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6-9116 with file

Depo of: GEORGE J. LEVINSKAS Monsanto v Aetna December 22, 1992

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CONDENSED TRANSCRIPT & CONCORDANCE
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[1] - SUBJECT TO PROTECTIVE ORDER -
 [2] IN THE SUPERIOR COURT OF THE STATE OF
 DELAWARE
 [3] IN AND FOR NEW CASTLE COUNTY
 [4] ----- x
 [5] MONSANTO COMPANY, :
 [6] Plaintiff, :
 [7] -vs- : CA No. 88C-JA-118-1-CV
 [8] AETNA CASUALTY & SURETY : C-1-90-492
 [9] COMPANY, et al., :
 [10] Defendants, :
 [11] ----- x
 [12] DEPOSITION OF GEORGE J. LEVINSKAS
 [13] Tuesday, December 22, 1992
 [14] Wilmington, Delaware
 [15] Deposition of GEORGE J. LEVINSKAS, called for
 [16] examination pursuant to agreement by counsel, at the
 [17] law offices of Elzufon, Austin & Drexler, 21st Floor,
 [18] 1201 Market Street, at 10:00 a.m., before CRAIG L.
 [19] KNOWLES, Court Reporter, when were present on behalf of
 [20] the respective parties:
 [21] - continued -
 [22]

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[1] APPEARANCES:
 [2] PETER J. WALSH, JR., ESQ.
 [3] Potter, Anderson & Corroon
 [4] 350 Delaware Trust Building
 [5] Wilmington, Delaware 18999
 [6] On behalf of the Plaintiff.
 [7] DAVID S. FLORIG, ESQ.
 [8] Manta and Welge
 [9] One Commerce Square, 37th Floor
 [10] 2005 Market Street
 [11] Philadelphia, Pennsylvania 19103
 [12] On behalf of the Defendant Liberty Mutual
 [13] Insurance Company.
 [14] MARILYN M. SANDBECK, ESQ.
 [15] Wiley, Rein & Fielding
 [16] 1776 K Street, N.W.
 [17] Washington, D.C. 20006
 [18] On behalf of the Defendant Travelers Indemnity
 [19] Co.
 [20]
 [21]
 [22]

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[1] C O N T E N T S
 [2] WITNESS EXAMINATION
 [3] George J. Levinskas
 [4]
 [5] by Mr. Florig 5
 [6]
 [7] E X H I B I T S
 [8] LEVINSKAS DEPOSITION NUMBER None.
 [9]
 [10] AFTERNOON SESSION 77
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[1] P R O C E E D I N G S:
 [2] Whereupon,
 [3] GEORGE J. LEVINSKAS,
 [4] a witness, was called for examination by counsel for
 [5] Defendants and, having been first duly sworn by the

[6] Notary Public, was examined and testified upon his oath
 [7] as follows:
 [8] EXAMINATION BY COUNSEL FOR DEFENDANTS
 [9] BY MR. FLORIG:
 [10] Q. Good morning, Dr. Levinskas. My name is David
 [11] Florig. I represent Liberty Mutual Insurance Company
 [12] in a lawsuit that has been brought against certain
 [13] insurance companies by Monsanto Company. I will be
 [14] asking you a series of questions today. If at any time
 [15] you don't understand my question or want me to rephrase
 [16] it, I will be happy to accommodate you, just let me
 [17] know that, okay?
 [18] A. I will.
 [19] Q. The second thing is I need all of your
 [20] responses to be verbal so that the court reporter can
 [21] take down your answer. Do you understand that?
 [22] A. Yes, I do.

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[1] Q. Will you state your full name for the record,
 [2] please?
 [3] A. It's George J. Levinskas.
 [4] Q. What is your current address?
 [5] A. 526 Fairways Circle, Creve Coeur, Missouri,
 [6] 63141.
 [7] Q. Dr. Levinskas, are you taking any medications
 [8] today that would interfere with your ability to answer
 [9] my questions?
 [10] A. No.
 [11] Q. Can you tell me whether you have ever been
 [12] deposed before?
 [13] A. Yes, I have.
 [14] Q. How many times?
 [15] A. Oh, perhaps a dozen.
 [16] Q. Did any of those relate to your employment
 [17] with Monsanto?
 [18] A. All but one were related to employment at
 [19] Monsanto.
 [20] Q. Do you recall the names of the cases that you
 [21] testified at?
 [22] A. Not in particular.

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[1] Let me modify. I have been deposed; I have
 [2] not testified in court, there is that distinction.
 [3] Q. What were the subjects involved in those
 [4] depositions?
 [5] A. Polychlorinated biphenyls, acrylonitrile,
 [6] styrene, and one I believe on benzoyl chlorides.
 [7] Q. Were you deposed in connection with the
 [8] toxicity of those materials?
 [9] A. Yes.
 [10] Q. Tell me, did you meet with Mr. Walsh prior to
 [11] this deposition?
 [12] A. Yes, I did.
 [13] Q. When was that?
 [14] A. Yesterday afternoon and briefly this morning.
 [15] Q. For how long did you meet?
 [16] A. About two or three hours yesterday, an hour
 [17] this morning.
 [18] Q. Did you review any documents?
 [19] A. He showed me one letter.
 [20] Q. Is Monsanto paying your travel expenses for
 [21] this deposition?
 [22] A. I have been informed that my travel expenses

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[1] will be reimbursed.
 [2] Q. Are you being compensated for your time?
 [3] A. That has not been discussed.
 [4] Q. Have you made that request?
 [5] A. I have not inquired.
 [6] Q. Do you intend to inquire?
 [7] A. I shall.
 [8] Q. Can you describe for me your educational
 [9] background, beginning with post high school?
 [10] A. I have a bachelor's degree in chemistry from
 [11] Wesleyan University in Middletown, Connecticut. I have
 [12] a doctorate in pharmacology from the University of

[13] Rochester.
 [14] Q. Is that a BS in chemistry?
 [15] A. It's an AB degree.
 [16] Q. When did you get that degree?
 [17] A. 1949.
 [18] Q. Your major was chemistry?
 [19] A. Yes.
 [20] Q. Was there a minor?
 [21] A. Mathematics.
 [22] Q. Do you recall what the curriculum was for your

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[1] chemistry major?
 [2] A. Basically the program led to certification by
 [3] the American Chemical Society: Inorganic chemistry,
 [4] organic chemistry, analytical chemistry including
 [5] advanced analytical, physical chemistry.
 [6] Q. That included a certain amount of laboratory
 [7] work?
 [8] A. Yes.
 [9] Q. Did any of the courses you took in connection
 [10] with your undergraduate degree deal with disposal of
 [11] industrial wastes?
 [12] A. No.
 [13] Q. Do you recall ever doing any reading on that
 [14] subject?
 [15] A. Not at that time.
 [16] Q. Your Ph.D. in pharmacology was in 1953?
 [17] A. Correct.
 [18] Q. Did that involve a minor, as well?
 [19] A. Biochemistry.
 [20] Q. What was the curriculum for the pharmacology
 [21] degree?
 [22] A. There were three major areas. One was

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[1] pharmacology, itself; one was physiology; and the other
 [2] was biochemistry.
 [3] And then there were variations, advanced
 [4] courses and some variations around those subjects.
 [5] Those are the three areas.
 [6] Q. There were a number of courses within each of
 [7] those disciplines, is that what you are saying?
 [8] A. There were one to three courses in each of
 [9] those disciplines, and the rest of the time it was on
 [10] research.
 [11] Q. Can you tell me what pharmacology is?
 [12] A. Basically it's a study of the science of
 [13] drugs, their biological effects, and which would
 [14] include their therapeutic uses and their adverse
 [15] effects, which would include their toxicity.
 [16] Q. Can you tell me what physiology is?
 [17] A. Physiology is a more general description or
 [18] understanding of how the body works in the gross sense,
 [19] muscles, attachments to muscles, respiratory control as
 [20] distinct from the biological - biochemical
 [21] understanding of how those processes work.
 [22] Q. Is it fair to say it's a more mechanical study

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[1] of the body?
 [2] A. It includes mechanics, but I think it would be
 [3] too narrow to say it's more mechanical, or implies only
 [4] mechanical.
 [5] Q. It doesn't deal with the functions of the
 [6] various organs?
 [7] A. It does in a general descriptive sense, but
 [8] not at the molecular level.
 [9] Q. Can you describe for me what biochemistry is?
 [10] A. Biochemistry would be the study of chemical
 [11] reactions or chemical processes that occur in
 [12] biological or living systems.
 [13] Q. How long was the Ph.D. program?
 [14] A. There was no specified time interval. The -
 [15] there was no specified time interval I recall.
 [16] Q. Did you go into that program directly out of
 [17] college?
 [18] A. Yes, I did.
 [19] Q. Was your intent to become a toxicologist?

[20] A. I went to become a pharmacologist because I
 [21] was impressed with the department head, at that time
 [22] Dr. Hodge, whom I had met. And I decided that I would

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[1] study toxicology, whatever it entailed, in order to
 [2] study under Dr. Hodge.
 [3] Q. Your interest in that field was fostered by
 [4] this particular professor?
 [5] A. Yes, it was.
 [6] Q. Do you recall the names of any of the texts
 [7] that you used in the Ph.D. program, or any of the
 [8] authors?
 [9] A. There was A Manual of Pharmacology by Sollman.
 [10] Q. How do you spell that?
 [11] A. A Manual of Pharmacology by Sollman,
 [12] S-o-l-l-m-a-n.
 [13] There was another textbook on pharmacology,
 [14] the specific title I don't recall, but the authors were
 [15] Goodman and Gillman.
 [16] There was a book, I think the title was
 [17] Physiological Basis of Medical Practice, by Best and
 [18] Taylor.
 [19] I used a volume, Hawk's Physiological
 [20] Chemistry, I think was the title. And the editor was a
 [21] fellow named Oser, O-s-e-r, in biochemistry.
 [22] I seem to think there was another biochemistry

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[1] text, but I can't recall a specific title, in addition
 [2] to which we were given specific references to published
 [3] articles in the literature that we consulted and used.
 [4] Q. During the Ph.D. program do you recall ever
 [5] studying or reading about the disposal of industrial
 [6] wastes?
 [7] A. I don't recall if that was ever much of a
 [8] consideration. I don't recall any.
 [9] Q. Did you receive any academic honors or awards
 [10] during your undergraduate studies?
 [11] A. I received a so-called Dunlap Prize for
 [12] excellence in German.
 [13] Q. Excellence in?
 [14] A. German. I was elected to the National Honor
 [15] Society. That's it.
 [16] Q. Those were in high school, correct?
 [17] A. High school, yes.
 [18] Q. How about in college?
 [19] A. I was elected a Phi Beta Kappa; I was elected
 [20] to the Society of the Sigma Xi, which is the honorary
 [21] scientific society. And I received the Graham Prize
 [22] for Excellence in Natural Science.

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[1] Q. Did you serve any honors or awards during your
 [2] Ph.D. studies?
 [3] A. I was a pre doctoral fellow for the National
 [4] Research Council for most of my pre doctorate studies.
 [5] Q. What did that award entail?
 [6] A. Basically paid tuition and a stipend.
 [7] Q. Did you have any papers published while you
 [8] were working on your Ph.D.?
 [9] A. Not while I was working, but subsequently my
 [10] dissertation was published.
 [11] Q. What was your dissertation on?
 [12] A. Solubility Studies of Synthetic
 [13] Hydroxylapetite.
 [14] Q. What was the last word?
 [15] A. A-p-e-t-i-t-e, all one word, hydroxylapetite.
 [16] Q. Not being scientifically trained, could you
 [17] explain that to me in the best layman's terms that you
 [18] can?
 [19] A. It's really a study of the chemistry of the
 [20] bone mineral.
 [21] Q. Okay.
 [22] A. Such as you and I carry around.

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[1] Q. Why is there an interest in solubility
 [2] studies?
 [3] A. Well, there were two basic reasons at that

[4] time. One is that people felt as a mineral, bone
[5] should have a so-called solubility coefficient, and
[6] attempts to determine that over the years had been
[7] fruitless. I showed that one of the major reasons for
[8] the failure to show a solubility product is because the
[9] surface of bone is quite active and interacts with
[10] chemicals and the metals in the surrounding fluid that
[11] bathes the bone.

[12] Q. Prior to going to college you served in the
[13] military, correct?

[14] A. That's right.

[15] Q. Okay.

[16] A. I left at the end of my first semester in my
[17] freshman year, and I came back. I had started college
[18] just before I entered the service.

[19] Q. You received an honorable discharge?

[20] A. Yes.

[21] Q. Did you do any work that was related to
[22] chemistry while in the Army?

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[1] A. No.

[2] Q. Did you do any work while you were in the
[3] Ph.D. program?

[4] A. It was, for practical purposes, a full-time
[5] program, if I was not in class I was working on my
[6] dissertation.

[7] Q. Did you teach while you were in the Ph.D.
[8] program?

[9] A. Yes, I did.

[10] Q. What did you teach?

[11] A. Basic course in pharmacology. After I had
[12] taken it, I assisted in the teaching of it.

[13] Q. Was that to other graduate students or to
[14] undergraduate students?

[15] A. This was to medical students and graduate
[16] students.

[17] Q. Do you recall what text you used in teaching
[18] pharmacology?

[19] A. The two basic ones I referred to, Sollman.

[20] Q. All right.

[21] A. And Goodman and Gillman.

[22] Q. What was your first job after receiving your

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[1] Ph.D.?

[2] A. I took a teaching position at the Graduate
[3] School of Public Health at the University of
[4] Pittsburgh.

[5] Q. What did you teach at the University of
[6] Pittsburgh?

[7] A. Basically a course in applied toxicology.

[8] Q. What is applied toxicology?

[9] A. That's the title that was given the course.

[10] The way I taught it was how it would be used,
[11] toxicology information could be developed and used by
[12] students who would go out to call themselves health
[13] professionals.

[14] Q. Can you help me without with what specific
[15] kinds of things you taught in applied toxicology?

[16] A. I am not sure, when you say "help you out," I
[17] am not sure just exactly what you -

[18] Q. All right. Can you give me some more detail
[19] as to what kinds of things were taught in the applied
[20] toxicology course?

[21] A. I would have to dredge back quite a ways, but
[22] I had, either myself or other individuals, a few

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[1] lecturers, we were - taught the general issues of
[2] metabolism compounds, how they are reacted or how they
[3] are treated by the body. We would talk about, at that
[4] time at least, cancer, industrial inhalation hazards,
[5] eye and skin irritants, the gamut of things that people
[6] would encounter in industry or in using chemicals.

[7] Q. Was the course geared toward people who were
[8] going to be going out and working in industry as either
[9] toxicologists or hygienists?

[10] A. Predominantly it was industrial hygienists,

[11] some toxicologists, included some physicians, nurses
[12] who would be working in the areas of public health.

[13] Q. The main thrust of the course was how various
[14] materials would impact the human body?

[15] MR. WALSH: Objection, leading.

[16] A. No, I don't - I think I indicated we tried to
[17] discuss various chemicals, exposure, the effects that
[18] could be attributed to them to people who would be
[19] working in the areas of public health.

[20] BY MR. FLORIG:

[21] Q. Was the main concern the effects that those
[22] various chemicals would have on human beings as opposed

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[1] to aquatic life or animals?

[2] A. At that time most if not all the emphasis was
[3] on mammalian effects, yes. Mammalian effects only, I
[4] should say.

[5] Q. So a little broader than humans?

[6] A. Well, our data are basically developed on
[7] animals, we talk about mammalian systems.

[8] Q. While you were teaching at the School of
[9] Public Health, were you also conducting any research?

[10] A. Yes.

[11] Q. What kind of research were you conducting?

[12] A. We had a fairly extensive program with the
[13] armed forces on a high energy fuel that the military
[14] was interested in. I had a small grant from the
[15] National Institutes of Health to work on mechanisms of
[16] toxicity.

[17] Others in the department that I assisted had
[18] contracts with the Atomic Energy Commission, with other
[19] agencies. And I also was involved in the research
[20] programs of several students.

[21] Q. You mentioned that you were doing some
[22] research for the armed forces?

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[1] A. Yes.

[2] Q. What specifically did that research entail?

[3] A. The high energy fuels were derivatives of a
[4] class of compounds, compounds called brown hydrides,
[5] which were probably, still are perhaps among the most
[6] toxic chemicals that it was proposed to manufacture on
[7] a large scale.

[8] So we were attempting to determine what the
[9] effects are, to alert the physicians attending the
[10] people working on these materials to give them some
[11] idea what they might anticipate in the event of
[12] accidental exposures.

[13] Q. The toxicity of those fuels was already
[14] understood at that time?

[15] A. No, that was the, some things were known about
[16] them, but our efforts were known to expand and extend
[17] the amount of knowledge regarding those subjects.

[18] Q. In addition to conducting toxicology research,
[19] were you also conducting pharmacology research on those
[20] fuels?

[21] A. We did not make a distinction between the
[22] pharmacology and toxicology at that time, I'd say both

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[1] were being considered.

[2] Q. At that time you were also doing some research
[3] for the National Institutes of Health, is that correct?

[4] A. I had a grant that allowed me to pursue my own
[5] research interests.

[6] Q. What were your research interests at that
[7] time?

[8] A. We were trying to develop an understanding of
[9] mechanisms of toxicity that could be applied broadly to
[10] many chemicals, not specific ones.

[11] Q. Do you recall any of the chemicals that you
[12] worked on?

[13] A. The one that we spent most of the time on was
[14] chloroform.

[15] Q. What did you learn about the toxicity of
[16] chloroform during that period?

[17] A. Regrettably, not much.

[18] Q. You taught at Graduate School of Public Health
[19] until 1958?
[20] A. That's correct.
[21] Q. Can you define for me what is meant by the
[22] word "toxic"?

