

SUPERIOR COURT OF NEW JERSEY
LAW DIVISION: MIDDLESEX COUNTY
DOCKET NO. L-060148-87

JOHN PETERSON and
SHIRLEY MAE PETERSON,

Plaintiffs,

vs.

UNION CARBIDE CORPORATION,

Defendants.

DEPOSITION UPON
ORAL EXAMINATION OF:
BURTON DAVIDSON

TRANSCRIPT of the deposition notes of
BURTON DAVIDSON, witness called for oral Examination in
the above-entitled action, said deposition being
conducted pursuant to the Rules Governing Civil
Practice in the Superior Court of New Jersey, by and
before LYNDA A. COPLON, a Notary Public and Certified
Shorthand Reporter of the State of New Jersey, License
No. 170849, at the offices of LEVINSON, AXELROD,
WHEATON & GRAYZEL, ESQS., 2 Lincoln Highway, Edison, New
Jersey, on Tuesday, October 24, 1989, 1989, commencing at
10:15 a.m.

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1 A P P E A R A N C E S:

2 LEVINSON, AXELROD, WHEATON & GRAYZEL, ESQS.
3 BY: ALFRED A. LEVINSON, ESQ.
4 Attorneys for Plaintiff

5 PITNEY, HARDIN, KIPP & SZUCH, ESQ.S
6 BY: ROBERT L. HOLLINGSHEAD, ESQ.
7 Attorneys for Defendant

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1 BURTON DAVIDSON, having been first duly sworn
2 according to Law by the Officer, testifies as follows:

3
4 DIRECT EXAMINATION BY MR. HOLLINGSHEAD;

5
6 Q. Good morning, Dr. Davidson. For the
7 record let me introduce myself. I'm Robert
8 Hollingshead. I'm with the firm of Pitney, Hardin,
9 Kipp & Szuch. We represent the defendant Union Carbide
10 Corporation in this matter that was instituted by Mr.
11 and Mrs. Peterson and in which you've rendered an
12 expert opinion.

13 Now, my understanding from my own experience as
14 well as other experiences with my firm is that you have
15 been deposed a number of times over the course of your
16 career. Is that correct?

17 A. Correct.

18 Q. So I don't think we need to go
19 through all of the instructions. Let me give you a you
20 couple. If you will, please allow me to finish my
21 question before you start your answer and I'll give you
22 the courtesy of allowing you to finish your answer. If
23 Mr. Levinson should object to any of my questions
24 please wait until his objection is on the record and we
25 hash it out and at that point follow his instruction.

1 All your answers must be verbal, if you would
2 and if it becomes appropriate that I need your best
3 recollection as compared to an estimate with regard to
4 anything, please provide me with your best
5 recollection. If it is an estimate, please tell me
6 it's an estimate and if you're not sure please tell me
7 that as well. It's sometimes as helpful as a complete
8 answer. Any questions?

9 A. No.

10 Q. You've been good enough to provide my
11 with your biographical sketch which we'll have marked.
12 I think it will assist us considerably.

13 MR. HOLLINGSHEAD: Let's mark
14 it as Davidson-1.

15 (Biographical sketch is
16 received and marked Davidson-1 for identification.)

17 (Expert's report is
18 received and marked Davidson-2 for identification.)

19 (Notice to take depositions is
20 received and marked Davidson-3 for identification.)

21 Q. Dr. Davidson, as we were chatting
22 before the deposition started, I took your deposition
23 back in 1979 in a case also involving the Amboy
24 Terminalizing Company and at that point at that time I
25 went through your background quite extensively. So

1 what I would like to do is to update that testimony
2 that's already in the record.

3 MR. LEVINSON: Before we go
4 any further, let me ask you this: I looked for
5 his old deposition in his prior cases and I
6 couldn't find it. Do you have a copy of it?

7 MR. HOLLINGSHEAD: I have the
8 original with me.

9 MR. LEVINSON: Is it a thick
10 one?

11 MR. HOLLINGSHEAD: Yes, it's
12 200 pages.

13 MR. LEVINSON: Can I get it
14 photostated while you take his deposition. Go
15 ahead. They're all his or somebody else's?

16 MR. HOLLINGSHEAD: That's just
17 him.

18 MR. LEVINSON: Okay. I'll
19 make a copy. Go ahead.

20 Q. Dr. Davidson, would you starting
21 around 1978, '79 provide me with your employment
22 history, referring to your CV or biographical sketch,
23 if you'd like.

24 A. Yes, in 1978 I became chairman of the
25 department of chemical and biochemical engineering at

1 Rutgers, the State University and have continued in
2 that capacity to this date. I'm still chairman of the
3 department and I'm still teaching basically the same
4 courses with the addition of a new course which I
5 introduced about three years ago called chemical
6 systems safety and health engineering management.

7 Q. Chemical systems safety --

8 A. And health engineering management. I enclosed
9 an outline of the course in the back of the CV, I
10 think.

11 Q. When did that course -- when was that
12 course first given by you?

13 A. The subject matter of the course was given by
14 me since I've been at Rutgers back in 1964. It took a
15 final structure and became a formal course required ¹⁹⁸⁹
16 credits for graduation a little over two years ago. ¹⁹⁸⁷

17 Q. What is the general subject matter of
18 the course, other than what I gather from the title?

19 A. The title basically says it all. It covers --
20 it's a comprehensive course. Certainly interdispensary
21 in its philosophy and covers process safety
22 engineering. It covers industrial hygiene and
23 toxicology, not from a medical point of view but
24 strictly from a safety engineering requirement point of
25 view. It covers chemical laboratory safety and covers

1 environmental impact and environmental safety, both in
2 a plant environment and also in the social environment.
3 It's a 1.5 credit course and it is required for
4 graduation by all my students.

5 Q. The students that you're referring to
6 would be graduating with a Bachelor of science in --

7 A. Chemical engineering.

8 Q. What other courses are you currently
9 teaching at Rutgers?

10 A. That course I am currently teaching, that's a
11 fall course, of each year. In addition to that, this
12 semester I was teaching -- we do a lot of team
13 teaching. I was team teaching, am team teaching a
14 graduate engineering mathematics course called methods
15 of chemical engineering analysis. It's a graduate
16 course.

17 Q. What do you mean by team teaching?
18 Are you sharing --

19 A. Yes, we like to have two professors teach
20 certain courses whenever it's required. It's not
21 always done that way. My department is a very large
22 research oriented program and my faculty have lots of
23 research and to give them enough windows of opportunity
24 to do their research we like to do team teaching to
25 alleviate the teaching load and it works out. In this

1 case I'm team teaching with another professor, this
2 math course. I'm teaching the first half which just
3 completed and he's teaching the second half. First
4 half was analytical methods, second are numerical
5 computer methods.

6 In addition to that, in the springtime I teach
7 a course in process systems analysis and control which
8 is a required course for graduating seniors in my
9 department. I'm also team teaching that course with
10 another professor.

11 Q. What's involved in that course?

12 A. It's the design and analysis of control systems
13 automatic control systems both analogue and digital on
14 line control systems for chemical processes.

15 Q. What is your current teaching load
16 this fall semester?

17 A. The two courses I just mentioned, the safety
18 course and a graduate math course and in the spring it
19 will be the control course but in addition to that I
20 teach the freshman orientation lectures to the freshman
21 engineering students representing my department. We
22 have about six or 700 freshman engineers and they don't
23 declare their major until February of the freshman
24 year. So each department has a chance to give an
25 orientation lecture and I give seven such 80 minute

1 lectures, that's an additional teaching load, and in
2 addition to that, I'm an invited lecturer in the
3 industrial engineering department and in the ceramics
4 department where I give lectures on safety engineering
5 to their students since those departments don't have a
6 formal safety course.

7 Q. Is that load that you just described
8 typical of your teaching load over say the past five
9 years or so?

10 A. Since I became chairman, that's typical of my
11 teaching load, formal in class. I do considerably more
12 than that informally since I am the department chairman
13 I walk around the department in a three story complex
14 all the time lecturing students on hygiene, safety,
15 cleanliness and every other aspect because I feel I'm
16 responsible.

17 Q. You mean in the hall or --

18 A. It's a dynamic daily process. I always find
19 something wrong every day and I consider that extension
20 of my teaching responsibilities, in-house.

21 Q. When you appear in a litigation as
22 you appear in this litigation do you appear in your
23 capacity as the chairman of the department of
24 chemistry --

25 A. Chemical and biochemical engineer.

1 Q. Do you appear in that capacity?

2 A. No.

3 Q. Do you -- is there -- strike that.
4 What capacity could you appear in?

5 A. I'm a licensed professional engineer in the
6 State of New Jersey and I appear as an independent
7 consultant in the area of process safety engineering
8 and I have my own letterhead and my office is my home.

9 Q. Have you incorporated yourself in
10 order to do any of this work in any other litigation?

11 A. No.

12 Q. Do you employ any individuals to
13 assist you in your capacity as an expert witness in any
14 of these litigations, including this one that you're
15 in?

16 A. I don't employ anyone other than perhaps
17 occasionally I might use some typing services but I do
18 do collaborative work as required if I feel assistance
19 in certain technical areas are needed, I will advise
20 the person who employed me to employ a collaborator to
21 create a team of experts if it's required.

22 Q. At the present time can you estimate
23 for me the number of litigations in which you are
24 currently appearing as an expert, that would mean those
25 that are still pending?

1 MR. LEVINSON: Those are
2 pending?

3 MR. HOLLINGSHEAD: Yes.

4 MR. LEVINSON: Okay.
5 Including this one?

6 MR. HOLLINGSHEAD: Yes.

7 A. This will only be an estimate because I really
8 don't have any hard facts on what has been concluded
9 and what has not.

10 Q. I understand that.

11 A. Probably a half a dozen to maybe eight.

12 Q. Over the course of the past say five
13 years is it typical for you to be in six, eight or
14 their abouts, that number of litigations at one time?

15 A. In the last five years which has been
16 considerably heavier than in the previous five years
17 but I still throttle it down to approximately four days
18 a month and that often translates into a half dozen
19 ongoing cases. I really can't handle more than that
20 because it's not my primary duty. My primary duty is a
21 full time job at Rutgers and I have to do this on my
22 own time. So I'm limited by time. I'm at saturation
23 at four to five days a month.

24 Q. Is that the time you set aside for
25 your independent consulting work with respect to

1 litigation?

2 A. Yes, and I set it aside and Rutgers encourages
3 that also, but they limit that to about four or five
4 days. In fact, five days is the actual requirement.

5 Q. Is that an actual agreement with the
6 university?

7 A. Not really. The board of governors say that if
8 you keep it to five or less you don't have to report
9 your activities to the person in charge which would be
10 a department chairman or Dean. If it's over five,
11 you're required to volunteer your list of activities
12 and -- so I keep it less than five for two reasons.
13 That's one and the other reason I can't physically
14 handle more than that.

15 Q. What is the general nature of the six
16 or eight pending cases that you have now?

17 A. Basically it's in the area called safety
18 engineering and that of course covers exposure to toxic
19 chemicals, fires and explosions and I would say 90
20 percent of my consulting experiences have been in areas
21 of fires, explosions and fugitive emissions of toxic
22 materials that are both toxic and flammable. There may
23 be a toxic problem with fugitive emissions or may be an
24 explosive problem with emissions. That generally
25 covers and in that context we have of course warnings

1 and instructions and that type of safety concern.

2 Q. When you have a fire or an explosion
3 as a subject of the litigation, is it still involved
4 with toxic chemicals or the emission of toxic fumes in
5 that fire or explosion?

6 A. I have had situations where the fire and the
7 toxicity occurred simultaneously; the toxicity a result
8 of the burning of some organic material or inorganic
9 material where firemen could not fight the fire because
10 the fumes were so toxic. You have a synergism
11 between --

12 Q. My question is not clear. You're not
13 rendering opinions with regard to the cause of the fire
14 or explosion. You're rendering an opinion as to the
15 effects upon individuals who were exposed to the fumes
16 during the course of it. Is that correct?

17 A. No, not at all. My approach is holistic. It
18 covers the origin, to and including effects on property
19 and people.

20 Q. These would be chemical fires,
21 though?

22 A. Mostly chemical, yes.

23 Q. For instance, you would not be giving
24 an opinion on the mechanical start or ignition of a
25 fire at some point?

1 A. Ignition, yes, static electricity, auto
2 ignition, catalytic ignition. There's a variety of
3 ways in which ignition could occur. Yes, that's
4 certainly part of the fire triangle analysis that you
5 have to go through to find out the origin and
6 propagation of a fire, yes.

7 Q. Of the six to eight pending cases
8 that you have now, do any of them deal with the subject
9 matter of the polyvinyl chloride or vinyl chloride
10 monomer?

11 A. No.

12 Q. In --

13 A. But I say that with that one reservation.
14 There have been some experiences I've had in the recent
15 past where I don't know if it's been concluded I think
16 because so much time has flown by, my guess is it's
17 been concluded.

18 Q. I was just coming to that. I alluded
19 earlier to a matter that you were involved in back in
20 the late 1970s by the name of Meliko which was a case
21 involving polyvinyl chloride and/or vinyl chloride
22 monomer. Since that point in time, 1979 or
23 thereabouts, have you been involved in other
24 litigations in which you have rendered an opinion
25 regarding PVC or VCM?

