Depo of: GEORGE J. LEVINSKAS Monsanto v Aetna December 23, 1992

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- SUBJECT TO PROTECTIVE ORDER -
IN THE SUPERIOR COURT OF THE STATE OF DELAWARE
IN AND FOR NEW CASTLE COUNTY
- - - - - - - - - - - - - - x
MONSANTO COMPANY, :
Plaintiff, :
-vs- : CA No. 88C-JA-118-1-CV
AETNA CASUALTY & SURETY : C-1-90-492
COMPANY, et al., :
: Volume II
Defendants, :
- - - - - - - - - - - - - - x
DEPOSITION OF GEORGE J. LEVINSKAS
Wednesday, December 23, 1992
Wilmington, Delaware
Continued Deposition of GEORGE J. LEVINSKAS, called for examination pursuant to agreement by counsel, at the law offices of Elzufon, Austin & Drexler, 21st Floor, 1201 Market Street, at 9:30 a.m., before CRAIG L. KNOWLES, Court Reporter, when were present on behalf of the respective parties:
– continued –

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APPEARANCES:
PETER J. WALSH, JR., ESQ.
Potter, Anderson & Corroon
350 Delaware Trust Building
Wilmington, Delaware 18999
On behalf of the Plaintiff.
DAVID S. FLORIG, ESQ.
Manta and Welge
One Commerce Square, 37th Floor
2005 Market Street
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On behalf of the Defendant Liberty Mutual Insurance Company.
MARILYN M. SANDBECK, ESQ.
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1776 K Street, N.W.
Washington, D.C. 20006
On behalf of the Defendant Travelers Indemnity Co.

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C O N T E N T S
WITNESS EXAMINATION

E X H I B I T S
LEVINSKAS DEPOSITION NUMBER IDENTIFIED

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P R O C E E D I N G S:
Whereupon,
GEORGE J. LEVINSKAS,
was called for continued examination by counsel for Defendants and, having been previously duly sworn by the Notary Public, was examined and testified further upon his oath as follows:
EXAMINATION BY COUNSEL FOR DEFENDANTS
BY MR. FLORIG:
Q. Dr. Levinskas, good morning.
A. Good morning.
Q. We will try to get you out of here today as early as we can.
You understand you are still under oath, correct?
A. I do.
MR. FLORIG: Mark this as number 1.
(Deposition Exhibit 1 was marked for identification.)
BY MR. FLORIG:
Q. Dr. Levinskas. You have in front of you what has been marked as Levinskas number 1. I would just

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like to ask you, is this a copy of your resume, or c.v.?
MR. WALSH: You can take a minute to look at it.
MR. FLORIG: Sure.
(Witness examines document.)
A. Yes.
BY MR. FLORIG:
Q. On the first page in the upper right-hand corner there is an IBT number. Do you know what that refers to?
A. I have not seen this, the heading on here. I don't, I have no knowledge of it.
Q. Can you tell when this resume was prepared?
A. I do not recall a specific date. It does have, among the references there is one dated 1977, so it would either be 1977 or later.
Q. You will see on the first page under the first heading, Business, it says, "Director, environmental assessment and toxicology."
A. Yes.
Q. Do you see that?

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A. Yes.
Q. I believe you told me yesterday you held that position from approximately 1980 to 1986?
A. Yes.
Q. So this would have been prepared sometime in the early to mid 1980s?
A. Well, as I said, the date I gave about '80 or so for my title of director of environmental assessment and toxicology, I am not too sure of the actual date on which that change was made.
Q. All right.
A. But since this has a 1977, reference to a 1977 publication, I would say it was after 1977.
Q. Does the residence listed help you be more definite?
A. We lived at Kirkwood until 1981, I believe.
Q. Did you prepare this, do you want to refer to it as a resume or c.v.
A. Whichever you choose.
Q. Did you prepare this c.v., yourself?
A. I don't recall doing it, but I probably did.
Q. You can take as long as you need to look

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through this.
What I would like to know is whether all of the information contained therein was accurate at the time this was written.
(Witness examines document.)
BY MR. FLORIG:
Q. I won't ask you to go through all of your publications.
A. I believe it is.
I would like to go back and make two comments relative to earlier testimony.
Q. Sure.
A. I think I indicated my first title at Monsanto was manager of product –
Q. Development, I think you said.
A. Development. It was probably manager of product safety.
Q. All right.
A. And in that same paragraph on page 3-19-71 to present it says, let me go back here, make a reference

to the planning and design of environmental health laboratory currently under construction in the vicinity

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of the Washington Medical School. That would make me think that this was probably prepared more likely about '75 or '6.

Q. All right.

A. Or it could have been as late as '77.

Q. That lab came on line in '77?

A. I think it came on line in '77, so this was probably prepared about '75.

Q. Okay.

A. Well, I go back to that '77 publication, it would have to be early '77.

Q. Was this c.v. ever circulated outside of Monsanto?

A. I have no knowledge that it was.

Let me back up. I did put together a c.v. which I had sent once or twice at request of people either in professional societies or where I had been invited to lecture. With those exceptions, which I sent a few times, I have no knowledge that this was sent out side of Monsanto.

Q. Were the c.v. or c.v.'s of employees involved in toxicity testing ever attached to reports that were

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sent outside of Monsanto?

A. I have never attached them. I do not know what others may have done.

Q. I want to direct your attention to page 3 under the heading 1971 to present. In the second paragraph, the first sentence says, "Direct and supervise toxicology section of department which determines the need for, plans, monitors and evaluates all toxicity testing for the company." Do you see that?

A. Yes.

Q. Was it true in 1977 that you were involved with all toxicity testing?

A. It was intended that all toxicity tests were to be placed through my section in the department.

Q. All right.

A. Let me modify that. We are talking now with respect to mammalian testing.

Q. Didn't you say yesterday that the environmental sciences group may have been doing toxicity testing, as well?

A. I indicated that there could be aquatic

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testing or environmental fate testing that was being done elsewhere in the company.

And also it would be a question of what timeframe are we talking about.

Q. So there may have been toxicity testing going on within the company which you were not involved with, correct?

A. I have no knowledge that there was, but there could have been.

Q. One of the goals of toxicologists and industrial hygienists is the protection of people, correct?

A. I am not prepared to speak to the goals of industrial hygienists. My efforts as a toxicologist are to, as I said, determine the need for, design, plan, implement, evaluate, test data and forward it to others with my interpretation or suggestions as to the significance and, on occasion, utility of the information. How it is used and how it is implemented by others, I do not know.

Q. Do you have any understanding of why those people would request or need that information?

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A. There could be a variety of reasons.

Q. What would they be?

A. One could be a regulatory requirement, which have gotten increasingly more stringent over the years. The other could be a – these are compared to existing products.

Another goal would be to have information from which procedures could be developed to ensure the safety of employees, users of the product.

Q. Those all lead ultimately to the protection of people, don't they?

A. Yes.

MR. WALSH: Excuse me, Dave, I assume that my standing leading objection continues today?

MR. FLORIG: Yes.

MR. WALSH: Thank you.

BY MR. FLORIG:

Q. Your answer was yes?

A. One of the purposes is, yes, as I have indicated, to develop the information so that it can be used to assure the safety of the employees and the customers.

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Q. And others who might come in contact with the material, is that true?

A. I have some difficulty with that question. I can, not I, but the company, can send information with the product. And what happens to the – if the product and the information get separated at some future date, someone could come in contact with it somewhere. And if the information is not there, I don't know how that would be handled.

Q. I want to ask you about several publications or texts that we didn't discuss yesterday. I just want to ask you if you are familiar with them.

Are you familiar with a book by M. B. Jacobs entitled The Analytical Chemistry of Industrial Poisons, Hazards and Solvents?

A. I have heard of the book, yes.

Q. All right. Do you recall if you ever used or looked at the book?

A. I may have glanced at it.

But that is predominantly an analytical chemistry book. That is not my field of interest or expertise.

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Q. How about a book by W. S. Spector entitled Handbook of Toxicology, Acute Toxicities of Solids, Liquids and Gasses to Laboratory Animals?

A. I have heard of the monograph. It is a, I think – I shouldn't say I think.

I have heard of the monograph, but right now I have difficulty visualizing the nature of the book and its content.

Q. You don't recall whether it was a compendium of chemicals and their toxicity evaluations?

A. It's been some time since I have looked at the book, and I have difficulty, I just can't visualize the nature of the book or its content, I am sorry.

Q. Do you recall whether either of the first two books that I mentioned were regarded as authoritative or respected within the toxicological profession?

A. I cannot speak for others. I have indicated that I have knowledge of the books. Personally I do not recall using them very extensively.

Q. Does that mean that you are unable to make an evaluation or you don't have an opinion?

A. I cannot recall enough of either book to

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comment on it at this time.

Q. Next is a book edited by F. A. Patty, P-a-t-t-y, entitled Industrial Hygiene and Toxicology.

A. Yes.

Q. What can you tell me about that book?

A. That is a rather extensive compendium. It has sections which deal with the general practice of industrial hygiene. It also has summaries of toxicity of various chemicals.