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[1] A. I can give you a definition that I use, I am
[2] not sure that it's a universal definition or that
[3] everybody would define it the same way.
[4] Q. Okay, can I hear your definition?
[5] A. Well, toxic is something that would be
[6] adverse.
[7] Q. Adverse to what?
[8] A. Just in general, adverse. The same way, as
[9] opposed to, say, beneficial.
[10] Q. Would something have to be adverse to humans
[11] to be considered toxic?
[12] A. No, to me toxic is merely a descriptive word
[13] which has the opposite connotation of beneficial.
[14] Q. Wouldn't you agree that it would have to be
[15] adverse to something?
[16] A. Yes.
[17] Q. Something living?
[18] A. It would have to be demonstrable that it was
[19] adverse.
[20] Q. It would have to be adverse to something that
[21] was living?
[22] A. It could include that.

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[1] Q. Could it include being adverse to something
[2] that was non-living?
[3] A. If I hit this table top with a sledgehammer
[4] and broke the glass, I could call that a toxic
[5] reaction.
[6] Q. Under your definition of toxic would you
[7] consider that to be a toxic reaction?
[8] A. As I say, to me toxic is a descriptive word
[9] which is the opposite of beneficial. And it has to be
[10] connected to something.
[11] Q. Right. But as you used the word "toxic" you
[12] wouldn't describe breaking the glass on this table as a
[13] toxic effect, would you?
[14] A. Not necessarily, no.
[15] Q. Not at all, would you?
[16] A. I might facetiously.
[17] Q. Would the study of toxicology include
[18] considerations of breaking glass?
[19] A. It could.
[20] Q. Is that something you have ever worked on in
[21] your career?
[22] A. I have had glass equipment that I was working

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[1] with shatter.
[2] Q. Did you consider that to be a toxic effect to
[3] the glass?
[4] A. If I got cut by a piece of glass, I would
[5] consider that a toxic effect.
[6] Q. Could you describe for me what "toxicology"
[7] is?
[8] A. I would say toxicology is the study, and let
[9] me go back, this is a difficulty with the term
[10] "toxicology." Toxicology is a study of the effects of
[11] chemicals on living systems or organisms.
[12] Q. Does that include any living systems or
[13] organisms, or is it limited to animal life?
[14] A. In my definition it would include all forms of
[15] living material.
[16] Q. Are there other accepted definitions of
[17] "toxic" other than the one you gave me?
[18] A. I am sure that if one looked in dictionaries
[19] and textbooks one would find variations and many other
[20] descriptions probably.
[21] Q. Are you familiar with what any of those other
[22] variations or descriptions are?

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[1] A. I don't recall that I have ever looked for the

[2] definition of toxic, per se, in a textbook. I don't
[3] recall dictionary definitions.
[4] Q. Have you ever seen through your reading or
[5] attendance at professional meetings a definition of
[6] "toxic" different than the one that you gave me?
[7] A. I probably have, but I don't recall.
[8] Q. The only definition of "toxic" that you recall
[9] today is something that would be adverse?
[10] A. I indicated that that was my definition of
[11] "toxic" and that others may or may not agree with it.
[12] Q. But you don't recall any other definitions
[13] that you have heard or have heard used within the
[14] profession?
[15] MR. WALSH: Asked and answered.
[16] A. Like I say, I may have. I don't recall
[17] specific instances.
[18] BY MR. FLORIG:
[19] Q. Have you ever heard or read a different
[20] definition of "toxicology" than what you gave me?
[21] A. Oh, I think originally the definition of
[22] "toxicology" came up as sort of a side issue of

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[1] pharmacology. If you overdose with a beneficial
[2] therapeutic drug, you will get toxic effects. And I
[3] think that the connotation of toxicology, at least
[4] originally, was the study of those adverse over effects
[5] of drugs.
[6] Q. All right.
[7] A. But the definition that I offered is that it
[8] is perhaps a mislabel to call it "toxic," if that
[9] term - but it's a study of the biological effects of a
[10] chemical on a living organism. They may be beneficial,
[11] they may be deleterious. But the practice has moved
[12] away from the initial concept or definition of the
[13] term.
[14] Q. After leaving the Graduate School of Public
[15] Health, what was your next job?
[16] A. I went to work for the American Cyanamid
[17] Company.
[18] Q. Where were they located?
[19] A. At that time the laboratory that I went to was
[20] in Stamford, Connecticut.
[21] Q. Did the laboratory stay there during your
[22] career at American Cyanamid?

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[1] A. About three years later it was moved to
[2] Princeton, New Jersey.
[3] Q. Around 1961?
[4] A. Summer of '61, as I recall.
[5] Q. What was your first position at American
[6] Cyanamid?
[7] A. I think the specific title was research
[8] pharmacologist.
[9] Q. What were your duties as a research
[10] pharmacologist?
[11] A. It was to inform myself about the operation
[12] adequately to be able to take control and direction of
[13] the laboratory.
[14] Q. Would it be fair to describe that as an
[15] indoctrination period?
[16] A. Yes.
[17] Q. All right. And how long did that
[18] indoctrination period last?
[19] A. About six months.
[20] Q. Can you describe for me in detail what you did
[21] during that indoctrination period?
[22] A. Familiarized myself with the people, the

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[1] operations and studies under way. Reviewed their data
[2] collections, report writing procedures, began drafting
[3] reports and formats for reports.
[4] Q. Do you recall what kind of projects were being
[5] worked on during that indoctrination period at American
[6] Cyanamid?
[7] A. Most of them probably were agricultural
[8] chemicals. There were, since it's a broad based

- [9] chemical company, there were a variety of other
 [10] products as well.
 [11] Q. Do you recall what any of the chemicals were
 [12] that were being worked on during that period?
 [13] A. Well, as I have indicated they were pesticide
 [14] products, probably some polymers and some dyes.
 [15] Specific names, I don't think I could give you more
 [16] than one or two.
 [17] Q. Do you recall the names of any of the
 [18] pesticides?
 [19] A. One at that time was Cyprex.
 [20] Q. Is that a trade name?
 [21] A. That is a trade name.
 [22] Q. Do you recall what the components of Cyprex

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- [1] were?
 [2] A. It was dodecylguanidin acetate.
 [3] Q. Were there others?
 [4] A. There were some wet strength resins for paper.
 [5] I could only give you a generic term like Accostrength
 [6] 2386 was one of them. I would have to stop and think
 [7] and recollect to go back to specific names.
 [8] Q. Was the lab working on toxicity tests on
 [9] Cyprex at that time?
 [10] A. They had just completed a long-term study
 [11] about that time. One of my early duties was to write
 [12] the report on that study, yes.
 [13] Q. Do you recall what the conclusion was of that
 [14] study?
 [15] A. Basically, the nature of the chemicals, it's
 [16] rather severe eye irritant, that would have been known.
 [17] The study was known to show the -- show whether or not
 [18] it was a carcinogen, it was free of carcinogenic
 [19] effects, and it was submitted to the EPA to support the
 [20] registration of the product.
 [21] Q. When something is found to be an eye irritant
 [22] does that mean that the substance is considered to be

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- [1] toxic?
 [2] A. I would make a distinction between toxicity
 [3] and irritant effects.
 [4] Q. What distinction would you make?
 [5] A. Toxic is a connotation of, unfortunately to
 [6] many people it's something serious or it's almost like
 [7] fatal. I do not regard minor skin lacerations, even
 [8] fairly severe skin lacerations or burns as being in
 [9] that sense toxic as people equate with -- as I perceive
 [10] the lay population to interpret the term "toxic."
 [11] Q. If toxic is something that would be adverse
 [12] and the material caused a skin irritation, wouldn't
 [13] that mean the material is toxic under your definition?
 [14] A. Yes. I would make a distinction, as I say,
 [15] between toxicity and irritation.
 [16] Q. In toxicity reports if something is known to
 [17] be an eye irritant, that is listed in the report,
 [18] correct?
 [19] A. Yes, we describe exactly what we find.
 [20] Q. That would be a toxic effect of the Cyprex?
 [21] MR. WALSH: Are you referring to his work at
 [22] American Cyanamid?

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- [1] MR. FLORIG: Yes.
 [2] MR. WALSH: Or in general? I am sorry?
 [3] MR. FLORIG: Let's deal with American Cyanamid
 [4] right now.
 [5] A. When I arrived at Cyanamid, Cyprex was labeled
 [6] as an eye irritant. That label had been approved by
 [7] the Environmental Protection Agency. The studies that
 [8] I referred to that were finishing up when I came there
 [9] were long-term studies aimed at determining whether it
 [10] was an animal carcinogen, and those are the studies I
 [11] worked on.
 [12] BY MR. FLORIG:
 [13] Q. All right. So at the time you arrived at
 [14] American Cyanamid, Cyprex was known to have some toxic
 [15] properties?

- [16] A. Yes.
 [17] Q. You were working to determine if there were
 [18] additional toxic properties?
 [19] A. They had done the work, basically completed
 [20] the work to determine if there were additional toxicity
 [21] properties.
 [22] Q. And you were reviewing --

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- [1] A. I was reviewing that and preparing reports on
 [2] it.
 [3] Q. The conclusion was that it was not
 [4] carcinogenic, correct?
 [5] A. That is correct.
 [6] Q. You mentioned that during the indoctrination
 [7] period at American Cyanamid you were working with some
 [8] polymers?
 [9] A. Yes.
 [10] Q. Do you recall what those polymers were?
 [11] A. They were basically wet strength resins for
 [12] paper.
 [13] Q. What are wet strength resins for paper?
 [14] A. They are coatings that interact with paper to
 [15] give it some tensile strength when the paper gets wet.
 [16] Q. Do you recall the names of any of those
 [17] resins?
 [18] A. As I say the one that comes readily to mind
 [19] was Accostrength 2386.
 [20] Q. What conclusions were reached about 2386?
 [21] A. As I recall, the one thing I do recall, they
 [22] did produce some liver injury. They were not

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- [1] carcinogenic. And that the feeding levels to the
 [2] animals were really very high, is about all I recall at
 [3] this time.
 [4] Q. Was this, again, a project that you didn't
 [5] actively work on but reviewed what had been done before
 [6] you got there?
 [7] A. Correct.
 [8] Q. So 2386 was found to have toxic properties to
 [9] it?
 [10] A. Yes.
 [11] Q. Do you recall any other polymers that you
 [12] worked on during that period?
 [13] A. There were other names under the Accostrength,
 [14] which is a trade name. There were trade names such as
 [15] Superflox. I don't recall specifics.
 [16] Q. You mentioned that during this indoctrination
 [17] period you worked on data collections, correct?
 [18] A. The comment I made about data collection was
 [19] looking at the procedures, how they were collecting the
 [20] data from the studies that were ongoing.
 [21] Q. During the indoctrination period did you do
 [22] any literature searches or direct any literature

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- [1] searches?
 [2] A. I have made an attempt to keep abreast of the
 [3] literature regularly, and I can't recall specific
 [4] searches or specific topics that I would have done at
 [5] that time.
 [6] Q. At that time when you first went to work for
 [7] American Cyanamid were literature searches part of the
 [8] standard procedure in evaluating the toxicity of a
 [9] material?
 [10] A. I am not aware of what would be considered
 [11] standard procedure, I can only address what I would do.
 [12] Q. You mentioned that you reviewed some data
 [13] collections and report writing procedures and became
 [14] familiar with the operations that were going on at the
 [15] American Cyanamid lab, correct?
 [16] A. Yes.
 [17] Q. Did those procedures involve literature
 [18] searches involving chemicals that American Cyanamid was
 [19] working on in that lab?
 [20] A. I did not make searches of the literature for
 [21] the chemicals that were being worked on. I am not
 [22] aware of whether others did or did not.

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[1] Q. You don't recall reviewing those in
[2] preparation for writing reports?

[3] A. No.

[4] Q. Do most reports on toxicity of materials being
[5] evaluated include a section of references or literature
[6] searches?

[7] A. Again, I don't think I can speak to most
[8] reports. I don't know what would be the most practice.

[9] Q. Do you recall if there were such sections on
[10] the reports on Cypres and 2386?

[11] A. It was our practice to limit the report to a
[12] description of what the study was. There might be a
[13] brief statement, a sentence, as to why the study was
[14] undertaken.

[15] But basically it was a description of what was
[16] done, how it was done, what the findings were and the
[17] conclusions which were drawn from the findings. That
[18] was the extent of the report.

[19] Q. All right. Again, I am talking about this
[20] 1958 period, prior to beginning tests on a particular
[21] chemical, do you know if American Cyanamid did a
[22] literature search about that particular material?

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[1] A. I do not know that.

[2] Q. Would you expect that they would have?

[3] MR. WALSH: Objection, calls for speculation.

[4] You can respond.

[5] A. I guess my answer would be they might or might
[6] not have, it would depend.

[7] BY MR. FLORIG:

[8] Q. What would it depend on?

[9] A. The person who was initiating the study,
[10] whatever his feeling was.

[11] Q. As a matter of good toxicological practice in
[12] 1958, wouldn't it be reasonable to do a literature
[13] search prior to beginning any new research on the
[14] material?

[15] A. In the case of Cyanamid specifically these
[16] were generally proprietary products that the company
[17] made and probably relatively few if any other people
[18] were making, so that the probability of anything being
[19] in the literature would be practically zero.

[20] And I don't know about others, but I - that
[21] was the situation largely at Monsanto - or at Cyanamid
[22] at that time.

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[1] Q. Wouldn't you have wanted to know any dangers
[2] or hazards associated with the components of those
[3] products before handling them and doing research on
[4] them?

[5] A. Most of these are single entities, they are
[6] not components.

[7] Q. If there were components that were not
[8] proprietary, wouldn't you want to know what safety or
[9] hazard information was out there about those components
[10] before working on them in the lab?

[11] A. I would want to know what the components were.
[12] I might then want or might not want to look at
[13] individual components.

[14] But, yes, I would want to know what the safety
[15] precautions others had recommended to avoid needless
[16] exposure of myself or my co-workers.

[17] Q. That would include any prior toxicity
[18] information that was available, correct?

[19] A. Yes.

[20] Q. That was really a matter in 1958 of good
[21] safety and housekeeping practice, correct?

[22] MR. WALSH: Object to the form. Leading.

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[1] Lack of foundation.

[2] MR. FLORIG: You can have a standing leading
[3] objection, if you like.

[4] MR. WALSH: Thank you.

[5] A. In 1958 there were relatively few journals
[6] describing industrial chemicals and their toxicity.

[7] And there were a few fairly good textbooks that one
[8] could feel quite confident from checking the textbook
[9] that one was up to date. And the literature searches
[10] in the concept of computers were not existent.

[11] BY MR. FLORIG:

[12] Q. So at least it would be good practice to go to
[13] the journals or textbooks or the literature that was
[14] available in 1958 to determine safety and housekeeping
[15] and toxicity information?

[16] A. Let me back up. I guess we have a semantic
[17] question.

[18] Q. Okay.

[19] A. When you say "literature," to me that connotes
[20] the research journals and the publications. And I do
[21] not think that those at that time contained information
[22] on most of these materials that we are talking about.

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[1] Q. All right.

[2] A. There were some textbooks or reference books
[3] that one kept almost as bibles by the bedside. Yes,
[4] those would have been checked.

[5] Q. All right.

[6] A. But I do not refer to those, at least in my
[7] concept of semantics, as the literature.

[8] Q. Thank you, that is helpful. So you would
[9] consult the journals and the textbooks and the
[10] literature, if any was available, about the safety and
[11] hazards and toxicity of the materials being worked
[12] with?

[13] A. If the textbooks would carry concise summaries
[14] of what was available, if it was deemed pertinent, one
[15] could then go to a specific source cited from that
[16] textbook and look at it.

[17] Q. All right.

[18] A. But to systematically search all the journals,
[19] no, I did not do that; and I don't think very many
[20] people did.

[21] Q. Do you recall what the names of any of the
[22] journals or textbooks were that were used back in 1958?

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[1] A. I really have difficulty recalling them,
[2] because some of these journals have changed names, and
[3] I am not sure which -

[4] There was American Industrial Hygiene
[5] Association put out a quarterly which became later the
[6] American Industrial Hygiene Journal. I think about
[7] this time The Journal of Occupational Medicine was
[8] beginning, about '56, '7, '8, '9, somewhere through
[9] there.

[10] There was a, at one time it was labeled
[11] Journal of Industrial Hygiene and Occupational
[12] Medicine, I think was the title. And that has
[13] undergone a series of name changes, but it's maintained
[14] its continuity. I don't know its current title.

[15] Q. Okay.

[16] A. There was an industrial hygiene foundation at
[17] Pittsburgh that would send out abstracts of articles
[18] and references, sort of a periodic check on the
[19] literature.

[20] Beyond that I don't really recall there were
[21] specific sources.

[22] Q. Do you recall a book by Irving Sax?

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[1] A. That came much later in time, I think. I am
[2] not sure when the first edition came out, but I have
[3] some knowledge of it.

[4] Q. If I said that was published in 1951, would
[5] that refresh your recollection?

[6] A. It would surprise me. I was not aware that it
[7] went that far back.

[8] Q. Is that one of the journals or textbooks that
[9] you referred to as containing concise information?

[10] A. Sax contains information. In those areas that
[11] I feel I know something about, I would say that it is
[12] unfortunately not critically evaluated. It contains
[13] good and bad information.

[14] Q. Was that one of the texts that was available
[15] to you during your career at American Cyanamid?
[16] A. I really do not refer to Sax very often.
[17] Q. Was that available at American Cyanamid, do
[18] you recall?
[19] A. I suspect it was, but I don't recall
[20] specifically.
[21] MR. FLORIG: We have been going for an hour.
[22] Do you want to take a five-minute break?

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[1] MR. WALSH: Sure, that sounds good.
[2] (Recess.)
[3] MR. FLORIG: Back on the record after a short
[4] break.
[5] BY MR. FLORIG:
[6] Q. Dr. Levinskas, I would like to go back just a
[7] moment and ask you, is Mr. Walsh representing you at
[8] this deposition today?
[9] A. He is representing me as a former Monsanto
[10] employee, yes.
[11] Q. Are you paying his attorney's fees?
[12] A. No.
[13] Q. Do you know who is?
[14] A. No.
[15] Q. Have you been able to recall the names of any
[16] of the other journals or textbooks other than the ones
[17] you mentioned that were used as reference materials
[18] during your indoctrination period at American Cyanamid?
[19] A. I would first like to say my indoctrination
[20] period was an indoctrination into the Cyanamid
[21] operation.
[22] Q. Yes.

