 A It's a laboratory that got started in doing research
10 on cancer when two of the people working in research there
11 found the ultimate carcinogen that causes cancer with
12 benzo(a)pyrene or one of the related materials but one of the
13 metabolites was the ultimate carcinogen because of -- that
14 they've established a reputation as being very good in
15 research and they now have a relatively large building that's
16 devoted purely to research on cancer at the University of
17 Wisconsin.

18 Q Are these authors with the McArdle Laboratory?
19 Are some of them with the McArdle Laboratory of Research?

20 A I don't know these names so I don't know whether
21 they all were or not. Apparently DiGiovanni is.

22 Q There are two institutions there listed below the
23 names of the authors, are there not?

24 A Yes, sir.

1 Q And in these papers -- these peer-reviewed papers,
2 do they directly list the affiliation of the authors so they
3 know who they are and where they come from?

4 A I think they, for practical purposes, always do.

5 Q And what are the two institutions that are listed
6 here under the names of these authors?

7 A First, McArdle Laboratory at the University of
8 Wisconsin for Cancer Research. The second is the Biology
9 Division of Oak Ridge National Laboratory at Oak Ridge,
10 Tennessee.

11 Q Are you familiar with that laboratory, sir?

12 A The Oak Ridge National Laboratory has a Biology
13 Division that has the responsibility both for monitoring the
14 health effect of the workers as well as doing research on the
15 effect of radiation, as well as attempting to define a new
16 effects level for radiation because they're both part of the
17 overall effort that was formerly the AEC.

18 Q Does that research at Oak Ridge have anything to do
19 with cancer?

20 A Yes, sir, because one of the clear-cut examples of
21 the effect of external environment on man is, I suppose since
22 they first discovered radiation, it was in the 19 -- 1940s
23 when they were using radiation to treat thymus and thyroid,
24 they found that 10, 20 years afterwards they started developing

1 cancers of the thyroid. So it's been known for many, many
2 years that radiation in large doses causes cancer and once
3 that's established, they want to see how low the exposures
4 have to be before you don't see it related to taking a chest
5 x-ray or anything else.

6 Q Now, if I can direct your attention to the abstract
7 of this article, sir. There's a mention about a third of
8 the way down of an extremely long chemical name. The last
9 part of which is benzopyrene, do you see that, sir?

10 A Yes.

11 Q I won't ask you to read the entire chemical name
12 but what does that have to do with what you were telling us
13 about the discovery of benzopyrene as a carcinogen?

14 A Well, this is one of the benzopyrenes. This is
15 benzo(a)pyrene modified by one of the side groups on the
16 benzopyrene molecule. They use this material because it's
17 well known that these related chemicals when painted on the
18 back of a mouse will produce papillomas. That means it will
19 produce a growth wherever they put it. They'll shave the
20 back of a mouse and then they'll put a drop or more on that
21 shaved -- or shaved area and then over a period of time the
22 mouse will develop a little tiny growth, not a tumor -- a
23 tumor but not a cancer, and then with time, sometimes it will
24 go on to develop cancer. It's well-described, well-defined,

1 and uses a model for studying cancer in cancerigenesis.

2 Q Now, this abstract, sir, discusses what is the
3 effect of the TCDD application for initiation of this
4 papilloma formation, does it not?

5 A I haven't read it.

6 Q Let me direct your attention to that portion --
7 direct it to just before we broke which begins with the words
8 "In contrast". Do you see that there?

9 A Yes.

10 Q Now, just before that there's a sentence that begins
11 with "The application". Do you see that, sir?

12 A Yes.

13 Q Would you read that, please?

14 A "The application of TCDD five minutes prior to or
15 one day after initiation with DMBA, benzo(a)pyrene, or MCA
16 had little or no effect on papilloma formation."

17 Q All right. I'd like to ask you about that for a
18 minute. MCA is methylcholanthrene, correct?

19 A Yes, sir.

20 Q Methylcholanthrene, is that another carcinogen like
21 benzopyrene?

22 A I can't answer the question. There are a number of
23 these polycyclic aromatic very closely related, but some of
24 them produce cancer and some of them do not. So I'd have to

1 look in the book to see whether methylcholanthrene is a
2 carcinogen or not.

3 Q All right. And what about DMBA, dimethylbenz(a)-
4 anthracene?

5 A I have the same problem that's related to the
6 methylcholanthrene.

7 Q Now, that sentence you just read says that if you
8 apply TCDD five minutes before or one day after you initiate
9 with these three materials, it has little or no effect on
10 papilloma formation, correct?

11 A That's right.

12 Q Now, what does that tell you, sir, about whether or
13 not if someone had already had exposure to a carcinogen and
14 then was exposed to TCDD thereafter, whether TCDD would
15 promote a cancer from exposure to that previous exposure to
16 that carcinogen?