1 A. Yes.

2 Q. Can you tell me how many
3 approximately?

4 A. Other than the subject one of today's
5 deposition, one other.

6 Q. What do you recall about that, how
7 long ago was it?

8 A. I'm estimating because I -- my file is gone on
9 this and a lot of my file on Meliko also because I
10 cleaned up my office a number of years ago, but I
11 recollect -- I know for a fact it was a fugitive
12 emmision problem dealing I believe it was B.F. Goodrich
13 plant in south Jersey. I would say around '80, '81.

14 Q. What law firm got you involved in
15 that case?

16 A. It was Brown, Connery, Culp. I think it was
17 William Cook was the particular individual, I think,
18 that retained my services.

19 Q. Were they representing the plaintiffs
20 in that case?

21 A. I believe so.

22 Q. What were you asked to provide?

23 A. This was a report, well, first an investigation
24 and study and then a report.

25 Q. What was the issue?

1 A. The issue was there was factual data on the
2 fugitive emmissions from various stacks in and around
3 the plant and this was a VCM, PVC plant and I had
4 information on a number of stacks, stack heights and
5 emmission resins, particles and residual free
6 monochloride monomer. I had data supplied by the State
7 of New Jersey, division of air pollution and also in
8 depositions of discovery in the plants, what the
9 emmission sources were; averaged out over a period of
10 time. It was alleged that downstream, down wind
11 several miles over the boundry fence an individual
12 contracted angiosarcoma and I believe died and it was
13 alleged that that was contracted by -- from exposure to
14 fugitive emmissions from the B.F. Goodrich plant and so
15 I was retained to analyze the situation and render a
16 report and that was one of the cases where I did
17 solicit the assistance of another engineer to handle a
18 certain aspect of my investigation.

19 Q. Who was that?

20 A. That was Dr. Richard Peskin I believe was the
21 person.

22 Q. What was his specialty?

23 A. Atmosphere dispersion modeling and analysis,
24 aerospace year.

25 Q. Do you remember the names of the

1 plaintiff in that case?

2 A. I have no recollection. I did make attempt to
3 do that in preparation for this deposition as you
4 instructed. I just drew a blank. I couldn't find a
5 single piece of material in my file.

6 Q. You're referring to my notice to take
7 deposition and produce documents that Mr. Levinson
8 provided to you and have which we have marked as
9 Davidson-3 for identification?

10 A. Yes.

11 Q. The named defendant in that case was
12 B.F. Goodrich?

13 A. I believe that's my recollection. It could be
14 Goodyear. It was not Union Carbide.

15 Q. B.F. Goodrich as you know from
16 reading literature with regard to PVC is a PVC
17 manufacturing facility?

18 A. Yes.

19 Q. Are you aware that Goodyear is also?

20 A. I believe so. I don't know for a fact. I'd
21 have to review some references.

22 Q. Do you have any other information
23 within your files that would assist you in determining
24 the specific name of the case and the defendant in
25 particular, such as invoices or billings on the file?

1 A. No. I even attempted to go back to my calendar
2 book but I only go back about five years on that.

3 Q. You said this was around 1980?

4 A. I think around the turn of the decade, yes.

5 Q. Do you recall the defendants
6 attorneys in the case?

7 A. I don't believe I was -- I don't remember. I
8 don't think I was deposed. I think I just submitted a
9 report and that's the last I heard of that incident.

10 Q. Is that the last involvement you've
11 had working into PVC or VCM until this litigation, the
12 Peterson litigation?

13 A. Correct.

14 Q. Prior to the Meliko litigation back
15 in the late 1970s, had you had any prior experience or
16 involvement with PVC or VCM issues?

17 A. Yes.

18 Q. Can you refresh my recollection as to
19 what that was, if you recall?

20 A. Yes. There's a professor on campus by the name
21 of Gilbert. He's now an emeritus professor of food
22 science, and he got me involved -- I was doing a lot of
23 publishing in the area of simulation and modeling and
24 transient diffusion in other systems, not this one, and
25 he wanted to get my assistance on analysis of the

1 transient diffusion of residual monomer and PVC resins
2 that he was working with on behalf of his company that
3 he was doing research for. I believe it might have
4 been a university contract or it may have been a
5 consulting contract. I don't know. I think it was a
6 university contract, Borden company and I assisted him
7 in the analysis of transient modeling of the transient
8 diffusion elution of residual free monomer from PVC
9 resin materials and he was doing some pioneering work
10 in the gas chromatography aspects of analysis in the
11 parts per billion range in '74, '75.

12 Q. Was any of that done in connection
13 with any pending litigation at that time or was it a
14 university project?

15 A. No. This was strictly a research --

16 Q. I gave you a compound question. Was
17 it dealing with litigation?

18 A. I don't know, but I don't think so. This was a
19 university contract. It was strictly research.

20 Q. So the three litigations that you've
21 had involving injuries alleged to have been caused by
22 exposure to PVC or VCM would be the Meliko litigation
23 and those injuries; the litigation in the early 1980s
24 involving the B.F. Goodrich plant and the current
25 litigation, the Peterson litigation. Is that correct?

1 A. Yes. I recollect also in the '70s around the
2 same period of time, middle '70s one or two
3 investigations on the pyrolysis components of PVC
4 wrapping film of the type that's used in supermarkets
5 for wrapping meat.

6 Q. What was your involvement with regard
7 to that?

8 A. I did -- I was asked to investigate the health
9 effects and safety engineering problems associated with
10 the machinery used for wrapping the meat and of course
11 one of the components of the machinery was the PVC film
12 and one aspect of the process had to do with the
13 sealing and shrinking of the film around the package of
14 meat and there was a hot plate or hot wire associated
15 with cutting the film and sealing the package and there
16 were pyrolysis fumes given off by this hot pad and hot
17 wire and I did an analysis of -- including literature
18 survey of what the problem was and rendered a report.

19 Q. You say that was in the mid 1970s?

20 A. I think it was, yes.

21 Q. For whom was the report rendered?

22 A. This was for, I think a meat wrapper who came
23 down with some asthmatic problems, broncheal problems.

24 Q. Do you recall the law firm that --

25 A. Allergic reaction problems.

1 Q. Do you remember the law firm that was
2 representing the individual?

3 A. It was in Newark, New Jersey. I don't
4 recollect right off the top of my head the name of the
5 attorney. I think the firm was Maddson.

6 Q. Matson, Madden and Polito?

7 A. I think so.

8 Q. Do you recall who the defendant was
9 in the case?

10 A. I think Franklin machinery and company --
11 Franklin Electric made the Hobart machinery and the
12 manufacturers of the film I think was Goodyear, it may
13 have been B.F. Goodrich, one of those two.

14 Q. Do you have a degree in toxicology at
15 all?

16 A. No.

17 Q. Do you have any medical degree?

18 MR. LEVINSON: Is there such a
19 degree?

20 Q. Do you know if there is such a
21 degree?

22 A. There is now at Rutgers. We just hired a Dr.
23 Goldstein who is running the institute -- well, the
24 doctor is doctor of philosophy.

25 Q. In a toxicological field?

1 A. Right.

2 Q. Do you have a medical degree?

3 A. No.

4 MR. HOLLINGSHEAD: We can
5 agree that there is such a thing as a medical
6 degree?

7 Q. Of the six or eight pending cases
8 that you now have, can you tell me how many of them are
9 on behalf of the Levinson law firm?

10 A. Two or three.

11 Q. Can you estimate for me in the course
12 of the last five years approximately as to how many
13 cases you have appeared in on behalf of the Levinson
14 firm?

15 A. In the last five years?

16 Q. Approximately.

17 A. Maybe ten.

18 Q. In the last five years have you
19 appeared in any litigations on behalf of the defendants
20 in any particular litigation?

21 A. Yes.

22 Q. Can you tell me for whom you've
23 appeared on behalf of the defendant?

24 A. Well --

25 Q. Is it a long list? Depends on the

1 definition of long, I suppose.

2 A. I'm trying to recollect here. The one I'm
3 working on currently has to do with the San Juan DuPont
4 Plaza hotel fire in San Juan Puerto Rico which took
5 place about three years ago.

6 Q. For whom are you appearing?

7 A. The Drexel Heritage furniture company which is
8 one of the 10,000 defendants in the fire. Actually
9 it's Aetna Insurance Company that I believe is the
10 insurance company with the coverage.

11 Q. For Drexel Heritage?

12 A. Yes. So I guess I'm really working, I guess,
13 for the law firm that retained my services.

14 Q. Who is that?

15 A. That would be in Southfield, Michigan,
16 Denenberg, Black, Duffy et al. Michael Black is the
17 person I work directly with.

18 Q. And that hotel fire as I recall, I'm
19 not in the case, but it deals with toxic emissions
20 being given off by the fire, in a very broad sense?

21 A. No. It was an arson situation, as everybody
22 knows but it has to do with safety engineering, fire
23 safety engineering. It has to do with toxicity and
24 flammability of thousands of rods used in a hotel for
25 construction and decoration; furniture, chairs, rugs,

1 carpets, drapes.

2 Q. Is polyvinyl chloride or vinyl
3 chloride monomer a subject of your report or
4 investigation in that case?

5 A. Only in a tangential way.

6 Q. How is that?

7 A. There was a lot of PVC materials used in and
8 around the hotel. It's -- it was not the focus of my
9 involvement, but it's just part of the hundreds of
10 different products that produced toxic fumes which were
11 part of the overall fire scene.

12 Q. Have you rendered a written expert
13 report in that case?

14 A. Not at this point.

15 Q. You're working on one?

16 A. I don't think there will be one. This
17 litigation is strange in that I have not seen hardly
18 any reports or depositions.

19 Q. Are you serving more as a consultant
20 for the Michigan law firm?

21 A. No, I'm going to testify if, at least I'm
22 scheduled to, probably in the spring. I don't
23 understand the laws down in San Juan. It's a
24 strange -- I have run into every fire expert that I'm
25 aware of. Hundreds of them all over the world are

1 involved and I know most of them.

2 Q. In any event, you have not yet
3 rendered an expert report, whether or not you do so is
4 a matter of conjecture?

5 A. I've rendered opinions, internal work product.
6 I've been asked not to put anything in writing. We've
7 had lots of technical meetings and thinking analysis
8 review of literature, including running tests and
9 analyzing the tests that other experts have run.
10 That's about where it is at this point.

11 Q. Are you appearing on behalf of a
12 defendant in any other pending litigation?

13 A. You mean current or in the past?

14 Q. No, current at the moment and then
15 I'll go backwards.

16 A. I don't recollect any but on the other hand I
17 sometimes don't know or can't evaluate it because
18 there's a thing called subrogation. I know of many
19 instances where I start off as somebody retains me on
20 the plaintiff's side and I end up on the defendant's
21 side who sues somebody else. I remember the Rollins
22 environmental explosion in south Jersey, big
23 conflagration a number of years ago. I started off as
24 an expert working for a firm that was representing
25 plaintiffs and during the course my testimony and

1 report was used by the primary defendant who turned
2 around and sued somebody else --

3 Q. Well --

4 A. I don't know how you count that. I don't keep
5 track. I don't keep a book saying I've worked for
6 plaintiffs or defendants. I'm hired for my time and
7 advice and I remember it that way.

8 Q. Do you recall any other litigations
9 in approximately the last five years in which you were
10 specifically hired by a defendant in a personal injury
11 litigation?

12 A. I'm not sure of the year and I'm not so sure it
13 was a litigation but it might have been for Union
14 Carbide.

15 Q. What was that?

16 A. Up in Michigan, some hunters, a hunter had a
17 serious eye injury as a result of an exploding battery,
18 Union Carbide dry cell battery that was used in your
19 socks for sock warming. You know the socks that
20 campers and hunters buy that are electrified and
21 produce heat. The batteries drain down fairly fast and
22 it's been a custom of hunters to throw them into the
23 bonfire and put another fresh set of batteries in their
24 socks. Well, I guess in this instance the batteries
25 literally exploded in the fire and parts of it came out

1 and struck this person in the eye. I think Union
2 Carbide wanted to know first of all was it technically
3 feasible for such a thing to happen. So I did some
4 experiments. I believe I rendered an internal kind of
5 work product report. I don't believe there was any
6 formal report beyond that. I did experiments here in
7 New Jersey and I worked with another individual who was
8 also retained, Dr. Salkind, who is an electric chemical
9 engineer. We drew some conclusions and passed them on
10 to Union Carbide. I think their attorneys came down to
11 Rutgers and we had a couple of meetings, designed
12 experiments, got their approval. That was the last I
13 heard of it.

14 Q. Were the attorneys the in-house
15 counsel or was it an outside law firm?

16 A. Danbury lawyers.

17 Q. That's their corporate headquarters?

18 A. A young lady I forgot, Nancy Gray or something
19 like that. I just --

20 Q. It's not a name I'm familiar with,
21 but you were retained by the corporation through its
22 corporate counsel and rendered your report to them?