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[1] A. It was not an indoctrination of me into the
[2] field of toxicology.
[3] Q. Right.
[4] A. I really cannot recall. There are many
[5] textbooks, not many, there were some textbooks I use
[6] and some journals I look at, and I have developed this
[7] habit over the years.
[8] But I am unable to say when I became aware of
[9] or started using this particular text or monograph.
[10] Q. Is it fair to say some you had used as a
[11] graduate student and continue to refer to?
[12] A. Yes.
[13] Q. Some that you used at the Graduate School of
[14] Public Health that you continue to refer to?
[15] A. Yes.
[16] Q. Were those the ones you mentioned to me
[17] already, or some of the ones you mentioned?
[18] A. The ones I mentioned would include those, yes.
[19] Q. I am going to take you back briefly to your
[20] graduate studies and ask if one of the skills taught
[21] during your graduate studies was how to do this kind of
[22] historical research on chemicals and their potential

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[1] toxic effects?
[2] A. I was never, quote, taught, end of quote, how
[3] to do research, historical research on a chemical and
[4] its effects. I am not aware of anyone who was taught
[5] that at that time.
[6] Q. Is that something that you learn through
[7] experience as a graduate student?
[8] A. There are review articles that come out, there
[9] are updates on information. Unless one has a specific
[10] interest or a particular need, at least I would not go
[11] back and look at the early literature. I would rely on
[12] the collector of the information in the review article.
[13] Q. For instance, when you were doing your bone
[14] solubility testing as a graduate student, did you
[15] attempt to review what had gone on before?
[16] A. Yes.
[17] Q. When you were teaching at the Graduate School
[18] of Public Health, did you teach students how to do
[19] surveys of literature or texts?
[20] A. No.

[21] Q. Is that something they would be expected to
[22] learn on their own if they had to?

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[1] A. I did not teach it, and it never occurred to
[2] me that it had to be taught.
[3] Q. Is that because you would expect the students
[4] to learn how to do that?
[5] A. All of our students were graduate students.
[6] They had at least a bachelor's degree, in some cases
[7] doctorates. If they did not know how to study or do
[8] research, that was their problem, it was not my
[9] concern.
[10] Q. If one of your students came to you, for
[11] example, and said, "I am interested in studying the
[12] toxic effects of mercury, but I don't know where to
[13] start," could you direct that student to some
[14] information or source books?
[15] A. I could probably have located an article, a
[16] review article that he could look at. But if he wanted
[17] to do research, he would have to have a better
[18] formulation of a question rather than "I want something
[19] to do. Tell me what I should do."
[20] Q. What was your next position at American
[21] Cyanamid, or what was your position after this
[22] indoctrination period?

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[1] A. I was named chief industrial toxicologist and
[2] I became the director of their environmental health
[3] laboratory.
[4] Q. That was simultaneous?
[5] A. Yes.
[6] Q. Just so I get the titles correct, chief
[7] industrial toxicologist and director of environmental
[8] health laboratory?
[9] A. Right.
[10] Q. That would have been around the end of 1958?
[11] A. Either end of '58 or early '59, yes.
[12] Q. How long did you hold those titles?
[13] A. Until 1971.
[14] Q. You kept those titles until you left American
[15] Cyanamid?
[16] A. Yes.
[17] Q. Did you have distinct duties with respect to
[18] each of those titles, or was it one job with two
[19] titles?
[20] A. It was one job, and the title depended on the
[21] context in which people wanted to refer to it, I guess.
[22] Q. Can you describe for me what your job entailed

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[1] when you first assumed those positions?
[2] A. Basically it consisted of planning, conducting
[3] and evaluating the results of toxicity studies on
[4] Cyanamid products, preparing those reports or reports
[5] of those studies in a manner suitable for distribution
[6] outside the company and within the company. There were
[7] occasions when I prepared summaries of data for
[8] specific reasons, and there were times when I made
[9] contact with regulatory agencies regarding those
[10] products.
[11] Q. Was your work limited to a final American
[12] Cyanamid product, or was it, did it also involve the
[13] components of those products?
[14] A. It was limited to things of interest to
[15] Cyanamid, most of those were specific materials. The
[16] only components, place components would fit would be
[17] there might be a formulation of a material in a solvent
[18] or some other mixture for ease of application or
[19] handling or something.
[20] And so that would be the only place that we
[21] would get into components in general that I can recall.
[22] Most of it was single entity.

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[1] Q. Did any of your work involve evaluation or
[2] testing of waste streams from American Cyanamid?
[3] A. I don't recall that it did. If it were done,
[4] it would be no more than very cursory, short-term

[5] tests.
 [6] Q. You don't remember call being involved with
 [7] any of those?
 [8] A. I say there may be a few that we did, I can't
 [9] recall specifically. But we certainly did not do any
 [10] extensive testing of any waste products.
 [11] Q. Did you do any evaluation or testing of
 [12] byproducts or co-products?
 [13] A. The same answer I would make as I did for
 [14] wastes. We may have done a few cursory or short-term
 [15] tests, but we did no extensive testing of such
 [16] materials.
 [17] Q. Why do you say cursory or short-term testing?
 [18] A. Well, we might have done something like
 [19] measure the ability to irritate the eye or the skin, or
 [20] we might have done a single dose oral toxicity by
 [21] mouth, which we would do on many materials, research
 [22] materials as well as products, early stages. So we may

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[1] have handled the waste, but nothing that made any
 [2] impression on me. We did not do anything like the
 [3] kinds of studies we do on a product that was going to
 [4] be marketed.
 [5] Q. Was that true through your entire career at
 [6] American Cyanamid?
 [7] A. Yes.
 [8] Q. Do you recall being involved with toxicity
 [9] studies on bulk chemicals being made by American
 [10] Cyanamid?
 [11] A. I would give the same answer as I did for the
 [12] others. We may have done some short-term single dose
 [13] tests with bulk chemicals. We did not do any extended
 [14] testing of them.
 [15] Q. Your involvement was almost exclusively with
 [16] consumer products from American Cyanamid?
 [17] A. It included, it could have included all the
 [18] products or any of the products that Cyanamid made.
 [19] The predominant emphasis was on agricultural products.
 [20] Cyanamid initially did not have, in the conventional
 [21] sense that we think of consumer products that were
 [22] broad based products.

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[1] Later on they did some, and we did a little
 [2] bit of testing on consumer products.
 [3] Q. Thank you.
 [4] Do you recall any of the agricultural products
 [5] you were involved with testing?
 [6] A. There were a series of chemicals called
 [7] organophosphates, several derivatives of those or
 [8] several members of that category. There were a variety
 [9] of experimental compounds being developed of various
 [10] classes, I just can't recall specifically, chemical
 [11] nature.
 [12] Many of these came in as new materials with CL
 [13] numbers on them, Cyanamid Laboratories numbers on them.
 [14] And I did have records, the company had records of the
 [15] chemical structures, but I did not attempt to recall
 [16] them.
 [17] Q. You mentioned organophosphates. Are those
 [18] fertilizers?
 [19] A. No, these are pesticides.
 [20] Q. Pesticides. Do you recall the results of any
 [21] of your toxicity studies on those pesticides?
 [22] A. There were a variety of different responses,

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[1] depending on which material was under study.
 [2] Q. Do you recall any of the specific materials
 [3] that were under study?
 [4] A. Two to illustrate the range. One is Malathion
 [5] and the other as Parathion.
 [6] Q. Was the first you mentioned Malathion?
 [7] A. Yes.
 [8] Q. Do you recall what the results were of your
 [9] toxicity tests on that material?
 [10] A. We did a variety of tests. Some had been
 [11] done, we did additional ones. Other than give you a

[12] recital of all of the effects, I can't tell you which
 [13] was which.
 [14] But it's a class of compounds known as
 [15] cholinesterase inhibitors. It's been used very widely,
 [16] approved on probably a hundred or more crops. Its
 [17] toxicity is quite low, it's among the lowest of that
 [18] class of compounds. It's relatively innocuous in
 [19] people, quite potent in insects.
 [20] Q. It was found to have some toxic properties,
 [21] correct?
 [22] A. The purpose of toxicity testing is to give

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[1] sufficiently high doses that one can observe what the
 [2] adverse effects would be, toxic effects, yes.
 [3] Q. Can you tell me what you discovered by
 [4] Parathion?
 [5] A. By contrast to Malathion it is highly toxic to
 [6] people, animals and insects. Its general properties
 [7] are the same except that it's a much more potent,
 [8] considerably more potent in general than the Malathion.
 [9] Q. What was the environmental health laboratory
 [10] at American Cyanamid?
 [11] A. There had been two preexisting laboratories,
 [12] one on industrial toxicology and one for industrial
 [13] hygiene. Those two were merged into the environmental
 [14] health laboratory, which at the time that I took
 [15] direction of it.
 [16] Q. The merger had taken place prior to your
 [17] becoming the director?
 [18] A. It occurred about the same time.
 [19] Q. All right.
 [20] A. I can't be more precise than that.
 [21] Q. Can you describe for me while you were in that
 [22] position how toxicity tests were done?

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[1] MR. FLORIG: Why don't we strike that and back
 [2] up a step.
 [3] BY MR. FLORIG:
 [4] Q. How would you determine when you became the
 [5] director of the environmental health lab which
 [6] materials you were going to test?
 [7] A. Much of the requests, if you will, for testing
 [8] came from my immediate superior in the medical
 [9] department to which I - the laboratory was a part of
 [10] or the medical director, himself. They in turn would
 [11] be contacted either by the operating companies,
 [12] operating units which had the products or they would
 [13] have contacted the operating units to get their
 [14] concurrence to do the studies.
 [15] Q. All right.
 [16] A. So I did not make very many decisions about
 [17] what had to be tested.
 [18] Q. So directive came to you from somewhere from
 [19] one of your superiors?
 [20] A. Yes.
 [21] Q. What would be the next step in doing a
 [22] toxicity test after determining which material you were

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[1] going to test?
 [2] A. Well, we would determine what raised the
 [3] question so we would know what type of testing to do.
 [4] Then it would be to design a test, plan a test
 [5] procedure, schedule it and have it conducted, assemble
 [6] the data, write the report and return it to the
 [7] appropriate people.
 [8] Q. All right. Were there protocols in place for
 [9] conducting those tests?
 [10] A. My general recollection is that as I got a
 [11] request, I would develop sort of a general protocol for
 [12] that test.
 [13] Q. All right.
 [14] A. The next time I got a request I would review
 [15] the previous one I had done of that nature, decide it
 [16] was either adequate to use again or I would modify it
 [17] in light of the particular chemical or changes or
 [18] whatever, and then use that.

[19] Q. If the question were raised about a material
[20] because someone had reported that it had caused a skin
[21] irritation, would you also do inhalation studies on
[22] that material, oral dose studies on that material, or

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[1] would you be limited to dermal?
[2] A. I don't think there was a specific answer. It
[3] would depend on what information we already had, the
[4] confidence we put into it, and also the nature of the
[5] use from which the complaint had arisen.

[6] Q. Do you recall doing any testing or supervising
[7] any testing while director of the environmental health
[8] lab dealing with the effects of materials on other than
[9] mammalian life?

[10] A. We did not have the capabilities in the
[11] laboratory, in my laboratory, environmental laboratory,
[12] to deal with other than mammalian systems. We did not
[13] do such testing.

[14] Q. Did you send any of that testing to outside
[15] labs?

[16] A. There were other parts of the company that
[17] would study effects of chemicals on plants, because
[18] they were seeking chemicals that were either beneficial
[19] or harmful to plant life.

[20] Shortly before I left Cyanamid, probably in
[21] the late '60s, there was a fish testing laboratory that
[22] opened up in the Boston area, and we began doing a

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[1] little bit of our pesticide work for materials intended
[2] to be used around or on water. We began doing a few
[3] fish toxicity tests. But that was a relatively short
[4] time before I left Cyanamid.

[5] Q. All right. Was the purpose of that testing to
[6] determine what effects the pesticide would have on fish
[7] if it got into the body of water in which the fish was
[8] living?

[9] A. Yes.

[10] Q. Do you recall any such tests being done on
[11] aquatic life within a body of water?

[12] A. No, I do not recall such tests.

[13] Q. While you were at Cyanamid and were doing
[14] toxicity testing of various materials, was one of the
[15] considerations the pathway of ingestion?

[16] A. Well, ingestion is a specific pathway.

[17] Q. All right.

[18] A. That would be by mouth.

[19] Q. Did you consider alternative ways in which the
[20] material could enter the body?

[21] A. Yes, some thought was given to that.

[22] Q. That is part of the study of toxicology,

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[1] correct?

[2] A. In the sense that there were and still are
[3] relatively few criteria or standards, regulatory
[4] agencies have subsequently more recently set standards
[5] for tests or descriptions of tests, much of the testing
[6] at that time was done on the judgment of the
[7] individual.

[8] And so it's hard to say that, you know, this
[9] was a standard or this was not a standard, because I
[10] don't think there were very many studies done in what
[11] we would call the cookbook fashion, routinely.

[12] Q. Even as far back as when you were a graduate
[13] student, it was known that the human body could absorb
[14] materials in basically three ways, absorption,
[15] inhalation and ingestion, is that fair to say?

[16] A. Yes.

[17] Q. Are there other ways, or are those the three?

[18] A. Well, we inject things, we get them beneath
[19] the skin.

[20] Q. All right.

[21] A. There are other external surfaces besides the
[22] skin. There are a few materials that may penetrate

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[1] through the eye, other body surfaces, orifices.

[2] Q. All right.

[3] A. But it's a question of how you want to
[4] subdivide them.

[5] Q. Is it fair to say that those are the three
[6] primary means by which materials get into the human
[7] body?

[8] A. They would be the three most frequently
[9] encountered.

[10] Q. Occasionally there would be these other means,
[11] either some kind of injection beneath the skin,
[12] absorption through the eye or through some other body
[13] cavity?

[14] A. Yes.

[15] Q. You mentioned that as director of the
[16] environmental health lab you had contact with
[17] regulatory agencies of the government, correct?

[18] A. Yes.

[19] Q. What did those contacts entail?

[20] A. They dealt with registration of the pesticide
[21] products or in seeking regulatory approval from the
[22] Food and Drug Administration for indirect contact

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[1] chemicals with foods.

[2] Q. Was pesticide registration a requirement in
[3] 19358, or did that come later?

[4] A. It was a requirement and it was at that time
[5] handled by the U.S. Department of Agriculture.

[6] Q. What kinds of information did the Department
[7] of Agriculture require along with your registration
[8] application?

[9] A. It would depend on the nature of the chemical
[10] and the intended use of the chemical.

[11] Q. Depending on what it was going to be applied
[12] to?

[13] A. What it was going to be applied to, how widely
[14] it was to be applied, a variety of considerations would
[15] go into that.

[16] Q. Did the USDA require that you break down what
[17] the components of the material being registered were?

[18] A. One had to present an identity of the material
[19] and, if it was a mixture, one would have to identify
[20] the components and the percentages.

[21] Q. Was it required that toxicity information be
[22] supplied with the registration?

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[1] A. Yes.

[2] Q. Did American Cyanamid have to do toxicity
[3] tests to establish what the toxicity of the materials
[4] was?

[5] A. Yes.

[6] Q. That was part of your job?

[7] A. Yes.

[8] Q. What toxicity information was supplied to the
[9] U.S.D.A. in conjunction with a pesticide registration?

[10] MR. WALSH: Objection, that is a very broad
[11] question. Are you asking him about a particular
[12] chemical, or in general?

[13] MR. FLORIG: I am asking in general.

[14] MR. WALSH: All right.

[15] A. I think I tried to indicate it would depend on
[16] the nature of the chemical, its intended use, its scope
[17] of use. I mean how widely was it going to be used.

[18] BY MR. FLORIG:

[19] Q. Yes.

[20] A. Was it going to be used -- who would use it.
[21] So there could be quite a number of questions that
[22] would have to be considered.

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[1] Q. In connection with the toxicity information
[2] that was supplied, was that given in parts per million
[3] or parts per billion, is that the kind of information
[4] that you would give to the U.S.D.A.?

[5] A. Part per million and part per billion are
[6] concentration terms. They might or might not appear on
[7] a toxicity report. It would depend whether those terms
[8] were used in the report.

[9] Q. Would you provide information on the effects

[10] on humans of exposure to a certain concentration?
 [11] A. We would not have information on the exposure
 [12] effects in humans.
 [13] Q. All right.
 [14] A. In most cases. So we would provide basically
 [15] animal data describing results which were encountered
 [16] at levels considerably in excess of any that we
 [17] anticipated the users or the consumers to encounter.
 [18] Q. Did you provide information on the effects on
 [19] animals of exposures to different concentrations?
 [20] A. Yes.
 [21] Q. Would that information contain inhalation
 [22] information?

