

1 IN THE DISTRICT COURT OF BRAZORIA COUNTY, TEXAS
2 239TH JUDICIAL DISTRICT
3

4 MANDY STAPLES, as mother and
next friend of JONATHAN STAPLES (age 10),
5 JUSTIN STAPLES (age 8); and SHELBY
STAPLES (AGE 5); CHRISTINA CARL, aunt
6 and guardian of the person and estate
of CARLIN DAVID STAPLES, JR., (age 16);
7 and ROBERT STAPLES, as uncle and
8 next friend of JESSE STAPLES (age 13)
9 vs.

NO. 13798*JG00

10 SHINTECH INCORPORATED
11
12
13

14 **DEPOSITION OF OTTO WONG**
15 **MARCH 12, 2002**
16 **Volume I**
17 **(Pages 1 - 261)**
18

19 Taken before KAREN E. THOMPSON
20 CSR No. 2792
21
22

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DEPOSITION OF OTTO WONG - VOLUME I

1 I N D E X

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3 DEPOSITION OF OTTO WONG

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6 EXAMINATION BY: MR. COLBERT 7

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11 E X H I B I T S

12 DEFENDANT'S PAGE

13 1 CV of Otto Wong, 19 pages, 22

no Bates numbers

14 2 Article, American Journal of industrial 32

15 Medicine, 20:317-334 (1991), "An

Industry-Wide Epidemiologic Study of

16 Vinyl Chloride Workers, 1942-1982,"

by Wong, Whorton, Foliart, and Ragland,

17 18 pages, no Bates numbers

18 3 Reviews, Scand J Work Environ Health 54

14 (1988) 61-78, "Effects of exposure to

19 vinyl chloride - an assessment of the

evidence," by Sir Richard Doll, FRS,

20 18 pages, no Bates numbers

21 4 Article, Journal of Occupational Medicine 67

Volume 31, No. 6, June 1989, entitled

22 "Cohort. and Case-Control Analyses of

Workers Exposed to Vinyl Chloride: An

23 Update," by Wu, Steenland, Brown, Wells,

Jones, Schulte and Halperin,

24 6 pages, no Bates numbers

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1 E X H I B I T S

(Continued)

2 DEFENDANT'S PAGE

3 5 Article, Scand J Work Environ Health, 6 8

1991; 17:159-69, "A collaborative-study
4 of cancer incidence and mortality among

vinyl chloride workers," by Simonato,
5 et al, 11 pages, no Bates numbers

6 6 Letter to the editor, American Journal 57
of industrial Medicine 24:249-250 (1993)

7 from Hasnukh C. Shah, Ph.D., 2 pages,
no Bates numbers

8 7 Letter to the editor, American Journal 60
9 of industrial Medicine 24:251-256 (1993)

from Otto Wong and Donald Whorton,
10 6 pages, no Bates numbers

11 8 HoustonChronicle.com article, 6/26/98, 80
"In Strictest Confidence," by Jim Morris,

12 6 pages, no Bates numbers

13 9 November 9, 1998 letter from Otto Wong 89
to Ms. Mable Chan, Dateline, NBC,

14 2 pages, no Bates numbers

15 10 November 11, 1998 letter from Otto Wong 91
to Ms. Mable Chan, Dateline, NBC,

16 1 page, no Bates number

17 PLAINTIFFS' EXHIBITS

18 PX 1 "Epidemiological Study of Vinyl Chloride 170
Workers," Final Report, May 3, 1974,

19 submitted to The Manufacturing Chemists Association by Tabershaw/Cooper Associates,
20 42 pages, Bates Nos. DOW 1051 - 1092

21 PX 2 "Evaluation of Mortality in B.F. Goodrich 175
Workers, A Follow-Back Study of Medical

22 Records and Death Certificates," Final
Report, May 17, 1974, Submitted to The

23 B.F. Goodrich Company by Tabershaw/Cooper
Associates, 111 pages,

24 Bates Nos. BFG 23339001 - 055 and
BFG 23339057 - 106, plus 5 unnumbered pages

25

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1 E X H I B I T S

(Continued)