Q. Was that a reference that was used throughout industry?

MR. WALSH: Objection, calls for speculation.

A. I do not know the extent of its use or distribution. I refer to the sections on chemicals in it fairly frequently.

BY MR. FLORIG:

Q. You view the information in there as reliable, as best you could tell?

A. Many of the authors I know, have known

personally, and I consider them to be competent toxicologists and I would accept their word as reliable.

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Q. You mentioned yesterday a TLV Committee. Is that also referred to as the Committee on Threshold Limit Values?

A. I believe they are the same.

Q. Is that an arm of the American Conference of Governmental and Industrial Hygienists?

A. Yes.

Q. Are you aware of a publication by that committee entitled Documentation of Threshold Limit Values?

A. Yes.

Q. What can you tell me about that publication?

A. Again, it is a compendium which provides summaries of the toxicology of the chemicals listed for which they have established so-called threshold limit values.

Q. Is that regarded as reliable?

A. OSHA adopted it for its permissible exposure limits, I guess that attests to its reliability.

Q. Do you know when that committee started publishing TLVs?

A. I do not know the specific year.

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Q. Do you recall whether it was, when you were a graduate student, whether it was in existence at that time?

A. I do not recall, as I indicated, the year it started, and I could not even make a reasonable guess as to when it started.

Q. Next is a text by H. B. Elkins, The Chemistry of Industrial Toxicology. Are you familiar with that book?

A. I know of the book.

Q. Have you used it?

A. I would – infrequently, very infrequently because it deals predominantly with chemical analysis. And I have indicated earlier that is neither my interest nor my specialty.

Q. Next is a book by L. T. Fairhall entitled Industrial Toxicology.

A. I know the monograph.

Q. What can you tell me about that?

A. My general recollection, it's a series of relatively short articles which combine some toxicology and some analytical chemistry.

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Q. Did you regard that book as reliable?

A. It probably is reliable. Because of the brevity, the smallness of the volume and brevity of the treatment, I did not find it very useful.

Q. Is that because it was information that was already generally known to you?

A. I think I had better sources. Patty would be one of those for comparable information.

Q. Next is a book by H. W., perhaps it's Gerarde, G-e-r-a-r-d-e, entitled Toxicology and Biochemistry of Aromatic Hydrocarbons.

A. Yes.

Q. Are you familiar with that book?

A. Yes.

Q. What do you recall about that book?

A. Dr. Gerarde was doing research on petroleum compounds, and that monograph is a result, compendium of much of the studies that he did.

Q. Did you refer to that book?

A. If I had petroleum compounds that were there, I would refer to that book.

Q. Did you regard it as a reliable source of

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information?

A. Yes.

Q. Next is a book by two authors, one, H. Gerarde, and the other W. D. Deichman, D-e-i-c-h-m-a-n, entitled Toxicology of Drugs and Chemicals?

A. Yes, I know the monograph.

Q. What do you recall about that book?

A. It was a relatively short description of a variety of compounds. Its primary use was intended and I think its use was for treatment of acute exposure such as emergency room treatment for exposures to chemicals.

Q. Did you have occasion to consult that book?

A. I would look at it on occasion, but not regularly.

Q. Did you view the information as reliable?

A. Yes.

Q. Next is a book by E. Browning entitled Toxicity of Industrial Organic Solvents. Are you familiar with that book?

A. Yes.

Q. What do you recall about that book?

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A. I do not consult that very frequently, but my recollection is that they were somewhat extended essays on a variety of solvents.

Q. Did you view that book as reliable?

A. Yes.

Q. Are you familiar with the term "synergy" as it applies to toxicology?

A. Yes.

Q. What does that term mean to you as applied to toxicology?

A. To me, synergy would be an additive effect, one plus one equals two.

Q. Is that different from how you would think of synergy in a non-toxicological context?

A. That is my definition of synergy in all contexts.

MR. FLORIG: Will you mark this as Exhibit 2

(Deposition Exhibit 2 was marked for identification.)

BY MR. FLORIG:

Q. Dr. Levinskas, you have been handed what has been marked as Levinskas Exhibit 2. I don't really

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think it's going to be necessary for you to read through the entire document. If you want to take a moment and refamiliarize yourself with it, that is fine.

(Witness examines document.)

BY MR. FLORIG:

Q. Okay?

A. Yes.

Q. My first question is do you recall preparing this document?

A. I don't recall preparing it, but – before looking at it. But, yes, I did prepare it.

Q. You prepared it in December of 1973?

A. I would say then or just before then.

Q. You were making a presentation about safety aspects of Lopac containers?

A. Yes.

Q. Do you recall who attended that conference?

Let me see if I can ask a better question. I don't want the names of people. Was it a presentation for people outside of Monsanto?

A. Yes, this was for people outside of Monsanto.

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Q. Was the entire conference focused on these Lopac containers?

A. Yes.

Q. What is a Lopac container?

A. Lopac is a trade name for the plastic soft drink bottle we talked about yesterday, the beverage container.

Q. You personally conducted some studies on that container, correct?

A. I did a limited amount of study on it, yes.

Q. Including burning?

A. Yes.

Q. Let me direct your attention to page 12. The first full paragraph, the third sentence reads, "It is also possible that simultaneous exposure to a mixture of combustion products could result in a synergistic action, i.e., a greater toxicity than that which would be expected from the simple additive effects of each

compound."
Do you see that?
A. I do.
Q. Is that consistent with the definition I have

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synergy that you just gave me?
A. No.
Q. Can you explain what the inconsistency is?
A. The term "synergistic," at one time I took – I had different people express different interpretations. Some refer to synergism as additive, some refer to it as greater than additive. This troubled me. So I went through just about every pharmacology textbook I could get my hands on to look up the definition of synergism.
Q. All right.
A. I found that there was no consistency in the term as it was being used by different people. I thereupon decided that the original definition that I had in grad school of synergy was additive. I decided I would stay with that.
Some say additive, some say greater than additive. I decided, it would have probably been about this time, insofar as possible in the future I would avoid using the term "synergy."
Q. In this presentation you referred to it as greater than simply additive, correct?

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A. Yes. I think I am reflecting the confusion that I believe exists because of the various definitions in the various textbooks.
Q. Today you believe in the simple additive definition of synergy?
A. If I were to use the term, and I avoid it as I have indicated, I would prefer to simply say additive or greater than additive.
Q. All right.
A. Or on occasion it may be less than additive.
Q. In your experience can exposure to two toxic materials produce a greater than additive toxic effect?
A. I think I just indicated it could be additive, greater than additive or less than additive.
Q. Your experience has shown all three?
A. I have not thought of it in those terms, but I think I could say yes.
Q. You can put that aside.
Are you familiar with the term "persistence" as it applies to chemicals?
A. Again, persistence is a descriptive term, and people have their own definitions of it.

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Q. What is yours?
A. Persistence would have to be in some context. Obviously a chemical in a bottle I would hope is persistent.
Q. In a bottle are some chemicals more persistent than others?
A. This goes to the question of persistence. If I have a bottle of a chemical, I would like some assurance that that chemical will be there or that what I get out of that bottle is that chemical when I take that bottle off the shelf.
If it's not persistent, then it's not a useful chemical or it's not useful to keep that chemical for that purpose.
Q. Is it true that some chemicals staying in the bottle, is it true that some chemicals will persist longer than others in that environment?
A. I think that is true, yes.
Q. Does persistence refer to the property of a chemical or a compound maintaining its identity over a period of time?
A. I think I have indicated one would have to put

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persistence in some context. For instance, if one buys a drug, you will have an expiration date. Now why it has an expiration date with an admonition not to use it beyond that date, it could be any one of several reasons.
So when you talk of persistence, I think you have to talk of persistence in some situation or some context.
Q. Let's talk about the outdoor environment. Will some chemicals or compounds, if buried in the ground, maintain their identity longer than others?
A. I think that has been demonstrated, yes.
Q. Would you refer to that as their persistence?
A. Some –
Q. In the environment?
A. Yes, some have called it persistence in the environment.
Q. Would you call it that? If there is another better term –
A. Salt exists in the ocean. You can say salt is persistent in the ocean. I think it's a question of how one wants to apply the term and the sort of

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situation one has to describe.
Q. During the time that you worked for Monsanto would you have wanted chemicals or materials known to have toxic properties to be dumped or stored in soil or ground-water?
MR. WALSH: Objection to the question as vague and broad, lacks any specificity.
A. I don't see that what I would want or might not want, I don't think it has any relevance.
BY MR. FLORIG:
Q. Well, Dr. Levinskas, you are not here to determine what is relevant, you are here to answer questions. And I would like you to answer the question that I asked.
A. I have indicated that sodium chloride persists in the environment. If we had sodium chloride and somebody was going to throw it out on the ground for melting snow or putting it into a pit, I don't think I would have any objection to that.
Q. How about the same question for acrylonitrile?
A. My understanding of acrylonitrile is it's a flammable substance and it's volatile. And to put