23 A. Yes.

24 Q. To the best of your recollection
25 through no outside law firm involved?

1 A. I wasn't involved of any. There certainly
2 could have been but this was really a research project.

3 Q. What happened after you rendered that
4 report, anything?

5 A. Well, we found that the batteries do, indeed,
6 explode and we sort of delineated the mechanism and I
7 indicated also that I felt that because of that they
8 needed warning labels. These did not have warnings,
9 some of them do, there are batteries in the markets
10 place that have warnings do not discard in a fire just
11 because of that reason, but these were apparently
12 overlooked. They were made out of paper, you wouldn't
13 think they would explode but they did. If they had
14 metal caps at the end and that was the part that struck
15 the eye. We found a positive result but from their
16 point of view it was a negative.

17 Q. Did you have any further involvement
18 with that matter after you rendered your report?

19 A. No. I think we were told that the matter was
20 concluded at some point and that's all I know. I think
21 there was a phone call.

22 Q. In the biographical sketch we've
23 marked as Davidson-1, do you include all of your
24 publications, particularly since 1979?

25 A. Only the academic ones. I don't include any

1 reports or work product that emanates from my
2 independent consulting work.

3 Q. Fine. I was concerned about your
4 academic publications, not your other reports.

5 A. Yes.

6 Q. I see that you list in here on page
7 four of the biographical sketch what you refer to in
8 the heading as industrial experience and you list
9 several companies, their locations and the job
10 descriptions that you did for them. What is that
11 intended to demonstrate?

12 A. That's my industrial work experience, actually
13 consulting experience with the major -- I consider
14 those major. I have probably a lot of little five
15 minute discussions with various people. I do pro bono.
16 These are all I was retained for a specific assignment.
17 Some of them lasting for two months, others for shorter
18 periods, but I consider them all major work experiences
19 as a practicing chemical engineer. It's also part of
20 the outreach program. We're encouraged to get involved
21 with industrial matters whenever the opportunity arises
22 and that's what that shows.

23 Q. On the same page down at the bottom
24 it refers to selective administrative achievements as
25 chairman, and I assume that's as chairman of the

1 chemical and biochemical engineering department?

2 A. Yes.

3 Q. On page seven there's a heading
4 entitled sponsered research activities and then it goes
5 on for the rest of that page. The first is chemical
6 and biochemical reactor area. Can you tell me in
7 general what the listing of the sponser and description
8 and project length, et cetera, are intended to show?

9 A. Yes. Those are my -- as a principal
10 investigator, that means that if I get an idea for a
11 research project, it's important that you find a
12 sponser because it involves purchase of equipment or
13 purchase of materials to build an apparatus. They are
14 often very expensive. You can't do much experimental
15 research without a sponser. So professors are
16 encouraged to seek out sponsors for their research
17 ideas. That list shows in one column on the left side
18 the sponser and the center column, the subject matter
19 and the last column the expended funds and the period
20 and out of that input one generates output in the form
21 of supervised students for the Master's or doctor of
22 philosophy degree and also oral presentations and
23 meetings and publications that flow from that work.

24 Q. Next page has a listing under the
25 heading water resources and environmental pollution

1 areas. I'm assuming these are various sponser and
2 projects similarly done by you in this area?

3 A. Correct.

4 Q. And the listing is intended to
5 demonstrate the same type of information, sponser,
6 description of the project and the funding, plus the
7 project length?

8 A. Correct.

9 Q. On page nine, major referred journal
10 publications. That's a new phrase to me. What does
11 that mean?

12 A. In academy we make a strong distinction between
13 refereed and non-refereed. The one is the quality of
14 your refereed papers. Refereed means that you submit
15 your research paper to a journal which is independent
16 of your organization and that journal has an editor and
17 a publisher and they have a review panel consisting of
18 your peers at other universities and in the industry
19 and these people are asked to independently evaluate
20 your manuscript for accuracy, for relevancy, for impact
21 and if you get a passing grade then it qualifies for
22 publication. If you're lucky it gets published and
23 that's called a refereed paper.

24 Q. What is non-refereed?

25 A. Non-refereed would be -- and there is some

1 overlap, an editor notices that you've done a lot of
2 work in a certain area and solicits you to write a
3 review article or to write an article on a certain
4 topic where only the editor is really reviewing it and
5 doesn't go out for external review. The editorial
6 board looks and says that's exactly what we wanted.
7 That would be a non-refereed. There's no veto power
8 from the outside.

9 Q. In any of your publications during
10 the course of your academic career, have you discussed
11 the topic of polyvinyl chloride or vinyl chloride
12 monomer?

13 A. I don't believe so. The only one would be in
14 any of the publications that Dr. Gilbert produced. I
15 believe he probably in those articles acknowledged my
16 input but I don't think I was an authority. If I was,
17 I would have listed it in my CV, but probably because
18 of my involvement I was at least acknowledged. I don't
19 know what papers they would be. Maybe it was just
20 reports.

21 Q. Have you authored any papers during
22 the course of your academic career, professional career
23 involving the subject matter of any particular
24 chemical?

25 A. Any chemical?

1 Q. Yes.

2 A. Your question is a little difficult in the
3 sense that almost everything that I publish is a
4 chemical. So I would say yes to all of them that are
5 listed but I sense you mean something else.

6 Q. Do any of your publications deal with
7 the toxicological properties or the physical properties
8 of any particular chemical?

9 A. Yes.

10 Q. Can you recall for me which chemical
11 or chemicals?

12 A. Or compounds or mixture of chemicals. Yes, one
13 that I think maybe fits that description on would be my
14 four years of research in the smoldering kinetics of
15 cellular plastic foam insulation materials, generically
16 an example would be polystyrene, polyurethane, where I
17 performed experiments on the smoldering kinetics and
18 decomposition compounds from that process, smoldering
19 and flaming combustion.

20 Q. Which paper was that? Is it here
21 listed in your biographical sketch?

22 A. Actually it's in the form of a book.

23 Q. Can you tell me which book it is?

24 A. I have to review this and if hopefully I can
25 point to it.

1 Q. Sure.

2 A. It would be on page 10 where it says fire
3 research on cellular plastics define a report on the
4 products research committee, library of Congress and
5 there's a catalog number, April '80, chapter three,
6 science of fire, chapter four, small scale tests and
7 the work in there is a culmination of five years of
8 research by not only myself but other experts in the
9 fire combustion field.

10 Q. Do you have other publications that
11 similarly discuss the physical properties or
12 toxicologic properties of chemicals?

13 A. In the calculation of coal because we were
14 using a very toxic compound, nitrogen dioxide gas, to
15 desulfurize coal without combustion is in the next
16 piece of work.

17 Q. What were the properties of coal that
18 were discussed in that book?

19 A. Basically it's the organic desulfurization
20 using nitrogen dioxide gas and in the lab reports and
21 in the thesis that flowed from that which are
22 publications, there's always discussion on the safety
23 aspects of the compounds and NO 2 certainly is one that
24 comes to mind.

25 Q. Are there any other publications that

1 are listed in your biographical sketch that discuss the
2 physical or toxicological properties of any particular
3 chemical?

4 A. All the papers on the reactor analysis discuss
5 physical properties of the catalyst and the gases that
6 are used, starting with my dissertation work on the - -

7 Q. I'm sorry?

8 A. You're talking about densities, viscosities,
9 heat capacities, I presume that's what you meant.

10 Q. Are those papers listed under your
11 major refereed journal publications?

12 A. Yes.

13 Q. Okay. Could you point that out to
14 me?

15 A. The second one, kinetic catalytic oxidization
16 of sulfur dioxide. Next one is catalytic process --
17 I'm responding to the part of your question that said
18 which ones deal with the properties and/or
19 toxicological.

20 Q. Fine.

21 A. Here I'm referring to the properties.

22 Q. When you say properties are you using
23 the phrase -- strike that. When you say properties are
24 you referring to physical properties, which was my
25 question?

1 A. I'm referring to physical properties and
2 chemical properties.

3 Q. Not toxicological properties?

4 A. Not per se. When I come to one specifically
5 I'll try to indicate. Unless I indicate I'm still
6 talking physical and chemical properties. By
7 properties I mean in order to do any of my research in
8 these areas I have to investigate the density, the
9 viscosity, the heat capacity, the heat of reaction.
10 These are properties that you must know a priori in
11 order to do experiments or precision work. Kinetics
12 and mechanism of bacterial disinfection by chlorine
13 oxide. The kinetics and mechanism of bacterial
14 disinfection by chlorine.

15 Next one which is a seminal piece of work that
16 has some direct application to our subject, although
17 you may not read it that way, a new approach to the
18 analysis of heterogeneous reaction rate data.

19 Q. How is that related to the subject of
20 this litigation?

21 A. Surface adsorption of gases on solid surfaces.

22 Q. Absorption or adsorption?

23 A. Adsorption. The next, treatment of langmurian
24 kinetics in the analysis of optimal catalyst
25 composition profiles. Another one which is also

1 germane and maybe I'm leaping ahead in interpreting
2 your question --

3 Q. You can safely leap in that regard.
4 Go ahead.

5 A. I'm not unsophisticated. Analysis of
6 non-isothermal effectiveness factors using a using
7 generalized langmuir-Hinshelwood rate expression, it
8 has a lot to do with intra-particle diffusion.
9 Mechanistic analysis properties of chemicals in a
10 diffusing in a solid matrix.

11 Next one also is a diffusion study, treatment
12 of urinous wastewater using a dual-functional reverse
13 osmosis membrane system and then the last one on page
14 nine is another seminal piece of work, which is also
15 germane, mass transfer and biochemical reaction in
16 enzyme membrane reactor systems.

17 Page 10, design analysis of immobilized enzyme
18 flow reactors. Again, a lot about diffusion reaction
19 properties of chemical systems.

20 Q. Is it fair to say that the bulk of
21 the major refereed publications deal with physical
22 properties of various chemicals in some fashion?

23 A. Physical and chemical because you're having
24 physical reaction adsorption. The dividing line
25 between purely physical and purely chemical --

1 Q. I don't mean to divide them, frankly.
2 They deal with the physical and chemical properties.
3 Do any of the publications on your two pages that
4 you've been reading refer to the toxicological
5 properties or discuss the toxicological properties of
6 any particular chemical?

7 A. Not in the papers as a focus. That would come
8 into play in the lab procedures and structural design
9 to students and things like that which are not part of
10 the publication. The focus is not that at all. No
11 animal or human studies. They would just come in in a
12 routine way as a priori safety regulations in order to
13 carry it out. In other words, safety data sheets would
14 be reviewed. That's all part of up front.

15 Q. When you talked about the smoldering
16 and flaming kinetics of polyvinyl chloride and --
17 strike that.

18 When you talked about the smoldering and
19 flaming kinetics of polystyrene and polyurethane, was
20 that a subject of a publication?

21 A. It's in the books that I mentioned. It was all
22 the subject of a Master's thesis and internal reports
23 to the product research group.

24 Q. I remember now. I apologize for
25 forgetting.

1 Did that, what I'll call publication, refer to
2 the toxicological properties of polystyrene or
3 polyurethane?

4 A. It wasn't my focus but it was the focus of the
5 products research committee and when we had our three
6 major conferences we had toxicologists reporting right
7 alongside the fire engineers, of which I was one. So I
8 had privy to their research and discovery. They had
9 privy to what components I found which may or may not
10 have led them in certain toxicological discrections but
11 it was one of the major concerns of the whole
12 committee, what types of toxic compounds are being
13 emitted when you pyrolyze these foam insulation
14 materials, both in smoldering and flaming combustion.
15 Then the toxicologists, knowing what these compounds
16 are, could then isolate them and study them on their
17 own and focus on the toxicological effects. So there
18 was like an overlap between the two fields at these
19 conferences.

20 Q. Have you ever been responsible for
21 the design and implementation of any particular animal
22 studies regarding toxicological effects of chemicals?

23 A. Only in a strange way. Recently in my
24 department we hired an individual with a couple of
25 Ph.Ds and an M.D. and he does know cancer research

1 which is a new area for chemical engineers to get
2 involved with. We may be one of the first departments
3 to have a co-focus in an area called immuno technology
4 which is an area we've identified as a future growth
5 area for our engineers to get involved with and we have
6 several thousand square feet in the basement of our
7 complex devoted to cancer research, and in that
8 facility we operate a relatively small animal care
9 center where we sacrifice white mice for cancer studies
10 and since I'm the chairman of the department, I am
11 responsible for that whole set up in a technical
12 management sense. I don't get directly involved at all
13 with any of the research other than I attend the
14 seminars. We just had one last Thursday on certain
15 aspects of immuno technology, monoclonal antibodies and
16 certain cancers. So there is a connection that way,
17 sort of a back door condition to the animal,
18 toxicological cancer research slash chemical
19 engineering activity within my own department.

20 Q. Would you classify your role with
21 regard to that new area that's being handled by your
22 department as administrative?

23 A. Yeah, with a vision. I spotted this decades
24 ago.

25 Q. What do you mean by this?

1 A. The importance of immuno technology research in
2 the chemical engineering field and I felt for too long
3 we've kept the fields physically apart, in separate
4 location on campus. There had been a movement in the
5 chemical industry to recognize this. There had been
6 reports put out recommending that academic departments
7 start getting serious about incorporating more inter-
8 disciplinary activities in their area and this is how
9 we created a whole environmental engineering focus in
10 our department. I was the one responsible for
11 identifying this and recruiting this individual and
12 this program. Actually we stole him from MIT.