2 PLAINTIFFS' PAGE

3 PX 3 Draft report, "Epidemiological Study of 180

4 Vinyl Chloride Workers," April 15, 1974,
prepared for The Manufacturing Chemists

5 Association by Tabershaw/Cooper Associates,
40 pages, Bates Nos. SL 81759 - 798

6 PX 4 "Epidemiological Study of Vinyl Chloride 188

7 Workers," Final Report prepared for
Manufacturing Chemists Association by
8 Equitable Environmental Health, January
1978, 55 pages, no Bates numbers

9 PX 5 "Epidemiological Study of Men Employed 226

10 in the Vinyl Chloride Industry Between
1942 and 1972: I. Re-analysis of

11 Mortality through December 31, 1982; and
II. Update of Mortality through

12 December 31, 1995," Final Report prepared
for The Vinyl Chloride Panel, Chemical

13 Manufacturers Association by Applied
Epidemiology, Inc., January 8, 1999,

14 195 pages, Bates Nos. CMA 171394 - 171587

15 PX 6 "IARC Monographs on the Evaluation of the 200 Carcinogenic Risk of Chemicals to
Humans,

16 Some Monomers, Plastics and Synthetic Elastomers, and Acrolein," Volume 19,
17 February 1979, 63 pages, no Bates numbers

18 PX 7* Draft, "Epidemiologic Study of Vinyl 210
Chloride Workers," prepared for Chemical

19 Manufacturers Association by Environmental
Health Associates, August 5, 1986,

20 marked "CONFIDENTIAL - Subject to
Protective Order in Ross v. Conoco,"

21 59 pages, Bates Nos. CMA 007465, 007467
007523

22 PX 8 5 August 1982 letter from T.R. Torkelson 240

23 at Dow Chemical to Thomas H. Milby, M.D.,
2 pages, no Bates numbers

24

25 *Document stamped "CONFIDENTIAL"

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1 E X H I B I T S

(Continued)

2 PLAINTIFFS' PAGE

3 PX 9 January 6, 1983 letter from Stephen P. 242
Illes at PPG Industries to Otto Wong,
4 1 page, document number obliterated.

5 PX 10 Undated document headed "7.0 Status 246
Report on Chronic Vapor Inhalation

6 Study and Recommendations on In-Depth
Audit," two pages, no Bates numbers

7

8 PX 11 Conoco Interoffice Communication to 257
File from Tom Grumbles, October 28, 1982,

9 Subject: CMA VC Panel Study Update,
1 page, no Bates number

10

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DEPOSITION OF OTTO WONG - VOLUME I 5

1 DEPOSITION OF OTTO WONG

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3 BE IT REMEMBERED that, pursuant-to Notice,
4 and on Tuesday, March 12, 2002, commencing at the hour
5 of 9:00 a.m., at the Law Offices of BROBECK, PHLEGER &
6 HARRISON, One Market, Spear Street Tower, San Francisco,
7 California, before me, KAREN E. THOMPSON, a Certified
8 Shorthand Reporter of the State of California,
9 personally appeared OTTO WONG, produced as a witness in
10 said action, and being by me first duly sworn, was
11 thereupon examined as a witness in said cause.

12 ---000---

13 A P P E A R A N C E S

14 VAUGHAN O. STEWART, Attorney at Law, of the
15 Law Offices of VAUGHAN O. STEWART, 115 N. Dixie Drive,
16 No. 500, Lake Jackson, Texas 77566, was present on
17 behalf of the plaintiffs.

18 LESLIE M. STEWART, Attorney at Law, of the
19 Law Offices of TOMBLIN CARNES McCORMACK, LLP, 210 Barton
20 Springs Road, Suite 550, Austin, Texas 78704, was
21 present on behalf of the plaintiffs.

22 KEVIN L. COLBERT, Attorney at Law, of the Law
23 Offices of GARDERE WYNNE SEWELL, LLP, 1000 Louisiana,
24 Suite 3400, Houston, Texas 77002-5007, was present on
25 behalf of the defendant.

