SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION - MORRIS COUNTY
DOCKET NO. C-3939-84

DIAMOND SHAMROCK CHEMICALS COMPANY,

Plaintiff,

-v-

THE AETNA CASUALTY AND SURETY COMPANY, et al,

TRANSCRIPT OF PROCEEDINGS
(MORNING SESSION)

Morris County Courthouse
Morristown, New Jersey
Thursday, September 29, 1988

BEFORE: THE HONORABLE REGINALD STANTON, A.J.S.C.

TRANSCRIPT ORDERED BY: STEPHEN D. CUYLER, ESQUIRE

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THE COURT: Please be seated, ladies and gentlemen. Now, come back up, please, Dr. Wolfskill, and, Mr. Cuyler, when you're set. Dr. Wolfskill remains on the stand under oath.

MR. CUYLER: Your Honor, I've pondered this out carefully and my questions will take about 30 minutes, I cannot vouch for how long the witness' answers will take.

THE COURT: Okay, let's see how we go

CROSS-EXAMINATION BY MR. CUYLER:

Q Doctor, you have before you, I believe, the copy of your report that's been marked into evidence. Is that correct?

A Yes.

Q All right, at the end of the report, there are a series of diagrams, am I correct?

A In the appendix?

Q Yes.

A Yes.

Q I'm not talking about the ones in the glassine envelopes that you prepared or your company or someone prepared, I'm talking about what appear to be some photocopies. Is that correct?

A Yes.

Q Can you tell the Court where you obtained

these? I take it from Diamond Shamrock through Mr. Steward?

A The base maps, yes.

Q All right, was there any information in this compendium that you did not obtain from Diamond Shamrock?

A Well, I obtained some of the information from Gordon Steward who I believe is no longer an employee of Diamond Shamrock.

Q But these diagrams were basically Diamond Shamrock diagrams?

A That's correct.

Q Do you know what time these diagrams speak to, the diagrams of the plant?

A Well, these are various drawings of the plant layout at various times. The dates are generally on each drawing as to when that drawing was produced.

Q All right, can you go through and, first of all, were there any drawings that you saw that are not produced -- produced, rather, in your appendix?

A Yes, there was a large selection of drawings and I believe Mr. Steward participated in selecting the ones that would illustrate his analysis of where dioxin was.

Q All right. Now, when you said the date is

on the drawing, can you tell us where you're referring to?

A Down in the margin under the section at the bottom, there are usually signatures and dates, some of which are legible and some of which are not legible on these reproductions.

Q Whatever the dates say, did you understand that these diagrams represented the plant as it existed in the 1960s or the 1950s? In other words, before or after the explosion?

A At the moment, I don't recollect if we had the 19 -- the pre-1960 drawings, I don't remember if they're included in this or not. I know that Mr. Steward indicated on here pre-1960 locations of equipment.

Q All right, but your understanding then is that while Mr. Steward may have indicated pre-1960 locations for the most part, these depict the plant -- with the exception of those notations -- depict the structure of the plant following the 1960 explosion and the reconstruction?

A Well, as I said, I don't recollect if maybe there is a pre-1960 drawing in here, there may be.

Q Well, my question is this --

A I did not select the drawings.

Q -- if there is a pre-1960 drawing of the section, for instance, of the plant that was not reconstructed such as the L formulations building, would that to your understanding reflect nonetheless the layout and the condition and the layout of the building as it existed during the 1960s?

A I think there is a pre-1960 drawing in here. The last one that I'm looking at, I believe, is a 19 -- pre-1960 arrangement.

Q All right, and what is that? Oh, all right, that's the old process building, right?

A That's the old process building.

Q So that certainly didn't exist in 1960?

A That's correct, this is a drawing prior to the explosion.

Q Now, sir, you said that you had read 17 depositions, do you recall that testimony?

A Yes.

Q All right, that was for preparation of your report P-363?

A I read Burton's deposition page-by-page --

Q No, my question is the 17 depositions you reviewed, did you review them prior to the preparation of your report P-363?

A Yes, I did review them prior.

Q Did you review any depositions after preparation of P-363, any new depositions?

A Well, I think there was one by Mr. Smith that I don't believe I had before preparation of the report.

Q Aside from Mr. Smith's deposition, have you reviewed any new depositions within the last six months?

A Well, I can't recollect exactly how many I had before this report was presented. I had a large stack of them at that time. I do remember that I got Mr. Smith's deposition later, I may have gotten Dr. McBurney's and there may have been a few others, but there was a large stack of depositions available prior to the report.

Q Have you reviewed any depositions in the last six months that you had not reviewed at the time of your preparation of P-363 that you consider are material to your opinions?

A Well, I've reviewed Homer Smith, that's the one I can't recollect for sure that I received after this report. I think there may have been some others, but I'm not sure whether they were there before or after.

Q Certainly nothing that stands out in your mind today?

A That's correct.

Q Certainly nothing that's formed the basis of your testimony in court either today or yesterday?

A Well, I think all of them have formed the basis for my testimony in court this week.

Q Are you aware that in April of this year, there were a number of depositions of prior plant employees taken?

A Well, I don't recollect, again, the dates --

Q Good enough.

A -- that were on the depositions.

Q But nothing there rings a bell? For instance, if I were to tell you there were such depositions, could you tell me the names of any of the individuals deposed?

A Well, I think if you told me the names of the ones that were taken after the report, I could probably recognize that those were depositions that I have read.

Q But there's nothing -- you can't tell me that there's any -- what I'm trying to find out is did you read any depositions taken since April, and if so, which ones and did they tell you anything significant about the operation of this plant during the '50s or the '60s?

A I cannot tell you which ones I have read since the report was written, but I can tell you that all of

the ones that I have read, all 17 that I've read, do not change my conclusions.

Q All right, fine. Now, you've indicated that you read Mr. Burton's rather carefully and closely. Is that correct?

A Yes.

Q And you had two days of depositions, two volumes of depositions, correct?

A Yes.

Q You found his material, his deposition, to be informative, I take it, on plant operations?

A I accepted them as informative.

Q Okay.

A They were certainly in detail.

Q All right, and you found his information to be material to your analysis?

A Yes.

Q All right, and you found his information to be relevant to your analysis. Is that correct?

A Yes.

Q All right, of the depositions you read, did you find anybody to have information more material, more relevant than that provided by Mr. Burton in terms of the operations of this plant from the 1950s?

A Other depositions described activities, you

know, which were beyond the tenure of Burton, after he left the plant, so that was new information not covered in Burton's depositions.

Q That's why I asked the 1950s.

A I beg your pardon?

Q That's why I specifically asked in my question during the 1950s.

A No, I didn't find anything that, you know, among the depositions that covered the 1950s that to me was significantly different that would affect the analysis that I was making.

Q Were you consulted at all by the Canill firm with regard to your opinion as to who might be an appropriate fact witness to present to this court?

A I didn't catch one word, an important what?

Q A significant or an important fact witness to present to this court?

A A fact -- I did ask that Gordon Steward be a witness in this court --

Q No, sir, my question was were you consulted with regard to that? Yes or no, and then we'll go on to what you did after that.

A Well, I don't remember if they asked me or I asked them that I would like Steward to testify --

Q Okay.

A -- about these events.

Q That's fine, but my question is did you request Mr. Burton to testify?

A No.

Q All right, were you ever advised by the Canill firm that they had interviewed Mr. Burton and, in fact, were you provided -- if you were so provided -- were you provided with any notes of that interview?

A I don't recollect any notes of an interview.

Q You were never advised that Mr. Spivak and Mr. Cox had interviewed Mr. Burton?

A Well, I may have been, but I don't recollect seeing any notes or I don't recollect being advised of that.

Q Very good. Sir, now you had testified yesterday in response to some hypotheticals, I believe, placed to you by Mr. Koepff and I'm not purporting to quote you exactly, but to the effect that an analysis of whether something constitutes an accident requires a case-by-case analysis of all of the relevant facts. Do you recall that?

MR. FALLS: May I have that question read back.

THE COURT: Yes, would you read that back,

please, Miss Yunasz.

(Whereupon the last question is read back by the Court Reporter.)

A I don't recall that we were trying to decide whether something was an accident based on its relevant facts, I think we were discussing what would be environmental damage based on the facts of the situation.

Q You don't recall saying that an accident requires case-by-case analysis?

A Well, for the purpose of assessing environmental damage, yes.

Q Well, no, for the purpose of determining whether something is "an accident" or not?

A Perhaps we discussed something in that vein.

Q Perhaps?

A Well, I don't recollect exactly that he asked me a question --

Q He gave you some hypotheticals. He said assume you have a pump, assume it starts to leak, assume a period of time goes by before it's repaired, assume there's an accident, do you recall that testimony?

A Yes.

Q And in response to that, you said I don't

know, well, I don't know, I don't have all the facts, each incident requires a case-by-case analysis of all the relevant cases. Isn't that correct?

A That's correct.

Q Okay, would you tell me one pump, one particular pump, that leaked in the 1950s? Take any one you want, give me all the relevant facts regarding that individual leak and you can start by telling me what pump it was and what day it started to leak.

A I have never made any analysis of any single pump.

Q Because all those relevant facts simply aren't available for analysis, isn't that correct, that simple kind of detail simply isn't available?

MR. FALLS: Let him answer the question, please.

THE COURT: Let Dr. Wolfskill finish.

A I believe there is information in the depositions that talk about a particular device, whether it was a pump or some other device that actually leaked, they identified a particular leak. Whether they gave enough details to conclusively assess, I don't know.

Q All right.

A I mean I don't recollect that there was that

much detail in the deposition.

Q Fair enough, but what we can say is that given this plant, given the general condition of the plant as it was in 1950, given the general type of operation that existed there in 1951, given the type of equipment that was there and the type of manufacturing process, we do know that from time to time, there were going to be such leaks?

A That's correct.

Q Okay, and that's anticipated, that's expected?

A They expected the equipment will leak, that's right.

Q Sir, are you aware that chlorophenoxy herbicides have an anti-bacterial effect?

A No, I'm not aware of that feature.

Q Now, sir, were you here when Commissioner Catania testified?

A No.

Q You were not. Let me just tell you, sir, his testimony was and if I've summarized this incorrectly, I'm sure somebody will correct me, but that basically any one of a number of the priority pollutants that were found at the site would have required a cleanup? Have I basically said that

correctly, gentlemen? I guess.

MR. FALLS: In connection with the sale of the property.

MR. CUYLER: Yeah, under ECRA.

Q Are you in agreement with that?

A Well, I'm not sure that any -- I mean that every single one found would require a cleanup under ECRA. I have read Mr. Catania's, you know, the record, the transcript --

Q Uh-hun.

A -- or his testimony and I'm not sure that he said every -- if I understand your question right --

Q Let me simplify it.

MR. FALLS: Let him finish his answer.

Q Let me simplify it so we can save time. Let me focus you in on DDT. Are you at least in agreement with Mr. Catania that the DDT found on the site would require cleanup?

MR. FALLS: Under ECRA.

Q Under ECRA.

A I actually would not have answered those questions that were posed to Catania the same way because I still believe that the State would be required to show that what amount of chemical was there would be harmful and require cleanup and the mere

presence, I don't believe, would require cleanup.

It, again, it's similar to the CERCLA process, but it would require the State to determine that there is a threat to public health in the environment due to the presence of a chemical in some quantity.

Q Okay. Now, let me just ask you this question in front of this Court which has to judge, among other things, your credibility. Are you telling this Court that you have doubts that DDT found in the quantities found at Lister Avenue would require a cleanup under ECRA?

A I could predict that it probably would require cleanup given those amounts, but I don't think the mere presence constitutes a requirement of a cleanup.

Q Now, sir, are you aware that DDT, manufactured DDT, stopped in 1959 at this plant?

A I recollect that it stopped sometime in the '50s, I'm not sure what date.

Q Okay, that information is set forth in the record of decision which was put into evidence by Plaintiffs, are you aware of that?

A Yes.

Q Sir, am I correct in saying, then, that whatever DDT was found at this plant had to exist as of the date that operation was abandoned, dismantled and

sent someplace else?

A I think that's correct, I don't know of any other sources of DDT.

Q Okay, were you at all asked at any time to do an analysis as to what portions of Alternative Number 3 that was specified as a mode of cleanup in the ROD would be required for the DDT and what were required exclusively by dioxin, you were never asked to do that analysis, were you?