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[1] A. There might be short-term inhalation studies
 [2] on some registrations.
 [3] Q. Was that information based on a single dose?
 [4] A. Much of the inhalation information at that
 [5] time was based on single dose exposures.
 [6] Q. Was some also based on exposures over an
 [7] extended period of time?
 [8] A. There were some multiple exposures; I do not
 [9] recall any for extended periods of time.
 [10] Q. Just so I am clear, what do you mean by an
 [11] extended period of time?
 [12] A. It would have been exposures over several days
 [13] a week for a week or two, but not a 90-day or a
 [14] lifetime sort of inhalation study.
 [15] Q. That was not required by the U.S.D.A.?
 [16] A. Not that I am aware of, they never required
 [17] it.
 [18] Q. Were some of the studies submitted to the
 [19] U.S.D.A. also ingestion studies?
 [20] A. Yes.
 [21] Q. Was that information also provided in the same
 [22] way, is it a single ingestion, long-term ingestion,

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[1] some intermediate level?
 [2] A. Except for very preliminary information most
 [3] of the ingestion data were of longer duration, anywhere
 [4] from one month upward.
 [5] Q. Okay. Was absorption information supplied?
 [6] A. In most cases, or I should say probably --
 [7] virtually no cases the effects of the chemical as
 [8] manifested in the animal would be attributed to
 [9] absorption. But absorption as such was not measured.
 [10] Q. Can you explain that to me, how you can
 [11] attribute it to absorption without testing for
 [12] absorption?
 [13] A. If I gave an animal cyanide and it turned blue
 [14] and died of cyanide poisoning, I would assume it died
 [15] from cyanide poisoning. I would not have measured how
 [16] much of the administered cyanide had gotten into the
 [17] animal, but I would be quite convinced he had died of
 [18] cyanide poisoning, or he did die of cyanide poisoning.
 [19] Q. Is that because of controls used, you can rule
 [20] out other causes?
 [21] A. The purpose of control is to observe the
 [22] behavior of the test animals, a norm or standard from

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[1] which you observe the changes in behavior if any of the
 [2] test animals. There simply is an inability in most
 [3] cases to measure the extent of absorption of many
 [4] compounds.
 [5] Q. Was information supplied in connection with
 [6] the registrations as to whether the material was a skin
 [7] irritant?
 [8] A. That would be part of the registration
 [9] package, it would be required for labeling of the
 [10] material.
 [11] Q. The same is true for an eye irritant?
 [12] A. Yes.
 [13] Q. Does the word "corrosive" have a technical
 [14] meaning within the study of toxicology?
 [15] A. I guess I would have to indicate I am not sure
 [16] what most people consider corrosive. To me corrosive

[17] is destruction. It's a destruction of tissue or
 [18] destruction of the underlying material, corrosion of a
 [19] metal by an acid.
 [20] So corrosion is an actual destruction, it's
 [21] more than an irritation.
 [22] Q. All right. If I look at a toxicology report

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[1] and it lists a material as corrosive, does that mean
 [2] that it will do permanent damage to the living tissue
 [3] it's exposed to?
 [4] A. Corrosive can refer to inanimate surfaces or
 [5] to living tissue.
 [6] Q. Yes.
 [7] A. There are substances that I have tested that
 [8] were marked corrosive to inanimate surfaces that are
 [9] not corrosive to living tissue.
 [10] Q. Okay.
 [11] A. The fact that there is destruction of the
 [12] tissue may or may not mean that it will recover at the
 [13] end, it could be either.
 [14] Q. As applied to living tissue, corrosive is,
 [15] just so I understand, more extreme than an irritant,
 [16] correct?
 [17] A. Yes.
 [18] Q. From your understanding of your profession, if
 [19] I see in a toxicology report that something is listed
 [20] as corrosive, it doesn't say to what, does that
 [21] generally mean to living tissue?
 [22] MR. WALSH: Objection. The question calls for

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[1] speculation.
 [2] You can respond.
 [3] A. If I were labeling -- if I tested a material
 [4] that was destructive to living tissue, I would label it
 [5] corrosive. And then I would either specify skin or
 [6] eyes, if I knew, or both.
 [7] BY MR. FLORIG:
 [8] Q. All right.
 [9] A. Or I might say "Corrosive," and then follow it
 [10] with the phrase, "Do not get in skin or eyes or on
 [11] skin, in eyes," and so forth. Then with a very, the
 [12] following line, "In case of contact flush immediately
 [13] with plenty of water." So I would try to make the
 [14] statement refer to the tissue.
 [15] If it said corrosive to mild steel or
 [16] whatever, that's the way I would prefer to see it done.
 [17] I am not sure it's always done that way.
 [18] Q. Most industrial toxicity testing is not done
 [19] on humans, correct?
 [20] A. That's a very general statement, but I guess I
 [21] would concur. Most industrial toxicologists are not
 [22] physicians; they have no justification for working on

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[1] people or with people.
 [2] Q. How do you go about translating the results of
 [3] animal toxicity testing to humans?
 [4] I should say, how did you do that when you
 [5] were at Cyanamid?
 [6] A. Well, there are several ways. One is that you
 [7] assume -- all of these involve assumptions until you
 [8] gain experience otherwise. For most short-term tests
 [9] including labeling we assume the animal is predictive
 [10] of the effect in man.
 [11] If there are handling accidents or episodes of
 [12] some nature that there is human contact, inadvertent or
 [13] accidental, then one would attempt, should attempt to
 [14] gather that information and compare it with the animal
 [15] result.
 [16] If there is consistency between animal and
 [17] human, then one has greater confidence that other
 [18] studies will also be consistent. If they are
 [19] inconsistent it creates dilemmas.
 [20] The other aspect of animal testing is that we
 [21] frequently test in more than one species. And there is
 [22] a general supposition which has worked well over the

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[1] years that if there is a consistency in response
 [2] between the different species, that man ought to be
 [3] somewhat similar.
 [4] Q. All right.
 [5] A. If there is a discrepancy between the two
 [6] tested species, one assumes as a matter of prudence and
 [7] common sense that man might be at least as sensitive as
 [8] the most sensitive species, recognizing man might be
 [9] less sensitive.
 [10] But he is at least as sensitive as the most
 [11] sensitive species, and one would use that as a basis
 [12] for extrapolation.
 [13] Those are the general rules that I think most
 [14] people follow whether they recognize them or not.
 [15] Q. Okay.
 [16] A. Then a third point. The levels at which those
 [17] effects occur and the potential level of exposure of
 [18] man, fantastically high levels of exposure, one does
 [19] not expect to see them at very insignificant levels of
 [20] exposure to man.
 [21] Q. You anticipated my next question. Knowing
 [22] what a toxic dose is to an animal, how are safe levels

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[1] of exposure to humans established, how were they back
 [2] in your Cyanamid days?
 [3] A. The only reasonably referable standard was the
 [4] Food and Drug Administration. The late Dr. Arnold
 [5] Lehman and his group concluded that there could be a
 [6] ten-fold variation between species; between the test
 [7] animal and man, and there could be a ten-fold variation
 [8] between the most sensitive and the most resistant
 [9] member of a given species.
 [10] So ten times ten is a hundred, and they
 [11] applied a hundred fold safety factor to the so-called
 [12] no-effect level of a long term animal study.
 [13] Later they began using a thousand-fold safety
 [14] factor if they were using a 90-day study for a
 [15] no-effect level instead of a lifetime study.
 [16] Q. All right.
 [17] A. If one looks at the so-called threshold limit
 [18] value set by the American Conference of Governmental
 [19] Industrial Hygienists the, quote, safety factors
 [20] between the no-effect levels and the permissible
 [21] workplace exposure levels are really - vary all over
 [22] the map, there is no consistency. Some are relatively

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[1] small, you know, just small devisors, 2, 3, 4, 5 upper
 [2] effect levels. So there is no overall consistent
 [3] pattern.
 [4] Q. No effect level is referred to as NOEL, is
 [5] that correct?
 [6] A. Yes, they are essentially synonymous, some
 [7] minor variation but essentially synonymous.
 [8] Q. NOEL is no observable -
 [9] A. Us old-timers would say no observed effect,
 [10] which we meant, and the purists are saying well, since
 [11] you didn't look at everything you could have looked at,
 [12] so they are saying, we would say no observed level,
 [13] saying we did not see anything, they are saying we did
 [14] not see anything in the things we looked for and we
 [15] didn't look at everything under the sun, so they have a
 [16] no observed effect level which is, semantically may be
 [17] more precise but the meanings are essentially
 [18] synonymous.
 [19] Q. You mentioned threshold limit values a moment
 [20] earlier, those are known as TLVs?
 [21] A. Yes.
 [22] Q. Do you recall when TLVs came into being?

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[1] A. The predecessor of the TLVs was a list
 [2] published by Warren Cook about 1943 or '45.
 [3] Q. Is that Warren Cook?
 [4] A. Warren Cook, C-o-o-k, I think.
 [5] They had different terms. He published a
 [6] so-called "permissible workplace exposure" or
 [7] something, I forget. The term has bounced around quite

[8] a bit before they settled on TLVs. His is probably one
 [9] of the earliest, if not the earliest publication. It
 [10] was a compilation of numbers that different people in
 [11] state, federal government's and elsewhere had
 [12] established.
 [13] Q. All right.
 [14] A. So he just sort of compiled and published this
 [15] list.
 [16] Q. Mr. Cook used some predecessor term to TLV?
 [17] A. Yes, I think he said "permissible exposure
 [18] levels," I am not sure that that was the -
 [19] Q. Your recollection is that Mr. Cook's, was it a
 [20] book?
 [21] A. No, it was just an article.
 [22] Q. An article. Do you know where it was

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[1] published?
 [2] A. I wouldn't want to swear at it, but in general
 [3] I think there is a journal that is no longer published
 [4] call Journal of Industrial Hygiene and Toxicology.
 [5] Q. All right.
 [6] A. And I think it was in that. And it would have
 [7] been in the 1940s.
 [8] Q. Your understanding was that Mr. Cook conducted
 [9] some kind of literature or search to determine what
 [10] studies had been made on various materials and compiled
 [11] them?
 [12] A. As I recall I think I said he compiled
 [13] information from a variety of sources. How he, whether
 [14] he got it through personal contact or, I doubt that
 [15] many of these were published prior to his collecting
 [16] them.
 [17] Q. Sure.
 [18] A. I don't know how he got them.
 [19] Q. Was that a reference or a source that you used
 [20] at the Graduate School of Public Health?
 [21] A. The reason I - I think the reason, I don't
 [22] know when I did this, but somewhere along the line as

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[1] part of the teaching I was going to present to students
 [2] or to people that I was talking to a history, where did
 [3] TLVs come from and how they got to the present form.
 [4] And in preparing for that is when I went back and
 [5] looked at Cook's original article and how it developed.
 [6] Q. Yes.
 [7] A. But I don't recall now whether I did this as a
 [8] teaching at Pittsburgh or did this at a talk I was
 [9] going to give somewhere subsequent.
 [10] But that is the reason why I went back and
 [11] looked at it.
 [12] Q. Referring to your period at Cyanamid, is it
 [13] fair to say that you would want to be conservative in
 [14] exposing humans to materials that were known to be
 [15] toxic in some fashion?
 [16] A. I guess I have some difficulty with the
 [17] question.
 [18] Q. Okay, what difficulty?
 [19] A. We are not - we don't normally plan to expose
 [20] people to chemicals.
 [21] Q. It was recognized within the chemical industry
 [22] at that period that people did get exposed to chemicals

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[1] either in the workplace or near the plant, correct?
 [2] A. Yes, we recognized that people will be exposed
 [3] to chemicals if they use them, but we don't plan to
 [4] expose them in that sense of the word.
 [5] Q. All right.
 [6] A. I guess that is the distinction I would like
 [7] to make.
 [8] Q. Within the chemical industry at that time,
 [9] well, let me go back a step.
 [10] During the period you worked for Cyanamid did
 [11] you have contact with people from other chemical
 [12] companies?
 [13] A. Yes.
 [14] Q. How would those contacts occur?

[15] A. A fair number would be through scientific
[16] meetings. I would meet them at scientific meetings or
[17] be introduced to them by people who knows them as well
[18] as me. Through trade association activities such as
[19] the Chemical Manufacturers Association, I would meet
[20] and deal with some of these people. In a few instances
[21] there might be a common interest in a chemical or they
[22] would be using one of our materials or we would be

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[1] using one of theirs and we would have contact on a
[2] specific chemical. I guess those are the
[3] predominant -
[4] Q. In some instances would Cyanamid fund studies
[5] along with other companies of various materials, is
[6] that one of the ways you are thinking about?
[7] A. There could be that. There were one or two
[8] instances I think when I was at Cyanamid where Cyanamid
[9] participated in a so-called joint venture.

[10] Q. You participated in some of those meetings and
[11] trade associations and joint studies personally?

[12] A. I was not personally involved in the joint
[13] studies.

[14] Q. All right.

[15] A. I did participate in trade association
[16] meetings, yes.

[17] Q. Was it your understanding as an industrial
[18] hygienist or toxicologist that chemical companies were
[19] interested in keeping worker exposures to the lowest
[20] levels they could if the materials were known to be
[21] toxic?

[22] A. That's the impression I had, and as far as I

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[1] know that is the procedure they operate under.

[2] Q. That is true even until today, correct?

[3] A. Yes.

[4] Q. And that was true when you were at the
[5] Graduate School of Public Health, to the best of your
[6] knowledge, correct?

[7] A. Yes.

[8] Q. You mention that you have done a little bit of
[9] historical research, at least in connection with Mr.
[10] Cook's list.

[11] Is it your understanding that one of the
[12] reasons industrial toxicology became a discipline was
[13] to protect workers from unsafe exposures to chemicals?

[14] A. I really don't know why industrial toxicology
[15] became a discipline as such.

[16] Q. Okay.

[17] A. Under the general framework of occupational
[18] health that I referred to as the Department of
[19] Occupational Health at the school in Pittsburgh, there
[20] was an interest in protecting employee health. This
[21] was one of the facets of it. That was one of the
[22] elements to consider in health protection.

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[1] Beyond that, I don't know and I don't really
[2] have much, haven't given thought to why it became, or
[3] why it's recognized as a separate discipline and became
[4] a separate discipline.

[5] MR. FLORIG: It's almost a quarter after. Do
[6] you want to take a lunch break?

[7] MR. WALSH: Sure, fine.

[8] MS. SANDBECK: Fine.

[9] MR. FLORIG: We will resume at a quarter after

[10] 1.

[11] (Whereupon, the deposition was recessed at
[12] 12:15 p.m., to resume at 1:15 p.m.)

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[1] AFTERNOON SESSION

[2] (1:23 p.m.)

[3] MR. FLORIG: Back on the record.

[4] BY MR. FLORIG:

[5] Q. Dr. Levinskas, as you understand, you are
[6] still under oath, correct?

[7] A. I do.

[8] Q. Before lunch we were talking a little bit
[9] about the history of industrial toxicology or
[10] industrial hygiene. Do you recall that?

[11] A. We talked about the specific special limit
[12] value list.

[13] Q. All right. Was one of the purposes of
[14] industrial toxicology or industrial hygiene to allow
[15] companies to implement procedures that would prevent
[16] employees from being exposed to certain levels of toxic
[17] materials?

[18] A. I can't answer that question, I don't know
[19] what the origin was or its intention.

[20] Q. During your career at Cyanamid would Cyanamid
[21] take steps to make sure their employees weren't exposed
[22] to unacceptable amounts of toxic materials?

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[1] A. There were other people in the Medical
[2] Department whose function was to ensure the safety of
[3] workers. I do not know much of their operations, but
[4] there were other people who had that concern.

[5] Q. Those people would rely on the information
[6] that your department helped to generate?

[7] A. That would be part of the consideration, yes,
[8] I would say.

[9] Q. Based on your knowledge of the chemical
[10] industry up until 1971 -

[11] MR. FLORIG: Strike that.

[12] BY MR. FLORIG:

[13] Q. At Cyanamid were precautions taken to prevent
[14] human exposure to potentially toxic materials?

[15] A. I have indicated there are other people who
[16] were concerned with the health of workers.

[17] Q. Yes.

[18] A. And I could assume that that was so, but I was
[19] not directly involved in that phase of the operation.

[20] Q. That would have been a reasonable step to
[21] take, correct?

[22] A. As I have indicated, in the Medical Department

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[1] were personnel concerned with health, and as far as
[2] that was concerned that would be a reasonable step to
[3] take.

[4] Q. Based on your experience in the industry up
[5] until '71, would that have been done throughout the
[6] industry?

[7] MR. WALSH: Objection, that calls for
[8] speculation.

[9] A. I do know from contact with people in other
[10] companies that they had medical departments and
[11] personnel who were concerned with employee safety. On
[12] the basis of that I could assume that the rest of the
[13] industry was doing the same.

[14] Q. Okay.

[15] A. Or at least the segments of industry I had
[16] contact with.

[17] Q. As an industrial hygienist or toxicologist or
[18] pharmacologist, based on your experience up until 1971
[19] you wouldn't want the potential for uncontrolled
[20] exposure to toxic materials to occur to human beings,
[21] would you?

[22] MR. WALSH: Object to the question as broad

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[1] and vague.

[2] A. I guess one would have to define
[3] "uncontrolled." I think I have indicated in earlier
[4] comments that the intent is not to expose people. It
[5] comes about rather through a recognition that in using

[6] chemicals people will be exposed. But there is no
 [7] intention of exposing them.
 [8] And so I guess the most direct answer to your
 [9] question is, I don't think I would want people exposed,
 [10] controlled or uncontrolled, if I could avoid it.
 [11] BY MR. FLORIG:
 [12] Q. While you were at Cyanamid did you have any
 [13] responsibility for disposal or treatment of waste
 [14] products?
 [15] A. No.
 [16] Q. In 1971 you went to work for Monsanto,
 [17] correct?
 [18] A. Yes.
 [19] Q. Can you tell me how it is that you came to be
 [20] employed by Monsanto?
 [21] A. The Cyanamid decided to disband their
 [22] environmental health laboratory. It was retrenched and

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[1] ultimately closed out. And so I was seeking
 [2] employment.
 [3] Through the offices of people in personnel at
 [4] Cyanamid that I knew, had suggested I contact the
 [5] personnel people at Monsanto, which I did, which led to
 [6] my coming here, or coming there.
 [7] Q. And ultimately to your coming here. A little
 [8] 'round about, but understood.
 [9] Your first contact was with personnel within
 [10] Monsanto, the Personnel Department?
 [11] A. Yes.
 [12] Q. Prior to that time did you know anybody who
 [13] worked for Monsanto?
 [14] A. Yes.
 [15] Q. Do you recall who those people were?
 [16] A. The two that come most readily to mind is the
 [17] late Dr. Bill Hunt and to a lesser degree, Elmer
 [18] Wheeler.
 [19] Q. How did you know Bill Hunt?
 [20] A. Through meetings, associations in toxicology.
 [21] Q. How about Elmer Wheeler?
 [22] A. Again, through meetings and associations.