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

2 (Continued)

3

4 STEVEN E. MARQUES, Videographer, of DAN

5 MOTTAZ VIDEO PRODUCTIONS, LLC, 402 Dewey Boulevard,

6 San Francisco, California 94116, was present videotaping

7 the proceedings

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DEPOSITION OF OTTO WONG - VOLUME I 7

1 MORNING SESSION 8:57 A.M.

2 THE VIDEOGRAPHER: Good morning. This marks
3 the beginning of Videotape No. 1 in the deposition of
4 Dr. Otto Wong in the matter of Mandy Staples, et al.,
5 versus Shintech, Incorporated, in the District Court of
6 Brazoria County, Texas, 239th Jurisdictional District,
7 Case No. 13798-JG00.

8 Today's date is March 12, 2002. The time is
9 8:57. The location of this deposition is Brobeck,
10 Phleger, One Market Street, San Francisco, California.
11 This deposition was noticed by plaintiff and the
12 videotape is being produced on behalf of the same.

13 The video operator is Steve Marques, a
14 California Notary Public for the County of Santa Clara,
15 employed by Dan Mottaz Video Productions LLC, 402 Dewey
16 Boulevard, San Francisco, California 94116,
17 415-731-1300. The court reporter is Karen Thompson with
18 Jane Grossman Reporting Service.

19 Would counsel present please identify
20 themselves and state whom they represent.

21 MR. COLBERT: Kevin Colbert for Shintech, and I
22 just want to make a correction. The deposition was
23 noticed by counsel for defendants. I'm not sure
24 Mr. Stewart would like to pay for the cost.

25 MR. STEWART: Vaughan Stewart for the
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1 plaintiffs.
2 MS. STEWART: Leslie Stewart for the
3 plaintiffs.
4 THE VIDEOGRAPHER: If there are no
5 stipulations, the reporter may administer the oath.
6 OTTO WONG
7 having been sworn as a witness by the
8 Certified Shorthand Reporter,
9 testified as follows:
10 EXAMINATION BY MR. COLBERT
11 MR. COLBERT: Q. Good morning.
12 A. Good morning.
13 Q. Would you please introduce yourself to the
14 judge and jury.
15 A. I'm Otto Wong.
16 Q. Dr. Wong, how are you currently employed?
17 A. I'm employed at Applied Health Sciences in
18 San Mateo, California.
19 Q. In what capacity?
20 A. I'm the chief epidemiologist there.
21 Q. I take it, sir, that you are an epidemiologist?
22 A. Yes, sir.
23 Q. What is an epidemiologist? What do you do as
24 an epidemiologist?
25 A. Well, maybe it's easier to define what
DEPOSITION OF OTTO WONG - VOLUME I 9

1 epidemiology is. Epidemiology is the branch of medical
2 science that deals with the distribution and
3 determinants of diseases in human populations.

4 MS. STEWART: Just time out for a second. This
5 is being taken pursuant to the Texas Rules of Civil
6 Procedure; right?

7 MR. COLBERT: Yes, it is.

8 MS. STEWART: All right.

9 MR. COLBERT: Q. When you say epidemiology is
10 a study of distribution and determinants of illness and
11 disease in human populations, what do you mean by
12 "distribution"?

13 A. Well, "distribution" means we want to find out
14 which group in the human population has a higher rate of
15 certain disease than the rest of the population. In
16 other words, we want to identify the high-risk groups of
17 certain disease. And "determinants" meaning risk
18 factors.

19 Once we have determined which group that has
20 higher rate of a certain disease, we want to find out
21 why, why their rates of that disease is elevated. And
22 hopefully, we can do something about that to reduce the
23 rates.

24 Q. How does an epidemiologist do that?

25 A. Well, we do research. We do studies.

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1 Basically, we compare a group of persons with, let's
2 say, exposure, to a group without exposure, compare the
3 disease rates and -- to determine whether there is
4 indeed a higher rate of disease in the group with the
5 exposure.

6 Q. Are there different types of study design
7 within the science of epidemiology?

8 A. Yes.

9 Q. What types of study design are there?

10 A. In occupational epidemiology, there are two or
11 three major study designs. One is what we call cohort
12 study. In a cohort study, we define a cohort of persons
13 with certain exposure, exposed to a certain chemical,
14 and observe them over time, find out what diseases that
15 they have and compare the disease rates to a group
16 without exposure. That's what we call cohort study, or
17 sometimes we call that prospective study.