13 Q. Who is the individual?

14 A. This is Dr. Martin L. Yarmush.

15 Q. What's --

16 A. He's an extraordinary individual.

17 Q. Is he a medical doctor?

18 A. He's a medical doctor, a Yale medical school,
19 Rockefeller University Ph.D in biochemistry, Ph.D
20 biochemical engineering MIT. 35 years old and we do
21 about a million dollars a year in cancer research
22 within the department and we do about a million
23 dollars -- two million dollars a year in that.

24 Q. Starting on page 13 of your
25 biographical sketch there's a headline thesis

1 production. Can you tell me in general what that is
2 intended to reflect?

3 A. That's the output from the input, one form of
4 it, referred publications is one and another output is
5 degrees completed and supervised as a major thesis
6 advisor.

7 Q. So these theses are the results of
8 the efforts of your students that you are supervising?

9 A. Correct.

10 Q. So for instance taking the first
11 listed thesis which is distributed parameter kinetics
12 by John McAuliffe, the author was Mr. McAuliffe?

13 A. Yes.

14 Q. Under your supervision?

15 A. Yes.

16 Q. With regard to the major oral
17 presentations that are listed starting on page 15, do
18 you keep the papers involved in any of these
19 conferences or seminars where you have presented them
20 orally?

21 A. I normally have at one time copies of the
22 proceedings but I often run out of supply because
23 people send you post cards asking for copies of the
24 proceedings. So you send them out and the file runs
25 dry quickly. Some yes, some no.

1 Q. Did you consider yourself an
2 epidemiologist?

3 A. No.

4 Q. You were provided by Mr. Levinson
5 with a copy of the notice to take deposition and
6 produce documents which we've marked as Davidson-3. Is
7 that correct?

8 A. Correct.

9 Q. Have you brought documents with you
10 today in response to that?

11 A. Good time to take a break.

12 MR. HOLLINGSHEAD: Sure.

13 (Whereupon a recess is taken.)

14 Q. Turning your attention to the notice
15 to take deposition and produce documents, in particular
16 if did you bring records or documents with you
17 responsive to the first request which I'll paraphrase
18 as records of all communications between you and the
19 attorneys for the plaintiffs including correspondence,
20 memoranda, notes regarding telephone conversations and
21 other oral conversations?

22 A. Yes.

23 Q. Could you produce those for me,
24 please?

25 A. I only have one piece.

1 Q. And you're referring to a letter of
2 October 16 to you from Mr. Levinson advising you that
3 your deposition is going to occur today, providing you
4 with a copy of the notice to produce documents?

5 A. That's it.

6 Q. When you were originally retained by
7 Mr. Levinson, did you receive correspondence from him
8 at that time giving you any of the details of the
9 litigation?

10 A. No. My first meeting was April 20 right here
11 in this office.

12 Q. Were you --

13 A. In Mr. Levinson's office. I was called.

14 Q. During that telephone conversation
15 did Mr. Levinson give you some idea of what was at
16 issue in the litigation?

17 A. No, just he indicated my previous experiences
18 in Meliko and indicated that they were something
19 similar to that. I went down on the 20th and sat with
20 him.

21 Q. You have not received any other
22 letters or correspondence from Mr. Levinson or his firm
23 regarding this litigation at all?

24 A. No.

25 Q. And --

1 A. Other than I just recently received a report of
2 Dr. Epstein. I wouldn't call it a report, just a
3 literature survey -- maybe it's a report of --

4 Q. What's the date of the letter that
5 sent that to you?

6 A. August 15, 1989.

7 Q. This was received by you after the
8 submission of your expert report which is dated July
9 20, 1989?

10 A. That's correct.

11 Q. Therefore you did not take this
12 document into consideration in the writing of your
13 report?

14 A. That's correct. I did send recently a
15 supplementary report, one paragraph.

16 Q. Have you provided that to Mr.
17 Levinson?

18 A. I think he just got it today or last week. I
19 think he has it now.

20 MR. HOLLINGSHEAD: Let's mark
21 as Davidson-4 this letter of August 15, 1989
22 from Dr. Epstein addressed to Mr. Levinson and
23 which apparently was forwarded to Dr. Davidson.
24 (Letter dated August 15, 1989
25 is received and marked Davidson-4 for identification.)

1 MR. HOLLINGSHEAD: I'm also
2 marking as part of that exhibit the enclosures
3 that were with Dr. Epstein's letter to Dr.
4 Davidson which can be described. There's also
5 a page entitled occupational risk factors based
6 on and a page entitled risk factors for
7 laryngeal cancer.

8 Q. Have you reviewed the document that's
9 been marked as Davidson-4?

10 A. Yes.

11 Q. Has any part of it formed a basis for
12 your supplemental one page report?

13 A. I reviewed the document and wrote a one
14 paragraph report.

15 Q. For the preparation of that one page
16 report, did you review any other additional documents?

17 A. Well, I reviewed my report dated July 20, 1989
18 to see if this new piece of information had any bearing
19 on my conclusions, findings and I wrote a one paragraph
20 statement saying that no, it did not. In fact, I did
21 include that thinking in my report. It's mentioned in
22 several places. I certainly did not exclude other
23 fugitive emissions along with VCM and PVC resin.

24 Q. Which we'll get to later. Do you
25 have a copy of that one page supplemental report that

1 you provided to Mr. Levinson?

2 A. Good question. I think I gave it to Florence
3 and she's probably copying it. I -- it's not where it
4 should be. I think I gave her the original and she's
5 copying it.

6 Q. Since your retention by Mr. Levinson,
7 have you had telephone conversations with him or anyone
8 from the Levinson firm dealing with the substance of
9 your report or opinion and I'm contrasting that with
10 talking about the deposition logistics?

11 MR. LEVINSON: I just handed
12 him the deposition in his first case and I'll
13 have you back your copy in a minute.

14 A. The answer is no.

15 Q. Have you had other personal
16 conferences with Mr. Levinson beyond your first meeting
17 on April 20 of 1989?

18 A. Repeat that.

19 Q. Did you have other conferences with
20 Mr. Levinson in person after your first conference of
21 April 20, 1989 prior to the submission of your report
22 on July 20?

23 A. No.

24 Q. Did you make notes at your first
25 meeting with Mr. Levinson on April 20?

1 A. Mental notes.

2 Q. Nothing written down?

3 A. No, I understood precisely what the charge was.

4 Q. When you say charge you mean what he
5 was asking you to do in this litigation?

6 A. Correct, and I asked him for foundation and I
7 think I turned around or he pointed behind me and he
8 had a whole table filled with documents, four feet long
9 and about a foot high. I said fine, I need to review
10 those documents and I did.

11 Q. That would bring us to request number
12 two, which is: "all materials supplied to him,"
13 meaning you, "by the attorneys for the plaintiffs."
14 Were you provided with materials by Mr. Levinson at
15 that first meeting that you later reviewed for the
16 preparation of your report?

17 A. No. All the materials I was presented I
18 examined here in these offices on Saturday morning. I
19 believe Florence let me in the office and I spent about
20 three hours, four hours reviewing the documents and
21 extracting those which I felt I could use in my
22 furthering studies. She copied those for me and sent
23 them to me.

24 Q. With regard to the documents that you
25 reviewed but did not receive copies of are they listed

1 in your expert report that we've marked as Davidson-2.

2 A. No. I believe everything that is indicated
3 there for the most part I have with me.

4 Q. Why don't you produce for me what you
5 have brought with you today that would be responsive to
6 request number two with regard to materials supplied to
7 you by attorneys for the plaintiffs?

8 MR. HOLLINGSHEAD: Off the
9 record.

10 (Whereupon a discussion is
11 held off the record.)

12 Q. Dr. Davidson, you've provided me with
13 what would appear to be approximately a foot of
14 documents that are folders and indexed by you. Are
15 these all the materials that you reviewed or did you
16 review other materials that you do not have copies of
17 today?

18 A. Not really, no. I have another bag here.

19 Q. I see another bag with Redwell
20 folders and we'll get to that. I'm a little confused.
21 You came in for a Saturday morning for four or five
22 hours and you reviewed materials?

23 A. Yes.

24 Q. Did you obtain copies of all of those
25 materials from Mr. Levinson's office?

1 A. Of the ones I requested.

2 Q. So there were other materials that
3 you reviewed at that time which you did not later
4 receive the copies of and which are not present here
5 today?

6 A. There were some overlap materials between my
7 previous investigation in '76 which I still had files
8 on and I felt I didn't need extra copies of those. So
9 they stayed behind. So this bag that you have and this
10 one here is sort of a mixture of my existing partial,
11 previous file on Meliko and new material on Peterson.

12 MR. LEVINSON: I'd like to
13 make a statement at this point. The original
14 files and papers he looked at on the Saturday
15 he referred to are still sitting in my office
16 in the same place if you want to see them.

17 MR. HOLLINGSHEAD: I may at
18 some point but let me figure out where I'm
19 going here.

20 MR. LEVINSON: Okay.

21 Q. In your expert report that we've
22 marked as Davidson-2, you have a particular segment
23 entitled materials reviewed and it goes on for four
24 pages?

25 A. Yes.

1 Q. Is every document that you reviewed
2 whether or not you later received a copy of it included
3 in these four pages?

4 A. All these, yes, that includes all the materials
5 I reviewed other than textbooks and handbooks where I
6 referred to specific properties.

7 Q. I understand that, but what I'm
8 looking for particularly is that all materials that you
9 reviewed that contained factual information with regard
10 to the Peterson litigation or the OTD ATC facility or
11 Union Carbide's involvement, all of those documents are
12 listed in your report marked Davidson-2. Correct?

13 A. Correct.

14 Q. That would include documents that you
15 saw in Mr. Levinson's office but which you did not feel
16 that you needed copies of specifically for your file?

17 A. Correct.

18 Q. All right. What I would like to do
19 is simply mark each of the folders and then whether or
20 not I need to have particular copies is a matter I'll
21 discuss later.

22 Would you go through this folder and give us a
23 brief description of what it is.

24 A. All of the files are marked Peterson versus
25 Union Carbide. This one is marked BD reports. Those

1 are reports produced by me including as you requested
2 original draft. It includes the reports previously
3 submitted in Meliko as well.

4 MR. HOLLINGSHEAD: Would you
5 mark that as Davidson-5.

6 ("BD" reports are
7 received and marked Davidson-5 for identification.)

8 Q. Next.

9 A. This is called ATC slash UC facts plants. It
10 has to do with facts about the subject ATC plant.

11 Q. Were they drawn also partly from the
12 Meliko litigation?

13 A. Partly. Mostly new correspondence I hadn't
14 either seen previously or retained in my previous file.
15 It includes correspondences between ATC and Union
16 Carbide, descriptions about the plants, operations,
17 things like that.

18 (ATC/UC folder is
19 received and marked Davidson-6 for identification.)

20 Q. Next.

21 A. Next file entitled reports of other experts and
22 it includes a report by Dr. Wheeler and other reports
23 mentioned in my materials cited.

24 Q. By those reports exclusively from the
25 Meliko litigation?

1 A. Well, some are, I guess and some are not. It's
2 hard to say but certainly Wheeler's report indicates
3 Meliko. So that's a leftover report which I had
4 retained a copy of many years ago. That's in there.

5 Q. They would either be the Meliko
6 litigation or the Peterson but nothing else?

7 A. Correct.

8 Q. Some of those I take it came from
9 your own personal file that you retained from Meliko,
10 including the Wheeler report?

11 A. That's correct.

12 MR. HOLLINGSHEAD: Mark that
13 as Davidson-7.

14 (Expert's reports file is
15 received and marked Davidson-7 for identification.)

16 A. Next file is called Answers to Interrogatories.

17 Q. Are they answers only with regard to
18 the Peterson litigation?

19 A. Yes.

20 (Answers to Interrogatories
21 file is received and marked Davidson-8 for
22 identification.)

23 Q. Okay.

24 A. Next is standard, codes for VCM-PVCR which is
25 abbreviation for vinyl chloride monomer and polyvinyl

1 chloride resin.

2 Q. May I see that one?

3 MR. HOLLINGSHEAD: With regard
4 to the contents of this file that we've marked
5 as Davidson-9.

6 (Standards and code file is
7 received and marked Davidson-9 for identification.)

8 Q. Would you tell me what you mean by
9 what you have referred to as standard and codes?

10 A. These documents have to do with standard and
11 codes dealing with VCM exposure in the work place,
12 documents emanating from OSHA and also some of these
13 documents, or at least one of them, comes from Dr. Fred
14 Gollob -- no, Lou Melino, dealing with the summary of
15 the OSHA forthcoming standard, OSHA NIOSH, summarizing
16 what was in the federal register, April 5th, 1974
17 federal register and then there is the Wednesday,
18 December 24, '75 federal register national emission
19 standard for proposed vinyl chloride. All relate to
20 Government standard.