A That's correct.

Q Okay, and it would be rather unfair of me to ask you to do it off the cuff as you sit here today?

A Well, I have an opinion that because dioxin was found at every place it was looked at at that site, it would be a redundant exercise.

Q Okay. Now, sir, let me ask you, you mentioned that your opinion with respect to I think, on, Opinion Number 3 on the exhibit "Conclusions of Dr. Wolfskill -- Dr. L. Anthony Wolfskill" was predicated in part on retro-analyses you had done at various pollution sites?

A Yes.

Q Okay, now many pollution sites were we talking about there, give me the number?

A Well, I made a list one day of the ones that I

could recollect that we've had this retrospective analysis and it came to 20 so I think the number is about 20.

Q So in comparing the Lister Avenue plant to your information you had by way of background, you compared this Lister Avenue plant to 20 other polluted plants that you've been to?

A That's correct.

Q Okay, and you found that the problems or the conditions or the type of situation which gave rise to the pollution at 80 Lister Avenue was very typical of the same conditions which had existed during the '50s and during the '60s at these other 20 polluted sites. Is that correct?

A Some of the conditions were typical here. Some of the other plants had different kinds of discharge streams so they were not involved with the 80 Lister plant.

Q Okay, fair enough. Now, if I understand what you're saying in regard to your Opinion 1(a), I had asked you before just a few minutes ago whether given the condition, the nature of the operations, the age of the plant, the 1951, whether you could anticipate accidental escapes of organic compounds and you indicated that, yes, you could.

I take it, and let me just clarify this, that what you're saying could not be anticipated was the enactment of CERCLA or that type of legislation?

A That's correct.

Q Which would mandate cleanup of those conditions?

A That's correct.

Q Okay, I take it also what you're saying from your review of the relevant regulatory laws and statutes that basically there is stricter enforcement today, stricter inspecting and reporting requirements and that the government is basically devoting more resources today to the enforcement of environmental regulations than it was during the '50s certainly and to some extent during the '60s?

A That's correct.

Q Okay, would you agree with me, sir, that today it's virtually impossible for a chemical manufacturer, indeed, for anyone to play a kind of cat and mouse game with the Federal Government when it comes to pollution?

A I don't understand what a cat and mouse game entirely is.

Q Let me do it and try to get away with it, that's what I mean by a cat and mouse game.

A We actually have an ex-client who I think was doing that in 1986, 1985.

Q But they're going to get caught?

A As near as I know, the RCRA rules as well as the CERCLA rules are difficult to circumvent and I'm not sure what percentage of people may escape one or other of those regulations. There may be some, I can't say there wouldn't be none.

Q Now, but my point is this, simply that one of the main differences in the law as they existed in 1980 from the 1950s is that enforcement is much tougher today than it ever was in the 1950s?

A Well, the laws and the enforcement is different by a wide margin.

Q Now, sir, you used the phrase "dilution is the solution," do you recall that?

A Dilution is the solution?

Q Yes.

A Yes.

Q And you said that was basically the philosophy that existed when, in the '50s, '60s, when did that exist?

A It mainly existed until the permit called NPDES was instituted sometime around 1970 which required measurement of releases to surface water and required a

permit similar to the air permits of a few years earlier and once that regulation became in effect and was enforced, releases to rivers were then measured and permeated as to quantity so that the pollution was permeated as to how much could be released. I think that was the single factor that made the change.

Q Now, prior to that back in the days when dilution was the solution, are you saying that that phrase "dilution is the solution" was the license to dump limited quantities of anything you wanted on any body or surface water or on the ground?

A No, I don't think it was a license to dump anything anywhere, I think it was a philosophy that caused effluents to be discharged into large bodies of water that would actually dilute it. That's, I mean, that's a requirement of dilution is that there is a large body of water to dilute an effluent.

Q Now, when you have up on your conclusions Diamond would not have anticipated, Diamond would not have anticipated as you do in the beginning of 1(a) and 1(c) on your conclusions, you aren't telling us that you can actually read the minds of the executives of Diamond Shamrock who were there during the 1950s and 1969s -- up through 1969, are you?

A Well, this is opinion and that's why the word

"would" is there.

Q Just an opinion?

A If I had a fact, I would say Diamond did.

Q So what you're doing is you're bringing your experience, your expertise, your knowledge to this courtroom and you're saying that, in fact, under the totality of circumstances, it is your opinion that a reasonable responsible manufacturer in the position of Diamond Shamrock would not have anticipated. Isn't that correct?

A That's correct.

Q All right. Now, sir, would you agree with me -- I think we agree, and you correct me if I'm wrong, that dilution was the solution was not a license to dump unlimited quantities of whatever you wanted into the environment?

A That's correct.

Q Okay, and would you also agree with me that given any type of chemical, any chemical can be toxic and hazardous in strong enough concentrations under the right circumstances, right?

A In general, yes.

Q Okay, so one thing you have to determine when you're looking at the phrase "dilution is the solution" is (a) what type of chemical am I dumping,

correct, to know whether it's reasonable, whether it's reasonable and responsible to dump?

A I'm not sure that in those two decades that plant operators were actually that sophisticated that they thought they could dilute one chemical, but not another. I don't really believe there was an awareness of discrimination as to chemical type.

Q You're not -- you're saying that in the 1950s, you don't think that somebody, a company like Diamond Shamrock, was sophisticated enough to know that if it was disposing of table salt such as came off this process sodium chloride in the Passaic River that that was one thing, but that something like DDT was in a totally different category when it came to the old dilution is the solution solution?

A Well, at this particular plant, I think they believe that the flow --

THE COURT: Maybe you just ought to wait a minute. Go ahead, please.

Q Go ahead.

A -- of the river was sufficient to handle whatever they were putting in. I don't -- I didn't get in the record much distinction or, if any, that they were sensitive to the type of chemical.

Q Well, sir --

THE COURT: Let me ask, would you excuse me just a minute. Do I have the attorneys here in the P.K. Real Estate matter?

(Whereupon a discussion is held in another matter.)

THE COURT: Fine, let's continue. It will only take a few minutes for me to break in this trial. Go ahead, please.

Q Sir, my question wasn't directed to Diamond, my question is the reasonable responsible chemical manufacturer during the 1950s, are you telling this Court that such a reasonable responsible chemical manufacturer would not have the sophistication to know or appreciate that there was a difference between dumping table salt and DDT into a surface water?

A I think they approached it from a different aspect which was if the -- whatever material was their effluent, did there look like there was plenty dilution out there to handle it which was not very sophisticated, but I'm sure in this case, there was more cooling water than anything else which probably had the least amount of chemicals in it and I think they understood at this plant that cooling water was less of a pollutant than some other chemical stream because, to my knowledge, they never hooked that up to

the sewer.

Q Sir, I promised I'm going to try and finish within a half an hour and it's only with your assistance and I'll ask the question one more time.

I want to know whether in your opinion whether a reasonable responsible chemical manufacturer in the 1950s would appreciate a difference between dumping table salt and DDT into a body of surface water?

A Yes.

Q Thank you. Would a reasonable responsible chemical manufacturer in the 1950s know that whatever contaminant it was dumping into surface water that the effect would depend upon the ultimate concentration of that contaminant in the surface water?

A I do not believe that they understood the effect of concentrations as it might affect the environment or public health to any significant degree.

Q Well, now let me ask you that. Are you telling me that in the 1950s, the average reasonable responsible chemical manufacturer did not appreciate that there was a correlation between concentration and the toxicity of any given chemical?

A Oh, I think they understood that, yes.

Q Okay. During the 1950s, would the average

reasonable responsible chemical manufacturer have appreciated that the toxicity of any given chemical varied in terms of the concentrations needed to affect different species of life?

A I think there was very little appreciation at that time of plant operators as to dose response, relationships to various environmental media.

Q Have you done a literature research, for instance, on DDT?

A No, not on DDT.

Q All right, so you are totally unaware that in the 1940s and I think it was in 1949, but we will in our case put it into evidence, but you are unaware in the 1940s, the Canadian Government did a research on DDT and found it was more toxic to cold-blooded animals than warm-blooded animals and that it was more toxic to fish, you're unaware of that study?

A I have not seen that study.

Q Okay.

A I don't think that plant managers and operators have seen that study either.

Q Now, sir, in your opinion when a reasonable responsible chemical manufacturer in the 1950s was going to operate under dilution is the solution, would it have been reasonable and responsible

for that chemical manufacturer to have done a literature search particularly with regard to the insecticides and pesticides that it knew it was dumping into surface water that it was controlled and regulated by the State and Federal Government?

A I never ran into an operator that said they did such an analysis.

Q Okay, you never ran into one, but do you think it would have been reasonable and responsible even given the limited technological knowledge in the 1950s?

THE COURT: I'm sorry, would you step back? Did we lose the question? We probably did, would you read it back slowly, please, Miss Yunasz

(Whereupon the last question is read back by the Court Reporter.)

A I would say no because of the limited knowledge that the operations people had.

THE COURT: Let me just interrupt if I may a minute, Dr. Wolfskill, and make sure that we're not missing something under an ambiguity.

I would suspect without in any way demeaning the intelligence or scientific skill of an operator of a relatively small plant like

this that somebody like Mr. Kennedy or Mr. Burton or one of them wouldn't be spending a lot of time reading the literature and keeping up on scientific or academic research in this whole area.

So when we talk of a plant operator, I wouldn't expect the hands-on man or I wouldn't expect the hands-on man running the plant to be watching these things, but I might expect that in a large company with staffs of research scientists and people with academic backgrounds that somebody at central headquarters or in a laboratory support group would be watching the literature and keeping abreast of things like that.

Isn't that so, don't these companies make an effort to do that?

THE WITNESS: Yes, and I think to the extent Diamond had a research group that kept up with the literature, these people probably made these studies and analyses, but I think what determined plant behavior at any one particular location was largely what they felt the public policy at that time regarded effluent.

And I think there are good examples

along the Passaic River of how public policy was applied to plants along that river during this time and the plant I think normally looked to public policy to tell them as to when enough is enough with regards to releases and that occurred in this plant as it went into the '60s.

The public policy continued to reduce the amount of effluent that could be released to the river as well as to the air that they never got around to the subsurface, that never occurred during the life of this plant.

But for the river and the air releases between '51 and '69, there were perceptible changes in the combination of law and enforcement of the law that directed the plant to reduce their flow of effluents to the river and so I think they felt they were in proper accordance with public policy.

THE COURT: Thank you. Okay, go anead.

Q Sir, basically if I understand that last answer, what you're saying is that you could simply in the 1950s look out at the Passaic River and see a dirty river?

A That's what the record says that the river was dirty in those days.

Q And that that was the indicia the public policy had reference to, it certainly was one of the conditions?

A Well, it was my interpretation in looking at the record in this that the case was that public policy tolerated this portion of the river as a high discharge of effluents.

Q And that given the condition of the river, a little bit more wasn't going to hurt?

A I think that's correct.

Q The old everybody's doing it.

A I think everybody is doing it because public policy permitted them to use the river for their discharge.

Q Now, to your knowledge, sir, did you find any evidence that Diamond Shamrock, and particularly the Concord Research Lab or wherever it was originally located in the '50s, I think there was some testimony it may have switched or something, did any literature searches on any of the raw materials, the intermediates or finished products manufactured at 80 Lister Avenue during the '50s or the '60s?

A I'm afraid I don't understand the question.

Q Well, let me rephrase it then. My question is did you find any evidence in your review of

any of the materials that Diamond Shamrock did a literature search on the toxicity of any of the raw materials, the intermediates or its finished products at 80 Lister Avenue during the 1950s?

A I don't recollect any at this time.

Q Okay. Now, --

THE COURT: Now, do we have everybody in P. K.?

A VOICE: Yes, Judge.

THE COURT: Would you just step down for a minute, please, Dr. Wolfskill, and, Counsel, would you just vacate counsel table for a couple of minutes? Leave your papers there, I don't think we'll be very long.

(Whereupon a recess is taken.)

THE COURT: Let's go back to Diamond Shamrock, please. Okay, we have Dr. Wolfskill back on the stand under oath and whenever you're ready, Mr. Cuyler.

Q Doctor, you have your report? I'm sorry, do you have your report, Doctor?

A Yes.

MR. CUYLER: Judge --

THE COURT: Yes, I have it.

MR. CUYLER: -- you have a copy?