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liquid acrylonitrile in a pit would run serious risks of fire, so forth.
I would, one would have to consider that circumstance and a lot of other things before one could make a comment on it.
Q. Putting aside fire, during the time you worked for Monsanto would you have wanted acrylonitrile to be dumped into soil or ground-water?
A. I would not want any untreated waste dumped into water.
Q. That would include ground-water?
A. Yes. I would not want it dumped into water. And as I have indicated, I don't know what the regulations, whether they would permit open burning or not, but I would not want a flammable liquid placed in an open vessel or open areas where it could catch fire.
And in addition to which acrylonitrile has acute toxicity, so I think before one could even speculate on that one would have to know a variety of things.
Q. Is it fair to say that during the time you worked for Monsanto you would not want materials known

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to have acute toxicity dumped into soil or ground-water?
A. I did not make that generalization. I indicated that in response to your question on acrylonitrile.
Q. Now I am asking a new question.
A. One would have to define "acute toxicity."
Q. Can you define "acute toxicity" for me?
A. I indicated, table salt in sufficiently high doses can be acutely toxic.
Q. Yes.
A. To man and animals. I would not have objections to sodium chloride. Which is table salt, being used either to melt ice or dumped into a pit.
Q. Acrylonitrile you would have problems with because of its acute toxicity?
A. I have indicated its flammability, its acute

toxicity. And also it is a skin irritant.
Q. What would your answer be to that question if the material involved were trichloroethene?
A. I think I would want to know how much, where, why, alternates, alternate routes of disposal, and

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would hope that the individual or would remind the individual that he should consider existing regulations if any which might govern those actions.
Q. What would your answer be for dichloroethene?
A. Similar to the one I have just given.
Q. Trichloroethene has toxic properties, correct?
A. It has some manifestation of toxicity in animals, yes.
Q. How about in humans?
A. I really have no direct knowledge of its effect on humans.
Q. During the time that you worked for Monsanto, would you have wanted chemicals or materials known to have toxic properties to be disposed of in a manner such that they could commingle with other chemicals and materials known to have toxic properties?
A. There could be times when it might be beneficial to mix wastes; there could be times when it might be not desirable.
Q. If there were the potential that those wastes in commingling would have more than a simply additive effect, would you consider it to be good practice to

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dispose of those chemicals in a manner in which they could commingle?
A. To have additive effects there would have to be some finite concentrations of the chemicals that would have to be exceeded. If the concentrations to produce those effects were not exceeded it could be permissible.
Q. When you say permissible, are you referring to regulatory permission?
A. It could include regulatory permission. It may not have been the best term. As I indicate, it may be practical, and it may also be permissible or legally permissible.
Q. During the time you worked for Monsanto would you have wanted chemicals or materials known to have toxic properties to humans to be disposed of or stored in such a way that they could migrate through soil or ground-water?
A. Again, depending on the dose involved, just about every chemical can show some toxicity to – and so it's such a broad question that I don't think it's capable of a single simple answer.

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Q. What if the quantity that was migrating through the soil or the ground-water was unknown?
MR. WALSH: Let me note an objection to this whole line of questioning as hypothetical and broad, vague and abstract.
A. I guess I would have to break my response to that into two parts. You know, in a once-upon-a-time fashion, other than prohibitions on dumping into flowing water streams, there was virtually no consideration given by anybody, that includes the government regulation – government agencies, individuals, about ground-water contamination. At that time things were done in one manner.
At a later date when one became conscious of the potential for ground-water contamination, considerations were taken in that respect.
Again, it would take knowledge of a variety of factors to determine whether or not such an action might be considered as – well, whether such an action might be considered. One would have to take a lot of other material into consideration.
BY MR. FLORIG:

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Q. Do you know approximately what time the dividing line came between when no consideration was given to ground-water contamination and some consideration was given to it?
A. I don't know that there was a definite time line that I am aware of. It was like many other things, a growing consciousness and increasing awareness, it started somewhere and got to be much more prominent.
But I can't really give you a timeframe in which that developed.
Q. Can you give me an approximation?
A. In the general terms, I don't think I could even begin to guess. There undoubtedly are people who felt this was a problem earlier and there are people who felt it was a problem later. Really, I am unable to provide any information on that.
Q. How is it that you know that there was a time when no consideration was given to ground-water contamination?
A. As a youngster I grew up in the city of Hartford, we had the Hartford River running right

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through the capital grounds. There were a lot of machine shops. And I can see the oily wastes still comes out of the outfall pipes into that river which fed directly into the Connecticut River.
When I came back out of the service much of that had ceased. That is with respect to contamination of free flowing water.
So since then it's gotten, one reads in the newspaper about incidents of contamination or one reads, hears anecdotes on the newspapers. And somewhere along, as I say, consciousness has grown. But I cannot put a timeframe on it.
Q. The period you referred to in Hartford was the 1940s, correct?
A. It would have been the mid, late '30s. That was as I say direct discharge into a flowing water stream, which in turn led to another body of water which ultimately went out to Long Island Sound.
Q. You have been familiar throughout your professional career that liquids tend to soak into soil, correct?
A. I don't think I had thought of it in those

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terms. Certainly volatile liquids will evaporate. I have not thought in terms of just how deep they would soak in.
Q. Rain soaks into the ground unless it is saturated, correct?
A. Much of it soaks into the ground; some of it still evaporates.
Q. You have known that throughout your professional career, correct?
A. I am not sure when I became conscious of it, but I probably did.
Q. Could you go through for me the factors that you would want to consider for deciding whether disposal of toxic materials in soil or ground-water was a reasonable method of disposing of them?
A. Since my own professional development and experience has changed over the years and since societal standards regarding the acceptability and non-acceptability of such actions has changed, I think it would be difficult to answer without some reference to a specific timeframe.
Q. Let's start with the 1950s.

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A. Insofar as I can recall the 1950s, there were waste pits, open lagoons and ground disposal was probably used reasonably well by many people. I don't recall anybody being overly concerned about how they disposed of wastes. They would burn them, bury them or disperse them.
Q. What would you want to know about the waste and the location in which it was being disposed in the 1950's?
A. I don't recall being asked any questions about disposal of wastes in the 1950s. I doubt that I would have given any thought to it.
Q. Would you have been totally indifferent to what was being disposed?
A. I don't know what my reaction would be. I don't think I was asked that question and I don't

think, I didn't given it any thought. So I don't know what my response would be.
Q. Were you interested in the 1950's in protecting people from potential exposure to known toxic materials?
MR. WALSH: Object.

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A. Yes.
MR. WALSH: I object to the question as vague. Are you talking about in general, or him in particular?
MR. FLORIG: Him in particular.
MR. WALSH: All right.
A. I had that interest with respect to the occupational work force, yes.
BY MR. FLORIG:
Q. Did you have that interest with regard to those other than the occupational work force?
A. Prior to coming to Cyanamid in '58 when we started dealing with pesticides, that would have a more general potential exposure, I probably did not think much beyond the occupational work force. I can't recall, but I don't think it was a major or any overriding concern of mine.
Q. Was that also true at Cyanamid and Monsanto?
A. No, I indicated when I came to Cyanamid and we had pesticides, which had a broader population, potential population exposure, then I began to think more in terms of the user of the product.
Q. And that is also true for your career at

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Monsanto?
A. Over the years at Monsanto we have gotten more concerned, I have gotten more concerned with the casual contact with chemicals, yes.
Q. Throughout your career as a toxicologist wouldn't you have always wanted to control the potential for exposure of workers to chemicals and materials known to have toxic properties to the greatest extent possible?
A. I have not been in the control side of the operation. I have indicated earlier that my function is to develop testing procedures or undertake tests to develop information to evaluate the information and to pass it on to those who would be dealing with controls, recommendations and suggestions as to the significance of that data and what might be done with it.
Q. One of the primary reasons that your profession was needed within industry was so that others could control potential exposure to workers, is that true?
A. I don't see a connection between the two, in the sense that you did it.

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I have indicated that the toxicologist is responsible for the development and evaluation of the data. The overall protection of the workers is a multi-faceted operation which includes among mundane things of giving physicals to people which we do not indulge in. So there are many people involved in the operation.
Q. And their primary goal was to protect workers from potential exposure, those groups working in unison, correct?
A. I think I indicated in yesterday's testimony, it's the – my interpretation is that we would prefer not to expose people, or we do not expose people in that sense.
But we recognize that in using, working with chemicals, people will be exposed. So it is to make a determination or an estimation as to whether the exposures are likely to be harmful or not to the individuals.
Q. In making that evaluation you want to know what the potential exposures are?
A. That would be an element to consider, yes.