21 Q. Next?

22 A. The next file is entitled BD work sheets.

23 (BD worksheets are
24 received and marked Davidson-10 for identification.)

25 Q. Before we go to the next folder, let

1 me backup to the contents of Davidson-10. Let me refer
2 you to the personal history of John Peterson which
3 appears in this folder, is that your product?

4 A. No, this is a document I gleaned from the
5 master Levinson file which was not prepared by me. I
6 had no input to this. It's just something I took
7 because frankly I wanted to verify the validity of
8 those comments and the last sheet there when I reviewed
9 John Peterson's deposition I was able to verify all
10 these things.

11 Q. That's a document that you relied
12 upon in large measure for facts regarding Mr. Peterson
13 and his exposure, experience at ATC?

14 A. I didn't rely on that at all.

15 Q. This had nothing to do with the
16 preparation of your report?

17 A. No, it just stimulated me to verify the
18 veracity of that document.

19 Q. Which you did by looking at the
20 deposition itself?

21 A. Right. So I relied on my digestion of the
22 deposition, rather than that document.

23 Q. And does your digestion of the deposition
24 appear in this set of notes entitled John Peterson, re
25 evidence of a lack of engineering safety, ventilation

1 controls, et cetera?

2 A. Yes, that would be found starting on page 5,
3 re: Deposition of John Peterson and going to -- up to
4 and including all of page nine.

5 Q. What does that entire document
6 represent, what you're looking at now which was inside
7 Davidson-10?

8 A. It's my practice when I read a deposition and
9 the ones I read are the ones indicated on page four of
10 my report, I like to take notes and I usually do it two
11 columns, the source and meet of the reference. I make
12 little comments to myself and I indicate the page
13 number and line number that I gleaned that piece of
14 information and that's what you see here, a digestion
15 of depositions here of Borch, and Romain, Peterson,
16 Shirley Mae Peterson and also a digestion of the
17 correspondence between ATC and Union Carbide. That's
18 also in here.

19 Q. What is reflected in the other set of
20 notes that appears in Davidson-10 where the top heading
21 is re: X subject chemicals --

22 A. These five work sheets are a digestion of the
23 Wheeler report or redigestion of it. I had once
24 digested it ten, 12 years ago and also are some of my
25 calculations and simulations of and verification of Dr.

1 Wheeler's calculations that appeared in his report
2 dealing with fugitive vinyl chloride monomer emissions
3 in concentrations at ATC. That's basically what
4 represents.

5 Q. Next folder, please.

6 A. It's entitled literature on PVC-R-VCM, physical,
7 chemical and toxic properties.

8 MR. HOLLINGSHEAD: Let's mark
9 that.

10 (Literature folder is
11 received and marked Davidson-11 for identification.)

12 Q. In looking at the contents of David
13 David 11, I note that there are various articles and
14 other information contained herein, is this a
15 collection of all of the treatises or articles or
16 literature studied by you for the preparation of your
17 report or is this merely what you have in your
18 possession?

19 A. The latter is true.

20 Q. Where did these materials come from?
21 Were they provided to you from Mr. Levinson's office
22 when you reviewed the materials here?

23 A. Well --

24 Q. Or did you have these in your
25 possession at an earlier time?

1 A. Probably a combination of the two. I would say
2 some of those were left over from Meliko, maybe several
3 were new.

4 Q. With regard to other literature that
5 is referred to in your expert report marked Davidson-2,
6 where did you go for general reference to those
7 articles or studies?

8 A. My report which is dated July 31st, 1975 which
9 was produced during the Meliko investigation, is the
10 results of my detailed perusal of the relevant and
11 available literature which -- all of which I believe
12 came from the Rutgers University library of science and
13 medicine. All that is documented in the 1975 report.

14 Q. So I take it that other literature
15 that is referred to in your report and which does not
16 appear within the contents of Davidson-11 has not been
17 copied by you and retained by you?

18 A. That's correct. At one time a lot of it was
19 copied and retained --

20 Q. But you don't have it now?

21 A. I cleaned out my file a number of years ago. I
22 threw away a lot of things which I knew I could
23 regurgitate from the library. That was certainly one
24 of the things that got thrown away.

25 Q. And the final folder within this

1 first bag of documents that you provided me with is the
2 correspondence that we talked about earlier. Is that
3 correct?

4 A. That's correct.

5 MR. HOLLINGSHEAD: Can we mark
6 that.

7 (Correspondence folder is
8 received and marked Davidson-12 for identification.)

9 Q. Now, doctor, you extracted something
10 from this file marked Davidson-12 and says it doesn't
11 belong in there. Can you describe what you
12 extracted?

13 A. One piece of my stationery.

14 Q. May I see it?

15 A. Sure. It's my partial bill. I thought I'd get
16 it started and hand it to you.

17 Q. Since I have a check for you at the
18 end of the deposition, we'll leave it on the table.

19 Can we proceed to the second batch of documents
20 that you have that appear. First we have a book, vinyl
21 chloride monomer and PVC manufacture, process and
22 environmental aspects. In a separate folder which
23 would appear to be depositions --

24 A. They're marked on the front.

25 Q. The front of it says depositions of

1 Epstein, Ms. Shirley Peterson, Wheeler, John Peterson,
2 Karnow, Borch, Brown slash Romain and without going
3 through all of that I assume that all those deposition
4 transcripts are within this folder?

5 A. Correct.

6 Q. The references to Shirley Peterson
7 and John Peterson obviously refer to the Peterson
8 litigation. I assume that the depositions of Epstein,
9 Wheeler, Karnow, Borch, Brown and on Romain all came
10 from Meliko.

11 A. Correct.

12 Q. This I am not going to mark and I
13 will return to you in as much as I have all of that.
14 The medical report Meliko circa 1978 to 1979. There
15 seems to be a little more in here other than medical
16 reports. Why don't you tell me what that first file
17 is?

18 A. There are some more medical reports and some
19 Interrogatories, Answers to Interrogatories.

20 Q. Which case?

21 A. In the Meliko matter. I separated the Peterson
22 Interrogatories from the Meliko and the reports in here
23 are for the Meliko matter.

24 Q. I may not need that.

25 MR. HOLLINGSHEAD: I'd like to

1 mark this folder, the entire folder as the next
2 exhibit.

3 (Redwell file is
4 received and marked Davidson-13 for identification.)

5 MR. HOLLINGSHEAD: Also
6 contained within that folder was the pretrial
7 order from the Meliko case from ten or 12 years
8 ago but several opinions and medical reports
9 that were rendered in that case.

10 Q. Dr. Davidson, is my summary correct?

11 A. Yes.

12 Q. I'll return this folder to you. Dr.
13 Davidson, as I said a moment ago, I'll return
14 Davidson-13 to you with a request simply that you keep
15 the documents that are in there now if -- that you
16 retain the same documents in the same envelope, do not
17 add more to it. If I need anything from that I'll tell
18 Mr. Levinson.

19 A. Okay.

20 Q. Going back now to the book vinyl
21 chloride monomer manufacturer, is this your personal
22 copy of this book?

23 A. Yes, it is.

24 Q. I'm looking, to give it more specific
25 identification, I'm looking at a book entitled vinyl

1 chloride monomer and PVC manufacture, process and
2 environmental aspects by Marshall Sittig, published in
3 1978 by the Noyes Data Corporation.

4 Dr. Davidson, I assume that this book played
5 some role in the preparation of your expert opinion in
6 this case?

7 A. It provided some of the data base for my
8 conclusions.

9 Q. I will return this to you as well. I
10 think we've identified it well enough. We don't need
11 to mark it. Is there any other material that you
12 received that provided you with factual information
13 regarding the Peterson litigation than what we have
14 marked and identified here this morning?

15 A. No?

16 Q. Did you have any other conferences
17 with Mr. Levinson or anyone from his firm in which
18 further factual information was provided to you
19 regarding the Peterson litigation?

20 A. No.

21 Q. Did you have telephone conversations
22 with Mr. Levinson or anyone from his firm prior to the
23 preparation of your report that's been marked
24 Davidson-2?

25 A. No.

1 Q. Have you had conversations either by
2 telephone or in person by Mr. Levinson or anyone from
3 his firm subsequent to the preparation of the expert
4 opinion marked Davidson-2 on the subject matter of the
5 expert report?

6 A. No.

7 MR. HOLLINGSHEAD: Why don't
8 we take a break for lunch.

9 (Whereupon a recess is taken.)

10 Q. Dr. Davidson, if we can pick up with
11 the notice to take the deposition just to clarify that
12 you have produced everything that has been asked by the
13 notice to be produced, particularly with regard to
14 items three, four, five and six. Do you have any
15 documents that are specifically related to those
16 requests and I show it to you -- let me go through it,
17 three asks for all communications between you and any
18 other person relating to this litigation or the issues
19 raised in the litigation including but not limited to
20 correspondence, memoranda, reports, et cetera. That
21 deals with discussions you might have had with
22 collaborators or consultants for example with regard to
23 the preparation of your report or any of the issues in
24 this case. Do you have any documents that reflect any
25 such communications?

1 A. I have no documents because I've had no
2 communications.

3 Q. That was the next question. You do
4 not use a collaborator with regard to this report?

5 A. No.

6 Q. Did you use any graduate assistance
7 for research or did you speak about the case with any
8 graduate assistant or any of your students?

9 A. None whatsoever, with the exception that in my
10 safety course I'm very meticulous about discussing
11 outside cases with the students in the classroom. I
12 always leave the names unmentioned, but we do discuss
13 VCM, the asbesto toxicity problem is discussed. To
14 that extent I do discuss these things with students in
15 the classroom, but I always disguise the particulars
16 and talk about the science. Not this case, but Meliko
17 in past years I did discuss this.

18 Q. Let's take last spring's courses
19 taught by you. That would be just prior to retention
20 by Mr. Levinson, did that course contain a discussion
21 of PVC or VCM or any of their properties?

22 A. None whatsoever. By the way, I also make it a
23 habit not to discuss anything that's ongoing. As far
24 as I was concerned, Meliko years ago was resolved,
25 although I never knew formally.

1 Q. I assume from that statement that the
2 Peterson litigation whether mentioned by name or
3 anonymously has never been the subject of a discussion
4 by your class?

5 A. I don't mention names. I just talk about the
6 science.

7 Q. Request four in the notice to take
8 deposition and produce documents for all materials
9 which you have reviewed, consulted, read or considered
10 in any way in reviewing this litigation and the issues
11 raised therein and in the rendering of this litigation
12 and we marked such materials as I recall, and you also
13 advised me that any other materials that you reviewed,
14 particularly library source materials important?

15 A. Correct.

16 Q. Item five, all written reports,
17 including draft, memoranda, notes or other
18 documentation relating to oral reports rendered in this
19 matter. Did you render any oral reports to Mr.
20 Levinson in connection with this matter?

21 A. No, just a written report.

22 Q. When you rendered that written
23 report, was it altered or changed in any fashion by Mr.
24 Levinson or anyone at this firm?

25 A. Not that I'm aware of.

1 Q. The final report as it appears today
2 and which we've marked as Davidson-2, is that the same
3 report that you render to Mr. Levinson, to the best of
4 your knowledge?

5 A. Yes, I have my original notes.

6 Q. Which we marked. Correct?

7 A. With the marking. You can compare them
8 word-for-word. I assume it's 99 percent correct.

9 Q. You're not aware of any substantive
10 changes?

11 A. Not that I'm aware of.

12 Q. Item six asks for all reports,
13 written and oral, correspondence and memoranda prepared
14 by you independent of the Peterson litigation relating
15 to the toxic properties of any chemical including but
16 not limited to polyvinyl chloride and vinyl chloride
17 monomer which is alleged to have caused Mr. Peterson's
18 illness or injuries in this matter. Do you have any
19 such documents that would be responsive to that
20 request?

21 A. They're all included in the original stack.

22 Q. Okay.

23 A. With the exception of I think I'm working on a
24 matter and this firm has been resolved, Kibble is the
25 person's name and I don't think I rendered a report,

1 but it had to do with welding fumes. So I had quite a
2 extensive file on welding fumes and other documents. I
3 didn't bring those with me but they were consulted.
4 They're in substantial agreement with what I recently
5 found out. Epstein reviewed similar materials and my
6 report reflects my knowledge about that material.

7 Q. But you rendered a written expert
8 report in the Kibble case?

9 A. I don't recall. I may have. I don't think so.
10 It was awhile back but I did retain my literature.

11 Q. Why don't I ask Mr. Levinson if he
12 can provide that to us.

13 A. I think it's Mr. Grayzel that is --

14 Q. Well, I'll ask Mr. Levinson to
15 oversee that and if we're not able to obtain it we may
16 ask you to provide it from your files.

17 A. Sure.

18 Q. While we were on the lunch break, Mr.
19 Levinson has provided me with the one page supplemental
20 report or opinion of yours dated October 23, 1989
21 addressed to him and I show it to you and ask if you
22 can identify that for us?

23 A. Yes, that's basically a one paragraph report
24 dated October 23rd that I referred to.

25 Q. Were you asked by Mr. Levinson to

1 prepare this supplemental report?