Q We only need one, Doctor. The next to the last figure -- I'm sorry, I think it's the third from the last figure in the appendix, this is the esterification unit. Is that correct?

A Yes, that's shown on the drawing.

Q Perhaps you can help me, there appear to be lines, vertical lines labeled "drain trench," see those?

A Yes.

Q Okay, is that typical or customary of the layout of the plant in the '50s and '60s to have drain trenches in the floor?

A Yes.

Q And they run out to I'm not sure if that's drain trench or drain trough running along out the side of the building?

A Yes.

Q And that drain trough runs down to a catch box?

A Yes.

THE COURT: Which exhibit is this? I know that the large exhibit is from the report 363, what page are we on?

MR. CUYLER: It's the third from the last, Judge. If I may, what we're doing is --

THE COURT: Okay.

MR. SPIVAK: Does it have a label on it

MR. CUYLER: A-13 is the label.

THE COURT: The one I'm looking at has A-13 handwritten and circled.

MR. CUYLER: We're looking right up here and out to here.

MR. FALLS: Can you show me where you're looking?

MR. CUYLER: Yeah.

Q And on the other side of the catch box, there's a discharge or at least a line going out, correct?

A Yes.

Q And where's that going to?

A To the Passaic River.

Q Thank you, Doctor.

MR. CUYLER: That's all I have, your Honor.

THE COURT: All right, who would like to go next.

MR. MOSER: I would, your Honor, if I may. Thank you.

CROSS-EXAMINATION BY MR. MOSER:

Q Dr. Wolfskill, I may have got it wrong yesterday and would like to bring you back to some questions you were asked by Mr. Bates and related to a distinction I thought you were making between environmental impact and environmental damage. Do you recall --

A Yes.

Q -- the general subject of that testimony?

A Yes.

Q Would you describe for us what you meant by environmental impact?

A Environmental impact is a very close corollary to the word pollution. It's the inversion into an environmental media like surface water or air or ground or ground water certain constituents and in a case like this, chemicals that are not normal to that environmental media and that's -- that is pollution and that is environmental impact on that media.

Q And did I understand you to be saying but not all pollution or not all environmental impacts are environmental damage?

A That's correct.

Q And when does it -- does the impact rise to the level of environmental damage?

A Well, under CERCLA law and EPA regulations, there is a long process that is involved in assessing impact or exposure is the typical word used there to receptors which receptor is the environmental media or public, public health, and in that process which includes a risk analysis and certain other statutes, a decision is made by the regulatory agency that an environmental impact has caused environmental damage.

Q So in your view, the impact, the environmental impact doesn't reach the level of environmental damage until such time as the regulators conclude that you've exceeded some threshold they consider appropriate at the time?

A That's the current system under CERCLA.

Q You also made reference I think during your testimony, too, what you called the regular -- I think your words were something like regulatory climate?

A Yes.

Q And I'm trying to understand whether do you agree based on the studies you've done that at any time between 1951 and 1969 Diamond engaged in discharges which violated laws or regulations applicable to the site?

A Well, I think they violated the regulations

applicable to the site.

Q All right.

A As I understand the regulation of that river, the part of the regulation of that river.

Q And on how many occasions did they do that?

A Well, I don't know how many occasions, I think it was generally a continuing process.

Q So you would agree with me that based upon what you've done, it appears Diamond was on a basically continuing basis violating regulations applicable to the plant?

A I'm not competent to actually judge a violation, but that's my impression from reading the record.

Q All right. You also made a reference again, I'm sorry, my notes weren't perfect, you were discussing I thought the characteristics of soil and the fact, as I got it, that the depth of dioxin couldn't tell much about how -- you couldn't tell much from the depth of dioxin because you need to know things like the permeability of the soil and the means by which the dioxin would have been transmitted, do I have that generally correct?

A I don't understand what you cannot tell by the depth of dioxin, cannot tell what?

Q Well, what can you tell by the depth of dioxin?

A Primarily we can tell what portion of the soil has been impacted by the presence of dioxin.

Q You can't tell, for example, the duration that that dioxin has been in that location or on that premises, can you?

A Well, at a given sampling like in 1984, you cannot tell, you know, at what time the dioxin that is being measured in the laboratory that it was deposited on that soil particle.

Q Right, and, in fact, you can't tell when it was deposited on that site?

A Not from the analysis, you know, not from the results of the laboratory analysis, that's correct.

Q And, for example, in this case, you're not able to tell us the time at which any particular off-site location was contaminated by dioxin?

A Not from laboratory analysis but, you know, only from interpretation.

Q Well, I mean you're here today and you've made no study of the off-site distribution of dioxin, correct?

A I did not participate as a working member of the team that did the off-site characterization. I have

reviewed results of that, but not as a working mem
of the team.

Q Okay, and you're not able to say as t
particular off-site location when that location be
contaminated with dioxin except that it was
contaminated in 1983?

A Well, I have an opinion as to when it was
contaminated.

Q As to every site that's off-site that
contaminated?

A I have an opinion as to the migration mecha
and how they worked on that site and over the perio
time they were working and that they would have car
dioxin to various media.

Q That's the opinion you gave yesterday
which was the transmission mechanisms were in effec
from day one?

A Most of them were, yes.

Q Right, but aren't I correct, sir, that
you've done no study to know how much dioxin was
exiting the Newark plant at any given time, correct

A Well, that's correct.

Q And you've done no study of the
distribution of dioxin in the off-site locations?

A I've only reviewed the reports, some of the

reports, not all of them that give the off-site distribution of dioxin.

Q But if you don't know how much dioxin was leaving Newark when, then you can't know when dioxin first hit properties off the site, can you?

A Well, I think that's two different issues. When you say how much dioxin such as pounds or ounces or grams, the quantification is not available from the data base. The timing of these releases, though, is available from an understanding of the migration mechanisms of the plant.

Q Let me put it another way. You have no way of telling us now at which -- in which year any particular off-site location became contaminated with dioxin to a level that the regulators have subsequently required that it be cleaned up?

A That's correct, as regards any location in the neighborhood or any specific location in the river, that's indeterminate as to when any one location off-site was contaminated.

Q You've given us an opinion that this plant during the period 1951 to 1969 was a typical plant, Opinion Number 3?

A Yes.

Q Now --

A It was typical as regards to discharge of effluents.

Q Now, between 1951 and 1969, how many chemical plants had you been in other than the one in which you were a summer employee?

A Well, I worked at various times in plants in Texas, one plant that I can remember in particular, and a plant in Florida and several plants outside the United States.

Q I'm asking you now just so the record's clear between '51 and '69.

A Yes, and these are the dates, plus I was in and around plants in the Boston area where I lived and worked, but none of them were consistent products in a plant. I was just at a plant or nearby a plant during that period of time.

Q Now, these are chemical plants?

A Yes.

Q So how many chemical plants does that mean you were in between '51 and '69?

A Well, the plant in Texas and the plant in Florida plus two in Venezuela for an American company and for the same company in Libya and Aruba.

Those are one, two, three, four, five, six, Texas, Florida and three countries outside the United

States, I was in those plants on numerous occasions, perhaps 60 or 70 different occasions in those plants.

In the Boston area, I did not have a working assignment that I can remember inside a chemical plant, but we had a number of products around the waterfront that was adjacent to plants.

Q And at no time when you were in any of those plants was it your responsibility to be concerned with the effluents from those plants. Is that correct?

A That's correct.

Q Now, you also did other work for Diamond; that is, you've worked on the Greens Bayou?

A Yes.

Q And when did you work on the Greens Bayou plant?

A Between 1980 and I'm still working at the plant under different owners at present.

Q You began working on that project in roughly 1980?

A Yes.

Q And am I correct that that was a situation involving an investigation of both on and off-site contamination --

A Yes.

Q -- emanating from a Diamond facility?

A Yes.

Q And could you just tell us in a couple of sentences what was the nature of the pollution emanating from the Diamond facility in Greens Bayou?

A It was arsenic and tetrachloride.

Q And how was it exiting the plant and getting into off-site?

A I think all of this was subsurface migration if I remember well, plus there was because of subsurface migration, there was a surface water release.

Q You also worked for the Muscle Shoals plant?

A Yes.

Q This was for Diamond?

A Yes.

Q When were you retained to work on that?

A I don't remember exactly, I think it was around 1981 or 1982.

Q And what was the nature of your assignment there?

A We investigated the mercury levels in an on-site lagoon that was out of service.

Q And what was the purpose of making that investigation?

A To determine the distribution of mercury in that

lagoon location.

Q I know that, but why did you care?

A Well, I'm not sure what the purpose -- the purposes of the investigation was used to finally because we did not work at the plant to do anything about it. We merely made an investigation of the distribution or mercury so I don't know what use was made of that information.

Q All right, in your expert opinion, why would somebody want to know?

A Well, I think they want to know what the distribution of contaminants would be on their site because they might have to do something about it.

Q Including, for example, making sure it doesn't get off the site?

A Yes.

Q And similar, you work at Diamond's plant at Mobile?

A Yes.

Q And do you recall when that assignment came?

A I would think 1983 or 1984.

Q And, again, you studied contamination at the Mobile site?

A Yes, there was one leak in a lagoon that we

studied to see if it had released contaminants.

Q And what was the conclusion?

A That there was a release to the ground water on the plant site near the lagoon.

Q And also you worked at Castle Hayne?

A Yes.

Q And when did you work there?

A Began working there, I believe, in 1982 and we are continuing work there with a different owner.

Q And what was the problem for which you were brought to Castle Hayne?

A There was a chromium leakage primarily through the floors of that plant into the ground water.

Q All right, and what was the nature of your study?

A The distribution of chromium in the ground water and the design of a remediation program to remove the chromium.

Q When you say the ground water, did you investigate whether the ground water involved -- whether the contamination included contamination of ground water which was not on the site?

A We investigated the perimeters of the plumes, the area of the contamination which was in the area of the site, so we concluded that the contamination was

not off the plant site.

Q And the steps you took were designed to ensure that the plume did not move to leave the site?

A That's correct, we designed a system to withdraw the plume back.

Q On Page 6 of your report, Doctor Wolfskill, you made reference to transmission of dioxin in organic liquids, what did you mean by "organic liquid"?

A Well, an organic liquid would be water that has some other kind of organic liquid in it and for the application at the 80 Lister plant, it would be other organic chemicals that are in the water.

Q That is other organic chemicals that can be found at the Lister Avenue site?

A Yes, that were found at the site.

Q And do I understand your report correctly to indicate that dioxin found in a solution in an organic liquid is more mobile, is that what Page 6 of your report describes?

A Well, it's not any more mobile, but it can move through the ground water phase in high concentrations than it can in pure water.

Q Okay. Now, I'm correct that -- question withdrawn.

MR. MOSER: Bear with me a moment, your Honor.

THE COURT: Yes.

Q With respect to Opinion Number 4 about migration, am I correct, sir, that any migration that is occurring from the Lister Avenue site since, let's say, July 1983 is de minimis.

MR. FALLS: Object to the form of the question.

THE COURT: Why don't you restate it.

Q Would you agree with me that any dioxin escaping from the Lister Avenue site since July 1983 is minimal?

MR. FALLS: I object to the form of the question. In one sense, all of these things are minimal since we're talking one part per million or ten parts per million, I think further definition is necessary.

THE COURT: Well, I don't think further definition is necessary unless the witness is confused by the question. Is it a question you can sensibly answer?

THE WITNESS: Well, I can give a qualified answer which will give my interpretation of the question.

THE COURT: Very well, go ahead, please.

A I believe the amount that is being released under current conditions and conditions since 1963 --

Q '83.

A -- in 1983 are very much less than migration prior to that period.

Q Okay, it's been now five years, but when did you first work on this facility?

A 1983.

Q Okay, so you've been there five years and the plant has basically been the same for the last five years or the site has basically been the same since they put the tarp on with the exception of a smokestack that was taken down and some barrels that were removed, right?

A No, there's one major change in the site during that period of time and that is the adjacent site, 120 Lister Avenue, contains several hundred, it's nearly a thousand large containers that have soil and debris and salvage material that came from off-site that were put back at this site and those materials are not covered by tarp.

Q Yeah, I want to direct your attention simply to the site known as 80 Lister Avenue so I'm excluding 120 Lister Avenue.

A All right.

Q 80 Lister Avenue is today with the exception of that smokestack and barrels essentially the same -- in the same condition it was commencing in and around July 1983. Correct?