18 Another study design is what we call
19 case-control study. In a case-control study, the
20 direction is somewhat reversed as opposed to a cohort
21 study. In a case-control study, we compare the exposure
22 histories of cases of patients with certain disease to
23 exposure histories of controls, people without the
24 disease.

25 Maybe I can clarify that with an example.

DEPOSITION OF OTTO WONG - VOLUME I

1 Q. Please do.

2 A. For example, if I go to a community hospital
3 and look at the medical histories of 100 lung cancer
4 patients-, those would be the cases -- and I notice that
5 out of the 100, 80 of them, 80 percent of them, had a
6 smoking history. My natural question would be, Is there
7 a connection between smoking and lung cancer?
8 But I really don't know whether that 80 percent
9 is high or low or as expected.

10 So, in order to compare the 80 percent to
11 something, I would look at the medical histories of 100
12 patients at the same hospital without lung cancer.
13 And let's say, for example, when I look at
14 that, only 30 percent of them smoke. I compare 80
15 percent to 30 percent, indeed, there is an increased
16 percentage. And based on that, I would say that there
17 is -- there may be an association. There are other
18 things that we have to look at.

19 But that would be a case-control study.

20 Q. You've mentioned cohort study and case-control
21 study. Are there other types of study design in
22 epidemiologic science?

23 A. Well, for case-control studies, there are
24 really two types. One is what we call population-based
25 or community-based or hospital-based. The example I

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1 just gave you would be a population- or hospital-based
2 case-control study. The way to obtain the exposure
3 history is through interview, by asking the cases and
4 the controls. So, the quality of information is not
5 that good because you would not be able to verify that
6 with documents.

7 There is another type of case-control study,
8 what we call nested case-control study.

9 MR. STEWART: What was that word?

10 THE WITNESS: Nested. N-E-S-T-E-D.

11 In other words, we do a case-control study, not
12 in the community itself, but rather, we do a
13 case-control study nested within a cohort. So, what we
14 do is we do a cohort study first, and then we do a
15 nested case-control study.

16 The reason for that is, in the cohort study we
17 are talking about tens of thousands of workers, and it
18 would be rather inefficient or expensive to collect
19 exposure information on everyone. So, a lot of times,
20 we do a cohort study first, identify the diseases that
21 we want to study, and then we do a nested case-control
22 study.

23 In a nested case-control study, the number of
24 subjects is much smaller. The number is much smaller
25 than a cohort study. With a smaller number, we can

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1 spend more time, more resources on each subject. So, a
2 nested case-control study is indicated when we want to
3 do detailed exposure information, collect detailed
4 exposure information, do detailed analysis.

5 MR. COLBERT: Q. Are there other types of
6 study design?

7 A. Those are the two main types of -- or rather,
8 three types -- of study design that we use in
9 occupational epidemiology.

10 Q. Dr. Wong, we've, I guess, very briefly
11 discussed what epidemiology is. What does epidemiology
12 do? Or I should say, what can you do in epidemiology?

13 A. Well, the main thing is to identify risk
14 factors or diseases, find out what causes a high rate of
15 disease in certain populations. And the public health
16 implication is, once we determine that, we need to do
17 something about prevention, reduce that.

18 For example, epidemiologic studies identified
19 that smoking would increase the risk of lung cancer.
20 Therefore, we want to eliminate smoking.

21 Q. So, epidemiology studies can be used to
22 determine cause-and-effect associations?

23 A. Absolutely.

24 Q. Is there a set of guidelines or tests that an
25 epidemiologist such as yourself would use to determine

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1 if there is a cause-and-effect association?

2 A. Yes. There is a set of criteria to determine
3 causation, and the criteria were developed by Bradford
4 Hill. Hill was a professor of medical statistics and
5 epidemiology at London University, I believe. In 19 --
6 in 1965, Hill published a landmark study, a paper,
7 outlining all the criteria that we should use to
8 determine causation in chronic diseases.

9 Q. Within the epidemiological community, who uses
10 those criteria that Bradford Hill published in 1965?

11 A. A lot of people use -- everybody use that, and
12 not limited to epidemiologic community. In fact, those
13 criteria are the scientific criteria to determine
14 causation in chronic diseases.