2 A. Yes. Actually I was asked by Mr. Levinson by
3 way of his secretary, Florence.

4 Q. This was at the same time you were
5 given the materials that were prepared by Dr. Epstein
6 and which we marked earlier with regard to the
7 properties on bisphenol, resins, polystyrene?

8 A. Correct.

9 MR. HOLLINGSHEAD: Let's mark
10 this.

11 (Supplemental report is
12 received and marked Davidson-14 for identification.)

13 Q. Turning now to your report which we
14 marked as Davidson-2. You have a copy of that in front
15 of you?

16 A. Yes.

17 Q. I would ask you to refer to that as
18 we go through it and I have a copy here as well.
19 Looking at the title on the cover of the court you
20 refer to and I will quote it, "occupational exposure to
21 dangerous materials (eg, polyvinyl chloride resin dust,
22 free vinyl chloride monomer gas, and heat sealer
23 fumes.)" Are the chemicals or the substances that are
24 included within the parenthesis intended to define the
25 only dangerous materials that this report discusses?

Davidson - direct/Hollingshead

1 A. No, it says for example. The report als
2 includes others. It's meant to be representative of
3 the co-focus.

4 Q. Specifically what other chemicals
5 within the body of the report are termed by you to be
6 dangerous?

7 A. PVC resin containing containing free radicals,
8 residual free monomer in the adsorbed bound and/or
9 entrapped states. The free eluded fugitive VCM in the
10 breathing zones. The thermal decomposition products
11 from the resin particles, particularly the PVC resin
12 particles contacting hot elements of the heat sealer
13 plate ensemble, decomposing to produce fugitive VCM
14 benzene hydrogen chloride, carbon monoxide, possibly
15 phosgene and possibly char particles.

16 Q. Are those the dangerous chemicals or
17 materials that the report discusses?

18 A. The focus of the report is in that area but the
19 report also includes, because it was part of the total
20 exposure environment, asbestos particles from repairing
21 brake lines, monomer fumes from bisphenol resin and
22 polystyrene resin particles and also welding fumes
23 which is a mixture of a variety of chemicals, depending
24 on what is being welded. Included in that is oxides of
25 nitrogen and metal fumes. All those compounds are

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1 mentioned at one point or another in my report and
2 included in the total exposure environment.

3 Q. Did you consider polyethylene at all
4 within the confines of your report?

5 A. Yes.

6 Q. Is that one that should be added to
7 the list?

8 A. Yes, that's in my report.

9 Q. Did you consider polyurethane within
10 the confines of your report?

11 A. No.

12 Q. Is bisphenol -- strike that. Do you
13 know what isopropilidene resins refers to?

14 A. Basically.

15 Q. Is that the same as bisphenol?

16 A. It's a cousin, yes. It's generically similar,
17 yes.

18 Q. Did you consider within the context
19 of your report isopropilidene bisphenol resins?

20 A. I considered -- can I refer to one of my work
21 sheets. The generic compounds that I considered was
22 Bisphenol A resin.

23 Q. Is that the only one that you
24 considered -- strike that. Is that a phenol?

25 A. Yes, it is.

1 Q. Is that the only phenol or bi-phenol
2 that you considered?

3 A. Yes.

4 Q. Were you asked to consider or did you
5 consider heavy equipment machinery in lubricants and
6 fuels as part of Mr. Peterson's exposure experience?

7 A. I was asked to review all fumes and lubricants
8 in his breathing zone but I had no specific data on
9 what those generic compounds were, other than they
10 could have been present but the quantity, type,
11 location, time period, I had no foundation for.

12 Q. In any event, you did not consider
13 materials that are referred to in the amended complaint
14 as heavy equipment machinery lubricants and fuels?

15 A. No.

16 Q. What information did you receive with
17 regard to any exposure that Mr. Peterson may have had
18 to asbestos and when did you receive such information?

19 A. When I received the documents from Dr. Epstein
20 I noticed the inclusion of asbestos in his analysis and
21 then I queried Mr. Levinson about the origin since I
22 did not find anything definitive in his work background
23 from his deposition, other than inference. He supplied
24 a Henry Valez's deposition.

25 Q. Was it a report?

1 A. Report, yeah -- no, it was a deposition.

2 Q. To my knowledge, Dr. Velez is being
3 deposed today.

4 A. Excuse me. It's a report. And he mentioned
5 that if that was verified in that finding and he
6 indicated yes, indeed, he had worked with brake lining
7 in his work environment. So I took that as a fact in
8 my report, in this report.

9 Q. In the second report?

10 A. Yes.

11 Q. I --

12 A. It was not part of my thinking in the July 20
13 report.

14 Q. And in fact, you had not been advised
15 prior to the preparation of your July 20 report that
16 there had been an asbestos exposure experience?

17 A. I did inquire about it earlier, but I had no
18 foundation for it in materials that I reviewed and
19 that's the Peterson deposition primarily.

20 Q. To whom did you inquire?

21 A. Mr. Levinson.

22 Q. What response did you receive at that
23 time?

24 A. Actually no response at that point.

25 Q. Has the knowledge that you have

1 acquired that Mr. Peterson apparently had some asbestos
2 exposure earlier in his experience at OTD changed
3 anything within the context of your report of July 20?

4 A. No. It just adds another unhealthy component
5 to his breathing zone, along with the others. The
6 thing that I noticed was the day in and day out
7 persistance of certain pollutants versus others and
8 that's why my report focused on VCM, PVC because it was
9 the one involved with the heat sealer and the one that
10 was involved on a day-to-day basis over a long period
11 of time.

12 Q. What is your understanding of the
13 asbestos exposure that Mr. Peterson did have?

14 A. With repairing brake linings and I don't
15 understand that to mean on a daily basis.

16 Q. What is your understanding?

17 A. Not a frequent job.

18 Q. For how long?

19 A. Probably working on it several years.

20 Q. Your information comes from where,
21 solely from the Valez report?

22 A. Yes, I think it was four years.

23 Q. Do you recall if anything in the
24 Valez reports talks about the extent of his exposure to
25 asbestos?

1 A. I'd have to review it to pin that down.

2 Q. Nothing comes to mind from your
3 recollection of the report?

4 A. No. Certainly there was nothing in Mr.
5 Peterson's deposition that would even infer that he was
6 doing this instead of doing other things. His primary
7 work function was a maintenance supervisor.

8 Q. Have you looked at, since learning
9 about the asbestos exposure, have you looked at the
10 toxicological properties of asbestos?

11 A. I'm fairly familiar with most of the
12 literature.

13 Q. Have you worked on asbestos
14 litigations prior to this?

15 A. Yes, and it's one of the main chapters of my
16 course. I've done extensive literature survey and
17 involved myself with that. We also unfortunately have
18 it in our own laboratories. I had day-to-day contact
19 with the problem for quite awhile at Rutgers. We had
20 38 buildings that had to be cleaned out. So I was
21 involved in a safety task force and I was on a lot of
22 advisory committees. So I know the literature very
23 well and it is a carcinogen and although I consider it
24 a physical carcinogen.

25 Q. What do you mean by that?

1 A. Solid surface basically. Nobody really knows
2 what the first step is, except maybe something happens
3 ultimately to some property in the cell which affects
4 DNA and so forth but I've never seen any delineated
5 mechanism of the physical carcinogen. I think it comes
6 in the area of solid state, but it does decay. It may
7 decay like PVC does in the body, very slowly and it
8 could be that these products are just not picked up in
9 any analysis. So nobody really knows exactly.

10 Q. Do you have a recollection from Dr.
11 Valez's report as to when Mr. Peterson's exposure to
12 asbestos occurred?

13 A. My recollection was in the first four years of
14 his employment there, starting in 1968.

15 Q. Your report indicates his employment
16 exposure period would have been 1967 to --

17 A. The first four years.

18 Q. So late '60s and early '70s?

19 A. Yes.

20 Q. When you reviewed the deposition of
21 Mr. Peterson, do you recall whether or not he talked
22 about asbestos exposure in the early part of his
23 employment with OTD?

24 A. I think that question was asked and his answer
25 was out in California in a manufacturing plant and he

1 said he wasn't personally knowledgeable that he was
2 exposed. That doesn't say he wasn't.

3 Q. Do you know what his job duties were
4 with GM which as I recall was General Motors?

5 A. If I can refer to my work sheet.

6 Q. Sure. And you're referring to the
7 work sheet that is contained within Davidson-10?

8 A. Yes.

9 Q. Okay.

10 A. Going to page 5 of that document, I'm going
11 through his chronological work history and your
12 question was?

13 Q. Do you have a recollection of having
14 learned anything about that work history with General
15 Motors?

16 A. Page 6, page 64 line three of his deposition
17 and page 57, line 17, he spent two to three years in
18 1946 in California GM plant and he indicated: "the air
19 at the GM plant very good." That's about what I
20 learned from his deposition. There wasn't anything
21 generic or definitive but chemicals he may or may not
22 have been exposed to. He wasn't complaining about the
23 air. He even qualified it as very good.

24 Q. You didn't learn any additional
25 information with regard to his work experience with GM,

1 did you?

2 A. No, this was the sole source.

3 Q. Did you interview Mr. Peterson at all
4 with regard to his prior history?

5 A. I never talked to him or met him.

6 Q. If he had had additional asbestos
7 exposure while with GM, would that be of some concern
8 to you or would you wish to consider that for the
9 possibility of revising any portion of your report?

10 A. It's a dangerous chemical. I consider it as
11 dangerous as VCM. It has the propensity to produce
12 cancers in different parts of the body. I would
13 consider it a co-cancerous agent that he would be
14 exposed to.

15 Q. I take it that your answer to my
16 direct question would be along the lines of this, you'd
17 like to consider it because it is a dangerous chemical
18 in your opinion?

19 A. Well, I have in my supplemental report have
20 considered it and indicate that. It's still in my
21 thinking as a co-chemical agent among the several that
22 have propensity to produce adverse medical effects. As
23 a safety engineer I would be concerned about it, if it
24 were in his environment and breathing zone as much as I
25 would be concerned with VCM. The history of both of

1 these chemicals in the literature have had very
2 parallel paths and I have lectured on that parallelism
3 to my students. Its interesting that practically year
4 for year they evolved the same way epidemiologically,
5 very analogous.

6 Q. Are you aware of any of his work
7 place exposures while he worked for Rheem
8 Manufacturing?

9 A. At Rheem he indicated he had one health problem
10 which was a hand infection which cleared up. That was
11 page 64 of his deposition, line 17. He also was a kiln
12 operator for Rheem.

13 Q. What was your understanding of the
14 business of Rheem manufacturing or do you have such a
15 understanding?

16 A. I'm familiar with the name and some of their
17 products.

18 Q. What are you familiar with?

19 A. They make a hot water heater.

20 Q. Do you know what the kiln operation
21 is or did Mr. Peterson describe it in his deposition?

22 A. No, I basically know what a kiln is.

23 Q. Tell me what that is.

24 A. It's a high temperature device. It's
25 insulated.

1 Q. With what?

2 A. Fire brick, asbestos, silica magnesia. Depends
3 on what product was used for insulation.

4 Q. Do you know how long Mr. Peterson was
5 with Rheem?

6 A. '60 to '65, one place in deposition he says '60
7 to '65 and another place he says '62 to '67.

8 Q. So it's somewhere early mid '60s?

9 A. Yes.

10 Q. Was he a kiln operator for that
11 entire period of time?

12 A. Not the entire. He was three and a half years
13 of that. For Rheem he was a laborer and then a
14 foreman.

15 Q. While he was a laborer he was also
16 operating the kiln?

17 A. I would think that would be part of it.

18 Q. Would it be important for the
19 preparation of your report or perhaps for the changing
20 of your report to learn more about his duties at Rheem,
21 particularly if it involved asbestos exposure?

22 A. He went into a little detail, pages 36, 41, he
23 said he didn't do maintenance or cleaning. That's
24 good. So if there were an asbestos situation there, at
25 least he's not in intimate contact with it. I would be

1 more concerned if he were an insulation laborer. He
2 said he didn't do cleaning or maintenance. That's
3 about as far as the deposition went with that subject.

4 Q. If the kiln that he was operating for
5 a number of years had been, in fact, insulated with
6 asbestos, is that a fact that you would like to take
7 into consideration in the preparation of your report or
8 perhaps the revision of it?

9 A. Well, I'd have to know more than just that.
10 I'd have to know the product, who did the repair work,
11 maintenance work, clean up work and where was Mr.
12 Peterson when all that was going on.

13 Q. If you had that information you would
14 wish to take that into consideration, I assume?

15 A. Yes, and I would. My thoughts don't exclude
16 that in his history.

17 Q. When you mentioned welding fumes and
18 you gave us the litany of dangerous materials or
19 chemicals that are the subject of your report what
20 definition do you give to welding fumes? What do
21 welding fumes contain?

22 A. Welding fumes, depends whether it's arc welding
23 or acetylene torch welding and then it depends on what
24 you're welding, stainless steel or some other material.

25 Q. Do you know what Mr. Peterson was

1 involved with at ATC or OTD?

2 A. One thing common to any kind of welding and one
3 of the major components in welding fumes, the one that
4 you really need the ventilation for are oxides and
5 nitrogen.