A I think that's correct.

Q And during those five years, you're not suggesting that any dangerous amount of dioxin has been leaving that site and contaminating Newark, New Jersey, are you?

A Well, I think it's possible that concentrations in excess of one part per billion can be leaving that site during this period of time.

Q Amounts of dioxin are leaving that site sufficient to contaminate someplace else by one part per billion?

THE COURT: The one part per billion is contamination so if one part per billion goes out, that's too much.

Q Let me ask it another way. Have you advised your client Diamond to take any further steps between July 1983 and today other than they have to prevent migration from 80 Lister Avenue?

A No.

MR. MOSER: Thank you, your Honor, nothing

further.

MR. KOEPFF: In light of one of your Honor's questions, Mr. Calogero said I could use one exhibit.

MR. CALOGERO: I did allow him.

THE COURT: Very well

THE WITNESS: Another quiz?

CROSS-EXAMINATION BY MR. KOEPFF:

Q Dr. Wolfskill I've put in front of you Defendant's Exhibit 690. This is an article from the Journal of American Waterworks Association from 1945 entitled "Chemical Engineers' Approach to Industrial Waste Problems." Have you seen a copy of this article before today?

A I don't believe so.

Q Okay, let me just quickly go through it. On the first page of this exhibit in the lower right-hand corner, would you agree with the statement there that this is now a statement made at least as of 1945, "Industrial waste pollution of streams has progressed to the point where many public water supplies are now menaced"? Would you agree to the truth of that statement as of 1945?

A Yes.

Q Would you agree to the truth of that

statement or the accuracy or that statement "also affected is industrial utility of those streams"?

A I don't know what this author means by "industrial utility of those streams."

Q Okay, let's move on then. The sentence carrying over from the bottom of this page to the next, would you agree with the accuracy of this statement as of 1945, "aquatic life in many streams is menaced if not now extinct"?

A That's correct.

Q Reading on, would you agree that I'm talking now again about the accuracy of these statements as of 1945, "many streams now have only a limited recreational value while others are entirely unfit for recreational purposes."

A Let me give one qualification to be clear. We're talking about 1945 which is a period of time that I have not made very much study on this issue, but it's certainly my opinion that what is being discussed here probably occurred in a number of locations in the United States, not everywhere in the United States, but a number of locations. I have no reason to doubt these are not correct in 1945.

Q All right, but you've given testimony about what was known or not known and what was of

concern or what was not of concern in the 1950s and 1960s, have you not?

A Yes.

Q Okay, and wouldn't you have to in order to give that opinion know what was of concern as of, let's say, the 1940s?

A Not necessarily.

Q Well, you don't think if something was of concern in the 1940s it wasn't still of concern in the 1950s?

A Well, for purposes of this case, I looked at what was actually of concern in the 1950s. These concerns still remain in 1950 and I'm not objecting that they were not also concerns of the '40s.

Q Turn to Page 335, it's the third page of this exhibit, and I have to apologize for the poor quality of the copy. It was telecopied to me last night and I'm reading in the middle of the left-hand column.

Again, I want to know your expert opinion as to whether in 1945 you believe this is an accurate statement. "The problem of industrial waste," I believe it's disposal, "should receive the same consideration as any processing problem." Would you agree with the accuracy of that statement?

A Well, I don't have a basis for that because this is being compared to any processing problem and I'm not versed enough in processing problems, you know, to effect a comparison of those two.

Q It's fair to say you wouldn't disagree with it or you're not in a position to disagree with it?

A I don't have a basis to disagree with it and I don't have any authentication to disagree with it.

Q Let me read on and see as of 1945 this was an accurate statement and again I have to apologize for the poor quality. "It should be subjected to an appropriate amount of research and engineering and economic consideration in determining the most feasible procedure." Would you agree with that statement?

A Oh, I think that's right, it should be subject to an appropriate level.

Q Now, let me go down a little bit further at the bottom of the page. Would you agree with the accuracy of this statement as of 1945. It's talking about classification of wastes and in about the third sentence it says "variations" and that's talking about wastes. "Variations will obviously exist among industries engaged in different types of operation and even in the same type of industry depending upon the

actual processes employed." Would you agree with that statement?

A Well, what variations are we talking about?

Q Well, why don't we go over directly to the right of that in the column in the paragraph that begins "chemical waste," do you see that?

A Yes.

Q Would you agree that "chemical wastes will be of widely divergent types and may contain any of the known chemicals and compounds depending on the raw materials used in the particular industry, the processes involved and the final products manufactured"?

A Yes, I believe that's correct.

Q Now, turn to the next page, Page 336 under the heading "Internal Plant Studies." Do you have that page in front of you, sir?

A Yes.

Q Would you agree that this was an accurate statement as of 1945 and I'm reading, "in any plant faced with a problem of treatment and disposal of its industrial trade wastes, investigations within the plant itself should first be conducted"?

A Yes, I think any plant faced with a problem that investigation would be one of the first steps.

Q Now, let me skip over to the second column on this page, the paragraph beginning "after." Would you agree as to the accuracy of this statement as of 1945, "after the internal studies have been completed and corrective steps have been taken, a minimum quantity of waste will actually be leaving the mill and will be in a minimum quantity of water"?

A Well, I think that is, you know, it's exactly the issue that the amounts of releases are determined by public policy which is a very localized or site specific area. So that the definition of "minimums" in these cases I think are actually defined by the execution of public policy at a particular plant site.

Q Now, let me skip on now to Page 338, do you have that page in front of you?

A Yes.

Q First of all, let me read this to you and ask whether you were aware that activated carbon filtration systems were available for use in industrial waste disposal systems as early as 1945?

A I don't know when they began, but they are an old method of waste treatment.

Q Now, I'm going to ask again whether you would agree as of 1945 with the accuracy of this statement, "constituents found in certain industrial

trade wastes can be removed by adsorption" -- that's a-d. "For example, on activated carbon, the carbon can be subsequently treated for stripping of the adsorbed material thereby accomplishing recovery of the material"?

A Yes, I understand that to be a common process treatment method and this is the treatment method that they finally decided on at this 80 Lister plant.

Q And it was a common treatment method as of 1945, was it not?

A I don't have any data to say how commonly it was used.

Q But you're not in a position to disagree with it?

A No, I can't.

MR. KOEPFF: No further questions.

THE COURT: Any further questions?

MR. CALOGERO: Yes, your Honor.

THE COURT: Go ahead.

CROSS-EXAMINATION BY MR. CALOGERO:

Q Is it your testimony that the attitudes and perceptions of chemical manufacturers in the 1950s and '60s was such that they would discharge effluents, contaminants and pollutants into rivers and streams?

A That's correct.

Q And it is also your testimony, Dr. Wolfskill, that the regulatory authorities that existed in the 1950s and '60s if they existed according to your testimony allowed such discharges to take place?

A Well, I think they allowed such discharges to take place as they considered were appropriate.

Q Now, isn't it true, Dr. Wolfskill, that in the 1950s, there existed an entity called Passaic Valley Sewerage Commission?

A Yes, that's what the record says.

Q And isn't it true that you, in fact, spoke to Mr. Lubetkin who was the former chief engineer of that commission during the '50s and '60s?

A Yes.

Q Isn't that correct?

A That's correct.

Q And you had a ten-minute conversation with him prior to the submission of your report in this case. Is that true?

A Yes.

Q And, by the way, was there anyone else that participated in that phone conversation that you had with Mr. Lubetkin?

A I think Mr. Spivak was on the phone.

Q Did Mr. Spivak say anything to Mr.

Lubetkin about what he wanted from Mr. Lubetkin with regard to information about the Passaic Valley Sewerage Commission?

A Well, I can't be too accurate about who said what, but I think I asked Mr. Lubetkin what I was looking for and Mr. Spivak on the phone introduced him to me.

Q And all of this took place in ten minutes. Is that correct?

A Well, more or less, I didn't time it.

Q And after those ten minutes, you were satisfied that you had done a thorough investigation into the Passaic Valley Sewerage Commission. Is that correct?

A I don't understand investigation into the commission.

Q Well, you called Mr. Lubetkin and you spoke with Mr. Lubetkin because you wanted to learn the interaction between the Diamond plant and the Passaic Valley Sewerage Commission in the 1950s and 1960s. Is that correct?

A No, I had a simpler question than that. I asked him what was the violation record of that plant and how did it compare with other plants in the area.

Q And Mr. Lubetkin in those ten minutes was

able to remember exactly what took place in the 1950s and '60s in regard to Diamond Alkali and the other plants that ran along the Passaic River, is that your testimony?

A No, as a matter of fact, he didn't remember because his response was I don't even remember anything coming up about the company, but I do remember several other companies.

After that conversation, he procured records from the Commission to actually see what the violations records were and he found one. That was the 1956 violation that we've seen the evidence on and he furnished those records later.

Q But didn't Mr. Lubetkin furnish those records to you subsequent to the issuance of your report?

A That's correct.

Q So again, Dr. Wolfskill, I ask you isn't it correct that your investigation into the interaction between Passaic Valley Sewerage Commission and the Diamond plant consisted of a ten-minute conversation between you, Mr. Lubetkin and Mr. Spivak and that was what information you had when you did this report which is now in evidence?

A That's correct, that's the information I had at

the time the report was written.

Q And isn't it true that you later came to learn from other information that was provided to you by Mr. Lubetkin that there were a number of violations by Diamond Alkali for dumping into the Passaic River?

A I don't believe that's correct. I believe a review of the records that he furnished showed that this plant did not have the as serious a violation record as other plants.

Q As other plants --

A So looking at this record did not change my conclusion in this report.

Q Did you look at the other violations by other plants in the 1950s?

A I read the list that he took excerpts that he furnished in these documents and I read through those to see what other violations there had been.

Q And after you read through those violations, is it still your testimony that there was no regulatory agency that was concerned about discharges into the Passaic River in the 1950s and '60s?

A No, I think just the reverse, there was an active agency that did take concern about the discharges in that river. In fact, there was a

fish-kill way up north in the upper reaches of the river that was a major violation and a shutdown to stop that by this Commission.

So, you know, I interpreted that they were actively on the job, and in some areas, they had certain concerns. In some areas of that river, they had certain concerns and in other areas, they had less concern. That's my interpretation of what I've seen of the record of the Commission's enforcement actions along the river.

Q My question to you, Dr. Wolfskill, is after having reviewed those records which Mr. Lubetkin furnished to you subsequent to the issuance of this report that you still will testify and yet you are still testifying that there was no concern by regulatory authorities in New Jersey about discharges into rivers and streams?

MR. FALLS: I object, your Honor, he just answered that question.

THE COURT: He hasn't testified to that effect.

THE WITNESS: Let me hear the question again.

MR. CALOGERO: I'll rephrase the question.

THE COURT: You don't have to answer that

one, ask another one.

Q Is it your testimony that there was no concern by any regulatory agencies in the 1950s and '60s about discharges into rivers and streams?

MR. FALLS: I object.

THE COURT: The answer's no, okay. That just isn't his testimony. His testimony is the level of concern, not what it is now as a broad proposition.

Q Let's go into the level of concern. Is it your testimony that these regulatory authorities did not have concern over the amounts that were being discharged into rivers and streams?

A That's too specific for me to understand their concern. What the record shows is that they had less concern in this portion of the Passaic River than they had in others, that's one thing that the record shows.

I believe they had some level of concern in all reaches of that river including where this plant was located.

Q My testimony -- my question to you now, Dr. Wolfskill, is were they concerned about the amounts that were going into the river and I'm referring now to the entire strip of river?

A What I noticed in the record is that they were

primarily concerned about things like odor or oil sheen or visible things like color and about pH and I never saw a reference that they were concerned about release of a certain kind of organic chemical in a certain concentration. That's a concern that did not get developed in this country very well until after the mid-'70s.

Q Well, isn't it true that those records contained a reference in February or March of 1956 that the Passaic Valley Sewerage Commission cited the Standard Dye and Fishing Company in Paterson where its dye waste overflowed from a collection pit on its property into the river?

A I don't remember that incident, but it's probably one I saw in the record.

Q And isn't that the type of practice that Passaic Valley Sewerage Commission would be concerned about in the 1950s and '60s?

A Oh, I think the record shows what they were concerned about and, you know, it shows what their action was towards those concerns.