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Q. If the acute and chronic exposures to workers were unknown, would that be of concern to the groups working together to foster employee safety?
A. There undoubtedly are many chemicals to which people are exposed that the degree of exposure to which is unknown.
One would, in many cases one is not able to measure exposure, so one, in addition to operating practices and protective equipment, attempts to minimize exposure.
MR. FLORIG: Why don't we take a short break.
(Recess.)
MR. FLORIG: Back on the record.
BY MR. FLORIG:
Q. Dr. Levinskas, let me ask you about some classes of chemicals and see what you know about them. Are you familiar with a class of chemicals known as chlorinated hydrocarbons?
A. I have some knowledge of those.
Q. What exactly are chlorinated hydrocarbons?
A. A hydrocarbon is a chemical that contains basically hydrogen and carbon. There are varieties of

Page 201

them, large numbers of them.
In some cases the hydrogens can be replaced by chlorenes, in that case you would have a chlorinated hydrocarbon.
Q. Do chlorinated hydrocarbons have any toxic properties, or is it dependent on the individual hydrocarbon?
A. I think I have indicated every chemical under some conditions at some dose level will have a toxic effect.
Q. Right. What are some of the toxic effects of chlorinated hydrocarbons?
A. One would have to be more specific. They can be, chlorinated hydrocarbons can be liquids or solids or gasses.
Q. Do each of those have their own distinct toxic effects?
A. Since there is a great variety of chemicals in that category, different members have different toxicity effects, not necessarily related to the physical state alone.
Q. Let me ask you about vinyl chloride. Was

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vinyl chloride known to have some toxic effects on humans back in the 1950's?
A. My recollection is that at one time vinyl chloride was considered for use as an anesthetic gas, among other things. And it was not used because it did have an adverse effect on people that you would try to use it for an anesthetic.
So I would say, yes, it's known to have toxic effects.
Q. That was known back in the 1950's?
A. I can't be sure. I don't recall just when I picked that information up.
Q. Do you recall if vinyl chloride is also a skin or eye irritant?
A. I have not worked with vinyl chloride. I do not recall the precautionary labeling on it, but it may be, I do not know.
Q. That would be a chemical that was commonly referred to in those texts we talked about earlier and periodicals?
A. After it got to be a substantial, or an article of commerce more than a curiosity, I am sure it

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would be included in those texts.
Q. Is benzene known to have some toxic effects on humans?
A. Yes.
Q. Was it known to have toxic effects back in the 1940s and 50's?
A. I don't know how far back that information has been known.
Q. Again, benzene would be something that is referred to in the literature and in the texts and references we talked about, correct?
A. Commonly referred to, yes.
Q. Do you recall what the toxic effects of benzene are?
MR. WALSH: Can you specify a timeframe,

because that might be important.
MR. FLORIG: Now.
MR. WALSH: I am sorry?
MR. FLORIG: Now.
MR. WALSH: Now, okay.
A. The most significant effect of benzene in my opinion is that high level exposures will produce

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destruction of the bone marrow, and that that has been the significant health effect that people have monitored for.
Just casual reading of the literature, there are some questions that have been raised as to whether or not benzene might produce cancer in animals, and people are beginning to consider benzene as a carcinogen based on human data which is being highly debated.
Q. At least within animals benzene has been associated in some studies with leukemia, correct?
A. My recollection is that there are some mouse studies suggestive of leukemia. The quality of the evidence is in dispute among scientists.
Q. Back in the 1950's was benzene known to be a skin irritant or an eye irritant?
A. Benzene is a solvent, it would be an eye and skin irritant.
Q. That would have been known back then?
A. Yes.
Q. Has it also been associated with respiratory problems?

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A. It's a volatile liquid, in high enough concentrations it could cause respiratory distress.
Q. Let me go back to a couple of the chemicals I mentioned a little while ago. Trichloroethene, is that material known to have toxic effects on humans?
A. I am not overly familiar with the toxicology of trichlorethene. I do not, cannot specifically recall what effects it might have on humans.
Q. That is part of a class of chlorinated solvents?
A. It is a chlorinated hydrocarbon and a liquid, yes.
Q. Is dichloroethene known to have any toxic effects on humans?
A. I would give a similar answer, I have not worked with dichloroethane –
Q. "Ethene."
A. "Ethene." I am not familiar with what effects it might have on humans.
Q. That again is a chlorinated solvent?
A. Yes.
Q. Is trichloroethane known to have toxic effects

Page 206

on humans?
A. I think trichlorethane was introduced as a substitute for carbon tetrachloride. Carbon tetrachloride does have liver effects in people and the expectation was that trichloroethane would be less harmful with respect to the liver
Q. Are you familiar with what the toxic properties of trichloroethane are?
A. I could not recite them in any great detail, other than a very generalized knowledge of solvents.
Q. Do you know if the expectation regarding trichloroethane was proven to be correct, that it would be less toxic?
A. I have no basis for commenting on it.
Q. Again, that is a chlorinated solvent?
A. Yes.
Q. Do you know what the toxic effects on humans are of dichloroethane, also known I believe as ethylene dichloride?
A. I do recall that ethylene dichloride has been used as a local anesthetic from my pharmacology studies. Beyond that I really don't have specific

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knowledge on the compound other than the general knowledge of chlorinated hydrocarbons.
Q. Ethylene dichloride was known, then, to have some toxic effect on humans in the 1940s or early 1950's?
MR. WALSH: Objection to form, misstatement of the testimony, if that is what you are purporting to do.
A. My recollection of ethylene dichloride is, when we studied about it in graduate school, is that if a stream is directed on to a local site, local tissue, and held there, it will evaporate so quickly that it will actually freeze the tissue. So that with respect to freezing of tissue, if that can be considered a toxic effect I would say yes, that was known certainly in the 1950's.
BY MR. FLORIG:
Q. Do you know if any other toxic effects were known at that time?
A. As I indicated in my earlier answer, that is my specific recollection on ethylene dichloride, and I don't recall anything beyond general knowledge of

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organic solvents.
Q. Are you familiar with aluminum chloride?
A. I have heard of the chemical, yes.
Q. Do you know if there are any toxic properties associated with aluminum chloride?
A. My recollection is aluminum chloride is an astringent. It's the material that appears on the styptic pencils you use when you cut yourself to stop bleeding. I would say my knowledge is probably limited to that fact.
Q. Do you know of any toxic properties to humans associated with calcium formate?
A. No.
Q. Does that mean no, you are not familiar, or no –
A. I have no knowledge of such.
Q. Are you aware of any toxic properties associated with chlorobenzene?
A. In general terms, chlorobenzene would be comparable, in short-term effects, to benzene.
Q. What about long-term effects?
A. I don't have a basis for making a comparison.

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Q. Would the short-term effects of chlorobenzene have been known to some degree back in the 1940s and 50's?
A. I don't know when that information was developed.
Q. When did you become aware of it?
A. Probably general reading on review articles somewhere along the line, but I can't comment for sure.
Q. Do you recall if that was at the University of Pittsburgh or American Cyanamid?
A. I am unable to state when.
Q. Are you aware of any toxic effects to humans associated with hydrogen cyanide? This should be a simple one.
A. Yes.
Q. What do you know about the toxic effects of hydrogen cyanide?
A. Cyanide is a characteristic poison in most detective stories, prussic acid. It interferes with the oxygen carrying capabilities –
I take that back. It interferes with the utilization of oxygen by tissues and, therefore, can

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cause death in high enough doses.
Q. Those toxic effects have been known for a long, long time, correct?
MR. WALSH: Objection to form, in particular, "a long, long time."
A. I don't know specifically when that information was developed, but it has been used when I was in graduate school, it's been used as an example. So it certainly was known to the late '40s, or by the late '40s.
BY MR. FLORIG:
Q. Would you give the same answer for dichlorobenzene as you gave for chlorobenzene?
A. In a qualitative sense, yes.

Q. What do you mean by, "qualitative sense"?
A. In general they should be similar, the amounts required to produce the effects may be somewhat different.
Q. Would they be higher or lower for dichlorobenzene?
A. I really can't say, I don't know.
Q. Are you familiar with any toxic properties to

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humans associated with ethyl benzene?
A. No, I have no specific knowledge on toxicity in humans.
Q. Are you familiar with any toxic properties to humans associated with hexachlorobenzene?
A. Yes.
Q. What are those toxic effects?
A. Hexachlorphene –
Q. Hexachlorobenzene.
A. I am sorry. I have no knowledge of hexachlorobenzene in humans.
Q. Are you aware of any toxic effects in humans associated with hexane?
A. No specific knowledge, just to general hydrocarbon solvent effects.
Q. What are those general effects?
A. Like most volatile solvents, high doses can produce some narcosis.
Q. All right.
A. They have a defatting action on skin. In prolonged or continuous contact it will cause skin irritation, will be irritating to the eye. High

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concentrations can lead to, inhaled, can lead to respiratory distress.
Q. Is that true for most volatile hydrocarbons, those kinds of effects you just mentioned?
A. To some degree this may be true for all of them. They may vary quantitatively in the amounts required, severity of effects that are produced.
Q. Okay. Have they been known to have those properties since the 1940s and the 1950's?
A. Again, I really am not able to say with any reliability when those, when that information was known.
Q. Again, those are the kinds of chemicals that we would see referenced in the literature we have talked about over the last day and a half?
A. Several, maybe all of them would appear in those references, yes.
Q. Are you aware of any toxic effects on humans of lead?
A. Yes.
Q. What are those toxic effects?
A. So-called plumbism, the most characteristic of

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which is the lead painter's colic, lead to some degree enterchanges with calcium, can be posited in the bone and can be detected by x-rays.
In more recent years there has been increasing concern about the effects on lead, of lead on the development of youngsters, though again I might add that is subject to some controversy within the scientific community.
Q. When were any of the toxic effects of lead that you just mentioned first known?
A. Again, I cannot say, but it probably is one of the earliest recognized industrial poisons.
Q. As an aside, several of the books I have seen referenced in the documents, or the early books refer to "industrial poisons." Was that common terminology back then, as opposed to talks instances or toxicity nowadays?
A. I have seen some older texts that refer to industrial poisons, but I don't know how widespread or acceptable that terminology was.
Q. All right. Are you aware of any toxic effects in humans associated with mercury?