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[1] Predominantly through the American Industrial Hygiene
 [2] Association, similar to along the line I met him.
 [3] Q. Did you hold those two men in high esteem, did
 [4] you respect them professionally?
 [5] A. Yes.
 [6] Q. Did you interview prior to being hired by
 [7] Monsanto with anyone other than personnel people?
 [8] A. At Monsanto?
 [9] Q. Yes.
 [10] A. Oh, my initial contact was with the Personnel
 [11] Department. Interviews and discussions were held with
 [12] members of the Medical Department before I joined the
 [13] company, before they agreed to accept me.
 [14] Q. Were those interviews with Mr. Hunt and Mr.
 [15] Wheeler?
 [16] A. Predominantly with Dr. Kelly, with Mr.
 [17] Wheeler, in the course of which I had some discussions
 [18] with Dr. Hunt.
 [19] And I met Jack Garrett for the first time. I
 [20] had also met Dr. Kelly for the first time. I had not
 [21] met him prior to being interviewed at Monsanto.
 [22] Q. Did you interview with Jack Garrett, or just

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[1] meet him prior -
 [2] A. Just discussions along the way. But I would
 [3] not regard what I had with him as an interview in that
 [4] sense of the word.
 [5] Q. Prior to 1971 I take it you were familiar with
 [6] Monsanto Company?
 [7] A. Yes, I had heard of the company.
 [8] Q. Prior to applying with Monsanto how did you
 [9] view them within the chemical industry?
 [10] MR. WALSH: Objection, broad, vague.
 [11] A. I don't think I had made a particular
 [12] assessment of them as such. I don't recall that I did,

[13] and I don't recall that I would have had a basis to
 [14] even think about it.
 [15] BY MR. FLORIG:
 [16] Q. Had they been considered a leader within the
 [17] chemical industry?
 [18] A. My response is limited to my opinion. I had
 [19] not thought of any of the chemical companies at that
 [20] time in terms of leaders or followers or rankings.
 [21] Q. All right.
 [22] A. I would have to confess that I don't think I

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[1] consciously or even subconsciously thought in terms of
 [2] ranking companies in any sort of relative scale for
 [3] goodness or badness.
 [4] Q. What was your first job at Monsanto?
 [5] A. I think the initial title was manager of
 [6] product development.
 [7] And the reason I joined the company was to
 [8] formalize and centralize environmental assessments of
 [9] Monsanto products. And the initial charge was to look
 [10] at new products and new uses of existing products.
 [11] Q. How long were you manager of product
 [12] development?
 [13] A. That title was probably about a year and a
 [14] half, something on that order.
 [15] Q. Until 1972 or '73?
 [16] A. I would say end of '72, early '73, somewhere
 [17] in there.
 [18] Q. What you just described for me, was that the
 [19] extent of your job duties in that position?
 [20] A. That was what occupied a substantial part of
 [21] my time. I may have, undoubtedly did have requests or
 [22] questions from other people that I responded to, but it

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[1] would have been somewhat incidental.
 [2] Q. What kind of environmental assessments did you
 [3] do?
 [4] A. In light of changing standards, concepts of
 [5] what was safety, what would constitute safety, and the
 [6] fact that there were increasing questions being raised
 [7] about environmental effects of chemicals, the idea was
 [8] to look at a material at an early stage of development,
 [9] try to anticipate the kinds of questions that would
 [10] arise or could arise from users of the material, from
 [11] the makers of the material, from those who wound up
 [12] with the final product in their hand, the ultimate fate
 [13] of the thing, and try to develop information or
 [14] research, see if there was information available or
 [15] should additional information be developed to try to
 [16] anticipate responses to those questions.
 [17] And then to come back at a second stage, after
 [18] the information had been developed and after the
 [19] product group had a chance to assess whether there
 [20] seemed to be a reasonable market for the product, to
 [21] give the Medical Department's concurrence that it was a
 [22] reasonably reassuring that the product could be made,

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[1] used and ultimately disposed of safely.
 [2] Q. Is it fair to say that your environmental
 [3] assessment of potential new Monsanto products was a
 [4] kind of cradle to grave assessment?
 [5] MR. WALSH: Object to the form.
 [6] MR. FLORIG: I will explain what I mean by
 [7] that to you.
 [8] BY MR. FLORIG:
 [9] Q. You had stated that you were looking to see if
 [10] the product could be made, used and disposed of safely?
 [11] A. That's right.
 [12] Q. Is it fair to characterize that as a cradle to
 [13] grave assessment?
 [14] A. That terminology, cradle to grave, has crept
 [15] in in more recent years, it has gotten to be bandied
 [16] about. That would be one characterization, I guess.
 [17] Q. Okay.
 [18] A. Would be acceptable, reasonable.
 [19] Q. All right. Did you assess the manufacturing

[20] process for that product?

[21] A. The manufacturing concept would take that into
[22] account. If it were a new process -

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[1] Go back. If it were an existing process,
[2] since we are dealing with new products and new uses of
[3] products, we would not have considered necessarily an
[4] old process.

[5] If it was a new process for manufacture, there
[6] was a separate procedure that I have heard of in the
[7] company and I have very little knowledge about, it's
[8] called LPP review, loss of property protection review,
[9] that was done by others that would look at the aspects
[10] of manufacturing under a new process.

[11] Q. If that kind of evaluation was to be done
[12] under your direction, would employee exposures have
[13] been considered?

[14] A. I think I would have to say first they were
[15] not done under my direction.

[16] Q. Okay.

[17] A. And secondly, I don't really know. While I
[18] know they were done and I know they existed, I really
[19] am not sufficiently familiar with the content or the
[20] nature of those reviews to comment whether or not
[21] employee exposures were actually considered.

[22] Q. You are talking about the LPP reviews?

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[1] A. Right.

[2] Q. When you say you were evaluating whether the
[3] product could be used safely, what did that evaluation
[4] entail?

[5] A. From my perspective, again, there is an
[6] earlier act, the Federal Household Substances Act,
[7] which deals with labeling hazards for household
[8] products. And that act's regulations require
[9] consideration of the intended use and reasonably
[10] foreseeable misuse of the product.

[11] Now that is what I would, from what I
[12] understand, would be the use of the product - I would
[13] look at it from the standpoint of intended use of the
[14] product and reasonably foreseeable misuse, which is not
[15] really well-defined. I would try to anticipate those
[16] kinds of questions.

[17] Q. How would you go about determining whether a
[18] product could be used safely?

[19] A. The proposed, those proposing its use would
[20] have some idea what it's to be used for and how it
[21] would be used.

[22] You know, I would have to ask them, what is it

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[1] that you want to make and how do you anticipate people
[2] are going to use it. And then I would want to know
[3] whatever else, whatever information might be available
[4] that might or might not be useful in evaluating the
[5] situation.

[6] Q. What kinds of information would you want to
[7] know in evaluating whether it could be used safely?

[8] A. Not to sound facetious, but I would like to
[9] know everything that was related to the safe use of the
[10] compound.

[11] But I don't really know what may or may not be
[12] useful until I get the information and I can look at it
[13] and consider it and decide whether it's useful. So
[14] what I would like to know is what can they tell me
[15] about the product, and then I will sit there and try to
[16] cogitate it.

[17] Q. Is one of the things you would want to know
[18] what the components of the product are?

[19] A. Again, I will go back to comments that I have
[20] made several times. I would want to know the
[21] composition, is it a single substance or is it a
[22] formulated material, a mixture of substances. So, yes,

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[1] I would want to know the major constituents of the
[2] material.

[3] Q. Would you want to know the major constituents,

[4] or all the constituents?

[5] A. I would have to say major constituents.

[6] Q. Why wouldn't you want to know all of them?

[7] A. I don't think there is a chemist astute enough
[8] to know every constituent in the sense of analyzing
[9] down to the last molecule.

[10] Q. By that you are talking about impurities and
[11] that kind of thing?

[12] A. Yes, it's a question of what you can detect,
[13] and the levels at which you can detect varies greatly
[14] for different kinds of materials. So I don't think it
[15] is feasible to say that I want to know everything down
[16] to a fixed level. That may be achievable for some
[17] substances and not achievable for others. And so the
[18] composition in terms of state of the art analytical
[19] capability. And that changes with time.

[20] Q. Right. You would at least want to know every
[21] constituent that was intentionally put there in making
[22] that product, correct?

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[1] A. Yes, I indicated major constituents. If it's
[2] in there, there must be a reason for it, or it's doing
[3] something and it should be mentioned.

[4] Q. Would you want to know the toxicity of all of
[5] those components?

[6] A. There well may be substances in there which
[7] are, for instance, on the threshold limit value list or
[8] somewhere that they have been well studied and
[9] regulated. I could check that without going into depth
[10] of the toxicology.

[11] If it were a new material, we would probably
[12] want to develop some of our own data, because there
[13] would be no data on it.

[14] So, yes, I would want to know something about
[15] the toxicology of the substances. But what I would
[16] want to know and to what extent again would depend on
[17] the product, its intended use and a host of other
[18] factors.

[19] Q. All right.

[20] A. I don't think there is a, I made reference to
[21] a cookbook. There is no standard procedure that one
[22] would in a mindless fashion apply time after time after

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[1] time because of differing circumstances and differences
[2] in products.

[3] Q. If it was a material whose toxicity was well
[4] known, you would simply refer to the literature or
[5] previous information about that component, is that
[6] correct?

[7] A. If it was a reasonably well known material and
[8] there was reasonable consensus about the toxicity, then
[9] I would rely on that data and not go further.

[10] Q. During the early '70s how would you determine
[11] if there was reasonable consensus about the material?

[12] A. Could be a variety of ways. One would be to
[13] talk to other toxicologists at other companies.

[14] Q. All right.

[15] A. One could look to see whether published data
[16] were consistent, whether different people had basically
[17] published or drawn the same conclusions from their
[18] data. The source of the data sometimes, whether it was
[19] well documented or was purely anecdotal.

[20] There would be a variety of ways of attempting
[21] to assess the data.

[22] Q. Is that a somewhat subjective process?

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[1] A. All judgments are subjective.

[2] Q. If one of the constituents of the product was
[3] a material whose toxicity was not well known, what
[4] steps would you take at that point?

[5] A. There could be a variety of responses. It
[6] would depend on the amount of material, of the unknown
[7] material, it would depend on the product, its nature of
[8] its use.

[9] There is no, at least in my judgment there is
[10] no fixed response to an unknown material without

[1] consideration of a variety of other factors.

[12] Q. Would you then have tests performed on that
[13] material?

[14] A. I may or may not.

[15] Q. If one of the constituents was a material of
[16] unknown toxicity, you may or may not test that
[17] material?

[18] A. That's correct.

[19] Q. What considerations would go into deciding
[20] whether to test that material?

[21] A. I think this has been indicated in the context
[22] of another earlier. It depends on the nature of what

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[1] it occurs in, the final product that is being marketed,
[2] its intended use, how it's going to be used, how much
[3] is going to be used, who is going to use it, how big a
[4] percent of it of the thing, how much of the composition
[5] is it in the material. Is it based on its chemical and
[6] physical properties, is it considered to be
[7] particularly hazardous in handling or not.

[8] So I think there are a variety of
[9] considerations that would come up each time, and I
[10] don't see that there is a fixed answer. At least I
[11] would not respond there is a fixed answer.

[12] Q. If you decided that Monsanto should test the
[13] material for toxicity, would you kind of walk me
[14] through what would be done with that material. Again,
[15] we are talking about the early 1970s.

[16] MR. WALSH: Object to the question as broad,
[17] vague and in the abstract.

[18] But you can respond.

[19] A. It's been said somewhere earlier in discussion
[20] that if we take over the concepts of what the product
[21] is, how it's intended and so forth we will determine
[22] what kind of questions might arise from its handling.

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[1] BY MR. FLORIG:

[2] Q. Yes.

[3] A. Then the experiments would be designed to
[4] develop information that could answer those questions.

[5] So it depends on what type of testing one
[6] deemed necessary, what kind of tests would be designed
[7] and would be conducted.

[8] Q. Still talking about this material of unknown
[9] toxicity, during your early years at Monsanto would
[10] kind of a literature survey be done?

[11] MR. WALSH: Same objection, vague, broad, in
[12] the abstract.

[13] A. The people who are working on the product
[14] generally have an idea of what competing products or
[15] the market they are entering, what the nature of the
[16] products is in there. They have an idea of the
[17] similarity or dissimilarity of their compounds to
[18] existing compounds.

[19] And they probably have as good an information
[20] base, I would rely on information they supplied, at
[21] least in the early years at Monsanto I would have
[22] relied on the information they supplied me because they

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[1] would be more familiar with the information than I
[2] would be.

[3] BY MR. FLORIG:

[4] Q. How would they come into possession of that
[5] information?

[6] A. I do not know how they came into possession of
[7] it.

[8] Q. By this time had some kind of database or
[9] computerized access to information about toxicity of
[10] various chemicals been developed?

[11] MR. WALSH: What do you mean by "this time,"
[12] can you specify a time?

[13] MR. FLORIG: The early '70s.

[14] MR. WALSH: Thank you.

[15] A. By whom?

[16] BY MR. FLORIG:

[17] Q. By anyone.

[18] A. Oh, there were databases being developed. I
[19] can't be very precise, I can't precisely give you who
[20] and when, what dates. But as computers became
[21] available people began collecting data and databases,
[22] yes.

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[1] Q. If Monsanto in the early '70s had wanted to
[2] look up the toxicity information of chemical X, could
[3] they do that through some kind of database?

[4] A. We have a library information services at
[5] Monsanto. My choice would be to ask them to look up
[6] the information.

[7] Q. All right.

[8] A. And whatever they returned to me I would then
[9] look at.

[10] Q. Would that include references to the
[11] scientific literature?

[12] A. It would depend on the nature of the request.
[13] If I asked them for toxicity, and I could name you the
[14] chemicals or classes of chemicals, I would get that
[15] toxicity information related, the more specific the
[16] question, the more likely you will get the information
[17] you desire without a lot of scatter.

[18] Whether they developed this information from
[19] manual searches or computerized searches I don't really
[20] know. But their job was information services, and if I
[21] had a question I would ask them to provide me with
[22] input.

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[1] Q. They could provide you with references to
[2] other studies?

[3] A. Yes.

[4] Q. That had been done?

[5] A. Depending what was available, either abstracts
[6] with reference to the article or just a list of
[7] references.

[8] Q. Do you know if they could also provide you
[9] with the article, itself?

[10] A. We could obtain the articles, yes, if they
[11] were not already available in the numerous journals
[12] that the library subscribed to of its own right.

[13] Q. Did that service also include foreign studies?

[14] A. I would say it probably did.

[15] Q. Was that service in place when you became
[16] manager of product development?

[17] A. I assume it was, I don't know when it came
[18] into service exactly. But I do know that when I had
[19] questions and I asked them, they were responsive.

[20] Q. Was that service administered through
[21] Monsanto's library, did you say?

[22] A. I think it was the library information

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[1] services, yes, it was a Monsanto people in a Monsanto
[2] facility.

[3] Q. Was it at headquarters, do you recall?

[4] A. It was at St. Louis, the one I am referring
[5] to.

[6] Q. Going back to this unknown constituent of a
[7] new product or a constituent that had unknown toxicity,
[8] you mentioned that you might develop some tests that
[9] you would want done on that material, correct?

[10] A. I don't think I indicated I would want to test
[11] that material. If it were a component of a product I
[12] might want to test the product containing that
[13] component. I might in some cases want to go back and
[14] test the component by itself.

[15] Q. All right.

[16] A. But it would depend again on a variety of
[17] factors.

[18] Q. As manager of product development what kind of
[19] questions would you want those tests to address?

[20] A. I think I have indicated, when you look at the
[21] anticipated use of the product and with some
[22] imagination the reasonably foreseeable misuse, what

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[1] kind of issues, questions are likely to arise from

[2] those circumstances and those are the questions one
 [3] would want to address.
 [4] Q. Would one of the questions be by what pathway
 [5] could the material possibly enter the body?
 [6] A. I think it was fairly general throughout the
 [7] industry that the acute hazards, what happened if you
 [8] spilled it on your skin, you got it on your fingers and
 [9] you licked your fingers, or you spilled it in your eye,
 [10] those were covered by proper labeling of the product.
 [11] If we had a component of ceramics and we
 [12] specifically said do not, you know, not for ingestion,
 [13] do not eat, or some phrasing of that sort, I don't
 [14] think I would expect that to be reasonably anticipated.
 [15] So I probably would not spend much time worrying about
 [16] repeated oral dosing, just as examples.
 [17] So it would depend as I say on what the nature
 [18] of the material is, how intends to use it, in the
 [19] course of using it what reasonable mistakes can we
 [20] make.
 [21] I see my associate, if I said don't drink it,
 [22] but I was going to use it, put it next to my coffee cup

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[1] I think I would worry about it more than if you had it
 [2] out in a backyard for some reason in a cup.
 [3] Q. Just so that I understand, if it were a liquid
 [4] that was designed to be sprayed, you would likely look
 [5] at the three major pathways we talked about earlier,
 [6] correct?
 [7] A. I probably would, in most cases probably
 [8] would.
 [9] Q. If it were a solid, you probably wouldn't
 [10] worry so much about absorption through the skin,
 [11] correct?
 [12] A. Solids can be absorbed through the skin.
 [13] Q. Right, but that would not be as likely in your
 [14] view as a liquid being absorbed, correct?
 [15] Or, again, does it all depend on the specific
 [16] material?
 [17] A. In addition to the specific material I would
 [18] ask you what's the nature of your solid.
 [19] Q. Okay.
 [20] A. Is it a talcum powder or is it a brick?
 [21] Q. Fair enough. In any event, someone within
 [22] your unit would sit down and evaluate all these

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[1] potential means by which it could get into the body,
 [2] correct, and decide which ones needed some study?
 [3] MR. WALSH: Objection, form. I think it's a
 [4] misstatement of the testimony.
 [5] A. I have indicated that I would want to know
 [6] what's available in terms of the product, its nature,
 [7] its use, et cetera, et cetera. And on the basis of
 [8] that my own judgment and experience, I would make
 [9] recommendations for testing if I deemed some was
 [10] necessary.
 [11] BY MR. FLORIG:
 [12] Q. Okay.
 [13] A. What others might do, I really cannot say.
 [14] Q. You also mentioned that you were as part of
 [15] the environmental assessment considering whether the
 [16] product could be disposed of safely, correct?
 [17] A. We considered what was the nature, what was
 [18] the ultimate disposition of the product. We took that
 [19] in as part of our assessment.
 [20] Q. How would you go about studying that?
 [21] A. I would have to rely on what people tell me
 [22] what happens to the product when it's served its

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[1] purpose.
 [2] Q. All right.
 [3] A. I feel if it was a component of cement I would
 [4] not worry about it. If it was a food additive and
 [5] somebody ate it, I would start worrying about it if I
 [6] was assured of the safety of it for being eaten.
 [7] So, again, it's hard to be general without
 [8] being specific about it, without specifics on a given

[9] compound.
 [10] Q. One of your examples is causing me some
 [11] confusion. You mention an apple that is eaten.
 [12] A. I didn't mention an apple.
 [13] Q. Something that was eaten. That had been, the
 [14] product had been used on that food and the food was
 [15] eaten.
 [16] Is that a use, or a disposal in your mind?
 [17] A. If I had a packaging material that was
 [18] regulated by FDA and it permitted some finite but small
 [19] level of contamination of a foodstuff and we were
 [20] making that chemical for that food contact, packaging
 [21] application, I would consider the final, the use of it
 [22] as in that packaging material.