17 A The statement made there is that they know how many
18 papillomas will be formed because of the many studies from
19 DMBA by benzopyrene or methylcholanthrene. They know how
20 many tumors would be formed by such painting, skin painting,
21 and they're saying that when they gave the TCDD about the
22 time of this painting, it had no effect.

23 Q How about when they gave it afterwards? Five --
24 one day after?

1 A No effect.

2 Q So would that indicate to you, sir, that exposure
3 to a TCDD at least shortly after exposure to a carcinogen
4 would not give rise to promotion?

5 A Yes, it says it did not.

6 Q Now, would you read the next sentence which begins
7 with the words "In contrast"?

8 A "In contrast, when TCDD was applied three days
9 prior to initiation with these hydrocarbons, a marked
10 reduction in papilloma formation was observed."

11 Q All right. So that if you put on the TCDD three
12 days ahead of time, you get fewer papillomas formed, correct?

13 A Yes, sir.

14 Q Now, if I can direct your attention to Page 1583 as
15 it's numbered in that lower right-hand corner in that Exhibit,
16 sir.

17 A Yes, sir.

18 Q We see in the left-hand column some remarks about
19 the Effects of TCDD on Epidermal AHH, EH, UDPGT and GST. Do
20 you see that, sir?

21 A Yes, sir.

22 Q What are they talking about there? What are those
23 materials, AHH, EH, etc.?

24 A The only one I know offhand is the first one, the

1 AAH and the others I assume are also enzymes because they're
2 talking about the effect of this on the enzymes.

3 Q All right. Now, AHH is what, sir?

4 A Aryl hydrocarbon hydroxylases.

5 Q And TCDD -- well, let me ask you. Is TCDD known to
6 have any effect on the induction to AHH enzyme?

7 A In animals, yes.

8 Q And in animals, what effect does it have?

9 A It causes the measured AHH level in almost any
10 tissue they analyzed for it, causes it to go up. In other
11 words, you can measure enzyme activity by a bioacid.

12 Q By a bioacid. What do you mean by that, sir?

13 A You don't measure the enzyme itself but you measure
14 it by putting it in the presence of something that's going to
15 metabolize.

16 Q You measure the enzyme activity by showing the
17 effect of that enzyme on something else, is that right?

18 A Yes, sir.

19 Q That's sort of like measuring an immune function,
20 sir, with exposure to certain kinds of irritants?

21 A I'm not sure that you can go that far, but when we
22 increase the amount of glucose we eat, we begin to produce
23 more insulin, so that's a better example of an effect. If
24 you get a lot of sugar, your pancreas will be putting out

1 more insulin. And a man that is overweight is more likely to
2 get diabetes because he's used up his ability to make insulin
3 on a continuing basis. The enzyme induction is something our
4 body goes on all the time, depending on what we eat, we reduce
5 one or another enzyme, depending on the food we're eating.

6 Q Is aryl hydrocarbon hydroxylases induced normally
7 every day in the body?

8 A We know it varies and we're not sure what it is
9 that's making it change.

10 Q But it's there and active at all times? It's in the
11 body actually, is it not?

12 A Yes.

13 Q Now, so TCDD in animals is known to induce production
14 or activity of AHH?

15 A Yes, sir.

16 Q Now, they have a discussion there, do they not, about
17 the effect of TCDD on epidermal AHH activity, correct?

18 A Yes, sir.

19 Q They're talking about it in the skin?

20 A Yes, sir.

21 Q Now, do they suggest that in these animals that were
22 reviewed here that the TCDD when painted on the skin caused
23 the AHH to go up?

24 A Yes, sir.

1 Q And it would be increased for five to 10 days after
2 TCDD application, is that right, sir?

3 A Yes, sir. But that doesn't mean at the same level.
4 It means it was falling off over that five to 10 days.

5 Q Increased?

6 A Over background.

7 Q So it's increased the greatest amount in the first
8 24 hours and then it falls off?

9 A Yes, sir.

10 Q Now, what is the effect then -- is there any
11 connection between the enzyme induction of TCDD and the
12 reduction in the number of these tumors by application of
13 TCDD?

14 A They have shown that these --

15 Q Were they mice?

16 A Yes, these mice that have the benzopyrene chemicals
17 painted on their backs developed a papilloma and when they
18 painted them on the back they also got elevation of the AHH.
19 And when they put -- when they put the TCDD on before, they
20 didn't see as many papillomas and I'm not sure -- they've
21 shown that AHH goes up and it's logical to conclude that the
22 AHH going up was a possible basis for the decrease in
23 papillomas. That's a reasonable explanation based on both of
24 these things occurring.