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A. Yes.
Q. What are those toxic effects?
A. In high doses mercury will produce visual disturbances in people, mental disturbances. It can produce a flushing of the skin. I guess those are the prominent features.
Q. Were those toxic effects known back in the 1950's?
A. The earliest that I can recall reading about those was in 1700.
Q. 1700?
A. Yes.
Q. That was before the 1950's.
Is mercury toxic to humans through the three main pathways into the body that we talked about yesterday?
A. The primary hazard that I recall – the primary route with the hazardous exposure that I recall is inhalation of mercury vapor. Absorptions through the skin or through the gut, if one swallowed mercury, would probably be so minimal that little if any effects would be observed.

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Q. Do you recall an incident involving mercury contamination of seawater in Japan in the 1900s?
A. I have read something about it.
Q. Do you recall what that incident was about?
A. There apparently was some waste mercury dumped into a bay, the metallic mercury, which apparently was thought to be inert, was modified by some aquatic organisms to produce so-called methyl mercury.
And because of a change in characteristics that mercury was taken up by sea life and in turn ingested by people. And the people developed signs of mercurial poisoning.
Q. That incident was widely discussed in the scientific literature back then, wasn't it?
MR. WALSH: Object to the form, calls for speculation.
A. As I have indicated, I have read about it. There were several papers published on it.
BY MR. FLORIG:
Q. In that case the exposure to humans was through ingestion, correct?
A. Yes.

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Q. Are you aware of any toxic effects associated with muriatic acid?
A. My recollection, well, my recollection is muriatic acid is hydrochloric acid, and that would be corrosive in high strength and an irritant at lower strengths.
Q. All right. Corrosive to skin, among other things?
A. Skin and eye corrosives and inanimate surfaces.
Q. Do you recall if there were any toxic effects associated with inhalation of muriatic acid fumes?
A. I do not recall specific data, but since it is an irritant, high concentrations of fumes would produce respiratory tract irritation.
Q. Those effects would have been known back in the 1940s and '50s?
A. Again, I don't know when they were developed. Currently it's certainly well established.
Q. That is the kind of common industrial material you would expect to see referenced in the literature we have been talking about?

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A. That would be, in the earlier literature that would be the kind of information one would see, yes.
Q. Are you aware of any toxic effects on humans associated with naphthalene?
A. Again I have no specific knowledge of naphthalene.
Q. How about naptha?
A. Other than generalized knowledge, I have no specific knowledge of the subject.
Q. Very briefly, what is the generalized knowledge that you have?
A. Naptha as I recall is a hydrocarbon fraction, it's a mixture of things. It's probably somewhat

similar to gasoline but a little more volatile.
Q. Is it a volatile hydrocarbon?
A. I have indicated it's a mixture of materials which would be hydrocarbons.
Q. Are you aware of any toxic effects on humans associated with nitrobenzene?
A. No specific knowledge on that subject.
Q. How about phenanthrene?
A. Same answer, no specific knowledge.

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Q. Are you aware of any toxic effects on humans associated with phenol?
A. Yes.
Q. What are those effects?
A. Phenol has been used as a disinfectant in many cases. It is, goes by the common name of carbolic acid. It was one of the earliest regulated poisons under the Federal Caustic Poisons Act as being corrosive and, as I recall from my reading, can be absorbed through skin and cause serious injuries in people.
Q. Those effects were referenced in the 1940s or '50s in the literature?
A. Again, I don't know whether they were specifically first described, but they probably were at that time.
Q. Next is a subject I know is near and dear to your heart, polychlorinated biphenyls.
A. I have read quite a bit on polychlorinated biphenyls.
Q. Are you aware of any toxic effects associated with PCBs?

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A. Yes, like other chlorinated hydrocarbons in adequately high doses they would produce liver damage in animals.
Q. How about in humans?
A. There is some early literature in the '20s, '30s, perhaps '40s, make it '30s and '40s probably, that is confusing because there may or may not have been polychlorinated biphenyls involved. But there were also chlorinated naphthalenes involved. So the literature is confusing with respect to whether or not these produced liver injury in humans.
Q. Are you aware of any toxic effects on humans of toluene?
A. The only effect that comes to mind is fairly recent information that glue sniffers use toluene, and that this can produce mental, nervous system damage. Beyond that, only generalized knowledge of hydrocarbon solvents.
Q. Is it a volatile?
A. It's fairly volatile, yes.
Q. Are you aware of any toxic effects on humans of trichlorobenzene?

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A. I guess I would respond similar to what has been said earlier on mono and dichlorobenzene. In some respects it would be qualitatively similar to benzene, but I don't have specific knowledge.
Q. You don't know whether the toxic level would be higher or lower?
A. I do not.
Q. Are you aware of any toxic effects on humans of trichloroethylene?
A. I have no direct specific knowledge on that subject.
Q. Finally, xylene.
A. Xylene is somewhat similar to toluene. I am not aware that it's been used by glue sniffers. Other than generalized knowledge of organic hydrocarbon solvents, I have no specific knowledge.
Q. Is that also a volatile?
A. Yes, it is.
Q. Throughout your career as a toxicologist and working in conjunction with industrial hygienists and medical personnel, is it fair to say that if a material had known toxic effects on humans that you would not

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want humans to be potentially exposed to that material in uncertain or uncontrolled concentrations?
A. I think I have indicated before, it is not the intention to expose people. But one recognizes that people will be exposed if the chemical is around. Therefore, efforts are made to bring together what information is available, including practices, protective equipment and so forth, to minimize the exposure of the individuals involved.
Q. Throughout your career that has simply been a matter of good industrial safety practice, correct?
A. After I left the university, throughout my industrial career I have been a member of the Medical Department. And I have looked upon my efforts as contributing part of the information that goes into this generalized goal that I just enunciated.
MR. FLORIG: Let's take a two-minute break.
(Recess.)
MR. FLORIG: Back on.
BY MR. FLORIG:
Q. I really have just a couple, maybe one brief question. That is, yesterday I asked you about

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translating the results of animal toxicity tests to humans. Do you recall that?
A. Yes.
Q. And one of the things you do in making that translation is to assume that the human is at least as susceptible as the most susceptible animal?
A. With respect to mammalian toxicity and estimation of effects on humans, you take the worst case scenario. You say man could be at least as sensitive as the most sensitive species that has been studied.
MR. FLORIG: Dr. Levinskas, thank you. That is all I have for right now.
BY MS. SANDBECK:
Q. Dr. Levinskas, my name is Marilyn Sandbeck and I represent the Travelers Indemnity Company in this action. I have just a few follow-up questions.
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Early on in your testimony yesterday you had given us a definition you have of "toxic," and then some time later you drew a distinction between toxicity and irritant effects.

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A. Yes.
Q. A question was then asked whether an eye irritant was a toxic effect in your view, and I don't believe we ever got a clear answer to that.
A. I would regard eye irritation as certainly a toxic effect. I was thinking more in terms of skin irritation. Unless there is some manifestation of systemic toxicity, I think of that as being a little bit different.
For instance, reddening of the skin, or even a mild swelling of the skin, I don't equate with the same concern as a toxic effect in the sense of something choking you or likely to face death. So I would make that sort of distinction between them.
Q. It seems then that you have two working definitions of toxic. The first one you said was any adverse effect, and now if I understand you correctly, you are equating it with risk of death?
A. No. I guess I would stand by my original definition of toxic effect, but in terms of seriousness or potential for, quote, marked harm, I think that minor skin irritations would be certainly of very

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little concern to me.
Q. So the distinction is between levels of concern?
A. I guess it's not my distinctions of level of concern, I would point out there are some things which I think are relatively trivial, and I would put minor skin irritations, while I would concede they are toxic effects, they would be of relatively little concern.
Q. But they all are within your definition of "toxic"?
A. They would be within my definition of "toxic", yes.

Q. Mr. Forig also asked you about the three major pathways to the body, absorption, inhalation and ingestion.
A. Yes.
Q. And you included injection as another possible pathway?
A. That's correct.
Q. Then you also mentioned that eyes, for example, might be another pathway. And I am wondering if that would not just be a subset of absorption.