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[1] Q. Okay.
 [2] A. The ultimate fate of it is that that packaging
 [3] material, if it's locked in a carport, whatever it is,
 [4] it's going to be burned or landfilled, whatever, but
 [5] the amount of material that gets onto the foodstuff
 [6] that you eat, that is an ultimate fate. Once you have
 [7] eaten it, I don't expect to see it around anymore.
 [8] And if it is part of a packaging component, to
 [9] do its job as a packaging component it's got to stay in
 [10] the package.
 [11] So I would figure that is the ultimate fate of
 [12] it or final disposition of it, it gets locked into the
 [13] packing material and we are done with it.
 [14] Q. Did you consider at all how that packaging
 [15] material was disposed of, whether by landfill or
 [16] incineration or some other method?
 [17] A. I don't think anybody considered the specifics
 [18] on how it was disposed of, but if it's to be a - if it
 [19] serves a function, a useful function as packaging
 [20] material it will have to stay with the packaging
 [21] material to perform its function.
 [22] Q. Even though some of it may get off into the

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[1] food, itself, is it not serving its function if it
 [2] leaves the packaging material and gets on the food?
 [3] A. If it's a component of the packaging material,
 [4] its function is packaging material.
 [5] Q. Yes.
 [6] A. The amount that gets into the food is
 [7] incidental, or it should be incidental. And so if the
 [8] regulatory agencies have approved the packaging
 [9] material, they basically are saying it is not going to
 [10] get into the foodstuff. If it does get into the
 [11] foodstuff it's going to be such small amounts that it's
 [12] not going to be a problem.
 [13] And they are basically saying, we agree with
 [14] you that it stays in the packaging. If it does not
 [15] stay in the packaging, we have a direct food additive
 [16] and we have a tremendous regulatory hurdle.
 [17] Q. A whole different settle of requirements?
 [18] A. Yes.
 [19] Q. And reporting?
 [20] A. Yes.
 [21] Q. All right. As manager of product development
 [22] were you concerned in any way with disposal of

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[1] Monsanto's wastes?
 [2] A. I don't recall that I had involvement at that
 [3] time with waste disposals.
 [4] Q. Did there come a time later when you did?
 [5] A. I suspect there were times when I was asked
 [6] questions about waste disposal, but I really cannot
 [7] recall the details and I would have to say for
 [8] practical purposes I was not very much involved in
 [9] waste disposal.
 [10] Q. What was your next position at Monsanto?
 [11] A. I became manager of environmental assessment
 [12] and toxicology.
 [13] Q. That was around 1973?
 [14] A. That would be about the time that I dropped
 [15] the title - end of '72, beginning of '73, probably.

[16] Q. How long did you hold that position?
 [17] A. Until about 1980, 1982, probably.
 [18] Q. At which time you became director of
 [19] environmental assessment in toxicology?
 [20] A. That's right. It might have been a little
 [21] earlier, but the next step was director of
 [22] environmental assessment and toxicology.

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[1] Q. Was there any difference in those two
 [2] positions?
 [3] A. For practical purposes, no. The staff that I
 [4] had working for me had increased; there were more
 [5] people involved. We had a larger testing program under
 [6] way.
 [7] Q. When you became director did someone step into
 [8] your old position as manager?
 [9] A. I had hired Dr. Fred Johansson, who basically
 [10] became manager at that time, yes.
 [11] Q. You became director sometime in the early
 [12] 1980s?
 [13] A. I guess it was about 1980. It might have been
 [14] a little earlier than that, I really don't recall
 [15] specifically.
 [16] Q. How long did you keep the position of
 [17] director?
 [18] A. Until 1986.
 [19] Q. What were your responsibilities as manager,
 [20] environmental assessment and toxicology.
 [21] A. By then we had developed a review of many of
 [22] the existing company products, we were involved in

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[1] several new ventures, joint ventures with the
 [2] chemical - under the auspices of the Chemical
 [3] Manufacturers Association. We increased our testing
 [4] programs so we would run a fairly extensive testing
 [5] program.
 [6] Developing data on new products, increasing
 [7] the available data on existing products, largely to
 [8] reflect the public concepts of what constituted safety,
 [9] which has become increasingly larger definition, larger
 [10] scope.
 [11] We had undertaken to build a laboratory, do
 [12] some in-house testing. There were increasing
 [13] regulations dealing with chemicals, and we were
 [14] cooperating to some extent with the regulatory agencies
 [15] to help develop those regulations.
 [16] Q. As manager what kind of joint ventures or
 [17] studies were being conducted under the auspices of the
 [18] CMA?
 [19] A. The two that I spent the most time on and
 [20] probably most involvement were acrylonitrile and
 [21] styrene.
 [22] Q. Is that styrene monomer?

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[1] A. Styrene, both monomers, acrylonitrile monomer
 [2] and styrene monomer.
 [3] Q. What did that joint venture consist of?
 [4] A. Each was a separate one.
 [5] Q. Why don't we deal with the AN one, first,
 [6] acrylonitrile.
 [7] A. In the early to mid '70s both, not both,
 [8] three, Dupont, Borg-Warner and Monsanto were working on
 [9] an acrylonitrile-containing polymer for a soft drink
 [10] bottle.
 [11] There was a considerable database available on
 [12] acrylonitrile, though it was quite dated.
 [13] Acrylonitrile had been used and regulated fairly
 [14] widely, I think there was reasonable agreement on it.
 [15] Q. Excuse me, there was -
 [16] A. There was reasonable agreement among people on
 [17] the health risks. But because of the, this proposed
 [18] expanded use and as a food packaging material, we would
 [19] need additional data.
 [20] We made attempts to locate the background data
 [21] on some of the published abstracts, and those were not
 [22] available. There were published abstracts by Svirebely

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[1] and Floyd.
 [2] So we met with a couple companies and
 [3] suggested we should pool our resources, expand and
 [4] develop an up-to-date database to reflect this greater
 [5] societal expansion of the definition of safety, what it
 [6] encompasses. And that it would probably be prudent for
 [7] us to get together and do this jointly, than each of us
 [8] should spin our wheels attempting to do it separately.
 [9] So that led to the formation of two
 [10] subcommittees or two committees under the CMA auspices,
 [11] one on acrylonitrile, one on styrene. These were
 [12] basically starting almost from scratch one. We looked
 [13] at the long-term effects, lifetime effects on rats,
 [14] six-month study in dogs, reproduction studies in rats,
 [15] some inhalation work in rats, some acute toxicity
 [16] studies.
 [17] About somewhat after we organized this the
 [18] Food and Drug Administration came out with a proposal
 [19] that they wanted to see an expanded database on
 [20] acrylonitrile because of the increased interest in
 [21] using these as food contact applications.
 [22] We then met with representatives of the FDA

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[1] and a host of Washington agencies, EPA, NIOSH, NCI,
 [2] OSHA. And we presented your program that we had agreed
 [3] on among the industry and under CMA auspices. And it
 [4] was not totally in agreement, but it was reasonably
 [5] close to FDA's proposal.
 [6] So we negotiated some changes in ours and
 [7] their demands, and we agreed on a proposal to studies
 [8] we would do and we would make the data publicly
 [9] available, then we proceeded to implement and develop
 [10] that data.
 [11] Q. Ultimately the bottle was not approved,
 [12] correct?
 [13] A. Technically the bottle was on sale.
 [14] Q. Okay.
 [15] A. I presume it was approved because it was being
 [16] used.
 [17] The Monsanto bottle was somewhat different
 [18] from the other two. When the studies being conducted
 [19] by Dow for the CMA group showed that acrylonitrile
 [20] produced tumors in rats, the project basically folded.
 [21] FDA, I think FDA revoked clearances or whatever
 [22] marketing permits were, whatever the basis was. That

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[1] led to ultimate lawsuits.
 [2] Q. Was the Monsanto bottle ever used for
 [3] anything?
 [4] A. It was on the market for at least awhile in
 [5] some test cities. I don't know whether it had general
 [6] approval or limited marketing approval. I don't know
 [7] the details of that.
 [8] Q. You mentioned that early on in this project
 [9] there was a database available on AN?
 [10] A. Yes.
 [11] Q. Correct?
 [12] A. Yes.
 [13] Q. And that there was reasonable agreement about
 [14] the toxicity of AN?
 [15] A. Yes.
 [16] Q. What was that agreement?
 [17] A. Acrylonitrile had been on the TOV list, I
 [18] won't say since the first one, but probably since the
 [19] first one. I think the TLV was unchanged up until the
 [20] time of the, that the questions arose regarding
 [21] carcinogenicity. Cyanamid had pulled together a
 [22] booklet.

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[1] Q. Cyanamid or Monsanto?
 [2] A. Cyanamid, in the '40s or '50s, 50s I guess,
 [3] that summarized, reviewed the literature on the
 [4] handling and hazards of acrylonitrile.
 [5] As I indicated, there were the published
 [6] papers of Svirebely and Floyd from the Public Health

[7] Service who had published and said they did a lifetime
[8] drinking water study in rats, as I recall as high as 50
[9] parts per million drinking water, for two years and
[10] they had seen no cancers. Most everybody was aware of
[11] this.

[12] Q. Was that study by Svirbely and Floyd, did you
[13] say?

[14] A. S-v-i-r-b-e-l-y, and Floyd is F-l-o-y-d, I
[15] think.

[16] Q. Do you know when their study was done?

[17] A. Those studies were published in the Abstracts
[18] of the Industrial Hygiene Association in the, I would
[19] say probably in the early '60s, it might have been very
[20] late '50s, '58 to '62, '63 interval, somewhere in
[21] there.

[22] Q. AN had a TLV or equivalent value established

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[1] for it back in the '40s or '50s, did you say?

[2] MR. WALSH: Object to the form, lack of
[3] foundation.

[4] A. I said I think it appeared on the original
[5] list, the Warren Cook list. I think it appeared on
[6] there, I am not positive of that. And I think the
[7] numbers stayed basically unchanged up until this
[8] question arose about the carcinogenicity.

[9] BY MR. FLORIG:

[10] Q. Since AN was on this TLV list, that means it
[11] had some toxic properties associated with it?

[12] A. Acrylonitrile -

[13] Q. At the time it appeared, correct?

[14] A. Yes.

[15] Q. Do you recall what those were?

[16] A. Acrylonitrile is a rather toxic material. I
[17] don't - liquid acrylonitrile is very irritating to
[18] skin, eyes.

[19] It's flammable. One has to keep air
[20] concentrations low because it burns readily, it
[21] represents a fire hazard. And that of itself puts
[22] restrictions on what you can do with acrylonitrile.

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[1] Q. Did AN have any other toxic properties other
[2] than being capable of producing skin irritation or eye
[3] irritation that were known back in the '40s or '50s?

[4] A. It is a, it will cause death in animals if
[5] given by mouth. I mean you can dose an animal, I think
[6] the published values in the literature are around 90
[7] milligrams per kilo, which means it's a toxic material.

[8] But I don't think it's a poison by the
[9] statutory definition of a poison. Yes, it can kill
[10] you.

[11] MR. FLORIG: We have been going about an hour
[12] and ten, do you want to take a break?

[13] MR. WALSH: Sure.

[14] (Recess.)

[15] MR. FLORIG: Back on the record.

[16] BY MR. FLORIG:

[17] Q. Dr. Levinskas, as you understand, you are
[18] still under oath.

[19] A. I do.

[20] Q. Do you know when the joint study under CMA on
[21] acrylonitrile was done, was that in the mid '70s?

[22] A. That program started in, I guess, about '74,

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[1] '5, so the study probably was finished around '77, '8,
[2] somewhere in there.

[3] Q. You mentioned a second study done under the
[4] aye species of the CMA, and that was a styrene study,
[5] correct?

[6] A. Yes. It was somewhat analogous but not
[7] identical with the acrylonitrile study.

[8] Q. Can you tell me about the styrene study?

[9] MR. WALSH: Objection, vague. Can you be more
[10] specific?

[11] A. There was a program, there was more than one
[12] study involved.

[13] BY MR. FLORIG:

[14] Q. Could you tell me what the program was, first?

[15] A. One was a lifetime rad exposure. It was 600
[16] and 1200 ppm, but I will be darned if I can recall
[17] whether that was drinking water or inhalation. I think
[18] it was inhalation.

[19] MR. WALSH: Remember, Dr. Levinskas, you don't
[20] have to guess, okay?

[21] THE WITNESS: I don't remember the route of
[22] exposure.

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[1] BY MR. FLORIG:

[2] Q. Okay.

[3] A. There was a short-term dog study, about six
[4] months. I don't - can't clear the cobwebs. I really
[5] hit a mental block on this right now.

[6] Q. Let me ask you some specific questions, maybe
[7] that will help.

[8] Was the styrene study done about the same time
[9] as the AN study we talked about?

[10] A. Yes, about the same time.

[11] Q. Again, that was under the CMA?

[12] A. It was initiated by Dow Chemical Company, and
[13] it was picked up and incorporated into the CMA program.

[14] Q. Do you know what other companies besides Dow
[15] and Monsanto were involved, if any?

[16] A. Oh, there were probably eight or ten companies
[17] involved, Dow, Monsanto and Borg-Warner, Foster Grant.
[18] There were others, but I am not sure I could - which
[19] were on acrylonitrile or on this or on both. I really
[20] can't be sure which were on which group. But there
[21] were more companies, there were about six or ten
[22] companies in total involved.

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[1] Q. Was this study designed to determine if
[2] styrene monomer was a carcinogen?

[3] A. Yes.

[4] Q. Was a styrene monomer also known to have a
[5] TLV?

[6] A. Yes.

[7] Q. Was that known back at the time of the Cook
[8] work that you referred to earlier?

[9] A. I don't know whether it was on the Cook list,
[10] but it had been on the list for quite sometime.

[11] Q. When you say for quite sometime, do you know
[12] if it had been on the list since the 1940s?

[13] A. It had been on the list for some time, but I
[14] can't recall when it made its first appearance.

[15] Q. Do you know what the toxic effects of styrene
[16] exposure were known to be?

[17] MR. WALSH: Objection. It's vague insofar as
[18] the timeframe is involved.

[19] MR. FLORIG: You are right. Let me rephrase
[20] it.

[21] BY MR. FLORIG:

[22] Q. Was there a database available on styrene

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[1] monomer prior to your starting the study, participating
[2] in the CMA study?

[3] A. Yes, there was information available.

[4] Q. Was there also reasonable agreement on the
[5] toxic properties of styrene at that time?

[6] A. Since it was on a TLV list and that data was
[7] available, I would feel that there was reasonable
[8] agreement, yes.

[9] Q. Prior to the CMA study, what was agreed about
[10] the toxicity of styrene?

[11] A. Styrene is also a reactive chemical, it's
[12] flammable to some degree. It's a gas, or its
[13] pressurized, mostly. And the air place, workplace
[14] levels had been accepted or established by the TLV
[15] Committee.

[16] Other than its generally solvent and narcotic
[17] action, I don't recall specifics.

[18] Q. You mentioned that styrene was known to be
[19] reactive. What does "reactive" mean?

[20] A. It reacts with other chemicals and with

[21] itself, that is how it makes polystyrene.
 [22] Q. What did you mean when you said it's known to

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[1] be solvent?
 [2] A. It's a liquid, it will dissolve other
 [3] substances.
 [4] Q. Okay.
 [5] A. When it's pressurized it's a liquid.
 [6] Q. Was styrene also known to be a skin and eye
 [7] irritant?
 [8] A. Yes.
 [9] Q. Was it known to cause respiratory difficulty?
 [10] A. I don't recall that specifically, but it did
 [11] have a, an acceptable level set for its safety in the
 [12] workplace, air concentration.
 [13] Q. You mentioned the TLV Committee, and I may
 [14] have missed this earlier. What was the TLV Committee?
 [15] A. The American Conference of Governmental
 [16] Industrial Hygienists published the TLV list, so the
 [17] TLV Committee is the group within it that reviews the
 [18] data, adds to or revises the numbers on that list.
 [19] Q. Do you know when that committee came into
 [20] existence?
 [21] A. Not specifically, I don't recall the date.
 [22] Q. Was it back in the 1940s or '50s, I am trying

Page 121

[1] to get a feel for -
 [2] A. It was subsequent to Dr. Cook's initial
 [3] publication which was mid '40s. It would have been
 [4] probably in the '50s, the TLV Committee.
 [5] Q. Was styrene determined to be carcinogenic as a
 [6] result of the CMA study?
 [7] A. The conclusion of the report was somewhat
 [8] unsatisfactory in that it was not a specific
 [9] conclusion. It indicated an increased incidence or
 [10] occurrence of leukemia in female rats with some
 [11] discussion as to the difficulty of reaching a
 [12] conclusion, and I believe also concluded on the note
 [13] that the study should be repeated.
 [14] Q. Was the study ever repeated, do you know?
 [15] A. Insofar as I know, it was not.
 [16] Q. Monsanto was a major producer of styrene at
 [17] the time of the study, is that correct?
 [18] A. Monsanto was a producer. I would not
 [19] characterize it as a major producer relative to the
 [20] other companies.
 [21] Q. Was Monsanto manufacturing styrene anywhere
 [22] other than Texas City, that you know of?