Q Doesn't the record of the Passaic Valley Sewerage Commission which you reviewed also show that in April 1956, Flintco Company was cited for a white discharge from a storm sewer that was going into the

Passaic River and that that discharge was traced to settling beds of the Flintco Company where its cleaning operations were in progress? Is that the type of discharge that the Passaic Valley Sewerage Commission was concerned with in the 1950s?

A That had to be one of them because it was a documented action.

Q And aren't those the same types of discharges that were going on at the Diamond plant in the 1950s?

A That's right, and we have the record of what the Commission's level of concern at this plant site was, what it actually was.

Q Now, is it your testimony that there was no concern in the 1950s and '60s by regulatory agencies concerning ground water contamination?

A It was very minimal, if at all. I'm sure there must be some places in the United States in those periods of time that there were ground water concerns, but it was not a typical event in any regulatory agency that I know of.

Q I show you what has been marked as Defendant's Exhibit 692. Defendant's Exhibit 692 is a labeled statement of Ott Chemical Company in Michigan at 505 Agard Road in Section 32, Dalton Township,

Muskegon County and it's also headed an "order of determination."

Isn't this type of concerns that were part of the states in this country, these were the types of concerns that these states had for ground water contamination in the 1950s and '60s?

MR. FALLS: I think the witness should have a chance to read the document.

THE COURT: All right, take a few minutes to take a look at it.

A Well, I've read about two-thirds of this and I think this is an order of determination in which a company applied to discharge or inject cooling and condensing waters, human sewerage and industrial process waters directly into the ground water.

We're not talking about a leaking situation here, we're talking about an injection well to use ground water to dispose of these wastes and without summarizing it too accurately, this commission authorizes that with certain levels of constituents that can be in the water that's injected and on the second page, it gives specifications of what are the ranges of the contaminants that would be acceptable and what would not. I think that's the general gist of this order.

Q And would you agree with me that the State of Michigan was concerned about its ground water, then?
A Well, that's correct.
Q Does this change your testimony that there was little concern about ground water contamination in the 1950s and '60s?
A My testimony is not in the context of a disposal well that is injecting waste directly into the ground water, my testimony has to do with spills and leaks that enter the ground water that are not, you know, a conscious act like this is talking about so I think those are different issues.
Q So your testimony now is that you're just concerned about whether or not any government agencies were concerned about leaks and spills in the 1950s and '60s from chemical plants in ground water. Is that your testimony now?
A My testimony is that accidental leakage into the ground and, hence, into the ground water receive very little, probably not zero, but very little note from regulatory agencies in the '50s and '60s and that opinion does not include disposal wells such as this act is talking about.
Q Now, during your research into your report, were you aware that the State of New Jersey had

a State Department of Health and a Bureau of Public Health Engineering back in 1960?

A Well, I don't remember the names of their agencies, but I'm sure they have agencies that do those sorts of functions.

Q And isn't it true that their functions were to go to chemical plants and observe whether or not certain effluents were being discharged into streams and creeks?

A Well, I don't know what their, you know, the charge of those agencies was. Again, I think it's common practice that there are agencies like that who have similar kind of assignments, but I can't tell you exactly what the assignments were of those agencies.

Q I show you what has been premarked as Defendant's Exhibit 688 and 689. Have you ever seen reports of this type prior to today, Dr. Wolfskill?

A Well, let me look at these reports to see what type they are. Well, I believe these types of agency inspection reports are very similar to the function that the Sewerage Commission in the Passaic Valley performed and perhaps because there was a river commission, these agencies may not have inspected the plants along the Passaic.

I don't know that because I don't remember

seeing any reports from this agency in this record, but these were the kinds of inspection reports that the Sewerage Commission were performing and I think there were some like this on the Diamond plant.

Q Isn't it true, Dr. Wolfskill, that these reports indicate that as early as 1960, and in some cases there is a reference to 1959, that there were regulatory agencies in the State of New Jersey that were concerned about discharges of effluents from chemical plants into streams and creeks?

A That's correct.

Q And isn't it correct, and looking at Exhibit 689, that these authorities were conducting analyses of the types of materials that were going into streams in New Jersey. Isn't that correct?

A Let me read the report. Exhibit 689 is an inspection or report of a particular plant that shows that samples were taken and certain general chemical analyses were taken to characterize the effluent.

Q Characterize the effluent, is that what your testimony is?

A Yes, you know, such as suspended solids and soluble ash and there's a table at the end of this exhibit that shows what they tested for.

Q And that table was done, was it not,

because the state agency that did it was concerned about the types of discharges into streams and rivers. Isn't that correct?

A Well, they had a concern expressed by the scope of this document.

Q Does this change your testimony that no one in the 1950s and '60s was concerned about the types of effluents into the river and streams of New Jersey?

A Well --

MR. FALLS: Object to the question.

THE COURT: Mr. Calogero, the witness has never said that. You keep coming back to that and planting that statement on him.

MR. CALOGERO: I'll put the word "little" in front of concern.

MR. FALLS: I still object to it.

THE COURT: Well, now, there's an arguably, you know, answerable question. Why don't you just restate it a little.

Q Dr. Wolfskill, was it your testimony that agencies in the 1950s and '60s particularly in New Jersey had little concern about discharges of effluents into the rivers and streams?

A I don't remember a statement that is exactly what you just said. What I said is that there was

little concern of agencies and not necessarily New Jersey as regards the release of effluents in rivers compared to the concern that there is today.

Q So it's your testimony that Diamond could not have anticipated the concern that there is today, is that what you're stating?

A Oh, I think that's correct.

Q In fact, Dr. Wolfskill, could anyone have anticipated that concern?

A Well, I don't believe that anyone operating in those dates would have anticipated that they were going to have substantial environmental damage in a CERCLA or RCRA or any of these current statutes in that sense back when they were operating.

Q But, you would state, would you not, that these documents do show that there was some concern by some agencies over the types of discharges of effluents into rivers and streams?

A That's correct.

Q And the document concerning Ott Chemical Company shows, would you not concede, that there was some concern about a regulatory agency on ground water contamination back in that time period?

A That's correct.

Q It's your testimony that the concern today

is greater and that Diamond could never have anticipated that great a concern?

A That's correct.

Q Now, you've stated that as part of the industrial practices that you were comparing Diamond's activities to that you visited or that you have visited a number of plants in your work. Is that correct?

A Yes.

Q And that some of these plants included Dow, Exxon, Shell, Tenneco. Is that correct?

A Yes.

Q And again, if I'm wrong, just tell me I'm wrong, is it your testimony that Diamond operated according to similar practices that those companies operated in the 1950s and '60s?

A Yes.

Q And is it your testimony that these companies in the 1950s and '60s would knowingly discharge into a river or stream after it had been warned by a regulatory agency not to?

A Well, I don't know that I know the violation history in each one of these plants from the point of view of continuing to discharge in a river after they had been ordered not to discharge anything into the river. I mean I interpret your question, you know, as

a pretty severe restriction by a regulatory agency.

Q Well, you're aware of the history of this plant, the Diamond plant, is that not correct?

A Yes.

Q And you're aware that there were discharges into the river subsequent to an order by the Passaic Valley Sewerage Commission to stop those discharges. Is that correct?

A I don't believe there was an order that said stop all discharges to the Passaic River.

Q There was a violation given to them, wasn't there?

A That's right, but not the former statement.

Q Isn't it true that the Army Corps of Engineers advised Diamond in 1965 to stop discharging into the river?

A Well, I don't know that those were the exact words used by the Corps of Engineers.

Q I'm not concerned about the exact words that they used. Isn't it true that they visited the plant in 1965 and told the plant to stop discharges into the river? That may not have been the exact words they told the plant manager, but isn't that what they did?

A I don't know if that's what they did.

Q Well, weren't you here when Mr. Kennedy testified?

A Yes.

Q Weren't you here when Mr. Steward testified?

A That's correct.

Q And didn't these individuals testify that the Army Corps of Engineers came in 1965 and told them to stop discharging?

MR. FALLS: I object, your Honor, testing his recollection of the testimony he heard.

THE COURT: Well, you can ask him if he remembers that. If he does, you can ask a follow-up question. Do you remember testimony along those lines that Mr. Steward indicated?

THE WITNESS: I don't remember any testimony that said all discharges which I interpret your question to be all discharges to be stopped and I think that's a significant difference between all or stop some particular stream.

Q They were told to stop some particular stream. Is that correct?

A That's what I remember, yes.

Q And isn't it true after that was said,

there were still discharges into the river?

A There continued to be discharges into the river as to my understanding throughout the operation.

Q That's your understanding of the operations at the Diamond plant. Is that correct?

A That's my understanding.

Q Now, my question to you is is your testimony that the other companies which you knew about and which you know about and which form the basis for your opinion as to what industrial practices were in the 1950s and '60s, is it your testimony that the practice of those companies were such that they would knowingly discharge effluents into a river after it had been ordered by a regulatory agency to stop a particular discharge?

MR. FALLS: I object to that, your Honor, because the witness has not conceded that they were told to stop all discharges.

MR. CALOGERO: I'm assuming that that testimony is in the record, your Honor.

MR. FALLS: There is no such testimony.

THE COURT: Well, suppose they say stop putting muriatic acid into the stream and you stop doing that, but you keep dumping salt in, I guess you haven't violated from what they told

you to do unless the witness is able to remember what the direction was and whether there was compliance with the direction.

Q And you don't recall what the particular violation was at that particular meeting is your testimony, Dr. Wolfskill?

A I don't understand what particular violation you're asking about.

Q You don't understand what the particular effluent was the subject of the investigation by Diamond in 1965?

A No, I don't remember which one was in '65.

Q But if Diamond was told to stop a discharge in 1965 and subsequently continued to discharge a particular acid into the river after that warning, is it your testimony that that would have been a standard industrial practice in the 1950s and '60s?

A It may not have been typical, but I think there are plenty of instances where specific releases continued even after that specific release had been cited. I don't know if there's enough of those to call that a typical practice, but it was not uncommon.

Q That's the way that these companies that you visited would have done business. Is that correct?

MR. FALLS: Object to the form of the

question.

THE COURT: Well --

MR. CALOGERO: Judge, he said it's not untypical, it's a typical question.

THE COURT: Well, you can respond to that.

THE WITNESS: I better hear it again.

THE COURT: Would you read it back slowly, please, Miss Yunasz.

(Whereupon the last question is read back by the Court Reporter.)

A Well, I think there's a few of these companies that, in fact, continue to release to surface water after there had been citations or comments or concerns issued by regulatory agencies. I don't, and as I said before, I don't think that was the average practice, but it was not uncommon.

Q Now, you did testify that you've read at some point the deposition of John Burton. Is that correct?

A Yes.

Q And did not Mr. Burton testify at some point in that deposition that there was an alarm system at the plant to warn people at the plant when there were going to be inspections by regulatory agencies, do you recall that?

A Yes, I think that's in his deposition.

Q Now, my question is is that the type of practice that was done or would have been done by other companies in the 1950s and '60s and specifically the companies that you were familiar with and which form the basis for your standard industrial practices?

A I don't know exactly, but I do know that in nearlyly every company I have been in, all visitors -- and this would include inspectors -- must report, check in, and the notice of their arrival is passed out among the plant.

I mean I've been in plants where such a call came in that the Texas Water Commission representative or somebody is here to inspect the plant, so I don't believe that whether they're called alarm systems or notice system, I think a notice system is very common in plants.

Q I'm not referring to a notice system, I'm referring to what Mr. Burton stated in his deposition, an alarm system to warn people at the plant to stop discharges, that's the type of system that I'm referring to, and my question is is that the type of system that in your experience was common in the 1950s and '60s?

A I don't think I have enough experience or detail

to know what operators did as a result of the notice that there's an inspector in the plant.

Q Now, you also read Mr. Burton's deposition where he stated that on a regular basis, acids were dumped into the river when the company could not get a proper market price for it. Is that correct?

A I believe that was in Burton's testimony.

Q And is it your testimony that that practice by Diamond was the type of standard industrial practice in the 1950s and '60s?

A I think so.

Q You think so?

A Yes.

Q Think it was right?

A Well, I'm not in a position to judge public policy. I mean --

Q Excuse me, Dr. Wolfskill, you used the term "public policy" when Mr. Cuyler --

MR. FALLS: May the witness answer the question?

THE COURT: You may ask the question, you may even ask it with vigor, but let Dr. Wolfskill finish.