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A. Insofar as the chemical gets into the body to produce an effect, that is the absorption process.
Q. All right.
A. There are, in my experience there have been two or three instances, there particularly comes out of working with military chemicals, where a chemical in the eye has killed, just a small amount of chemical, has killed a rabbit. And I don't think that people normally think of that. It's admittedly a very exceptional circumstance.
And since the eye is bathed in a fluid as distinct from skin, I would make that as sort of a subdivision, if you will, of surface absorption.
Q. All right.
A. So there are some substeps under those three general categories.
Q. Do you remember what that chemical was that killed the rabbit?
A. I really don't recall the name of it at this time. It was many years ago.
Q. I take it that is uncommon, the effect of the rabbit dying –

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A. I have only seen it two or three times, and I have probably looked at or been told of thousands of eye tests.
Q. Also in yesterday's testimony you discussed a study on acrylonitrile, and I believe the use for that acrylonitrile was going to be a bottle, some sort of –
A. A beverage container.
Q. Beverage container.
A. Component of a beverage container, yes.
Q. Is that the same as the Lopac?
A. That was the trade name for the container, was Lopac, yes.
Q. And I believe you said that that bottle was actually marketed by Monsanto?
A. It's my recollection it was in a test market in two or three cities in the United States. It was done with the concurrence of the FDA. I do not recall the nature, whether it was a test permit or food additive regulation or whatever. Whatever the nature of the, quote, approval, end of quote, by the FDA, but it was done with their knowledge and concurrence.
Q. And then was that bottle subsequently

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withdrawn from the market?
A. Yes, when the question arose about the carcinogenicity about acrylonitrile, it was withdrawn, I would almost say summarily, but I am not positive how that went by.
Q. Do you know if it was as a result of federal regulatory action?
A. I do not know what, that is, I don't know the specific steps involved, but it ceased to be a project and a product at that time.
Q. Do you know if Coca Cola ever considered use of that particular bottle?
A. Coca Cola was a user of this bottle, yes.
Q. They did actually use it?
A. Yes.
Q. For how long of a time?
A. I cannot recall.
Q. Do you remember what time period it was that it was on the market, just approximately?
A. Again, I would say around the middle '70s.
Q. Yesterday you were asked some questions about your role in the analysis of waste streams, and I was

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left somewhat confused by the testimony. So if we could go back to that, there are several aspects of it I think, and perhaps that is where my confusion lies.
First of all, did you ever run any sort of tests, or direct someone else to, on the toxicity of any waste streams from any of Monsanto's processes?
MR. WALSH: Objection as asked and answered.
You can respond again.
A. My recollection of my answer is that I indicated we may have done some short-term testing of waste streams or waste products, I cannot specifically recall having such tests done. But since we do very many short-term tests, it is conceivable that we did some of it, but I cannot say without check the records. I do not recall any.
BY MS. SANDBECK:
Q. All right. Now are you, this is where I am confused, are you assuming they were short-term just because you don't specifically remember doing them?
A. Yes, that would be my basis. We do a lot of things, short-term testing. And unless there is a reason for them to stick in my memory, I just do not

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recall many of them, most of them.
Q. If there were a long-term test you would remember it?
A. I would say that if there were long-term studies such as those we discussed on acrylonitrile, there is a much better chance I would remember them. I may have forgotten some long-term studies.
Q. Apart from the obvious definitions of long and short, is there any distinction you can draw for me between a short-term study and a long-term study?
A. Well, the purposes are a little bit different. As I have indicated, the longer term studies generally are in larger numbers of test organisms. The exposure conditions are usually less severe, and they are designed to determined if there would be some aspects of toxicity detected which had not been detected in the shorter term studies. So it's a series of progressive steps, if you will.
Q. If you will look at Exhibit 1, which is your resume, on page 3.
A. Okay.
Q. Mr. Forig had asked you about the second

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paragraph, first sentence, where it states that you "determined the need for, plans, monitors and evaluates all toxicity testing for the company." And then later on it also says, I think it's one sentence down, "Responsible for environmental assessment of all new products and new uses of existing products in the company."
First of all, is that entire paragraph accurate?
A. It was intended to be accurate, and I would so state that it is.
Q. If this is accurate I would assume, then, that if any toxicity testing was done for Monsanto during the time that you were in that position, you would have at least been aware of it, is that correct?
A. The way the phrase is made and the context in which I wrote that and which I would, from my understanding, my associates, they would read it, we are talking about mammalian toxicity.
So that when I say that directed and supervised testing, that is what we were supposed to be doing for the company. And that is referring to

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mammalian testing. I think I indicated elsewhere that I was not aware that there was testing outside our group.
We come to the second portion of environmental assessment. And I indicated several times that new products or new uses of existing products were to be formalized and centralized in the Medical Department, we would look at and use whatever information there was in coming to a conclusion.
Now there could be, if one wanted to use the term, toxicity testing of aquatic organisms or other

environmental fate effects, that could be done elsewhere in the company. I don't think it necessarily is contradictory to what is stated here.

Q. In the context of this paragraph what is the meaning of "environmental"?

A. Well, that ties in with the environmental assessment, as I have indicated that we were to look at new products and new uses of existing products and try to anticipate the kinds of questions that might arise if the product were commercialized and to review, make recommendations and undertake testing to provide

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information to respond to those questions that were deemed, we might be responding to.

Q. Does the term "environment" here, or is this term limited to the workplace environment?

MR. WALSH: I am sorry to interrupt. Which environment are you referring to?

Thank you.

A. No, I think I have indicated repeatedly that when we talk about environmental assessment of products we talk about products, new products, existing, new products and use of existing products and that we were going to consider their manufacture, their use and their ultimate fate or disposal in deciding what it is that we should be doing.

BY MS. SANDBECK:

Q. In your position as director of environmental assessment and toxicology were you ever consulted by anyone at Monsanto about the toxicity of any of their waste streams?

A. I guess my answer would be similar to what I have said about toxicity testing. Over the years I have been asked many questions. I do not have specific

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recollection of a question or a response whether it was made or whether it was not made. I just do not have a recollection of such.

Q. Was there any standard procedure in place by which the toxicity of a waste stream would come to your attention?

A. Are you asking within Monsanto, or just what?

Q. Yes, within Monsanto was there a standard procedure in place for your review of waste streams?

A. I can only respond by saying that this environmental assessment procedure which dealt with new products and uses of products were to be brought to the attention of the medical director, and I as his surrogate would look at them, many of them. What other procedures may have been I do not have any knowledge of.

Q. Well, within that context, the review that you just mentioned, would that include waste streams?

A. If there was a, I think I indicated in yesterday's testimony, if there was a new process which could entail new waste streams, that would be subject to a loss and personal property or property protection

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review and ultimately be reviewed by other people.

I really am not aware of any, quote, SOPs. I came to the company to start centralizing and working on the environmental assessment procedure. This was the funnel through which information was brought to my attention. I have no basis for judging whether everything was brought to my attention. And I have no knowledge of alternate routes by which information would flow.

But all I can say is if it was brought to my attention, I would evaluate it and see its utility for the purposes that I was suppose to deal with it.

Q. For value and utility are you talking about the end product, itself?

A. The – our initial efforts, my initial efforts were directed at new products and new uses of existing products, and that is what I am referring to.

Q. Yesterday you mentioned that Monsanto had always had an extensive and excellent, I am sorry, you said that Monsanto always had extensive and excellent analytical capabilities. You also mentioned using their library to get information for your own studies.

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A. Yes.

Q. Did you consider their information resources also to be extensive and excellent?

A. I don't think I made an evaluation of them. They had been in operation for many years, I guess, they were certainly when I got there. When I visited the facilities physically, there was literally endless rows almost it seemed of journals and monographs of all sorts of descriptions.

There were several people, of course, I got to know the manager of the section quite well, but there were several people whose primary job was to do literature searches, and I just decided to avail myself of it. I don't think I gave it a conscious thought or any doubt, any reason to doubt it.

Q. Were you pleased with the results that you got from the person that you went to to get information?

A. More than pleased.

Q. The information you got was sufficient in quantity and timeliness?

A. Yes.

Q. You mentioned that part of your

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responsibilities at Monsanto, I am not sure in what position you were in this regard, but you mentioned that part of your responsibilities included helping regulatory agencies to set standards?

A. That has been done on occasion, yes.

Q. Specifically, which standards were you involved with as far as helping to set regulatory standards?

A. The one that was most significant probably was when the Environmental Protection Agency was looking at setting testing standards for chemicals. There were several symposia or meetings held in Washington under the auspices of the Conservation Foundation. There were representatives from industry, academia, public interest groups.

We met in a series of workshops to see to what extent we could agree and what recommendations we could make to the administrator of the EPA for testing of new chemicals, what sort of testing procedures and the rationale for them, with the desired goal of limiting the amount of debate which might take place between these groups on proposed regulations and going to the

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administrator with a set of regulations that were agreed upon and that could be implemented rather quickly.

So that was the one that I would say is most memorable, in that area.

Q. Did that pertain to a particular class of chemicals?

A. This was just new chemicals in the broadest sense, without specific details as to which chemical.

Q. Were you there as a representative of Monsanto, alone, as opposed to the industry?

A. I am not sure. I was elected, or I was designated as a Monsanto representative. Whether an industry group or somebody else made that suggestion to somebody else, I don't know.