6 Q. Now --

7 A. You can get a potpourri of things, oxides of
8 metals, cadmium, zinc, tin.

9 Q. Do I take your answer to mean it
10 would be produced regardless of the material that was
11 being welded?

12 A. True. It basically comes from the high
13 temperature, decomposing nitrogen reacting with oxygen
14 to give you oxides, NOX, which is a strong pollutant.
15 It affects the entire respiratory system.

16 Q. Are you talking about the oxides of
17 nitrogen?

18 A. Correct.

19 Q. How does it affect the --

20 A. It's a strong oxidizer.

21 Q. Which means what in terms of the
22 effect --

23 A. It's very corrosive.

24 Q. How?

25 A. It affects tissue. It has the ability to scar

1 tissue.

2 Q. To your knowledge is it a listed or
3 suspected carcinogen?

4 A. In and of itself I don't know for a fact. I
5 never would rule it out as a chemist. I have not seen
6 that stated. It does have a TLV.

7 Q. What is the current TLV?

8 A. I think it's five parts per million.

9 Q. Do you know if there was one back in
10 the early '70s when OSHA published TLVs for the first
11 time?

12 A. It might be higher. It could be ten or 25.
13 I'd have to check my records.

14 Q. Do you include welding fumes as one
15 of the so-called co-chemical agents that might have had
16 an impact on Mr. Peterson?

17 A. Yes.

18 Q. Do you know the extent to which he
19 was exposed to welding fumes?

20 A. From his work history we have a little
21 information on that. He learned his welding ATC and no
22 other place; that for the first six years, he said he
23 did everything, plumbing, welding and so forth. So you
24 get an idea of his work history with welding from that
25 source of information.

1 Q. Well, that only tells you that he did
2 it, not how often?

3 A. Absolutely.

4 Q. So do you have any --

5 A. He said he did work off shifts. That's it on
6 welding. He doesn't give it to me in minutes or hours
7 or days.

8 Q. Is there anything that's been made
9 available to you that would give you an understanding
10 as to the level of exposure to welding fumes that Mr.
11 Peterson had during his employment at OTD, ATC?

12 A. That's basically, other than I believe one
13 place he mentioned there was no ventilation. The fumes
14 were lingering around.

15 Q. Do you have a reference to that in
16 your notes?

17 A. I was looking for that, too. I don't see a
18 definite reference to that. No, not here. I'd have to
19 really go back to the dep and see if that's true, what
20 I just tried to recollect.

21 Q. That recollection would have only
22 come from the deposition. Is that correct?

23 A. Only, yes.

24 Q. So it's either in the deposition or
25 it's not?

1 A. Definately.

2 Q. And if it's not in the deposition you
3 would stand corrected with regard to that statement?

4 A. If it's not in the deposition, yes.

5 Q. Do you know how long he had exposure
6 to welding fumes? By that I mean the duration of time
7 when he was performing welding operations at OTD/ATC?

8 A. No, he indicates that over a six year period he
9 was involved spuriously in that.

10 Q. Is that the first six years of his
11 employment?

12 A. Yes.

13 Q. That's approximately 1967 to 1973?

14 A. Yes.

15 Q. What other ingredients are there in
16 welding fumes if you can tell without knowing precisely
17 the type of welding he was doing and the materials he
18 was welding? You mentioned oxides of nitrogen earlier
19 as always being present?

20 A. Yeah, zinc, cadmium, tin, iron, and then it
21 depends on the surface that he's welding in addition to
22 the material, whether there is prior contamination by
23 oils and grease. You could get other chemicals
24 facility of a hydro carbon nature.

25 Q. Are you familiar with literature

1 discussing toxic properties of oxides of nitrogen?

2 A. Yes.

3 Q. Do you know what the literature says
4 in terms of the effects upon the human body, upon
5 exposure to oxides of nitrogen?

6 A. One of the epidemiological effects that has
7 been discovered is emphysema.

8 Q. Which epidemiological study or
9 studies are you referring to?

10 A. I was involved in an investigation of fumes in
11 a railroad repair shop where continual welding was
12 always done and it was in that work that I assume
13 across the literature that showed that this was an
14 occupational problem with the welding fumes and other
15 fumes and in that, that conclusion was arrived at that
16 oxides of nitrogen have the propensity to give you
17 ultimately emphysema.

18 Q. Do you recall the epidemiological
19 study you're referring to?

20 A. I'd have to go research that again.

21 Q. Do you recall the type of
22 epidemiological study it was?

23 A. It was an occupational epidemiological study.

24 Q. Do you know if it was referred to as
25 an SMR or a PMR epidemiological study?

1 A. I'd have to go and find the source of my
2 recollection.

3 Q. Do you know what those phrases mean,
4 SMR or PMR epidemiological study?

5 A. You better tell me and then I'll tell you if I
6 know that.

7 Q. As I recall standard mortality ratio
8 and PMR means --

9 A. Yeah, I don't recall that in much detail.

10 Q. Would that be important to you to
11 know what type of a --

12 A. I'm not a biostatistician or epidemiologist and
13 they play around with these formulas a lot. I'm a
14 deterministic person. I look at the chemistry.

15 Q. You mean you don't put a lot of trust
16 in any epidemiological study, whether it's SMR or PMR?

17 A. Right, not as it stands freely without looking
18 at the chemistry. The chemistry of NOX is devastating.

19 Q. That's oxides of nitrogen?

20 A. Correct. I recall my coal studies at room
21 temperature I can burn up coal which is the biomixture
22 of coal and air. It would literally catch your lungs
23 on fire, it's that strong. I can get regular coal
24 biparticulated and burn it up with a five percent
25 mixture of NOT and air. So it has the ability to chew

1 up that tissue, human tissue. So that can't be good.
2 That leads to lesions and all kinds of things.

3 Q. Are you aware of other reported toxic
4 effects of exposure to oxides of nitrogen?

5 A. Other than it affects the entire pulmonary
6 system.

7 Q. When you say it affects the pulmonary
8 system, what type of effects are you talking about?

9 A. Same as ozone would do. It's a pollutant like
10 ozone. It would affect the entire respiratory tree.
11 Ultimately creating emphysema.

12 Q. Emphysema would be the final product
13 of the exposure if it went that far?

14 A. I think so.

15 Q. Would there be pulmonary difficulties
16 in breathing as far as exposure to --

17 A. You're asking for medical determination. I
18 would rather not comment strongly on that.

19 Q. I understand it's not your field of
20 expertise but based upon the literature you have read
21 and understood, have you seen it reported that exposure
22 to oxides of nitrogen has an impact upon the breathing
23 function and other pulmonary functions?

24 A. Oh, absolutely. That's the first thing stated.

25 Q. Is it based --

1 A. That's why it has a TLV. You have to provide
2 adequate ventilation.

3 Q. Based on the reading that you've
4 done, are you aware whether or not oxide of nitrogen is
5 a carcinogen or a suspected carcinogen?

6 A. I'd have to research that. I don't recall that
7 offhand. I would say it's probably not.

8 Q. You didn't review that issue
9 specifically for the preparation of your opinion in
10 this case, did you?

11 A. Well, I did from this point of view, if you
12 read my report again, you'll find that I did allow for
13 the idea that you're getting simultaneous inhalation of
14 a lot of chemicals. There's a thing called synergism.
15 For example, if you inhale something that's a drying
16 agent, you dry out the linings of your mucous
17 membranes, the defenses in your body go down. If you
18 scar your broncheal tubes with inhalation of that
19 strong oxidizer or hydrogen chloride from fumes from
20 the heat sealer when PVC decomposes, you're affecting
21 your body's mechanisms for other pollutants. You take
22 your guard down by affecting your tissues with strong
23 oxidents and this is widely known among the
24 toxicologists that synergism does exist and inhalation
25 of one compound by itself could be tremendously

1 amplified if you inhale two simultaneously.

2 Q. Are you talking about the synergistic
3 effect upon the human body?

4 A. Yes, and also locally.

5 Q. But you're not testifying as a
6 medical --

7 A. Absolutely not. This is my reading and
8 understanding of the basic chemistry. I've studied the
9 effects, for example of a lot of compounds oncology
10 which is connective tissue. If I have worked with
11 collagen quite a lot. I can tell you what it does,
12 acids and bases and how they dissolve the collagen
13 right before your eyes. It would do the same to human
14 tissue.

15 Q. Are you aware of any toxicological
16 studies on the subject of synergism that you can refer
17 me?

18 A. I have several books in my library. There's
19 chapters on all these events. It's widely referenced
20 and discussed in the toxicological books.

21 Q. You're saying it's a basic
22 toxicological premise?

23 A. It's a fact.

24 Q. Sorry for the use of the wrong word.
25 It's a basic toxicological principal?

1 A. Yes.

2 Q. And it would appear in any standard
3 text that I care to peruse?

4 A. I would say yes.

5 Q. Are there other particularly noxious
6 ingredients within welding fumes such as oxides of
7 nitrogen that one needs to consider here in Mr.
8 Peterson's exposure history?

9 A. I think I've outlined the main ones I would be
10 concerned with, primarily the oxide of nitrogen because
11 it's ubiquitous and it's not a function of what you're
12 welding, only the temperature.

13 Q. Is there any study that you're aware
14 of that excuses the synergistic effects of oxides of
15 nitrogen with any of the other chemicals in this case?
16 By that I'm referring to PVC or VCM polystyrene,
17 Bisphenol A or fumes from the heat sealer?

18 A. I don't know of any. I think that would have
19 to be researched. Tox Line or Med Line, one of those
20 computerized searches could find something.

21 Q. In any event you didn't do it for the
22 preparation of your report?

23 A. No, I'm looking at it theoretically actually,
24 based on the facts it was feasible that it was there in
25 the same breathing zone, at the same time or at

1 different times and there it was inhaled because
2 ventilation was poor and no breathing apparatus around.

3 Q. You're not intending to express
4 within the confines of your report any opinion with
5 regard to medical causation in Mr. Peterson's
6 condition, are you?

7 A. None whatsoever. I hope I didn't indicate
8 that. I apologize if I do. I'm here as a safety
9 engineer.

10 Q. And your role as safety engineer is
11 to look at the theoretical possibilities of exposure to
12 a particular product in terms of what it can do or how
13 it might interact with other chemicals?

14 A. Yes. A safety engineer has to go into that
15 foreseeability aspect, has to really know a lot.
16 Doesn't have to have done the studies but you have to
17 look at the chemistry and any chemical safety engineer
18 would draw the same conclusion or at least should have
19 that oxides of nitrogen is dangerous. That's from the
20 generic nature of these two very reactive compounds.
21 NOX.

22 Q. Page 11 of your report -- strike
23 that.

24 Going back a moment ago to my question as to
25 whether or not you were expressing any medical

1 causation opinion, I'll refer you to page 11, and I
2 refer you to the middle sentence of the bottom
3 paragraph under the heading epilogue: "from the
4 totality of reports, deposition transcripts and
5 correspondence reviewed, it is presumed by this writer
6 that most probably a major co-chemical culprit in
7 causing Mr. Peterson's throat cancer was generic VCM in
8 either or both the resin bound RVCM or fugitive VCM
9 forms." That statement I take it is not intended to
10 express your medical causation view based upon any
11 reading of your literature?

12 A. Maybe it's a poor choice of words but I say it
13 is presumed. What I mean I'm presuming this as a
14 safety engineer who has reviewed the medical literature
15 and occupational health literature and this is what I
16 gleaned. This is what I'm extrapolating from the
17 engineering side of the picture.

18 Q. At the time you wrote this you did
19 not have any medical report or causation report from
20 Dr. Velez or consider Epstein, did you?

21 A. Valez, no.

22 Q. This is at the time of your July 20
23 report?

24 A. Epstein, only that part that's in his
25 deposition, partial transcript.

1 Q. From the Meliko case?

2 A. Yes.

3 Q. I can represent to you that he has
4 not yet been deposed in the Peterson litigation.

5 A. Then it was Meliko.

6 Q. What fumes come off from the heat
7 sealer and how do those fumes become generated?

8 A. All right.

9 Q. Maybe we should backup and explain
10 for the record what the heat sealer is or what your
11 understanding of it is?

12 A. Yes. The bags into which the PVC resin was
13 packaged, when it's on the assembly line after it is
14 filled, it goes a short distance to a heat sealer where
15 the bag is sealed. To seal the bag, heat is applied
16 and because of the documentation and also my own
17 observations there were lots of spills creating lots of
18 fugitive dust, bags would break open on the conveyor
19 belt in and around the heat sealer and at the heat
20 sealer and when the spilled resin dust, by spilling,
21 would contact the hot elements of the heat sealer you
22 get spontaneous thermal decomposition. The first thing
23 that probably happens is that you get a rapid evolution
24 of the residual free monomer being belched out because
25 you have raised the temperature of the resin.