THE WITNESS: I finished my answer, I'm not sure it was recorded.

MR. CALOGERO: Only the loudest get recorded.

THE COURT: Let's read what you have by way of an answer.

(Whereupon the last answer is read back by the Court Reporter.)

THE COURT: You're not in a position to judge public policy, do you want to leave it at that?

THE WITNESS: Let me just leave it at that.

THE COURT: Mr. Calogero, would you like to ask a question?

MR. CALOGERO: Yes.

Q Didn't you just testify this morning in response to a question by Mr. Cuyler and you used the term this was public policy to do these practices in the '50s and '60s, didn't you use the words "public policy"?

A I used the word "public policy," yes.

Q And in what context did you use it then?

A Well, the context I believe I used it then and what I generally believe is that discharge practices as well as, you know, the intended and the unintended version generally are responsive to public policy which

includes the framework of legislation or rules plus the enforcement of those rules and I think plant operators everywhere are sensitive to the combination of those two.

They perceive that as the public policy which sets the limits as to what they should be doing and I think Diamond was responsive to public policy during these two decades.

Q And are you saying that they were responsive to public policy and that that's the reason they dumped muriatic acid into the river when they couldn't get their market price?

A Well, I don't know that the reason they dumped it was that public policy permitted it.

Q But you did say public policy did permit discharge of effluents?

A It certainly did.

Q Now, did you read the testimony of Mr. Ingley who testified in this case very early?

A No.

Q If I were to tell you that Mr. Ingley testified that when he visited the Diamond plant in the 1950s that he had to wear rain gear and rubbers in order to visit the plant, would you dispute me on that?

A Well, I don't have any basis to dispute it or

accept it.

Q And would it be standard industrial practice in the 1950s and '60s to run a plant in such a manner that people who had to visit it would have to wear rain gear and rubbers?

A Well, I think it's common practice in chemical plants that protective clothing is generally worn appropriate to the conditions. I mean I've worn a lot of protective clothing myself, you know, up on various visits to various plants.

Q Is it your testimony that companies would regularly issue rain gear and rubbers to others who visited the plant?

A Well, it's very common today that things like hard hats and respiratory face masks and eye goggles and rubber boots and I've been in plants where they issue me a jacket to where.

Q What about the '50s and '60s?

A I can recollect one time in '64 I was in a plant that I wish I had some protective clothing, but I didn't have any, but I'm sure that protective clothing was issued at some places in the '50s and '60s and I think in this record, there is some indication that protective clothing such as changes of clothes, work clothes, et cetera, was a feature in this plant.

Q During your review of documents in this case, did you review those documents which concerned the condition of the ester plant in 1968 at the Diamond facility?

A I particularly remember some memo that I guess was trying to justify money for rehabilitating that plant and part of it, I think, was a description of conditions in the ester plant.

Q And didn't those conditions generally state that the floors were failing dangerously and the footings underneath tank legs were completely gone permitting saturation of soil with products?

A I can't verify those exact words without looking at the documents, but that's my sense of content, some of the content that was in that document.

Q And is it your testimony that that was standard industrial practice in the 1950s and '60s to have such conditions exist?

A Oh, I think that's correct.

Q And is it your testimony that even when these conditions were found to exist that they would continue to exist to up to a year afterward?

A I don't have a good way of judging what the response -- the average response time would be at a plant to making some change.

Q Are you aware or did you become familiar at all, Dr. Wolfskill, with the operation of the autoclave at the Newark facility and when I'm referring to the autoclave, I'm referring to the vessel that produced TCP?

A My only familiarity with the process in general which includes the autoclave is to understand that we had such pieces there. I'm not an expert in understanding what went on within a reactor or any other process equipment.

Q Do you understand or did you have an understanding that it was in that autoclave that dioxin was created?

A That's what I understand.

Q And is it your understanding that the creation of dioxin in that autoclave was related to the temperature that was applied to that autoclave?

A I don't understand that situation of temperature versus dioxin content.

Q And you have no understanding at all as to how temperature relates to dioxin in the autoclave?

A Well, I don't have sufficient information to be able to give any testimony on it. I've read the record and I generally know what it says about it, but that would not be sufficient to give you any testimony on

what the relationships are.

Q Wouldn't that information be important in your determination as to whether or not dioxin was at the site and where?

A Well, where, yes, because the autoclaves happened to be a position where dioxin was, but the amount of an impurity produced in a process is not a major consideration on the types of discharges that are going on at the plant which was my study of the plant.

Q What if a company had the knowledge that it was creating a contaminant that was causing a serious skin condition to its workers in the 1950s and '60s and had knowledge that by improvising the method that it produced a certain product that it could reduce that contaminant and reduce its effect among its workers, okay, do you understand so far?

A Well, I think I generally understand your hypothesis.

Q And what if that company made a conscious decision in 1960 and 1961 to not modify its procedure, but continue running the procedure so that it would keep producing high amounts of that contaminant, would it be your testimony that that would be a standard industrial practice in the 1950s and '60s?

MR. FALLS: Object, your Honor, this

witness has not given any testimony about worker health and safety.

THE COURT: He has not, his testimony on direct dealt with discharges into the environment so we're going beyond what he testified to.

MR. CALOGERO: Well, your Honor, my sense of environment includes the environment that the workers were in and, indeed, it's the same environment which is now contaminated and which is the source of this lawsuit and it's the same contaminant --

MR. FALLS: That's not accurate, your Honor.

MR. CALOGERO: It's not accurate that the workers weren't in this plant?

THE COURT: They were in the plant, but if you feel that you're competent to answer the question, please go ahead and do it, Dr. Wolfskill.

A Well, I was going to say I am not competent to answer that question because it speaks to the operation of a production in the plant and my testimony is limited to the discharge into the environment mechanisms.

Q In giving your opinion and in giving your report, you weren't concerned with the production processes at the plant?

A Only to the extent of what they were and where they moved dioxin around so I could understand where dioxin might enter the environment.

Q But isn't your testimony concerned with what were the standard industrial practices of plants concerning discharges and how they operated their equipment in the 1950s and '60s?

A No, it's limited to discharges, not to how they operate their equipment.

Q So you're not concerned at all with how Diamond operated their equipment?

A I'm not competent to judge how they operated their equipment.

Q Don't you think that it would be important in giving your opinion to know how they operated their equipment in the '50s and '60s before you could give a statement that it operated its plant in a typical manner for the 1950s and '60s?

A My testimony has to do with the typical nature of the discharges to the environment and not the typical process operations of a plant.

Q You aren't concerned about that at all?

A Well, only to the extent that I need to know where chemicals are in order to understand how they get access to the environment.

Q Well, you stated that you went on this facility in 1984. Is that correct?

A Yes.

Q And at that time, isn't it true that the facility had a tarp over it?

A It had a tarp over the ground.

Q There was no tarp or anything covering the buildings there. Is that correct?

A That's correct.

Q And how many times from 1984 up to the time that you spoke to Mr. Gordon Steward in April of 1987 were you at this facility at 80 Lister Avenue?

A I think I went inside the fence one other time, but I don't remember exactly when it was, but I've been to the site outside the fence probably two or three other times.

Q Did you during the time period 1984 to when you met Mr. Steward in April 1987 ever study any drawings or documents about that plant?

A Yes.

Q Did any of these documents and drawings concern equipment at that plant?

A That's right.

Q And is it your testimony that up until the time that you met Gordon Steward, you had no idea where dioxin could have been created at that plant?

A No, that's not correct, I had some information when I was working at the site.

Q Did you have any information about where TCP went from one location at the plant to another?

A Whoever the guide was that took me through all of these buildings, and I've forgotten what individual that was, told me we're now at this, we're at the autoclave, we're at something else, we're at something else so he identified all these items as we walked through the plant, but that was in 1984.

Q How long did you meet with Mr. Steward in April 1987?

A Pretty much all day.

Q And had you ever met him before that?

A Actually I think I have met him in some other context, but I don't remember exactly where it was. He has told me that we had met before on some other type of business.

Q At the time you met him, he was a consultant for Diamond Shamrock, was he not?

A That's what I believe.

Q He was being paid as a consultant. Is that correct?

A I guess he was working on a consultant basis at a plant in Alabama for Diamond.

Q So would it be fair to state that your sole knowledge about the plant equipment and the process at that facility came from Mr. Steward and the drawings that you reviewed?

A No, that's not correct, I also had a tour of all the equipment and was shown the equipment and given at that time the description what it was.

Q But that tour did not include anything regarding how TCP was produced and where it went after it was produced?

A No, I think it generally did but it's not, you know, something that I remembered well enough to do without Gordon Steward's assistance for me to actually put on that map where dioxin would be in the system.

Q Going to the map and I'm going to refer you now to Figure 3 which contains the dots, the circles and the Xs.

Is it not correct that you had the information available to you prior to your meeting with Mr. Steward as to the locations of dioxin at the site and what those Xs, circles and triangles represented.

Is that correct?

A I had the information where dioxin was in the ground.

Q And you went to Mr. Steward and after talking to Mr. Steward, you had sufficient knowledge to do the dot exhibit which is P-440. Is that correct?

A Yes.

Q And after your conversation with Mr. Steward, it's your testimony you had sufficient knowledge to draw Figure 2 which concerns likely contact zones for dioxin. Is that correct?

A That's correct.

Q And you then used Figures 1 and 2 and matched it up to the information that's in Figure 3. Is that correct?

A No, we used the information off of Figure 2 and matched it with the test data out of the projects reports in order to get Figure 3.

THE COURT: Mr. Calogero --

MR. CALOGERO: I have about five minutes.

THE COURT: Go ahead.

Q But, Dr. Wolfskill, you already had the information from Figure 3. Is that correct? You already knew where dioxin was located on the site. Isn't that correct?

A Well, on the ground, but before we did the exercise, I didn't know where it was on the plant.

Q Well, wasn't that exercise really a meaningless exercise in light of the fact that you knew very early where dioxin was located at the site?

A No, I don't think it was a meaningless exercise.

Q You didn't have to use the information in Figures 1 and 2 to show you where dioxin was located in the ground because you already knew that information in 1984. Isn't that correct?

A That's half the information and I knew that early.

Q By the way, when you found the missing two dots, what time was that, was it two weeks ago that you found out you missed two dots?

A Yes.

Q And those two dots were in the TCP purification unit, correct?

A Yes.

Q And isn't it true that Mr. Steward didn't tell you anything about dioxin at the TCP purification unit when you met him in 1987?

A No, that's incorrect. On the appendix of my report, he has those points marked, we just didn't pick those up when we made Figure 1.

Q When you refer to the appendix --
A The appendix of my report is Gordon Steward's notes.
Q -- you're talking about the A-1 drawings?
A Yes, A-1 through whatever they are, 15.
Q Now, your testimony earlier by Mr. Moser was a discussion of where dioxin was located or where it was not located off-site. Is that correct?
A Generally, yes.
Q Are you able to give an opinion as to how dioxin got to the Hug Holdings property?
A Well, I don't know where that property is.
Q Well, if you don't know where it is, then you really can't give an opinion, can you?
A Well, that's right, if I don't know where the property is, it might not be in Newark.
Q It is in Newark. Are you able to give an opinion as to how dioxin got to the Farmers Market?
A Well, again, I have to have information to know that that's in the area that received dioxin, you know, from this plant.
Q You have, as you sit here today, you cannot give an opinion as to how dioxin got to the Farmers Market?
A No, until I find out where the Farmers Market

is.

Q Are you able to give an opinion as to how dioxin got to the Newark Box Board?

A No.

Q Are you able to an opinion as to how dioxin got to Lockwood Avenue?

A Yes, I think I remember where Lockwood Avenue is.

Q Are you able to give an opinion as to how dioxin got to Brady Iron and Metals?

A Yes.

Q Isn't it true it got there because there was some equipment from the site buried there?

A That's my understanding that equipment from the site was taken.

Q There was a specific time period when that was done. Is that correct?

A I think it was more than one and I don't know how many time periods equipment was taken to Brady.

Q Are you able to give an opinion as to how dioxin got to the Hildeman property?

A I don't know where that property is.

Q If you're not able to give an opinion as to how it got there, you can't give an opinion as to when it got there. Isn't that true?

A Well, I can't give an opinion when it got to that property because I don't know where that property is.

MR. CALOGERO: All right, no further questions, your Honor.

THE COURT: Any more defense?