But the impression I had was that I was representing industry in general, not Monsanto specifically, but I was an industry representative who happened to be an employee of Monsanto.

Q. Do you remember any other standards that you offered assistance in providing new limits?

A. Most, as you well know, most of the proposed

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regulations are published in the Federal Register and comment is solicited from various sources. I have on several occasions, or on some occasions I should say, not several, been asked to provide input and I have made comments.

One specific one that comes to mind was they had an arsenic expander in their document, they cited, it was an arsenic compound, not just simple arsenic, it was a rather complicated arsenic compound.

And in their published proposed regulation

they made reference to the, quote, extreme toxicity, "extreme" is my word, which did not look right to me. So I checked the reference that they had and found that they had transposed gram, the abbreviation gm., and printed it as mg., milligram, which indicated that the toxicity was a thousand times greater than reported in the literature.

I just cite that for two reasons. One is that that is the sort of example of some of the things that I have done. And also there is a difficulty when people collect and cull information. Unless they are careful, there can be errors in the transcription.

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But most of the others, not most, all of the others were in response to regulations where if I was asked I would have made comments or offered my area, comments in my area of expertise and they would have been incorporated into a more generalized Monsanto response.

Q. Who would have asked you to make that response?

A. It would have been just about anybody. Could have been fellow members of the Medical Department, it could have been people who had a product or an interest in the product. It could have come from any one of several sources.

Q. Do you remember any of the specific chemicals that these recommendations might have dealt with in addition to the arsenic and –

A. I really do not. They did not involve that much effort on my part, so they don't really stick in my memory.

Q. You mentioned that some of the people who might have asked you to respond were those who had an interest in the product?

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A. Yes.

Q. Do you mean people within a particular Monsanto operating company?

A. Monsanto as far as I know does not make benzene. But using that as an example, I would expect that if a man was making benzene and OSHA or some agency was going to publish a regulation regarding benzene, he would learn about it and he would come in and say is there something we should do or could do or ought to do.

And that is what I mean by the operating people, the people who make or sell or use the product in their operations.

Q. What is environmental fate testing?

A. Again, I am not sure that is a standardized term. But in my concept it would be, it's a determination or it's an estimation of what is the actual fate, what's the actual known last event that happens to that material.

Q. You said that type of test would be done by another department, the environmental –

A. I believe I said there was a environmental

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sciences laboratory or group and that they could be doing such testing. I was not doing such testing.

Q. Do you know if the environmental science group included any toxicologists?

A. Rich Kimmerle we referred to yesterday is considered by some people to be an aquatic toxicologist.

I do not really know the specific background of those people well enough to comment beyond saying that I am not aware that they have any, quote, mammalian toxicologists in that group.

Q. Mr. Forig asked you about toxic effects of a variety of substances, one of which was mercury.

A. Yes.

Q. And you stated that the main hazard resulted from inhalation of mercury fumes?

A. Vapor.

Q. Mercury vapor?

A. I guess fumes is a possibility, though it seems unlikely route of exposure but the vapor certainly is a hazard.

Q. Mr. Forig also asked you about the incident in

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Japan that resulted in mercury poisoning?

A. That's correct.

Q. And these people that were affected by the mercury had ingested the substance.

There seems to be a conflict there between your description of the toxic effects of mercury and what happened in Japan, and I am wondering if you can just explain that for me.

A. There are two, two differences. The earlier discussion, my comments about mercury were talking about metal-like mercury. And I indicated that swallowing it or on the skin of the metal-like mercury I did not think represented any appreciable hazard.

The incident in Japan, the metal-like mercury, it is now known, was converted to methyl mercury, which is a different form of mercury. In that form it was taken up by aquatic organisms and transmitted to people.

So we are talking about a different form of mercury, and we are talking about a different duration of exposure. When we talked the first time it was a single dose of metal-like mercury by mouth, and now we

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are talking about repeated doses of modified mercury by mouth, and that is why the differences in responses.

Q. Are there other types of mercury in addition to metal-like and methyl?

A. Mercury forms a variety of chemicals. And so, yes, there would be other materials in which mercury could appear.

Q. What causes the transformation from metal-like to methyl mercury?

A. Beyond the general comment I made that it is metabolized or modified by organisms in the water, I do not know the details.

Q. So your comment regarding absorption or ingestion of mercury having a very limited toxicological effect was addressed just to a one-time contact with metal-like mercury?

A. That's correct.

MS. SANDBECK: Nothing further.

EXAMINATION BY COUNSEL FOR PLAINTIFF

BY MR. WALSH:

Q. Dr. Levinskas, I just have one brief area. I will try to be very brief on it.

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Mr. Forig and Ms. Sandbeck had asked you about the toxicity of a number of chemicals, and I just want to explore that area just a bit.

Does the fact that a chemical is toxic to humans necessarily mean that it poses a hazard to human beings?

A. To me toxicity is almost a characteristic or what one might also say a property of a chemical, namely, that if there is enough of the chemical at the right place at the right time, it will produce some degree of injury which could include death.

Q. Let me ask you to take a look at what has been marked as Levinskas Exhibit 2. In particular I want to direct your attention to page 3, the second paragraph. If you could just read that, please.

MS. SANDBECK: Which page?

MR. WALSH: Page 3, second paragraph.

(Witness examines document.)

BY MR. WALSH:

Q. Now would you agree with the statement that you have made there in this paper?

A. Yes.

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Q. Is that basically the same point that you just made?

A. Yes. I was about to add that the hazard, the risk of seeing signs of toxicity, from handling a chemical, will depend on the conditions under which it's used, the degree of exposure, a variety of other factors.

Q. By analogy here, would this cup of coffee, could it be considered toxic based upon what you have,

your definition as you use it in this paragraph?
A. Yes, there are some people to whom a cup of coffee would produce jitters and anxiety, and you can regard that as a toxic effect.
Q. Would this distinction that you have drawn between toxicity and the hazards of a chemical hold true for all of the chemicals that you discussed with Mr. Forig?
And I am referring only to those ones that you had specific knowledge of their toxicity.
A. I would say this is characteristic of all chemicals.
Q. So the fact that they are toxic doesn't

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necessarily mean they are hazardous?
MR. FLORIG: Objection, leading.
MR. WALSH: Let me rephrase the question.
BY MR. WALSH:
Q. Does the fact that a chemical has toxic propensities necessarily mean that it is hazardous to human health?
MR. FLORIG: Objection, leading.
A. If I could answer the question by paraphrasing, I would say despite the toxicity of a chemical it can be handled safely or in a non-hazardous manner.
BY MR. WALSH:
Q. Now if you disposed of a toxic chemical in a manner which you reasonably believed would not likely result in human contact, then by your definition of hazardous –
MR. WALSH: Let me strike that.
BY MR. WALSH:
Q. If you disposed of a toxic chemical in a manner which you reasonably believed would not likely result in human contact, then by your definition a

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particular chemical may pose little or no hazard to human health?
MS. SANDBECK: Objection, leading.
THE WITNESS: Am I allowed to answer, or not?
BY MR. WALSH:
Q. Yes, you can answer.
A. Since hazard involves exposure conditions to determine the degree of hazard, the conditions of exposure, it would be disposed of in a manner that there was no or negligible exposure, then the hazard should be none or negligible.
Q. Would that be true for all of the chemicals which Mr. Forig and Ms. Sandbeck discussed with you both yesterday and today?
A. In my judgment that would be true.
Q. Are you aware of any chemicals that in and of themselves are hazardous by your definition?
A. Hazard has to be associated with the use and the potential for exposure. To speak of hazards without recognizing the conditions of exposure I think is a meaningless exercise.
MR. WALSH: Thank you. I don't have any

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further questions.
MS. SANDBECK: Could we have just a few minutes.
MR. FLORIG: Sure, because I am going to have some questions.
(Recess.)
FURTHER EXAMINATION BY COUNSEL FOR DEFENDANTS
MR. FLORIG: Back on the record.
BY MR. FLORIG:
Q. Dr. Levinskas, as you understand, you are still under oath, correct?
A. I do.
Q. Any chemical in the right place in sufficient quantity can be hazardous, correct?
A. Any chemical in the right place at the right amount for the required period of time, I would add that, yes.
Q. Hazard depends on a variety of factors, correct?
A. Hazard is associated with use, insofar as use is varied, there could be a variety of factors involved.