1 The next thing that happens, and it's
2 simultaneously, depending on the temperature, PVC
3 decomposes thermally at around 350 do 400 degrees
4 fahrenheit based on the literature that I reviewed. At
5 this temperature, the polymer starts to unzip and you
6 get hydrogen chloride gas evolving. You get various
7 hydrocarbon compounds. You get a reformation of the
8 polymer in the form of the production of trace amounts
9 of benzene, which, by the way, is also a suspect or an
10 identified carcinogen, coming off. You get carbon
11 monoxide, also phosgene, but the primary thing, primary
12 irritant and the highest concentration is hydrogen
13 chloride which is an acid and it also acts as a drying
14 agent in your respiratory system and your throat. It
15 would tend to take up water, moisture and form
16 hydrochloric acid and then you get also pyrolysis
17 products, various charred hydrocarbon compounds might
18 be visible as smoke particles. We're talking about
19 micron, one, two, three, four, micron sized smoke
20 particles. I personally witnessed that with PVC
21 wrapping film on a hot plate in my prior experiences
22 and the smoke is visible and though smoke particles
23 also have the tendency to carry with them adsorbed
24 hydrogen chloride, adsorbed VCM. They are activated
25 particles. They could be carriers for the gaseous

1 components. It could be a short lived thing but if
2 you're in close to the breathing in zone of these
3 fumes, when you are inhaling the particles you're
4 inhaling what's adsorbed on them. The particles
5 themselves are toxic.

6 Q. Is it your understanding that Mr.
7 Peterson had considerable irritation in the respiratory
8 tract when he was exposed to the fumes off of the heat
9 sealer?

10 A. Yes. He said it was extremely choking.

11 Q. Caused him to cough?

12 A. A lot, yes.

13 Q. Had to leave the area?

14 A. Correct.

15 Q. Is hydrogen chloride the primary
16 ingredient in the heat sealer fumes?

17 A. Probably 20 percent by weight.

18 Q. That's what you meant earlier when
19 you said the primary irritant is hydrogen chloride?

20 A. Yes. Depends on the time at which you're
21 measuring the smoke and the temperature. I've seen
22 some data on this. I think in here, in the folders,
23 are tables that show the percent of each compound given
24 off at a certain temperature.

25 Q. As I leafed through the folders,

1 especially the one on various literature sources, I
2 seem to recall an article on thermal decomposition
3 of --

4 A. PVC.

5 Q. Could you find that article? You've
6 provided me with a copy of an article entitled thermal
7 decomposition of polyvinyl chloride by Stromberg,
8 Straus and Achhammer, appearing volume 35, published in
9 1959. Did you rely upon this article with regard to
10 any contents of your report, talking about the thermal
11 decomposition of polyvinyl chloride?

12 A. That's one of the references. This is just
13 representative of the kind of information that you can
14 get.

15 Q. Do you have other such articles in
16 your folder dealing with the decomposition of polyvinyl
17 chloride?

18 A. I recall an article by Zipp.

19 Q. I take it you don't have that?

20 A. Yes.

21 Q. Could you -- I appreciate if you take
22 out whatever you might have in the folder on this
23 subject?

24 MR. HOLLINGSHEAD: For the
25 record these are coming out of Davidson-11.

1 A. The guy's name is Zipp.

2 Q. That's an article entitled toxic and
3 health effects of toxics in plastics?

4 A. Yes.

5 Q. What's the journal?

6 A. Archives of Environmental Health, volume four,
7 1962 and -- I think he's associated with DuPont.

8 Q. The fact that he's in Wilmington,
9 Delaware might suggest that?

10 A. Yes. He's in the laboratory for toxicology and
11 industrial medicine.

12 Page 346 in his summary he says there are
13 problems -- as a class the plastics and resins are not
14 as exempt from health and toxicity problems as one
15 might have supposed them to be on the grounds of their
16 large molecular weight and chemical innerness. There
17 are problems of monomer weight fractions of adjuvants
18 and of thermal decomposition and combustion products
19 and we must be alert for them.

20 Q. Do you have any other articles that
21 you relied upon for the preparation of this report
22 involving thermal decomposition of PVC?

23 A. I relied on several others that are in my --
24 probably in my files on the meat wrapper syndrome cases
25 but four or five years ago I cleaned out so much from

1 my files that I hope I didn't throw away all my
2 literature. I may have my reports but I did rely on my
3 recollection and understanding from those prior
4 experiences and reading of cognate literature.

5 Q. So with regard to those other
6 articles that you may have read in the past, you did
7 not specifically refer to them for the preparation of
8 this report, but you relied upon your recollection of
9 them. Is that correct?

10 A. That's correct.

11 Q. Did you have any recollection as to
12 the authors of any of those articles or treatises?

13 A. The one that we just pulled out -- that's
14 not -- the deposition in the Meliko -- that writing
15 says that that came from another deposition in December
16 of '77 and that was from one of the meat wrapper cases
17 where I used that. That did come from my meat wrapper
18 file.

19 Q. You're referring to the Stromberg,
20 Straus article?

21 A. Yes.

22 Q. The thermal decomposition of
23 polyvinyl chloride, would that apply to any form of PVC
24 resin regardless of the manufacturing process that was
25 utilized to form it?

1 A. The difference would be in my estimation minor
2 because the major components is hydrogen chloride gas
3 and that's common to all the allegedly three methods of
4 making the PVC polymer. The differences would lie in
5 the amount of eluded vinyl chloride monomer. Some had
6 more, some less. There would still be smoke and the
7 irritation would be coming from the hydrogen chloride.

8 Q. While we're on the subject, what are
9 the, I think you said the three manufacturing processes
10 for polyvinyl chloride?

11 A. According to information I obtained from Dr.
12 Wheeler, Union Carbide had developed I think four
13 methods but only three -- products from three of those
14 methods were actually resins shipped to ATC, they were
15 suspension, bulk and solution. The emulsion resin Dr.
16 Wheeler indicated was not shipped.

17 Q. If I can take you back to the
18 Stromberg report entitled thermal decomposition of
19 polyvinyl chloride, there's a chart on page 358 which I
20 take it is the listing of, if I can call it,
21 by-products or at least those products that are
22 released upon decomposition, am I correct in that?

23 A. Yes.

24 Q. Is that the chart you were referring
25 to before when you indicated that hydrogen chloride

1 constitutes 20 percent by weight of the volatile
2 products that are given off upon decomposition?

3 A. No.

4 Q. Okay. Does that appear somewhere
5 else, perhaps in another chart in that article?

6 A. Yeah. That, if you -- yes, it comes from other
7 parts, page 357, table one, two and three. It really
8 depends on the temperature and the time. These are all
9 for 30 minutes at different temperatures.

10 Q. Each of those -- table one has a
11 reference of a hydrogen chloride, benzene toluene and
12 other hydro carbons. Table two have references to --

13 A. Other hydro carbons containing five or fewer --

14 Q. As the footnote on the page
15 indicates?

16 A. Right.

17 Q. Now, were you referring to that
18 chart --

19 A. Not specifically. I'm referring to my whole
20 recollection. When I said 20 percent I mean of the
21 total mass of the material initially. You know, the
22 whole solid PVC. We're only talking about the volatile
23 components and if you look here, hydrogen chloride is
24 quite evident as the major fraction.

25 Q. Is for example, hydrogen chloride

1 95.9 percent or an average of 96.3 percent?

2 A. Yes.

3 Q. And for table two it's an average of
4 98.6 percent and for table three 91.2 percent?

5 A. Right, and if you notice my reference to
6 benzene is 1.2 percent and two percent respectively.

7 Q. And you had said before there were
8 trace amounts of benzene?

9 A. Yes.

10 Q. That defines trace?

11 A. Yes, it's one percent, two percent of the major
12 components. Also we have toluene in there, too.

13 Q. Turn the page to table four. In
14 reference to that table or other parts of the article,
15 is there an indication that vinyl chloride monomer is
16 released upon decomposition -- thermal decomposition of
17 PVC?

18 A. I don't see it specifically listed.

19 Q. Do you --

20 A. But in other items that I -- other references I
21 do talk about any free monomer has to come off and it
22 probably comes off so fast it's not really captured in
23 these experiments. It would flash off as soon as it
24 starts feeling heat. It wouldn't probably be captured
25 and it would be in trace amounts depending on the

1 residual amounts, a thousand parts per million or
2 whatever per weight. We're talking about small
3 quantities, less than a tenth of a percent.

4 Q. When you talk about RVCM, you're
5 talking about the amount of vinyl chloride monomer that
6 would be trapped at the time of the thermal
7 decomposition?

8 A. Yes, and hasn't eluded out.

9 Q. Prior to that point in time when
10 there is thermal decomposition upon application of the
11 heat sealer to the PVC, would there not have been some
12 amount of I think you said diffusion of that RVCM to
13 the atmosphere?

14 A. It's diffusing continuously.

15 Q. From the time of its manufacture?

16 A. Correct.

17 Q. Is there any particular formula or
18 equation that would indicate the rapidity which the
19 RVCM would be diffused from the PVC after it's
20 manufactured?

21 A. Yes. This was actually attempted in the
22 first — the first I saw of it was in Barnes' article,
23 1974, I think, a reprint from a paper presented at a
24 technical meeting in Atlantic City, New Jersey. I
25 think it's referenced in my Meliko report and my own

1 diffusion studies about a year or two later than that.
2 I didn't see anything prior to that that would give me
3 a mechanistic model for the instantaneous diffusion in
4 distance and time in a resin particle, having a certain
5 gross size and internal tortuosity. Barnes did address
6 this issue and started to get at the effect of
7 diffusion co-emission. Doctor Wheeler's report he
8 talks about gross averaging percent loss versus time
9 which is not an accurate way to describe it. It's a
10 very coarse and bulk way to describe it. It's not
11 mechanistic. It doesn't account for the slow transient
12 diffusion.

13 Q. Would the Barnes approach in the
14 article in your view give one a better understanding of
15 the rate by which the RVCN diffused from the particle?

16 A. Oh, yes. Not only that, it tells you that it's
17 non-linear. The supposition that Dr. Wheeler used was
18 very linear --

19 Q. Which means?

20 A. Equal lengths, equal percent. Diffusion is not
21 a linear process. It's --

22 Q. How does it work if it's not?

23 A. It follows diffusion loss which is not linear
24 and goes according to the concentration gradients which
25 is changing with time. If you use Dr. Wheeler's

1 argument you have to make the supposition that the
2 concentration ingredients are constant, which no
3 chemical engineer would agree to. He was using it and
4 I don't fault him for using it as an estimate, but it
5 is not the science behind solution.

6 Q. What do you mean by the concentration
7 gradients?

8 A. That's the concentration of residual monomer in
9 the resin starting from, if you look at it as a sphere,
10 which it almost is, but not quite --

11 Q. You're talking about the particle of
12 PVC resin?

13 A. Right. They are highly porous inside and in
14 the center the concentration gradient is constant.
15 It's always zero and then it changes in time, all the
16 way out to the out boundary of the particle. It keeps
17 changing until all the VCM is eluded and the rate at
18 which it's lost is proportional to that concentration
19 gradient and the only way to attack that is to solve
20 the differential equations that describe that process.
21 That was the essence of the Barnes article and is also
22 my experience. I work with the same equations.

23 Q. By doing so, by using the Barnes
24 article or whatever formula might appear therein, can
25 one determine over the course of time how much of the

1 RVCN would have been difused from a particle of PVC
2 resin?

3 A. Yes. If you could fix a few variables, the
4 temperature --

5 Q. Do you mean the temperature of the
6 particle or atmospheric?

7 A. Temperature of the particle, which I'm -- which
8 also has -- doesn't have to be the temperature of the
9 atmosphere but you better fix that, too. Fixing the
10 temperature constant. Fixing the geometry and fixing
11 the initial distribution, that's the one that we don't
12 have a handle on yet. Just what is the distribution of
13 the adsorbed or retained monomer inside the resin?
14 Where is it located and what is its concentration? You
15 have to know that in order to solve the equations. I
16 think Barnes assumed if I recall uniformed
17 distribution, averaged it out to start with, which is a
18 fair supposition but it isn't accurate because it's not
19 uniform.

20 Q. Are there any other variables that
21 would need to be fixed?

22 A. Yeah. You'd have to know precisely from
23 surface area and pore size distribution, what the pore
24 model looks like for the resin model. I have never
25 seen anything definitive on that. Dr. Wheeler doesn't

1 even mention it, other than he eludes to it in his
2 micrographs and states that material is porous. The
3 truth is it's not uniformly porous. It has passageways
4 which affect the speed of diffusion and that is
5 something that has to be measured and studied
6 experimentally to really understand how VCM really
7 eludes to do any predictive modeling.

8 Q. Have you made any effort within the
9 confines of the Peterson litigation to determine the
10 diffusion rate of the RVCM from the PVC particles from
11 the time of manufacture and the time of processing at
12 the ATC facility?

13 A. No, except mental experiments. I did look and
14 I used in a few simulated calculations in my work
15 sheets, I accepted Dr. Wheeler's supposition about
16 linear equal percent loss and time.

17 Q. Despite your concerns about it?

18 A. Despite my concerns about it. I was trying to
19 do two things: Independently verify the accuracy of
20 his calculations by doing them myself my own way but
21 using his data base, and then making one correction --
22 several corrections that he didn't think about or
23 didn't state that he thought about and I put that in my
24 report, what I find wrong with the model, why the
25 numbering in his model made it come out to eight parts