1 Q So what they -- if you look at Page 1584, sir, you
2 see that? The first column there before Table 5?

3 A Yes, sir.

4 Q Would you read that sentence beginning with the
5 word "Experiments" to the end of the paragraph, that short
6 portion there, please?

7 A From the first paragraph?

8 Q Yes.

9 A "Experiments from our laboratories have shown that
10 TCDD possessed little or no tumor-initiating (16) or tumor-
11 promoting (3) properties in the skin of CD-1 mice at doses
12 that produced a marked inhibition of the initiation of skin
13 papilloma formation by several PAH (12). We therefore chose
14 TCDD as a tool for studying the effects of enzyme induction on
15 tumor initiation by PAH in mouse skin."

16 Q Now, the PAH are the poly aromatic hydrocarbons?

17 A Yes, that's those three chemicals we've talked about
18 initially, the benzanthracene, the methylcholanthrene and the
19 tetrahydrobenzopyrene.

20 Q All right.

21 A Those three are all PAH's.

22 Q Now, if you look at the last paragraph on Page 1585,
23 sir.

24 A Yes, sir.

1 Q You see where it says the results?

2 A Yes.

3 Q What do they say? Would you read that paragraph?

4 A "The results presented above, coupled with the
5 observed increases in epidermal AHH and UDPGT, suggested a
6 possible mechanism for the ability of TCDD to inhibit tumor
7 initiation by PAH. Under the influence of TCDD, epidermal
8 cells may be programmed to inactivate PAH carcinogens more
9 efficiently and therefore eliminate them more readily. Further
10 analysis of the profile of water-soluble metabolites as well
11 as of rates of clearance and excretion from epidermal cells
12 may shed further light on the inhibitory effect of TCDD and
13 similar compounds."

14 Q So that they're trying to relate experimentally two
15 observations that they've made?

16 A Yes, sir.

17 Q One, that TCDD stipulates and induces AHH and
18 production and activity, and the other, that TCDD inhibits
19 the papilloma formation if it's given before -- ahead of time?

20 A Right.

21 Q Now, let me direct your attention, please, if I may,
22 sir, to Defendant's Exhibit 166. That is another paper, is
23 it not, sir, published in a -- well, let me ask you -- what
24 is that, sir?

1 A This is a report by David Barry, Thomas Slaga,
2 DiGiovanni and Juchau from Oak Ridge as well as the University
3 of Washington in Seattle and they published a paper titled,
4 "Studies With Chlorinated Dibenzo-p-dioxins, Polybrominated
5 Biphenyls, and Polychlorinated Biphenyls in a Two-Stage System
6 of Mouse Skin Tumorigenesis: Potent Anticarcinogenic
7 Effects". This was published in the Annals of the New York
8 Academy of Sciences.

9 Q Is that peer review?

10 A Yes. And it was published, I think based on the
11 bottom, in 1979.

12 Q Now, some of these authors are the same people that
13 were involved in the other article, are they not?

14 A Yes, sir, I think two of them -- three of them.

15 Q On the other occasion they were working with the
16 McArdle Laboratory people at the University of Wisconsin and
17 on this occasion they're working with the University of
18 Washington, correct, sir?

19 A Yes, sir.

20 Q And if I can direct your attention to Page 411 of
21 Exhibit 166. In the discussion section, do you see that?

22 A Yes, sir.

23 Q And would you read the first three or four
24 sentences of the second paragraph of that discussion section,

1 sir?

2 A "This report demonstrates that TCDD possesses
3 remarkable inhibitory actions on skin tumor-initiation to
4 polycyclic aromatic hydrocarbons (PAH). Almost complete
5 inhibition of DMBA tumor initiation is achieved with a single
6 nontoxic topical dose of 0.1 micrograms and with a dose of 0.01
7 micrograms approximately 80 percent inhibition was achieved.
8 This potent anticarcinogenic effect may be related to the
9 ability of TCDD to induce epidermal enzyme pathways respon-
10 sible for detoxifying PAH carcinogens in the skin."

11 Q Sir, what is it about the enzyme productions that
12 can inhibit tumor or tumor production whether it be malignant
13 or non-malignant or benign?

14 A Well, there's no cause and effect established here
15 but what they're saying is these studies would be consistent
16 with the fact that TCDD in very small amounts can produce
17 enzymes which will break down the carcinogen. So it's not
18 going to produce a reaction without producing a papilloma.

19 Q So that it's a biochemical effect?

20 A Yes, sir.

21 Q On the carcinogen itself?

22 A Right.

23 Q And that's done by virtue of the enzymes in the
24 body being increased?

1 A Yes, sir.

2 Q Now, sir, we talked a little while ago about the
3 fact that a health study had been done on the residents of
4 Times Beach, do you recall that, sir?