MR. SHAHRIARI: Tom Shahriari for Firemen's Fund. I don't know if your Honor wishes to take a break.

THE COURT: Well, I'd rather if we can manage it finish it and get the witness out of here. We're trying to get him back down to Texas this morning.

CROSS-EXAMINATION BY MR. SHAHRIARI:

Q Dr. Wolfskill, you'll have to forgive me if I ask you some questions which show some naivete' with regard to soil and soil conditions, but can you tell me in the field of soil analysis, are there different types or categories of soil that have been developed by scientists?

A Yes, there's several soil classifications systems that classify different types of soil.

Q Have you ever made a determination of the types of soils that are underneath the 80 Lister site?

A Yes, I've reviewed the records that gave the

soil classifications at the site.

Q You personally have not made the determinations?

A I personally have not taken the samples, but I reviewed the data and reviewed the reports.

Q Okay, what are the types of soils that are underneath this site?

A There is a general fill material that occupies the first several feet of the site which is generally underlined by an organic silt which is down about 15 feet or so and underneath that is a sand and gravel formation.

Q And now far below all of this is there an impermeable layer?

A Of those three strata, the most impermeable strata is the organic silt which is the second one done.

Q Does that define a set aquifer?

A The organic silt defines the aquifer which sits above it in the fill, it doesn't define the ground waters below that layer.

Q Then am I correct in saying that there is more than one aquifer than one site?

A The word "aquifer" may not be the appropriate word, but there is ground water in the fill. There's

ground water in the silt also and there's ground water in the sand. Below the sand at some depth there's bedrock, there's also ground water in that bedrock.

Q And am I correct in saying that there are different rates of water permeability in different types of soil?

A Yes.

Q Has anyone ever made a determination of the rate at which ground water permeates the soil at 80 Lister Avenue?

A Yes, I believe that's in the project reports.

Q Do you recall what the rate is?

A Well, generally, the flow rate in fill is high, I don't remember the permeability numbers that go with it, but it's a high rate of flow. The organic silt is a very low rate of flow and in the sand is an intermediate rate of flow.

Q Now, if one knows the rate of flow in ground water, can one determine by some formula how rapidly materials that are in the ground water will move over time?

A Yes.

Q Has anyone ever tried to make a determination of how rapidly dioxin or any of the organic constituents have moved over time from the 80

Lister Avenue site?

A Well, you just made a major distinction when you said how rapidly. Chemicals are moving in the ground rather regime because that can be quite different from how fast the ground water itself moves.

I don't think an analysis has been made that would predict solar transport which is the term applied to the movement of chemicals in ground water. The investigation has primarily documented where those chemicals are located in the ground water and in the soil at the time of the investigation.

Q But is it, in fact, scientifically possible to make such a determination?

A That's correct.

Q And no one has made a determination?

A Well, I'm not sure no one has.

Q You're not aware of any?

A The dioxin determination is very difficult because it easily adsorbs to soil particles and stops, but the water continues on, but the water could have some dioxin in the water.

Q Isn't that true of DDT as well?

A I think DDT is highly insoluble and acts very much as dioxin does.

Q Okay, am I correct in saying as you move

further away from a point source of contamination that the contamination of the concentration of the ground water is generally less?

A I think that's true for the ground water. The only ground water samples that were taken inside the fence are all in fairly close proximity.

I mean the site is small and so I don't think there's a lot of difference in those. There is an off-site ground water well which has been tested in the --

Q Sir, I don't mean to cut you off, but my question is relatively simple. If I drop a certain organic substance onto the ground at point (a), as we move further away from point (a), doesn't that concentration decrease?

A Normally it does.

Q Okay, do we know what direction the ground water flows under the 80 Lister Avenue site?

A Yes.

Q Which direction is that?

A In the fill which is the top layer, it flows toward the river and I've forgotten the direction that it flows in the sand underneath. I don't believe it's north directly toward the river, seems like it's at some angle to the river flow or to the river direction.

Q Now, is the direction of flow of the ground water underneath the 80 Lister Avenue site constant or does it change?

A I think it's pretty constant. I don't believe that there's a lot of change in ground water flow in either that fill or that first sand below it.

Q How about the rate of flow?

A I think the rate of flow changes. The fill is -- generally, the rate of flow is largely determined by rainfall in these kinds of events. I don't believe the sand underneath the silt is affected materially by rainfall.

Q Dr. Wolfskill, I'd like to change my questions and go to this exhibit which has the Xs, triangles and little zeros on it, holes on it. The Xs, as I understand your testimony, represent the highest concentration points, correct?

A Correct.

Q And you determined those from a study that was done prior to your becoming involved in this whole thing or it was not a study that you did?

A Well, it was a study that I was working with in 1984.

Q Oh, good, okay. Well, the samples that were used to make the determination of concentrations

of dioxin at these Xs, Os and triangles, how's the sampling done? What size sample was taken? Specifically, what size sample was taken?

A I think they were generally three inches in diameter and about six inches long.

Q Okay, so at each one of those points, you took a sample of six by three inches?

A Generally.

Q I take it it was a cylindrical sample?

A Yes.

Q Did anybody ever make another sample, let's say, a foot away from the first sample?

A I don't know of any sampling that was done that close together.

Q How about two feet or three feet away?

A No, I don't think the -- I don't think a study was made as to what we might call micro-distribution of dioxin in horizontal terms of inches or few feet.

Q So there was no effort made to determine the concentration in a given area, but rather you just determined the concentration of dioxin on this specific three-inch place?

A Well, that's right, the samples all represent a small discreet piece of real estate and the analysis numbers go with that sample.

Q Okay, so -- well, let me strike that question. From those three-inch samples, you made a determination that it was more likely than not that this -- these Xs represented point sources of dioxin contamination, I think you described them as leaks or drips or what have you?

A Yes, based on the trend and the distribution of all of the points, not any one particular point, but the trend of all of the points, I made an interpretation determination that the likely entry was due to leaks primarily through the floor slab.

Q All right, let me ask you this. Some of these Xs are not on floor slabs, correct, they're outside on the ground?

A That's right, some are through the floor and some are right outside the floor.

Q Let me ask you if somebody took a hose and connected it to a TCP tank that had dioxin, contaminated TCP in it, and spilled it over a very large area, you would expect to find the large number of points within that area of that spill which had high concentrations of dioxin, is that a correct assumption?

A If enough was put out there on the ground, I think, you know, whatever that area of that spill would be would likely show concentrations in the range of one

part per million which were the Xs.

Q So with regard -- I'm sorry, I didn't want to cut you off. So with regard to the Xs down on the ground, you can't tell us whether that is the result of a discreet pinpoint three-inch spill or whether it's part of a much much larger spill because nobody ever took samples from anywhere around that X?

A And my interpretation would be if you took a sample a foot away, you would be likely get a similar large number although it would generally be erratic, but if 20 samples were taken, say, in the size of this room in an area that had a spill over the entire room, the numbers would jump around, but the trend of all of them would generally represent the intensity of that spill.

Q What I'm trying to get at, though, is nobody ever determined that so it is possible that this X that's out here on the soil is part of a much larger spill?

A That's correct.

Q Okay.

A And that actually would be my interpretation is that if you took other samples in the vicinity of those Xs, you would get more Xs.

Q Okay. Now, did anybody ever take a sample

from, say, a foot underneath one of these Xs?

A Yes. In fact, the sampling protocol was at all the places, there were surface samples as opposed to boring samples. There were samples taken first six inches, second six inches and the higher of the two values is what I used and then there was a sample taken of the next 12 inches so at every one of those points, there is a number that is from, say, 12 to 24 inches.

Q Okay, now about four feet below?

A Well, then there were a few taken deeper and then at the boring locations, they went down 15, 20, 30 feet.

Q Well, I'm specifically speaking of these locations here.

A But some of those are borings and some of those are the shallow surface samples.

Q I think you agreed with me that as you move away from a point source of contamination, a concentration level is decreased so if we were to find a level where you had a surface concentration -- well, strike that, surface concentration of a hundred parts per million and then you moved four feet down and you found the concentration of hundred parts per million as well, would that tend to lead you to conclude that there had been a leakage over a prolonged period of

time?

A That gets to the nature of the rate of flow-through of material and I actually think the rate of flow-through this fill which that's the material we're talking about since it's the upper soil, there probably -- these flowed fairly quickly and went on down the profile.

THE COURT: I think perhaps we better stop.

MR. SHAHRIARI: Your Honor, I have just one very basically last question.

Q How long has mankind known of the existence of ground water?

A I have no idea.

Q Would you guess it's a couple centuries at least?

A Oh, far more than that.

MR. SHAHRIARI: Thank you, nothing further.

THE COURT: Are there other defense questions? All right, I see we have several. We're at this stage where we'll stop. Let's keep it moving rather quickly when we get back.

(Whereupon a recess is taken.)

THE COURT: Please be seated, ladies and

gentlemen. Dr. Wolfskill remains on the stand under oath. Who wants to go next?

MR. FAVETTA: Antonio Favetta on behalf of AIG.

CROSS-EXAMINATION BY MR. FAVETTA:

Q Dr. Wolfskill, am I correct that the only samples that you utilized in arriving at your conclusions with respect to Point Number 2 was surface samples at the site?

A That's correct.

Q Okay, you did not use any boring samples. Is that correct?

A That's correct.

Q And am I also correct based on your earlier testimony I believe in response to questions by Mr. Koepff yesterday that the samples were done by someone other than yourself?

A That's correct.

Q And who was that?

A The surface samples in the zero to 12-inch from the locations called surface sampling --

Q I'm only concerned with that.

A Well, I'm making a distinction between surface samplings and borings, they each had shallow samples in them. The borings were done by my firm and some of

those locations were samples taken from soil borings, the shallow samples were taken by employees at I.T. Corporation.

Q Just so we have it straight, you only relied on the shallow surface samples in reaching your conclusions. Is that correct?

A That's part of the basis for that conclusion, but that's correct, only those samples were used. I have only one correction. I think there's a sewer sample that is deeper and the sump samples may be deeper than 12 inches because the sumps are probably deeper than 12 inches so those are the only exceptions.

Q I think you also described those surface samples as biased samples and not in any pejorative sense. Is that correct?

A The part of the program that was called shallow samples was a biased sample. The boring system was not a biased system.

Q My question is only with respect to shallow surface samples from now on.

A And they come from both kinds of exploration.

Q Okay, so that the shallow surface samples that you're talking about came both from shallow tests as far as the boring tests, is that what you're saying?

A Yes.

Q And you used both of those?
A Yes, I used everything that had a test value that was in the zero to 12-inch range.
Q Okay. Is it fair to say looking at Figure -- I guess this is the overlay's D-687 that has the color Xs and dots and triangles that the majority of the samples were taken at areas in close proximity to the process equipment?
A Process equipment, yes.
Q And would it be fair to say that there are relatively few samples taken in areas away from the process equipment?
A I would say that there are fewer samples taken away from the two buildings that had the process equipment in it.
Q The biased samples that were taken by I.T. were basically to determine whether there was dioxin on the site present in concentrations above action levels. Is that correct?
A Yes.
Q They weren't looking to determine how the dioxin got into the soil. Is that correct?
A I think that's correct.
Q And, therefore, they went to the heart of the matter, so to speak, and went to where they would

most likely find the dioxin in those concentrations which was near the process equipment, correct?

A Well, they did not only look there.

Q Well, if we look at the concentration of dots, circles and Xs, you would agree with me that they took more samples nearer the process equipment than otherwise?

A That's correct.

Q And going to your Conclusion Number 2, the soil samples that you looked at were soil samples, therefore, that came from areas near the process equipment as opposed to those areas not near the process equipment. Is that correct?

A No, it was taken from all the samples, some are near and some are not near.

Q But you will agree with me that there were more samples closest to the process equipment than otherwise?

A That's correct.

Q So the samples that you looked at and you looked at all of the samples and I don't disagree with that, you would be looking at samples that came closest to the process equipment?

A I don't think I looked at samples that tended to be close to the process equipment, I looked at all the

samples.

Q Fair enough.

A The density of the sampling doesn't have much to do with this analysis.

Q Okay, so that you looked at all the samples, but because of the way the sampling was done by someone else, there were more samples available from areas closer to the process equipment than otherwise. Is that correct?

A Yes.