15 For example, in the 1960s, the Surgeon
16 General's committee used the same set of criteria to
17 assess the relationship between smoking and cancer, back
18 in the 1960s. In fact, the same criteria were listed in
19 the first edition of the monograph, "Smoking and
20 Health," published in-1964, 1965.

21 Q. And who published that monograph?

22 A. HEW. The government, the U.S. government.

23 Q. The U.S. government.

24 Does an organization such as IARC,
25 International Agency for Research on Cancer, would they

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1 use the Bradford Hill criteria?

2 A. Yes, the International Agency for Research on
3 Cancer uses the same set of criteria.

4 Q. Would NIOSH, the National Institute of
5 Occupational Safety and Health, use the same criteria?

6 A. Yes.

7 Q. What are those criteria?

8 A. There are four or five major criteria. The
9 first one would be the strength and significance of
10 association. By that we mean how strong is the
11 association.

12 In epidemiologic studies, the strength of
13 association is measured by what we call relative risk,
14 the risk ratio. In cohort study, that would be the
15 standardized mortality ratio.

16 Remember the example I gave you early on?

17 Let's say we study a cohort of workers exposed to
18 certain chemicals, and we find out that their risks of
19 lung cancer is five times that of the general
20 population. We would say that the standardized
21 mortality ratio is five, or the SMR is five.

22 Q. And that example we were talking about is when
23 you were talking about going to a hospital and seeing
24 the 100 patients, and of those 100, 80 -- 100 patients
25 who had lung cancer, 80 smoked. Then you-go to another

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1 hospital and find 100 patients who don't have lung
2 cancer and look at their history?
3 A. Well, that's the case-control study.
4 Q. Okay.
5 A. For case-control study, what we do is we
6 compare the percentage of exposed cases to the
7 percentage of exposed controlled. In that case, the
8 risk ratio would be 80 percent over 30 percent, and that
9 would be 2-point something, 2.6. And when the risk
10 ratio is higher than one, then we say there is an
11 increased risk.
12 Now, because we are doing epidemiologic
13 studies, human studies, how confident we are in the risk
14 ratio, to a large extent, depends on how large our study
15 is.
16 One simple example would be if I tell you that
17 I talked to -- I did a survey and I told you that 66
18 percent of the people said that George Bush is doing a
19 wonderful job, 66 percent is pretty impressive. But if
20 you know statistics or you know epidemiology, you would
21 ask me, How many people did you talk to?
22 I can guess 66 percent by talking to three
23 people. If two answer yes, that would be 66 percent.
24 Or I can talk to 3,000 people, and if 2,000 answer yes,
25 I would get the same percentage. But obviously, the
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1 answer derived from a sample of 3,000 is much better
2 than the one derived from a sample of three.
3 So, in order to convey the idea of confidence,
4 how big a sample is, we have what we call 95 percent
5 confidence interval.
6 Q. Okay. What is a 95 percent confidence
7 interval?
8 A. Ninety-five percent confidence interval means
9 that we are 95 percent confident that a true estimate of
10 the risk is somewhere between those two numbers.
11 For example, if I do a study, and the risk
12 ratio is 5.0, and a 95 percent confidence interval is
13 from 4.0 to 6.0, what I'm saying is the most likely
14 estimate is 5.0. But I'm 95 percent sure that the true
15 estimate, the true risk, is somewhere 4.0 and 6.0. That
16 is what we call the margin of error in statistics.
17 Q. What does it mean, a 95 percent confidence
18 interval, if the lower of the limits includes one?
19 A. Well, if the 95 percent confidence interval
20 includes one -- for example, if we have a 95 percent
21 confidence interval that goes from, let's say, 0.5 to
22 1.5, which includes 1.0, and 1.0 being the background
23 risk, the norm, what we are saying is the study says
24 that the risk is similar to the background.
25 Epidemiologically, statistically, is indistinguishable
DEPOSITION OF OTTO WONG - VOLUME I
18

1 from the background.

2 Now, on the other hand, if the ~5 percent
3 confidence interval does not include 1.0, then we say
4 the risk is significantly different from 1.0.

5 Q. When you mention "background," could you
6 explain that, please?

7 A. "Background" meaning the risk of -- a
8 nonexposed person would have. For example, smoking and
9 lung cancer, we do find lung cancer in nonsmokers.