5 A Yes, sir.

6 Q Let me hand you what's previously been marked as
7 Defendant's Exhibit 55. Can you tell us what that is, sir?

8 THE COURT: Is that 55?

9 MR. HEINEMAN: Fifty-five, your Honor.

10 A This is a report, a progress report titled "Missouri
11 Dioxin Health Studies", dated October 16, 1983. It lists the
12 Missouri Division of Health, The Centers for Disease Control,
13 the St. Joseph's Hospital of Kirkwood and the St. Louis
14 University Hospital.

15 Q All right. Now, let me direct your attention, if I
16 may, sir, to Page 3 of that report. Three being an Arabic
17 numeral as opposed to a Roman numeral so it would be actually
18 about the ninth page of the Exhibit itself.

19 A Page 3.

20 Q Where it's entitled "Background and Characterization
21 of Environmental Contaminations", do you see that, sir?

22 A Yes, sir.

23 Q Now, what area are they talking about there?

24 A Well, they're talking about hexachlorophene plants

1 in southwest Missouri. They're talking about the horse arenas
2 in Missouri.

3 Q You see on the next page, sir, they have a list of
4 all of the various sites, various sites in Missouri. Do you
5 see that, sir?

6 A Yes, sir.

7 Q There are 33 such sites listed?

8 A Yes, sir.

9 Q Is that any relation -- does that have any.
10 relationship, sir, to the EPA designated dioxin sites in
11 Missouri?

12 A I think they are the designated sites. That doesn't
13 mean it was complete today but as of that date it was complete.

14 Q Now, on the Page 3 that I've reference to before,
15 they talk about the -- at the end of the first paragraph, what
16 the contamination levels were, do they not?

17 A Yes, sir.

18 Q And they suggest that most of the levels ranged in
19 what range, sir?

20 A Levels as high as 35 ppm were measured in the soil
21 in one of the 33 sites. Currently, isolated levels as high as
22 1.9 ppm exist in these contaminated areas but most of the
23 levels range from less than one part per billion to several
24 hundred ppb.

1 Q So there's a very wide range of contamination levels,
2 is there not, sir?

3 A Yes, sir.

4 Q Some less than one part per billion, some as high as
5 several hundred parts per billion with a few up in the parts
6 per million range?

7 A That's right.

8 Q Now, the next paragraph, sir, they talk about
9 approximately half of the sites that they listed being
10 contaminated with peak levels in excess of 100 parts per
11 billion, correct?

12 A Yes, sir.

13 Q Now, that's the contamination level in the soil, is
14 it not, sir?

15 A Yes, sir.

16 Q One hundred parts per billion and they say 11 of
17 them are in residential areas, correct?

18 A Yes, sir.

19 Q Now, the one part per billion set by CDC is for
20 residential areas, is it not, sir?

21 A Yes, sir.

22 Q Now, they characterize these people whom they
23 studied in two groups, do they not, sir?

24 A For at least -- for one study. I'm not sure if

1 they're talking about the 'same study that I recall.

2 Q If I can direct your attention to Page 27.

3 A Yes, sir.

4 Q They talk about -- actually the section begins on
5 the previous page, on Page 26, where they talk about how
6 they conduct this study, do they not?

7 A Yes, sir.

8 Q They talk about a health effects survey question-
9 naire, that's the first thing they did?

10 A Yes, sir.

11 Q And they did that to elicit information on exposure
12 risk, correct?

13 A Yes, sir.

14 Q Medical history, etc.?

15 A Yes, sir.

16 Q And then on Page 27 they did a dermatology screening
17 clinic, did they not?

18 A Yes, sir.

19 Q And they say there in that first paragraph, "The
20 primary purpose of this activity was to screen for persons
21 with chloracne who were then referred for a complete medical
22 workup". Correct?

23 A Yes, sir.

24 Q Then, thirdly, "They reviewed the initial group of

1 800 completed questionnaires and selected a group of
2 individuals for inclusion in a pilot medical study." Correct?

3 A Yes, sir.

4 Q And they did 130 individuals to whom they gave a
5 detailed medical workup, did they not, sir?

6 A Yes, sir.

7 Q Now, they go on and describe what the high risk and
8 low risk people are, do they not?

9 A Yes, sir.

10 Q What are the high risk people? What are the criteria
11 for them?

12 A They selected a high risk group, those individuals
13 who lived or worked in the TCDD-contaminated area or
14 participated more than once per week on an average in high
15 soil contact activities such as gardening, field or court
16 sports, horseback riding, or playing in the soil in TCDD-
17 contaminated areas. And these contaminated areas contain TCDD
18 in levels between 20 and 100 parts per billion for a period of
19 at least two years or greater than 100 ppb for a period of
20 at least six months.

21 Q So if they have the exposure to dioxin-contaminated
22 soil over 100 parts per billion in the soil for six months
23 or more, they were included?