Q So, therefore, would it be fair to say that you could rephrase Conclusion Number 2 to read the highest concentrations of dioxin contamination in the biased soil samples at the Lister Avenue site correlate well with the locations where TCP or 2,4,5-T products were manufactured or stored, et cetera, would that be a fair restatement of your conclusion?

A I don't think that would be an accurate restatement of the conclusion.

Q Would not be accurate?

A I don't think so. Well, I mean not exactly. I mean I haven't thought enough about that language to know how accurate it is or what it means, but what impresses me is that that is not how I would state the exercise.

Q Well, the soil samples you were looking at were biased soil samples in that they were not evenly distributed across the entire grid for 80 Lister Avenue?

A No, they're not correct, some of the samples were biased and some were not biased. There's a collection of sampling schemes on that chart, some biased, some unbiased, I looked at all of them.

Q Okay, but going back to my previous question, I think you agreed with me that of all the samples that you had more of them that were from areas closest to the process equipment. Is that correct?

A That's correct.

Q So instead of calling it biased for purposes of my question, let's say weighted samples. There were more in one area than another, the soil samples you were looking at were from the weighted samples?

A Well, that's not a correct way to state the result of that analysis.

Q I'm not asking about the result, I'm asking about the number of samples?

A But then you are going to a result and in talking about the sampling system and I don't think that is a correct way to characterize the result of the

analysis.

Q You looked at more samples that were closer to the process equipment than otherwise?

A Yes.

Q Even though you looked at all the samples?

A That's correct.

Q Okay, based on what you looked at, that suggested to you that the proximity of the location between the process equipment and the concentrations of dioxin, that the contamination at the plant site occurred as a result of numerous small accidental leaks and spills?

A That's because the high values were all over at the process plant and there were no high values in the other samples.

Q And are you telling me that you looked at samples from every point, let's say, every two feet or every three feet for the entire grid of the site?

A No, I looked at the samples that were available.

Q And that's because you didn't have samples for, let's say, every two feet or every three feet at the entire site, you looked at what I.T. gave you. Is that correct?

A I looked at the samples that were available. There are enough samples that are away from those

process equipment to be significant as far as hitting a high value.

Q Well, Doctor, then would it be significant if, for example, I told you for purposes of my question that there were, let's say, a dozen places where you got X values, high values, what have been marked here in red, would that be a significant factor in your hypothesis?

MR. FALLS: Object to the form of the question because I don't understand it.

A I don't understand the question.

Q Okay, your hypothesis is to create a correlation between proximity of the process equipment to the density or intensity, if you will, of the dioxin that was found near it. Is that correct?

A Yes.

Q And from that proximity, that correlation even though it's not a statistical one, you say you reach a conclusion that the way in which the dioxin reached the ground, the soil, was as a result of numerous small accidental leaks and spills. Isn't that correct?

A Yes.

Q And one of the factors that you considered in reaching that was the absence of any high values in

other locations. Is that correct?

A That's correct.

Q But we don't know if all the other locations were tested. Is that correct? In fact, I'll rephrase the question. We know that all the other locations were not tested. Is that correct?

A That's correct.

Q And, therefore, you would agree that if I told you that there wasn't a result which showed high values at those other locations, that would impact on your hypothesis. Is that correct?

A That's correct.

Q And, yet, you agree that you never had the data to test that hypothesis. Is that correct?

A No, I believe that this data array which is a combination of the biased sampling scheme and unbiased sampling scheme are statistically significant and that's my judgment without making calculations, statistically significant based on that array of data points. We have enough points to make this assessment.

Q That's your judgment?

A That's my judgment.

Q Okay, but you do agree with me that the individuals that were conducting the data sampling were doing it for a different reason, they were not looking

to prove or disprove a hypothesis, they were simply looking to find out whether dioxin was on the site and whether it exceeded action levels. Is that correct?

A Yes.

Q And that the best place to look for that was close to the process equipment as opposed to not close to the process equipment. Is that correct?

A Yes.

MR. FAVETTA: Thank you, no further questions.

MR. QUINN: Thomas Quinn on behalf of Evanston.

THE COURT: Mr. Quinn, come on up.

CROSS-EXAMINATION BY MR. QUINN:

Q Dr. Wolfskill, in response to a question posed to you by Mr. Moser, I believe that you stated that you could not tell when any one particular location off-site was contaminated and when the river was contaminated by dioxin. Is that correct?

A I could not tell any one place in the river or any one place on land.

Q Okay. Now, in your conclusions, I believe in Conclusion 2 that you said that dioxin got out at least from the process itself through a series of accidental leaks and spills. Is that correct?

A Yes.

Q And those occurred in varying degrees between '51 and '69?

A Yes.

Q Okay, so you had roughly 18 years of leaks and spills?

A That's what I would expect.

Q Okay. Now, also your report lists various migration mechanisms. Is that correct?

A Yes.

Q Okay, some of those are wind, air and soil movement?

A Yes.

Q And they would be continuous in varying degrees over the course of time?

A Most of them are continuous for the whole period.

Q Okay, and I believe that you had testified that a migration of dioxin off-site began somewheres in about '51?

A I would expect that it began at the beginning of the period.

Q Okay, so from that point of time up until today, you're really talking about 36 years of migration of dioxin off-site?

A Yes.

Q Now, what was the action level off-site for dioxin? What was the action level that the DEP was using?

A There was a cleanup period in the off-site level and the action level were one part per billion.

Q Okay, is that a relatively low threshold?

A Oh, I think it is a low threshold, yes.

Q Extremely low?

A Well, I think it is from my own assessment which is not -- my assessment is not authorized the way this system works, what I believe about this, but I think it is a very low number, yes.

Q Okay, and your expertise, you have familiarity with the movement of soil and the erosion of soil, things of that sort, that's in your area of expertise?

A Among other things, yes.

Q And that's in your area of expertise?

A Yes.

Q Now, we know that the dioxin was found off-site sometime in 1983, do we not?

A Yes.

Q Now, the day that that was found, you're not telling this Court that the dioxin just happened to

get there the day before, are you?

A I don't believe that's possible.

Q Okay, that's extremely unlikely, correct?

A Yes.

Q And, in fact, would it be fair to say to a degree that it's more probable than not that the dioxin off-site had gotten there prior to 1983?

A Oh, I feel sure that dioxin had gotten off-site before 1983.

Q And it's more probable than not that it had gotten there before 1981, correct?

A Well, I think it is highly probable that it got there in every one of those years.

Q Okay, and would it be fair to say that it had gotten there to the one part per billion action level prior to 1981?

A I would think in most of the areas that were affected that that would be true.

MR. QUINN: I've nothing further.

MR. CALOGERO: Your Honor, I have one question and if your Honor allows me, I'll ask it.

THE COURT: Okay, go ahead.

CROSS-EXAMINATION BY MR. CALOGERO:

Q Dr. Wolfskill, because it was common practice in the 1950s and 1960s to have spills and leaks, is it your conclusion that no matter how gross the conduct of Diamond Shamrock, the results would always be accidental?

A I don't know how to understand what "gross conduct" is. I don't know the meaning of that, so I don't know how to answer that question.

Q No matter how bad the conduct of Diamond Alkali was in running this plant in the 1950s and '60s, the results according to you would always be accidental?

MR. FALLS: Object to the form of the question.

THE COURT: Yean, I really think, Mr. Calogero is really interested in accidental in the view of the insurance law.

MR. CALOGERO: No, your Honor.

THE COURT: And that's not what Dr. Wolfskill is here for.

MR. CALOGERO: No, I'm referring to accidental as he refers to it in Conclusion 2.

THE COURT: Do you understand the question?

THE WITNESS: Well, the part that I cannot speak to is the judgment of good or bad or gross because I actually believe the company operated within public policy at the time. Therefore, I don't see how I can use the words bad, gross.

Q Would their conduct ever get to the point where the results would be other than accidental?

MR. FALLS: I object to the form of the question.

THE COURT: Well, do you understand what the question means, Dr. Wolfskill?

THE WITNESS: Well, there's now the scope.

A I concluded that part of the releases were accidental and part of these releases were planned. Now, for the part that were accidental, I'd say the answer's yes, I think they would all be accidental as a result of their conduct for those releases that were accidental.

Q And for those releases that were planned, are you saying that those releases are not encompassed in Conclusion 2?

A Conclusion 2 is limited to accidental releases that cause contamination of the plant site.

Q I understand that.

A Okay, within that scope, I think their

conduct -- their conduct was consistent with the accidental releases that are included in Conclusion Number 2.

Q No matter how mismanaged that conduct would appear to be today?

MR. FALLS: Object to the form of the question.

THE COURT: I'll sustain the objection.

MR. CALOGERO: Nothing further then, Judge, thank you.

THE COURT: Anything further on the defense side? Do you have any redirect?

MR. FALLS: Very few questions, your Honor.

REDIRECT EXAMINATION BY MR. FALLS:

Q Dr. Wolfskill, let me direct your attention to one of these diagrams which appears in the back of your report. It's the third one from the end and it's the one that I think Mr. Cuyler questioned you about and let me ask you to look very carefully at a legend which appears in the lower right-hand corner and look at it closely and see whether you can read it to me. It's a little hard to make out, that's why I ask you to look at it quite carefully.

A Well, this is a note, this drawing was

originally made by, I don't know the name of the company, Blank Associates in 1957. I believe that's '57. Equipment locations have not been revised.

Q Could I ask you again to look at that date and can you confirm to me whether that is a 2 or a 7?

A The last digit, the fourth digit?

Q The 1952 or 7?

A That's right, the last digit is a 2, it's the next to the last digit. Looks like a 5, but I'm not sure, but the last digit is a 2, it's not a 7.

Q Thank you.

MR. CUYLER: That's what it looks like to you, Doctor. Oh, I'm sorry?

THE WITNESS: I'm saying that's 1952, the highest uncertainty is the 5.

Q Now, you were asked about some of the depositions that you read prior to giving your testimony today. Did the depositions which you read include depositions of a number of employees at the plant who worked there during some period of its operation?

A Yes.

Q Let me read you a few names and ask you whether you happen to recall whether the names I read you are the names of people whose depositions you read.

Mysko.

A Yes.

Q Centanni.

A Yes.

Q Blair.

A Yes.

Q Scurman.

A Yes.

Q Bradshaw.

A Yes.

Q Okay. Now, with respect to the samples which you used in the developing of the chart which has been marked as Plaintiff's Exhibit 612, I think you've testified on a number of occasions that you used only the shallow soil samples?

A That's correct, zero to 12-inch depth range.

Q Now, why did you use those samples rather than some outer samples?

A I was interested in the distribution of dioxin at its first contact with entry which would necessarily mean a very shallow sample, the only exception being at the sewer or sump where it's a little deeper.

Q Now, I think you were asked about something which was called wiped sample?

A Yes.

Q What is a wiped sample?
A A wiped sample is a sample taken from the wall of a room such as this so that a chemical affixed to the wall might be analyzed in the laboratory.
Q And you testified, I think, that you did not use those samples?
A That's correct.
Q And why did you not use those samples?
A Well, those samples are not reflective of where dioxin would enter the subsoil because they are not samples of the subsoil.
Q Now, I think you were also asked about chip samples?
A Yes.
Q What are chip samples?
A Chip sample is similar to a wipe, but it's actually a chip of the wall or chimney or whatever's being sampled is taken to the laboratory and the chip itself is analyzed.
Q And you did not use the chip samples?
A That's correct.
Q And why did you not use the chip samples?
A Because, again, they do not represent a dioxin concentration in the shallow soil.
Q Now, I think you've already made clear

that you did not use the samples taken at levels deeper than the first 12 inches?

A That's correct.

Q Did you review those samples?

A Yes.

Q And did anything about them suggest to you that your analysis should be changed or modified?

A No.

MR. FALLS: That's all I have, your Honor.

THE COURT: Anything further on the Defendants? Fine. We're finished then with Dr. Wolfskill. We'll excuse Dr. Wolfskill.

THE COURT: Let's go to Mr. Backer. Who is going to be doing the questioning.

MR. GROARK: I am, your Honor.

JOHN S. BACKER, sworn.

DIRECT EXAMINATION BY MR. GROARK:

THE COURT: Have a seat there, Mr. Backer. Whenever you're ready, Mr. Groark, go ahead.

Q Mr. Backer, would you state your present position?

A My present employment is with Aetna Life and Casualty. I'm an assistant vice-president in the Commercial Claim Department.

Q And would you describe your education