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[1] A. I do not know where the manufacturing
 [2] facilities were.
 [3] Q. Do you know why the test or study was never
 [4] redone?
 [5] A. I cannot give a specific reason that I am
 [6] aware of.
 [7] Q. Do you know whether Monsanto conducted its own
 [8] study, subsequently?
 [9] A. Not on styrene.
 [10] Q. Why was the conclusion of the report viewed as
 [11] unsatisfactory?
 [12] A. I would say that when one does an experiment
 [13] to come up with an answer, if one concludes that I
 [14] can't draw a good conclusion and I must do it over
 [15] again, I would say that is unsatisfactory.
 [16] Q. Did you identify any particular problems with
 [17] the study that caused it to be inconclusive?
 [18] A. I am not aware from my knowledge of any
 [19] procedural or technical deficiencies or discrepancies
 [20] or details that would have concluded I think, the
 [21] response in animals was a weak one. It depends on how
 [22] the analysis was done, it was or was not statistically

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[1] significant against different comparisons. It just was
 [2] not a significantly strong response to reach a definite
 [3] conclusion.
 [4] Q. When you were manager of environmental

[5] assessment and toxicology at Monsanto did you have
 [6] responsibility for all of the toxicity testing going on
 [7] within Monsanto?

[8] A. Initially testing was being done by a variety
 [9] of people under a variety of circumstances. Dr. Hunt
 [10] was probably coordinating a fair part of it. After his
 [11] death, which was August I believe of '72, and it was
 [12] after that I got the title change of manager,
 [13] environmental assessment and toxicology, I was given
 [14] responsibility for toxicology testing. So
 [15] progressively we began to get more of a control,
 [16] direction, initiation of toxicity testing into the
 [17] Medical Department.
 [18] Q. All right.
 [19] A. At one time we probably were doing virtually
 [20] all the mammalian testing that was going on in the
 [21] company.

[22] Q. Was testing for toxicity being done at any

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[1] point that you were manager of waste streams from
 [2] various Monsanto plants?
 [3] A. We may have done some short-term tests, acute
 [4] toxicity tests on waste streams, I cannot specifically
 [5] recall.
 [6] Q. If they were being done, they would be done
 [7] within your general area, though, correct?
 [8] A. No, I think I have indicated that prior to Dr.
 [9] Hunt's death I really was not involved in toxicity
 [10] testing.
 [11] Q. Right.
 [12] A. Subsequently we began getting more and more of
 [13] it centralized in the Medical Department. So it is
 [14] conceivable that it was being done at early stages by
 [15] somebody else or someone else in the company, I cannot
 [16] speak to that.
 [17] Q. The only testing you recall doing may have
 [18] been some short-term testing of waste streams?
 [19] A. Yes, the stuff that I can recall was
 [20] relatively short-term testing.
 [21] Q. Do you recall what plants the testing was
 [22] being done for?

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[1] A. No, I do not. First, I did not personally
 [2] receive every sample that came in.
 [3] Secondly, samples generally came in with a,
 [4] you know, a code number or sample identity number or
 [5] something, and I would have no means of routinely
 [6] ascertaining or tracking back the specific plant site
 [7] from which it came. And I never made an effort to do
 [8] so. So I really cannot say.
 [9] Q. Do you recall ever determining whether a waste
 [10] stream from a Monsanto plant was toxic?
 [11] A. Again, without a definition or description of
 [12] toxic, or what are the criteria for using the term -
 [13] Q. Well, let's use the definition you gave me
 [14] earlier.
 [15] A. Well, if one is attempting to determine
 [16] whether a waste stream will kill or not kill aquatic
 [17] organisms such as fish, one can get a number analogous
 [18] to the LD 50, on rats, to go back to my two exam also
 [19] earlier of Malathion and Parathion. Parathion is a
 [20] statutory poison, Malathion is not.
 [21] Q. Right.
 [22] A. So in the sense that you may kill an animal or

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[1] kill an aquatic organism with the waste it would
 [2] manifest toxicity.
 [3] But whether I would consider it a toxic
 [4] chemical would depend on the concentration before I
 [5] could do that.
 [6] Q. Do you recall ever determining whether a
 [7] concentration you have a Monsanto plant waste stream
 [8] was sufficient to kill organisms that may come in
 [9] contact with it?
 [10] A. I think I have indicated that we may have run
 [11] some short-term tests and gotten results. But I don't

[12] recall specific compounds, nor do I recall specific
[13] results well enough to comment on them.

[14] Q. Why were only short-term tests conducted?

[15] A. On what?

[16] Q. On plant waste streams.

[17] MR. WALSH: Let me just note an objection. I
[18] don't think that was the testimony. Unfortunately,
[19] that is how it now sounds.

[20] But you can respond if you understand it.

[21] BY MR. FLORIG:

[22] Q. Is there anything inaccurate in the question I

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[1] asked you?

[2] A. You have asked me earlier whether we worked on
[3] tests of plant effluents. I have indicated, I believe,
[4] that those that I might have been involved in would
[5] have been short-term tests. In other and earlier
[6] testimony I had indicated that other people were doing
[7] testing at Monsanto, as well. And there could well
[8] have been other longer term tests or different tests
[9] being done by other people.

[10] And so now the question as I understand it to
[11] me is why are we only doing short-term tests with the
[12] implication that short-term tests are the only tests
[13] Monsanto has been doing on these wastes. I would I
[14] guess -

[15] MR. WALSH: Just to clarify the record, that
[16] was the basis of my objection.

[17] THE WITNESS: Yes, that I am talking about
[18] what I was involved with and what I would have some
[19] knowledge of.

[20] By focusing on that it's not meant to make any
[21] comments or statements about what the rest of Monsanto
[22] might or might not have been doing, because I don't

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[1] have specific knowledge.

[2] BY MR. FLORIG:

[3] Q. That is fine.

[4] Do you have any personal knowledge of anyone
[5] at Monsanto ever doing long-term tests of Monsanto
[6] plant effluents?

[7] A. I know that there was an environmental
[8] sciences group that was concerned with environmental
[9] effects of chemicals. The specifics of what they were
[10] doing I am not in a position to comment, I don't know.

[11] Q. You are familiar with some short-term tests of
[12] plant effluents, is that correct?

[13] A. I have indicated that among the many tests
[14] that would have gone through my group that I could
[15] consider responsible for could have included some
[16] short-term tests. I do not recall that my group worked
[17] on any extended tests.

[18] Q. Okay. Those short-term tests, you don't know
[19] what plants they came from, do you?

[20] A. I am not sure that we did any and, no, I am
[21] not sure what plants they came from.

[22] Q. You don't know what materials may have been

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[1] tested, correct?

[2] A. That's correct, I would not recall. If there
[3] were such tests, I don't recall the materials.

[4] Q. Do you recall during the period that you were
[5] the manager of environmental assessment and technology
[6] any tests being performed by Monsanto to determine
[7] whether materials were hazardous or dangerous to
[8] aquatic life?

[9] A. I have indicated that there were other people
[10] in Monsanto who were concerned with environmental
[11] effects, and they could have done such studies. I do
[12] not - I do not recall any at this time.

[13] Q. What is the environmental sciences group?

[14] A. It's another group within Monsanto that is
[15] concerned with the, I would say environmental effects
[16] of chemicals, specifically what they do in the charter
[17] I do not know.

[18] Q. Was that group in existence when you joined

[19] Monsanto?

[20] A. There were people working in the areas of
[21] environmental measurements and environmental effects.

[22] What they were called and how they were structured I do

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[1] not know, they were not part of the Medical Department.

[2] I don't really know the organization structures, how
[3] they evolved or changed with the years.

[4] Q. Did they have their own laboratory?

[5] A. Yes, they have facilities elsewhere at St.

[6] Louis.

[7] Q. In a different building from where you were?

[8] A. Yes.

[9] Q. Were they also conducting toxicity tests?

[10] A. I have indicated I am not sure what they were
[11] doing except they existed and they were working in that
[12] general area.

[13] But I don't recall specifics of what their
[14] capabilities were or what they were doing.

[15] Q. Do you recall ever exchanging any information
[16] with them?

[17] A. I am sure we talked back and forth on
[18] occasion. But as I say, I do not have enough of a
[19] detailed recollection to be sure what we talked about
[20] or when.

[21] Q. Do you recall if they ever asked your
[22] department to perform any tests or studies?

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[1] A. I have indicated that we may have done some
[2] short-term tests, some of the requests may have come
[3] from that group. At this time I can't recall.

[4] Q. Do you recall the names of any of the people
[5] working in the environmental sciences group?

[6] A. Some come to mind. One was Scott Tucker.

[7] Another was, I forget his first name, a fellow named
[8] Keller. I think Rich Kimmerle was there at that time.

[9] There were several chemists I met early when I came to
[10] Monsanto whose names I can't recall and I didn't have
[11] much contact with, but these three come to mind quite
[12] readily.

[13] Q. Do you know if one of them was the manager or
[14] director of that group?

[15] A. I don't know how, the structure of the company
[16] at that time.

[17] Q. While you were the manager of environmental
[18] assessment and technology, was the actual testing of
[19] materials performed on a contract basis?

[20] MR. FLORIG: Strike that.

[21] BY MR. FLORIG:

[22] Q. Did you use outside labs during that time?

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[1] A. Yes.

[2] Q. Did you do any testing in-house?

[3] A. I don't know about the rest of the company, we
[4] had no central testing laboratory. We did proceed to
[5] build one which became operational about 1977.

[6] Q. Was that built right on headquarters grounds,
[7] or somewhere else?

[8] A. It was built a few blocks from the Washington
[9] University Medical School in St. Louis.

[10] Q. That laboratory is Monsanto-owned?

[11] A. It's a Monsanto-owned facility, yes.

[12] Q. Prior to 1977 analysis and testing was
[13] performed by outside laboratories?

[14] A. As a chemical company Monsanto has always had
[15] excellent and extensive analytical capabilities. How
[16] much or to what extent they used outside laboratories I
[17] do not know.

[18] Q. I am talking just about your department.

[19] A. With respect to animal toxicity testing.

[20] Q. Okay.

[21] A. Insofar as I know Monsanto had no in-house
[22] capabilities prior to that.

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[1] Q. So the outside laboratory was for animal
[2] toxicity tests?

[3] A. Yes.
 [4] Q. If you wanted an animal toxicity test
 [5] performed prior to 1977, did you tell the outside lab
 [6] what material you wanted tested?
 [7] A. Yes.
 [8] Q. Did you tell them what kinds of tests you
 [9] wanted performed?
 [10] A. Yes.
 [11] Q. What exposure pathway you wanted used?
 [12] A. That was part of the test procedure, yes.
 [13] Q. The duration of the test, all those things?
 [14] A. Yes.
 [15] Q. Would you issue them some kind of written
 [16] instructions or protocol?
 [17] A. It would depend on -- it would depend on the
 [18] laboratory at the time. But there would be agreement
 [19] on what was to be done and how it was to be performed
 [20] before the studies began.
 [21] Q. Procedurally how would you be told or how
 [22] would you find out that there was a need to test a

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[1] certain material?
 [2] A. There could be several different ways. Most
 [3] would probably originate with the operating unit
 [4] because they would have a proposed use, or they would
 [5] have a desire to do something with their material. It
 [6] might require regulatory approval. So one would take
 [7] note of the regulatory wishes.
 [8] There could be any external factor which would
 [9] raise a question and to whom the question occurred
 [10] might or might not filter back down somehow and prompt
 [11] a review of the situation.
 [12] Q. Would an external factor be perhaps a
 [13] complaint from someone who had come in contact with a
 [14] material?
 [15] A. I suppose that could be a stimulus, yes.
 [16] Q. Or a complaint that a material had allegedly
 [17] caused a fish kill?
 [18] A. I don't recall being approached with the, an
 [19] allegation that a fish kill had happened and,
 [20] therefore, we should do something about it, I don't
 [21] recall having that sort of situation brought to me.
 [22] Q. Would those external complaints or ex Monsanto

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[1] complaints be the kinds of external factors you are
 [2] thinking about?
 [3] MR. WALSH: Objection to the form of the
 [4] question, vague, confusing.
 [5] A. I guess the fact that a question is raised
 [6] about a chemical, there may be adequate information
 [7] available to understand and, you know, it may be that
 [8] the statement that something happened is well known and
 [9] it's almost to be expected under the conditions every
 [10] misuse or the accident which occurred.
 [11] So the fact that a question is raised of
 [12] itself does not necessarily mean that one has to crank
 [13] up and initiate a, an investigation. You know, one
 [14] takes that statement and considers it in what is known
 [15] and it may be a plausible, logical, understandable,
 [16] almost expected consequence of what happened, in which
 [17] case one would do nothing.
 [18] Or it may be that one would decide that one
 [19] should at least consider doing something further. So I
 [20] am not sure that there is a fixed answer.
 [21] BY MR. FLORIG:
 [22] Q. What kinds of requests would you get from

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[1] operating units to conduct toxicity testing?
 [2] A. I don't know that we received requests as such
 [3] for toxicity testing.
 [4] I will go back and make the comments I made
 [5] about the environmental assessment procedure. For
 [6] manageability purposes, when a new product or new use
 [7] came up of existing products, we would look at this and
 [8] make recommendations to the operating unit for the
 [9] kinds of testing that should be done to reassure

[10] ourselves that their proposed programs would be
 [11] acceptable, assuming that the data we developed would
 [12] support their aims.
 [13] Later on we began a more general review of our
 [14] other products, existing products, on the basis that,
 [15] as I have indicated, the criteria, the definition of
 [16] safety had been expanded by the public at large to see
 [17] whether we should increase or strengthen, develop
 [18] further data on existing products.
 [19] So most of the time, and the
 [20] acrylonitrile/styrene programs would be an example of
 [21] this, we went back to the operating units and made a
 [22] suggestion to them that they should consider doing more

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[1] work, which they in turn would have to fund. And they
 [2] did.
 [3] Again, there may have been some circumstances
 [4] when they came in and said we would like you to do
 [5] something for a specific reason, but I don't really
 [6] recall that they did this. They might have come in and
 [7] talked about the question, said we ought to do some
 [8] further studies or consider doing further studies.
 [9] Again, over the years with the number of
 [10] things that happened, they may have come in and asked
 [11] us to do a specific test, but I cannot specifically
 [12] recall it.
 [13] Q. Some of your testing was done to meet
 [14] regulatory requirements?
 [15] A. Yes.
 [16] Q. Would the request for those toxicity tests
 [17] come from the regulators, or initiate within Monsanto?
 [18] A. No, they would come --
 [19] Let me add one possible qualification to what
 [20] I just said. If the pesticide people wanted to go for
 [21] a specific crop use they would have some idea of what
 [22] the regulations required to get that, the kinds of data

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[1] that had to be submitted to support that registration.
 [2] So they might come in and say we need these tests
 [3] because we want to register compound X for use P.
 [4] The people who make the products, generally
 [5] they are quite familiar with what criteria, what
 [6] regulations if any exist regarding their products. And
 [7] so when they feel that they want to go for one of those
 [8] goals then we would begin discussions as to scheduling
 [9] tests, target dates, so forth to come up with those
 [10] data.
 [11] Q. Okay. Going back to the outside laboratories
 [12] that Monsanto used for animal toxicity testing prior to
 [13] 1977, do you recall the names of those labs?
 [14] A. Well, there are lots of laboratories that
 [15] Monsanto has used off and on. I am not sure I could
 [16] recall them all, I am not sure I am aware of them all.
 [17] We used an industrial, Industrial Bio Test
 [18] Laboratories. We used the Younger Laboratories. I
 [19] believe they had used in the past Hazelton
 [20] Laboratories, and there was a Shelanski Laboratories
 [21] that we were probably -- those were probably the ones
 [22] being actively used about the time I joined the

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[1] company.
 [2] Q. Did you stop using those laboratories when
 [3] Monsanto's laboratory was built?
 [4] A. No.
 [5] Q. Did you continue to use all four, even after
 [6] your own laboratory was built?
 [7] A. Industrial Bio Test Laboratories no longer
 [8] exists, so we know longer use it.
 [9] Our laboratory was designed to handle a
 [10] substantial portion, but not all of the toxicity
 [11] testing that we anticipated when it was built, so that
 [12] there was the intention we would always have some
 [13] outside work.
 [14] Q. Did you let the outside labs know why you
 [15] wanted particular materials tested or why you wanted
 [16] the tests that you requested performed?

[17] A. I don't know what the practice was prior to my
[18] coming. In some cases we probably did, in others we
[19] probably did not.

[20] Q. Okay.

[21] A. We would tell them what we knew about the
[22] handling hazards so they could protect themselves and

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[1] their personnel.

[2] Q. That was a uniform practice?

[3] A. Yes.

[4] Q. Did you ever tell the laboratories what kind
[5] of results you would like to see?

[6] A. No.

[7] Q. During the period that you were manager did
[8] you have direct contact with regulatory agencies?

[9] A. I had some.

[10] Q. Do you recall what those contacts were in
[11] reference to?

[12] A. Some were in connection with pesticide
[13] registrations and some were dealing with the food and
[14] drug administration regarding indirect food additives.
[15] And there also were some dealing with the proposed
[16] plastic soft drink bottle, which is basically food
[17] additives.