24 A Yes, sir.

1 Q Or if it were only from 20 to 100 parts per billion
2 in the soil, it would be -- have to be for at least two years?

3 A Yes, sir.

4 Q And they did have one soil contamination level of
5 33,000 parts per billion, correct?

6 A Yes, sir.

7 Q That's what, 33 parts per million?

8 A Yes.

9 Q Now, the low risk was whom, sir?

10 A Individuals most who were from the original 800 who
11 had completed the questionnaires with the lowest risk of
12 exposure based on the type of exposure site, age, sex, race,
13 and a socio-economic status characteristic of a two to one
14 ratio of high/low risk subjects. This group was comprised of
15 40 individuals, when they selected them, who had no reported
16 any access to or any regular high soil contact activities in
17 a contaminated area.

18 Q So the low risk people were people who had not
19 reported any access to any of these contaminated areas or
20 regular high soil contact activities in any of these
21 contaminated areas, is that right?

22 A Right.

23 Q And they say that there were --

24 MR. CARR: Your Honor, counsel is just repeating

1 what the witness has read from the Exhibit. He's duplicating
2 and it's leading and all it does is take more time.

3 THE COURT: Objection sustained. Please refrain
4 from that.

5 BY MR. HEINEMAN:

6 Q Now, Doctor, if I can direct your attention to
7 Page 32 of this Exhibit. It talks about the presentation of
8 results of this study, does it not?

9 A Yes, sir.

10 Q Now, that's the place where that portion starts on
11 that page?

12 A Yes, sir.

13 Q If you turn to Page 33, sir --

14 A Yes, sir.

15 Q They talk about -- direct your attention to the
16 first full paragraph starting with the word "Regarding".

17 A Yes, sir.

18 Q Would you read the first two sentences, please?

19 A "Regarding the prevalence of specific generalized
20 disorders as reported in the Health Effects Survey
21 questionnaire, there were no differences or consistent trends.
22 Of the five cases of cancer reported (three in the high risk
23 group and two in the low risk group, difference not significant
24 at the 0.05 level), none of the cancers were soft tissue

1 sarcomas."

2 Q What is the 0.05 level? Is that one of these
3 statistical things you were talking about before?

4 A Yes, sir.

5 Q Okay. Briefly, what does that mean, sir?

6 A It means that for those five cases of cancer the
7 three in the high risk group and two in the low risk group,
8 that kind of difference could occur by chance and it doesn't
9 say by what level but it said not a significant difference.

10 Q Now, if we look at the next page, sir. Would you
11 read the first sentence on Page 34?

12 A "No consistent overall trends or statistically
13 significant individual diagnostic differences were detected
14 for reproductive health outcomes from the questionnaire
15 material."

16 Q In other words, they were comparing the low risk
17 and the high risk groups?

18 A Yes, sir.

19 Q And saying no consistent overall trends were
20 significant individual diagnostic differences?

21 A That's right.

22 Q Now, what about the next sentence there?

23 A "No difference was noted for males in prevalence
24 of reported sexual dysfunction and, although no differences

1 were reported in the questionnaire regarding an increased
2 prevalence of reproductive health problems, females in the
3 high risk group reported a later age at menarche."

4 Q That's the onset of menstruation, is that it?

5 A Right.

6 Q Now, the next sentence, sir, would you read that,
7 please?

8 A "When the analysis was restricted to only those
9 women who had reached menarche during the time at which they
10 would have been potentially exposed to environmental dioxin,
11 the significance of this difference diminished."

12 Q They give a value of P equals 0.17?

13 A Right.

14 Q That again is a statistical figure, correct?

15 A Yes, that means that could occur. That is a lot
16 more significant than that 0.05. In other words, there was
17 a real overlap of those two populations.

18 Q Would you read the next two sentences, please, sir?

19 A "Only 30 births were reported in the entire study
20 population since 1972 and no trends were noted in the
21 questionnaire medical history or reproductive outcome
22 sections. No birth defects were reported among children born
23 to women in the high risk group after the time at which
24 exposures could have occurred."

1 Q All right. Would you read the first -- read the
2 first two sentences of the next paragraph, please, sir?

3 A "In the dermatologic screening, no cases of chloracne
4 were seen. For the 104 individuals in the study population,
5 no significant differences in dermatological findings were
6 demonstrated by either medical histories (as reported on the
7 questionnaire) or physical examination."

8 Q So they found no chloracne --

9 MR. CARR: Objection, your Honor. He's repeating
10 now what the witness just said.

11 THE COURT: Objection sustained.

12 BY MR. HEINEMAN:

13 Q Now, would you turn to Page 35, sir? Would you read
14 the first sentence of that first paragraph?

15 A "The data from the neurological examinations were
16 analyzed and showed no significant differences between the two
17 groups or apparent patterns for either the self-reported
18 neurological conditions from the neurological examination or
19 the questionnaire medical histories."