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Q. What would those factors be?
A. It would depend on the nature of the material. It would depend on how it's going to be used, for what it's going to be used, who is going to use it, what precautions if any the user may impose on himself or others may impose on him.
Those are the ones that come most readily to mind, and if I reflected on this I might have some additional ones.
Q. Would you agree that hazard associated with a toxic chemical increases along with the concentration of that toxic chemical?
A. I think that in the conditions that we talked about, we talked about the degree of exposure and also the duration or I will add intensity, which is synonymous with duration of exposure. Insofar as concentration affects those, it would be a factor.
Q. And the duration of exposure is another factor?
A. Well, duration of exposure, intensity of exposure sort of interrelate.
Q. The quantity of the toxic chemical would also

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increase the hazard?
A. It would depend – the quantity would depend on the period of time over which it was taken.
Q. Would the nature of the medium in which the toxic chemical exists or is stored potentially increase the hazard?
A. It's difficult to say. Insofar as the way it is stored or the medium in which it is stored would contribute to exposure or absorption or would inhibit exposure or absorption, to that extent it would be a factor.
Q. The hazard associated with the use of a toxic chemical or toxic chemicals then goes up depending on those factors that you just mentioned, concentration, duration, quantity, medium, all of those factors go into assessing the hazard, correct?
MR. WALSH: Objection to your preliminary statement. It was not accurate with the testimony.
BY MR. FLORIG:
Q. If there is anything inaccurate in what I just asked you, let me know.
A. I would say those are all factors one would

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consider in estimating the hazard. They do not necessarily all contribute to an increased, or I shouldn't say that. They may or may not contribute to an increased hazard, there may be some times when they might contribute to an increased hazard.
Q. If the medium in which a toxic chemical were stored increased the chance that that material would come in contact with people, that would be an increase in the hazard, correct?
MR. WALSH: Objection to form. Lack of foundation.
THE WITNESS: May I have the question reread?
(The reporter read as directed.)
A. If the medium facilitated contact between the person and the chemical, that would be a factor to consider because it has the potential to contribute to hazard.
BY MR. FLORIG:
Q. All right.
A. But if the medium that brought it to the individual did not affect or inhibit absorption, it would not be a detrimental component in that sense, it

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would not contribute to the hazard.
Q. When you used the word "absorption", what did you mean in your last statement?
A. It has to go from the medium into the organism or into the person. If it's held by the medium, doesn't leave the medium and go into the person, then I don't think it contributes to the hazard.

Q. Just so I understand this point sufficiently, if the medium allows the hazardous chemical –
MR. FLORIG: Strike that.
BY MR. FLORIG:
Q. If the medium does not contain the hazardous or toxic substance, but instead allows it to potentially reach humans, that choice of medium has increased the hazard, correct?
MR. WALSH: Objection, the question is ambiguous insofar as the term "contained" is used.
BY MR. FLORIG:
Q. Do you have any trouble with the word "contained", Dr. Levinskas?
A. I have trouble more with the word "hazard".
MR. FLORIG: Can I hear the question back.

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(The reporter read as directed.)
MR. WALSH: Do you understand my question?
MR. FLORIG: I think I do. I will rephrase it.
MR. WALSH: Because I will explain it to you if that would help.
BY MR. FLORIG:
Q. If the medium in which the toxic chemical is contained does not confine the toxic chemical to that area, but instead allows it to leave the area and potentially reach human beings, that choice of medium has increased the hazard, is that true?
MR. WALSH: Objection, hypothetical, abstract.
A. I would go back to my definition of "hazard". The hazard of the chemical, the manifestations of toxicity involve a given use or conditions of use or exposure where that chemical can enter into the organizm.
The fact that the chemical is adjacent but not in the organism to me is a fact – or the fact that a chemical is present in a medium is a factor to consider in estimating hazard.

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BY MR. FLORIG:
Q. All right.
A. If the chemical stays in the medium and does not get into the organism, then I by the definition I have given, it does not represent a hazard to the organism.
Q. Let's assume that the toxic chemical can get from the medium into a human. Has the choice of medium that would not confine the material within it increased the hazard?
MR. WALSH: Objection, vague, confusing.
A. I guess I would have to go back to reiterate what I have said about hazard. There is a use and conditions for exposure from which one estimates the hazard, the hazard will be related to the amount of material, the duration and so forth in the organism.
Now, as long as it is outside the organism I don't think that represents a hazard to the organism. Whether it's next door or, you know, just outside the skin, if it does not get into the body, it should not manifest the signs of toxicity.
Q. I have asked you to assume that the toxic material can enter the body. Do you then increase the hazard to the body by increasing the chance that the material can get to the body?

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MR. WALSH: Same objection.
A. The hazard is an estimate of the risk of seeing signs of toxicity. Now without regard to how it comes, the hazard has to have some estimates, some basis for judging the amount that gets in the organism, the duration of the exposure, the intensity, all of these have to go into the estimation of hazard. How it is brought to the organism I don't think relates particularly to the hazard as I am trying to use the term.
Q. Let me approach it this way. If a material is known to be toxic to humans, do I increase the hazard to you the more I increase the chance of that material reaching you?
A. Insofar as there is a greater potential or greater actuality that the person will absorb more of the chemical, that would represent a more hazardous use than one with a lesser potential for absorption. But that is an element in assessing, estimating degree of

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hazard. It's not how it got there, it's how much is there and the other factors that we have been talking about.
Q. And also includes precautions taken to keep it from getting there?
A. I think precautions to, if one makes an estimate of hazard or one wants to reduce the hazard, one way of approaching that is to take additional precautions as I have indicated, such as protective equipment, other devices, to minimize or to reduce the potential for exposure.
Q. And that is a common sense reasonable step in industrial safety practice, isn't that true?
A. I can speak for what I would consider a practice. I cannot speak for the generalities of everybody.
Q. What is your opinion?
A. I think one should take steps to minimize exposure insofar that it is feasible.
Q. And to minimize potential exposure?
A. Well, when I say exposure I am thinking of potential exposure as well, real or imagined exposures.

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MR. FLORIG: That is all I have for now.
MS. SANDBECK: I have nothing further.
MR. WALSH: I don't have anything further, so that will conclude the deposition.
Just for the record I would request on behalf of Monsanto that the transcript be designated as confidential.
And you can forward the transcript to me for forwarding to Dr. Levinskas's review and signing.
Thank you, Dr. Levinskas.
MR. FLORIG: Thank you, Doctor.
(Whereupon, the deposition was concluded at 1:05 p.m.)

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ACKNOWLEDGMENT OF DEPONENT
I, George J. Levinskas, hereby acknowledge that I have read and examined the foregoing pages of my deposition and that:
(Check appropriate box.)
( ) the same is a true, correct and complete transcription of the answers given by me to the questions therein recorded.
( ) except for the changes noted in the attached Errata Sheet, the same is a true, correct and complete transcription of the answers given by me to the questions therein recorded.

Date Signature of Witness
Subscribed to and sworn before me.
this day of , 19

Notary public in and for the
My commission expires:

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Certificate of Reporter)
United States of America) ss.
District of Columbia)
I, CRAIG L. KNOWLES, the officer before whom the foregoing deposition was taken, do hereby certify that the witness whose testimony appears in the

foregoing deposition was duly sworn by me; that the testimony of said witness was taken by me to the best of my ability and thereafter reduced to print under my direction; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this deposition was taken and, further, that I am neither a relative nor an employee of any attorney or counsel employed by the parties thereto nor financially or otherwise interested in the outcome of this action.

Witness my hand this 26th day of December, 1992.

Notary Public in and for
the District of Columbia.
My Commission Expires October 31, 1994:

Look-See Concordance Report

- - -

1,701 UNIQUE WORDS
386 NOISE WORDS
14,996 TOTAL WORDS

- - -

SINGLE FILE CONCORDANCE

- - -

CASE SENSITIVE

- - -

WORD RANGES @ BOTTOM OF PAGE

LEVINSKAS: MONSANTO vs. INSURANCE COS.

CORRECTIONS TO DEPOSITION-George J. Levinskas Dec 22-23, 1992

Page	Line	Correction:
13	13,15	SPELLING
14	5	MISSPOKE - SHOULD BE PRODUCT AS ON LINE 8
19	4	SPELLING
19	16	"INTENDED" CONVEYS PURPOSE OF RESEARCH
25	20	SPELLING
28	2	SPELLING
28	17	"INTENDED" CONVEYS PURPOSE OF RESEARCH
28	18	SPELLING
32	15	SPELLING
50	5	SPELLING
52	9	CLARIFY PHRASING
62	7	PUNCTUATION CLARIFIES RESPONSE
69	1	SPELLING AND CLARIFY STATEMENT
69	9 TO 12	CLARIFY RESPONSE
73	19	SPELLING
76	2	SPELLING
82	2	WORD CORRECTION
103	6	CONVEY INTENDED RESPONSE
104	3	SPELLING
106	19	WORD CORRECTION
107	9	SPELLING
111	2	SPELLING
112	17	SPELLING
116	15	SPELLING
125	18	FINISH WORD
135	9,10,14	CONVEY INTENDED RESPONSE
201	3	SPELLING
206	20,21	DELETE. MISSPOKE. ETHYL CHLORIDE HAS LOCAL ANESTHTIC USE

LEVINSKAS: MONSANTO VS. INSURANCE COS,

CORRECTIONS TO DEPOSITION - Jorge J. Levinskas Dec 22-23, 92

Page	Line	Correction
207	9 TO 16	DELETE. MISSPOKE. ETHYL CHLORIDE HAS ANESTHETIC USE.
208	6 TO 10	DELETE. MISSPOKE. ALUMINUM SULFATE IS ASTRINGENT.
213	2	WORD CORRECTION
238	7	WORD CORRECTION
253	18	SPELLING