[18] Q. Your contacts with the regulators were limited
[19] to pesticides and additives?

[20] A. Most of it was that. There may have been a
[21] few other contacts later on, but substantially those
[22] are the two areas.

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[1] Q. Sometime in the late 1970's or early 1980s you
[2] became director of environmental assessment and
[3] toxicology, is that correct?

[4] A. Yes.

[5] Q. You stayed in that position until 1986?

[6] A. Yes.

[7] Q. Your duties were basically the same as those
[8] of manager but with a somewhat larger staff?

[9] A. I would say substantially that's correct.

[10] Q. Did you pick up any additional duties as
[11] director?

[12] A. Not that I can recall. It just seemed an
[13] intensification and enlargement of what we were doing.

[14] Q. During the period you were director do you
[15] recall any other joint ventures under the aye species
[16] of the CMA?

[17] A. Initially I was largely involved with,
[18] personally involved with the acrylonitrile and styrene.
[19] In later years I was less involved and others
[20] participated. I am not sure whose auspices, CMA or
[21] some other, but we have been involved in the
[22] Chlorobenzene Producers Association, or people who

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[1] worked for me were involved in the Chlorobenzene Users
[2] Association.

[3] We had a - I guess that's really the only
[4] other big one I can recall.

[5] Q. Do you remember any studies being conducted by
[6] the Chlorobenzene Producers Association?

[7] A. That is the reference I just made,
[8] Chlorobenzene Producers Association, the testimony I
[9] just said.

[10] Q. Right. Do you recall any studies that they
[11] did?

[12] A. I was pretty much out of the toxicology
[13] testing business at that time and I really don't recall
[14] specifics on the studies that they were doing.

[15] Q. Chlorobenzene Producers Association is a trade
[16] association?

[17] A. It's a trade association, I am not sure under
[18] whose auspices. Whether it's the Chemical
[19] Manufacturers or some other trade association, I don't
[20] recall.

[21] Q. You don't recall Monsanto participating in any
[22] studies in conjunction with that association?

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[1] A. Right. I have indicated that I know Monsanto
[2] participated in that group, it may still be a
[3] participant since I left, I don't know. I do not
[4] specifically recall the kinds of testing they were
[5] engaged in, I was not directly involved. But I do know
[6] we did belong to it.

[7] Q. What was your next job after being director of
[8] environmental assessment and toxicology?

[9] A. I was named the senior toxicology consultant.

[10] Q. How long did you keep that title?

[11] A. From the beginning of 1986 until I retired at
[12] the end of September, 1991.

[13] I did say '86, didn't I?

[14] Q. Yes.

[15] A. Yes, '86 to '91.

[16] Q. What were your duties as senior toxicology
[17] consultant?

[18] A. At that time with structural reorganizations
[19] the group I had headed was broken into two. One group
[20] was transferred to the agricultural company on work on
[21] pesticides, the other remained corporate to work on
[22] industrial chemicals. My duties were, I must say,

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[1] quite enjoyable personally. I had no administrative
[2] responsibilities.

[3] Q. That is always a nice touch.

[4] A. I had no budgets to worry about. I was there
[5] to act as a resource in terms of educating, assisting
[6] the younger toxicologists.

[7] I was attempting to keep these two separate
[8] toxicology groups consistent, that they didn't start
[9] going off in contradictory manners and so forth, since
[10] we were talking judgments, to try to keep a
[11] consistency.

[12] Q. Just a second. Are you talking about a
[13] consistency in procedures?

[14] A. In procedures, in the way we look at things.

[15] Q. Okay.

[16] A. I wouldn't want two parts of Monsanto talking
[17] out of its mouth in two different ways. And we would
[18] keep posted so we would have a consensus as to how we
[19] viewed things, and we expressed things, tried to use
[20] language in a similar manner that we would be
[21] consistent.

[22] And that if we got new information which

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[1] caused us to change our thinking, that we should do
[2] that consciously and that we all agreed we would make a
[3] change in our thinking.

[4] And since we also had in other areas of the
[5] company a fair number of new people, it was as I say to
[6] render what assistance I could to strengthen, to
[7] reinforce, to educate people throughout the department.

[8] MR. FLORIG: We have been going for an hour or
[9] so, do you want to take another short break?

[10] MR. WALSH: Sure.

[11] (Recess.)

[12] MR. FLORIG: Back on the record.

[13] BY MR. FLORIG:

[14] Q. Dr. Levinskas, are you receiving a pension
[15] from Monsanto?

[16] A. Yes.

[17] Q. Can you explain to me the difference between
[18] acute, subacute and chronic toxicity?

[19] A. They are very general terms. I would refer to
[20] acute as either single doses or would possibly include
[21] a few doses over a short period of time.

[22] Subacute in my definition would be anything of

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[1] greater intensity than acute up to six months duration.

[2] And I would then consider anything over six
[3] months duration as chronic.

[4] Now those are again somewhat subjective,
[5] others may not quite recognize those same limits.

[6] Q. Generally, whether they use the same time
[7] periods are not, those are terms that are understood

[8] within the industry, correct?
 [9] A. Right.
 [10] Q. Subacute is a dose of greater intensity than
 [11] acute?
 [12] A. No, it's, the duration of dosing.
 [13] Q. Right.
 [14] A. It's a longer duration of dosing.
 [15] Q. Subacute refers to the time period, not the
 [16] dose level?
 [17] A. Right, the interval.
 [18] Q. Does a thorough toxicity evaluation of a
 [19] material include all three kinds of tests?
 [20] A. I guess it depends on how one wants to define
 [21] "thorough," what you mean by "thorough." I guess I
 [22] would say it could but it need not include all three.

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[1] Q. Can you tell me in what circumstances it might
 [2] not include all three kinds of toxicity tests?
 [3] A. I would go back again to the concepts of use,
 [4] who was using it, how was he or she using it, what
 [5] levels are they using it at.
 [6] I think that, say some chemical with a very
 [7] minor use, casual, minor use, the definition of
 [8] thorough evaluation would be different than say a food
 [9] additive intended for wide scale consumption by large
 [10] segments of the population.
 [11] Q. Okay.
 [12] A. So that in some special cases or some
 [13] situations very little testing might be adequate,
 [14] sufficiently thorough to reassure one of the safe use
 [15] of the product, whereas in other cases that same amount
 [16] of testing would be quite inadequate.
 [17] Q. For an industrial worker working within a
 [18] chemical company within a particular operating unit
 [19] doing that week after week after week, would you want
 [20] to do all three kinds of toxicity tests for materials
 [21] that worker may be exposed to?
 [22] A. I think I would go back to some variation of

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[1] what I just said. There may be times when you would
 [2] want to; there may be times when it would not appear to
 [3] be necessary.
 [4] Q. If it was known that that worker was being
 [5] exposed to a chemical in some quantity during his or
 [6] her work, would you then run all three, want all three
 [7] kinds of tests to be done?
 [8] A. I think one would have to consider the
 [9] quantity, the frequency, the availability,
 [10] non-availability of protective equipment, a variety of
 [11] things.
 [12] I would go back. I do not see that there is a
 [13] single procedure or testing regimen that one says I
 [14] would always follow and this is what I would always
 [15] want to do and this is what I would always want to see
 [16] before I did something. I do not subscribe that that
 [17] is a necessary practice.
 [18] Q. What's the purpose of an acute toxicity study?
 [19] A. A major use of it is to provide labeling,
 [20] precautionary labeling for a product, raw material. It
 [21] is also used predictively of the effects, possible
 [22] potential effects of responses of a person exposed to

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[1] relatively large doses. So that if a worker, lab
 [2] worker drops a bottle and it breaks, is it likely to be
 [3] a cause for serious alarm or something relatively
 [4] harmless.
 [5] But its single biggest use I would say is for
 [6] labeling of a product, which in turn conveys safety
 [7] information to the potential user.
 [8] Q. What's the purpose of a subacute toxicity
 [9] study?
 [10] A. It's used to see if there are responses that
 [11] can occur from repeated exposures at considerably lower
 [12] doses in most cases that would not have manifested
 [13] themselves from a single exposure.
 [14] Q. And the purpose of a chronic toxicity study?

[15] A. I would say it's essentially a repetition of
 [16] what I said for subacute. It's of longer duration,
 [17] again, of lesser intensity of exposure, lesser degree
 [18] of exposure to see if there are other effects that have
 [19] not been seen earlier.
 [20] Q. Have you been employed since you retired from
 [21] Monsanto?
 [22] A. I have been asked by two different people

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[1] outside Monsanto to do a little bit of consulting work,
 [2] which I have elected to do. I am not actively seeking
 [3] consulting, and except for calls such as this from
 [4] Monsanto and the two companies I made reference, the
 [5] little bit of work I have done with, I have not been
 [6] employed.
 [7] Q. What's the nature of the consulting work you
 [8] are doing on those two jobs?
 [9] A. One is that they have a proposed food
 [10] additive, and I was asked to assist them in drafting
 [11] their petition reviewing some information form.
 [12] The other is a product liability case, and
 [13] because of work I had done years ago I have been asked
 [14] to testify to the toxicity of a material.
 [15] Q. What material is that?
 [16] A. It happens to be a chemical called
 [17] tetramethylsuccinonitrile,
 [18] t-e-t-r-a-m-e-t-h-y-l-s-u-c-c-i-n-o-n-i-t-r-i-l-e.
 [19] Q. Are you still doing that consulting, or are
 [20] those jobs complete?
 [21] A. They are both in a hiatus now. They may be
 [22] complete, I may be called back on them later. I do not

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[1] know at this time.
 [2] Q. You have been a member of a number of
 [3] professional societies throughout your career, correct?
 [4] A. Yes.
 [5] Q. From your resume I will just read several of
 [6] them and you can tell me what your participation is in
 [7] those societies.
 [8] What is the Society of Toxicology?
 [9] A. That was organized in 1961. Until then
 [10] toxicology had been a more generalized part as I have
 [11] indicated of the occupational medicine, occupational
 [12] health background.
 [13] There were people who decided that we should
 [14] have our own society. It was organized in 1961, and I
 [15] was one of a hundred or so charter members.
 [16] Q. Was anyone from Monsanto a member of that
 [17] society?
 [18] A. The late Dr. Hunt was a member of it.
 [19] Q. Was he also a charter member?
 [20] A. I can't swear to it, but he may have been.
 [21] Q. Have you held any officerships or leadership
 [22] positions within that society?

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[1] A. I am a member of several committees throughout
 [2] the years. There was a not too well named Toxicology
 [3] Committee at one time, and there was a Technical
 [4] Committee and a Membership Committee that I have served
 [5] on. And I have been chairman of the latter two, the
 [6] Membership Committee and the Technical Committee.
 [7] Q. Does that society issue any publications?
 [8] A. It sponsors two. One is Toxicology and
 [9] Applied Pharmacology, and the other is Fundamental and
 [10] Applied Toxicology. Those are regular periodicals.
 [11] It does issue abstracts for its annual
 [12] meetings under, I believe they are in a separate
 [13] monograph referred to as The Toxicologist.
 [14] Q. Those abstracts discuss particular chemicals
 [15] or compounds?
 [16] A. They are studies which may deal with chemicals
 [17] or with procedures, in some cases even with regulatory
 [18] issues.
 [19] Q. Has any of your work ever been published in
 [20] any of those publications?
 [21] A. I believe I have a paper or more in each of

[22] those.

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- [1] Q. Do you recall what the topics were for those
[2] papers?
[3] A. I can't recall specifically which journals and
[4] which topics, but some of those would probably go back
[5] to my days at, probably started when I was at the
[6] University of Pittsburgh, over the years.
[7] Q. You were a member of the American Industrial
[8] Hygiene Association?
[9] A. Yes.
[10] Q. Do you know when you became a member of that
[11] organization?
[12] A. Probably about 1955.
[13] Q. What kind of issues is that association
[14] involved with?
[15] A. At that time that was basically the technical
[16] society, or the professional society for people with an
[17] interest in occupational health. It consisted of
[18] hygienists, physicians, toxicologists, health
[19] physicists, ergonomics.
[20] Q. Did you stay a member of that association
[21] until you retired from Monsanto?
[22] A. Yes.

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- [1] Q. Is the same true for the society of
[2] toxicology?
[3] A. Yes.
[4] Q. Other than yourself, was anyone from Monsanto
[5] a member of the American Industrial Hygiene
[6] Association?
[7] A. Mr. Wheeler is a past president of the
[8] association. I believe Jack Garrett has been a long
[9] time member. Several of the more recent additions at
[10] Monsanto would be members.
[11] Q. Did you hold any positions of leadership
[12] within that organization?
[13] A. I was chairman of the Pittsburgh section of
[14] the national society, and I have served as a member of
[15] its Technical Committee, of its Hygienic Guides
[16] Committee. And I think I was on its education, I think
[17] that is the one I was on the Education Committee for
[18] awhile.
[19] Q. Does that association issue any publications?
[20] A. Yes, I made reference earlier to the American
[21] Industrial Hygiene Association Quarterly, which has
[22] been changed to the Journal of Industrial Hygiene. It

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- [1] also publishes several monographs dealing with
[2] different phases of industrial hygiene and assorted
[3] pamphlets and booklets.
[4] Q. Did they also publish abstracts?
[5] A. They publish abstracts in connection with
[6] their annual meeting, the presentations for the annual
[7] meetings.
[8] Virtually every article published in their
[9] journals does have an abstract early on, at the
[10] beginning of the published article.
[11] Q. When did you become a member of the American
[12] Chemical Society?
[13] A. Probably 1950 or '51. It was after I finished
[14] college, before I left graduate school.
[15] Q. Did you remain a member of that society until
[16] you retired from Monsanto?
[17] A. Yes.
[18] Q. Did you hold any leadership positions within
[19] that society?
[20] A. I was on the board of directors and I was the
[21] chairman of the Trenton, New Jersey, section of the
[22] society.

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- [1] Q. That's not an organization specifically
[2] concerned with toxicology or industrial hygiene, is it?
[3] A. No.
[4] Q. What prompted your membership in that society?
[5] A. I think I indicated at the beginning that, as

- [6] a major in chemistry, the courses we took were, the
[7] course I took was adequate to be certified as a chemist
[8] by the American Chemical Society. Having successfully
[9] completed that course, having been given a certificate
[10] saying I was a, quote, knowledgeable chemist, it was
[11] among the earliest of the professional societies that I
[12] decided to join.
[13] Q. Were you active in the society?
[14] A. With the exception of local affairs such as I
[15] have made reference to the Trenton section, I was not
[16] active beyond the local section.
[17] Q. Does the American Chemical Society issue any
[18] publications?
[19] A. Several.
[20] Q. Do you remember if any articles or abstracts
[21] concerning toxicity have been published in their
[22] publications?

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- [1] A. I cannot recall specific articles that are
[2] published in that. They tend to be more heavily
[3] weighted towards chemistry. There could be toxicology
[4] data, but I do not recall.
[5] Q. Have you ever been published in their
[6] publications?
[7] A. No.
[8] Q. You were a member of the Manufacturing
[9] Chemists Association?
[10] A. I served on several of its committees and task
[11] forces.
[12] Q. Those task force, were conducting or
[13] supervising toxicity testing of bulk chemicals?
[14] A. We made reference earlier to the acrylonitrile
[15] and styrene task forces.
[16] Q. Yes.
[17] A. Those are two specific ones that were under
[18] CMA auspices.
[19] Q. The Manufacturing Chemists Association, is
[20] that the same thing as the Chemical Manufacturers
[21] Association?
[22] A. Yes, the - MCA, Manufacturing Chemists

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- [1] Association was the earlier title.
[2] Q. Thank you.
[3] A. Currently some time back they changed their
[4] name to the current title, Chemical Manufacturers
[5] Association.
[6] Q. That straightens that out and reduces a few
[7] questions.
[8] (Pause.)
[9] MR. FLORIG: Why don't we break for the day
[10] and pick up at 9:30 tomorrow morning.
[11] (Whereupon, the deposition was recessed for
[12] the day at 4:05 p.m., to resume at 9:30 a.m. the
[13] following day, Wednesday, December 23, 1992.)
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[15]
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- [1] ACKNOWLEDGMENT OF DEPONENT
[2] I, GEORGE J. LEVINSKAS, hereby acknowledge that I
[3] have read and examined the foregoing pages of my
[4] deposition and that:
[5] (Check appropriate box.)
[6] () the same is a true, correct and complete
[7] transcription of the answers given by me to
[8] the questions therein recorded.
[9] () except for the changes noted in the attached
[10] Errata Sheet, the same is a true, correct and
[11] complete transcription of the answers given
[12] by me to the questions therein recorded.

[13]
[14] Date Signature of Witness
[15] Subscribed to and sworn before me.
[16] this day of , 19
[17]
[18] Notary public in and for the
[19] My commission expires:
[20]
[21]
[22]

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[1] Certificate of Reporter)
[2] United States of America) ss.
[3] District of Columbia)
[4] I, CRAIG L. KNOWLES, the officer before whom
[5] the foregoing deposition was taken, do hereby certify
[6] that the witness whose testimony appears in the
[7] foregoing deposition was duly sworn by me; that the
[8] testimony of said witness was taken by me to the best
[9] of my ability and thereafter reduced to print under my
[10] direction; that I am neither counsel for, related to,
[11] nor employed by any of the parties to the action in
[12] which this deposition was taken and, further, that I am
[13] neither a relative nor an employee of any attorney or
[14] counsel employed by the parties thereto nor financially
[15] or otherwise interested in the outcome of this action.
[16] Witness my hand this 25th day of December, 1992.
[17]
[18] Notary Public in and for
[19] the District of Columbia.
[20] My Commission Expires October 31, 1994:
[21]
[22]

Look-See Concordance
Report

2,277 UNIQUE WORDS
386 NOISE WORDS
24,444 TOTAL WORDS

SINGLE FILE
CONCORDANCE

CASE SENSITIVE

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19	16	"INTENDED" CONVEYS PURPOSE OF RESEARCH
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50	5	SPELLING
52	9	CLARIFY PHRASING
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