20 Q Would you read the next sentence, please, sir?

21 A "Except for diminished vibration sense at 256 Hz
22 for those in the high risk group ($p = 0.13$), none of the
23 differences on neurological examination approached statistical
24 significance."

1 Q So did they find, sir, one neurological difference
2 between the groups?

3 A No, sir, none.

4 Q Didn't they find a diminished vibration sense in
5 the high risk group?

6 A Yes, but it wasn't statistically significant.

7 Q Now, would you read the first sentence of the next
8 paragraph, sir?

9 A "As presented in Table 2, there appeared to be a
10 trend of increased urinary tract problems among the high risk
11 cohort as reported from the medical history section of the
12 questionnaire and the urinalyses although no statistically
13 significant differences were demonstrated."

14 Q Now, in the next paragraph, sir, the last paragraph
15 on the page, there's a sentence that refers to physical
16 examination. Do you see that, sir?

17 A Yes, sir.

18 Q Would you read that sentence?

19 A "On physical examination, there was a greater
20 prevalence in the high risk group of hepatomegaly, although
21 this finding, as well as all others, was not statistically
22 significant."

23 Q What's hepatomegaly, sir?

24 A It just means liver is enlarged.

1 Q Okay. Now, would you turn to the next page and
2 read the last sentence of the top paragraph on the page?

3 A "The two groups showed no difference in character-
4 istic urinary porphyrin patterns (see Table 4) and no cases
5 of overt porphyria cutanea tarda (PCT) or any precursor
6 conditions (latent PCT or Type B porphyria) were detected."

7 Q Now, would you read the first sentence of the next
8 paragraph?

9 A "As reported in the medical histories, there were
10 no differences in prevalence of immune disorders."

11 Q Now, they do say something about the physical
12 examination in that respect, do they not, sir?

13 A Yes, sir.

14 Q And what do they say about that?

15 A "On physical examination, the only significant
16 difference noted was a higher prevalence of palpable axillary
17 lymph nodes in the low risk cohort (p less than 0.05) and the
18 suggestion of a greater prevalence of palpable nodes among
19 the low risk group."

20 Q That was their low risk group?

21 A Yes.

22 Q Now, in the course of your examination by Mr. Carr,
23 there was discussion about whether the findings of coronary
24 heart disease in the Nitro plant were related to the levels

1 of coronary heart disease found in the Kanawha Valley in West
2 Virginia, in general, do you recall that, sir?

3 A Yes, sir.

4 Q Now, you recall, do you not, sir, that this was a
5 phenomena that was referred to Dr. Marian Moses?

6 A Yes, sir.

7 Q Did she use that statistic as an explanation for the
8 higher coronary heart disease levels found in the Nitro plant?

9 A Yes, sir.

10 Q Now, sir, does everything with respect to dose
11 response relationship, does that exist in connection with
12 every toxin that one might be exposed to that we know of?

13 A Yes, sir.

14 Q You mentioned, sir, that one could explain the
15 condition of the people in the Kanawha Valley because of the
16 lifestyle, was that right?

17 A Some of the conditions.

18 Q All right. I'm talking now about the coronary
19 heart disease, the higher cardiovascular disease, is that
20 right?

21 A Yes, sir.

22 Q Now, I believe you told Mr. Carr that you have not
23 personally observed the people that live in Charleston or
24 Nitro to see with your personal knowledge what their lifestyle

1 is, is that right?

2 A Yes, sir.

3 Q What can you tell us from your experience is the
4 connection between lifestyle and heart disease throughout the
5 country?

6 A From the Framingham Study, this is a study that was
7 started in the 1950s. They studied the population of
8 Framingham, every single person that lived in that community,
9 and they developed parameters that could be evaluated later,
10 including all laboratory tests where they had high blood
11 pressure. The completed examination was put into a computer
12 data base and from that they found that people have elevation
13 of blood pressure. They have more heart disease. People who
14 smoke have more heart disease. People have elevation of
15 cholesterol, have more heart disease. Now, I'm not sure when
16 that came from Framingham, all of those and since that time
17 the treatment of people who have any one of these conditions,
18 the responsibility of their physician is to tell them to
19 change your ways because it could well be that you'll have
20 heart disease. Some time since then it's also been
21 established that inactivity is related to coronary artery
22 disease as well. So, those are the risk factors that are
23 generally discussed. Since that time there's been a question
24 of whether triglycerides may be associated with it and it's

1 not clear. And then the other lipids that have been managed,
2 the VHDL's, the LDL's and the HDL's are all a part of some,
3 how the risk factors that are associated with coronary artery
4 disease.

5 Q Now, in the course of your examination you and Mr.
6 Carr discussed the fact that the levels in the plant were
7 approximately the same as the levels in the Kanawha Valley,
8 generally in terms of the amount of coronary heart disease
9 found or cardiovascular disease, is that right?

10 A Yes, sir.

11 Q Now, would you expect, sir, because of the dose
12 response relationship that if in fact the coronary heart
13 disease was due to exposure to TCDD that it would be higher
14 in the plant where the people are the closest to that
15 material?

16 A Yes, sir.

17 Q All right. Why is that?

18 A That's that dose response group. If dioxin causes
19 coronary artery disease, then those who have the most
20 exposure are going to have the most effect. Those who have
21 infinitesimally small exposure, a level that can't be measured,
22 whether it's there, if we can't measure it but it's possible,
23 the effect of that as compared to the dose that was inside of
24 the plants should be strikingly different.

1 Q So that regardless of whether there may be some
2 element of exposure in the Valley generally, infinitesimally
3 small, do you not say?

4 A Yes, sir.

5 Q You would expect it to be much higher in the place
6 where people would be getting activity day after day exposure?

7 A Moreso than that because the dose response curve is
8 not a straight line. It doesn't mean as you go up the dose
9 curve, if you've got it at one level and at a higher level
10 you're going to see more, that isn't the way the dose response
11 curve works. It becomes very sharp some place in the dose
12 response curve, it would be dramatically increased.

13 Q What do you mean by very sharp?

14 A It's no longer a straight line and it's curved
15 upward, a small increase in dose will produce more than just
16 that little increase related to a small increase in exposure.
17 It becomes multiplied. We call it geometrically increased
18 rather than linearly related.

19 Q So that at a level of very low exposure it may be
20 relatively flat?

21 A Yes.

22 Q And then at some level it shoots up?

23 A That's right. So the effect is greater than the
24 proportional increase in exposure.

1 Q What conclusion -- you told us before something
2 about how exposure diminished with distance from this source
3 of exposure?

4 A Yes, sir.

5 Q All right. You discussed that briefly with Mr.
6 Carr, I believe, did you not?

7 A Yes, sir.

8 Q What did you mean by that?

9 A If -- as you go away from the source, the concentra-
10 tion diminished more than --

11 MR. CARR: Your Honor, this is repetitious. Counsel
12 and the witness discussed this themselves. I object to it.
13 It's repetitious of what he's testified to yesterday.

14 THE COURT: Objection sustained. It is repetitious.
15 BY MR. HEINEMAN:

16 Q Doctor, what conclusion would you reach by virtue of
17 the fact that the cardiovascular disease inside the Nitro
18 plant and in the Kanawha Valley, in general, are approximately
19 the same?

20 A The dioxin had no effect on the population inside of
21 the plant.

22 Q Did Marian Moses reach the same conclusion?

23 A Yes, sir.

24 Q Sir, let me hand you what's been marked as

1 Plaintiffs' Exhibit 1494, which is something Mr. Carr discussed
2 with you. Would you agree with me, sir, that 1494B is a
3 blowup of a couple of paragraphs on the second page of that
4 Exhibit?

5 A Yes, sir.

6 Q Okay. Now, it's -- this is a blowup of the third
7 and the fifth paragraph, correct?

8 A Yes, sir.

9 Q Now, this document, as I recall from your examina-
10 tion by Mr. Carr, is a work description for dismantling the
11 residue equipment in Department 237, is it not, sir?

12 A Yes, sir.

13 Q And this was repaired in September 30th, 1983, by
14 a Mr. J. Linn, L-I-N-N ?

15 A Yes, sir.

16 Q I think you said he was somebody at the plant?

17 A Yes, sir.

18 Q That's at the Krummrich plant. And if you look at
19 Page 2 of the Exhibit which is actually the third page of the
20 Exhibit, you see the work description that is requested, do
21 you not, sir?

22 A Yes, sir.

23 Q And it says remove the insulation from the residue
24 equipment in Department 237?

1 A Yes, sir.

2 Q The residue equipment consists of the still pot,
3 the residue tank, the residue pump, the re-boiler pump and
4 the associated piping, correct?

5 A Yes, sir.

6 Q Now, the residue equipment, sir, and the still
7 column -- isn't that the stuff that the --

8 MR. CARR: Leading question, your Honor.

9 THE COURT: Objection sustained. Rephrase it,
10 please.

11 BY MR. HEINEMAN:

12 Q Where is that located to your knowledge in connection
13 with the still column itself?

14 A Well, it's related to -- that's the -- when we take
15 off the product and what we have left is the residue and that's
16 the cleaning up of this residue equipment, the final throw-
17 aways is what this is concerned with.

18 Q That's the still pot at the bottom?

19 A Right.

20 Q In the residue tank?

21 A Right.

22 Q And that's what's left after --

23 A The property is taken out.

24 Q The property is taken out. Now, the warnings that

1 are contained here, sir, are contained here are they not?

2 Part of the warnings contained in this paragraph here?

3 A Yes, sir.

4 Q "Due to the possibility of exposure to the above
5 chemicals rubber shoes, rubber gloves and disposal coveralls
6 must be worn in addition to the normal plant safety clothing."
7 Correct?

8 A Yes, sir.

9 Q Also respirators, rubber gloves, rubber shoes,
10 that sort of thing, correct?

11 A Yes, sir.

12 Q Now, didn't you tell us what it was that Monsanto
13 requires the people in the plant to wear when they were
14 cleaning up a spill?

15 A Yes, sir, we told them to use equipment much as
16 described in that second paragraph.

17 Q That would be a spill of chlorinated phenol?

18 A Yes, sir.

19 Q And the purpose of that is what, sir?

20 A Primarily to keep it off of their skin. These
21 materials are very irritating and will produce a burn if you
22 get it on your skin. And obviously we don't want them to get
23 it in their eyes, nor do we want them to have some way of
24 getting the stuff into their lungs.

1 Q Now, the people that were going to do this job were
2 not going to be exposed just to that --

3 MR. CARR: Your Honor, I object to the leading form
4 of the question.

5 THE COURT: Objection sustained.

6 BY MR. HEINEMAN:

7 Q Would they be exposed, sir, to the material being
8 produced and coming out of the still in the process?

9 A No, sir.

10 Q What is it that these people might be exposed to?

11 A These here?

12 Q Yes, in this document.

13 A Yes, those people are going to be working in a
14 place where the dioxin would be concentrated as opposed to
15 the general work inside the plant. Their chance of being
16 exposed to dioxin is much more than can be found in any other
17 circumstance.

18 Q Because they're going to do what?

19 A Because they're going to dismantle these residue
20 areas. The residue equipment consisting of the pot, the tank
21 and the boiler pump.

22 THE COURT: Is this a good point to break for lunch?

23 MR. HEINEMAN: Yes, sir, be fine.

24 THE COURT: Ladies and gentlemen, we'll take a

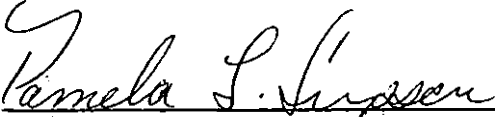
1 break at this time for lunch. Resume again at one o'clock.
2 I would remind you of the admonishments I made to you, that
3 will apply during this break also.

4 COURT RECESSED:
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1 STATE OF ILLINOIS)
2) SS
3 COUNTY OF ST. CLAIR)
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6 I, PAMELA L. SIMPSON, C.S.R., Official Court Reporter
7 in and for the Twentieth Judicial Circuit, and the Official
8 Court Reporter who transcribed the above-styled cause had on
9 July 23, 1985, do hereby certify that the foregoing transcript
10 of proceedings is a true, correct and complete transcript of
11 the proceedings had on said date.

12 DATED this 30th day of July, 1985.
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17 PAMELA L. SIMPSON, C.S.R.
18 Official Court Reporter
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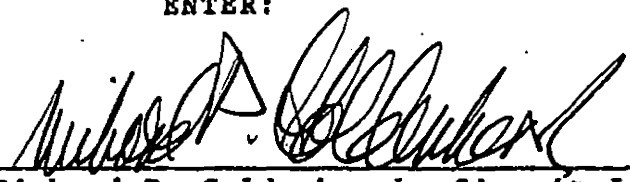
1 STATE OF ILLINOIS)
2 COUNTY OF ST. CLAIR) SS.

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I, RICHARD P. GOLDENHERSH, Circuit Judge in and for
the Twentieth Judicial Circuit, hereby certify that the above
is a true and correct transcript of the proceedings had in the
case captioned: FRANCES E. KEMNER, et al., v. MONSANTO COMPANY,
Cause No. 80-L-970, heard on December 17, 1985.

DATED this 6th day of January, 1986.

ENTER:


Richard P. Goldenherseh, Circuit Judge

1 STATE OF ILLINOIS)
2) SS..
3 COUNTY OF ST. CLAIR)
4
5
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7 I, RICHARD P. GOLDENHERSH, Circuit Judge in and for
8 the Twentieth Judicial Circuit, hereby certify that the above
9 is a true and correct transcript of the proceedings had in the
10 case FRANCES E. KEMNER, et al. vs. MONSANTO COMPANY, Cause
11 No. 80-L-970, heard on July 23, 1985.

12 DATED this 30th day of July, 1985.
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14 ENTER:

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17 RICHARD P. GOLDENHERSH
18 Circuit Judge
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