10 Q. Okay.

11 A. So, lung cancer in nonsmokers would be
12 background risk, and we use that background risk as the
13 basis for comparison when we study smokers.

14 Q. We were talking about the Bradford Hill
15 criteria, and you mentioned the first one, which is
16 strength of association, and you mentioned there are
17 four or five major criteria. What are those other
18 criteria besides strength of association?

19 A. The next one, I would say, consistency of
20 association. In other words, in order for an
21 association to be meaningful, we need to be able to see
22 that from different studies consistently, not just one
23 or two studies, but based on all the studies. That is
24 what we mean by consistency.

25 Q. Is there -- we have strength of association and

DEPOSITION OF OTTO WONG - VOLUME I 19

1 consistency of association. Are there other criteria?

2 A. The next one would be specificity. In other
3 words, we need to be specific when we talk about the
4 association between an exposure and a disease.

5 For example, if I make the statement that
6 chemicals can cause cancers, definitely, it's a true
7 statement. But how meaningful that is, that's another
8 issue. It doesn't give us a whole lot of information
9 because without specifying what chemical we are talking
10 about, at what level we are talking about, and also what
11 disease, what cancer we are talking about. That
12 statement, although it is true, is not very informative.

13 Q. Okay. So, we have strength of association,
14 consistency of association, specificity of association.
15 Are there others?

16 A. The next one is what we call exposure-response
17 relationship, or sometimes we call it dose-response
18 relationship. And that is a very important -- one of
19 the most important criteria. What it says is that if --
20 let's say chemical X can increase the risks of
21 chemical -- of disease Y. The higher the exposure of
22 chemical X, the higher the risks of disease Y.

23 On the other hand, if we don't see a positive
24 dose response, we don't see a positive exposure-response
25 relationship, then that would argue against a causation

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1 interpretation of that association.

2 Q. Would it also work that the longer a person is
3 exposed, potentially the higher the risk? Is that
4 another -- definition -

5 A. Yes. In fact, in epidemiology or in
6 toxicology, quite often we use the concept of what we
7 call cumulative exposure. Cumulative exposure would
8 depend on two parameters. The first one would be,
9 obviously, the concentration of exposure, the level of
10 exposure. The other component would be duration of
11 exposure, how long the exposure was.

12 Q. Okay. Dr. Wong, we've talked about strength of
13 association, consistency of association, specificity,
14 and dose-response relationship.

15 Are those all of the Bradford Hill criteria?

16 A. There's another important criteria in chronic
17 disease analysis, and that is what we call latency, the
18 time aspect, the temporal aspect of the disease process.
19 When we talk about chronic diseases such as cancer,
20 there is usually what we call a latent period or
21 latency. And for most cancers, we are talking about
22 decades, okay?

23 For example, if I -- I would not, but if I
24 start smoking today, I would not get lung cancer as a
25 result of the smoking tomorrow or day after tomorrow or

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1 next year even. But my risk of getting lung cancer is
2 increased, and very likely I would get lung cancer in 20
3 or 30 years.

4 The time between first exposure and the
5 appearance of disease is what we call latent period, and
6 that is usually several decades. In fact, when we do
7 analysis in epidemiologic studies, a lot of times we
8 would, what we call, truncate -- we cut off -- the
9 exposure 10, 15 years prior to diagnosis, because what
10 we are saying is that the exposure within the last 10 or
11 15 years is not very effective in the disease process.
12 The disease is actually due to exposure 10 or 15 years
13 ago.

14 Those would be the five major criteria that we
15 use in assessing causal relationship in chronic
16 diseases.

17 Q. Dr. Wong, as chief epidemiologist for Applied
18 Health Sciences, have you conducted or has your company
19 conducted epidemiological studies?

20 A. Yes, I have conducted many, many studies in
21 occupational epidemiology.

22 Q. More than 100?

23 A. Probably more than a hundred.

24 (Whereupon, Defendants' Exhibit No. 1
25 was marked for identification.)

DEPOSITION OF OTTO WONG - VOLUME I 22

1 MR. COLBERT: Q. I want to hand to you what
2 has been marked as Exhibit 1, Dr. Wong, and if you could
3 be kind enough to look at that.
4 A. Okay. This appears to be my CV.
5 Q. Is that a true and correct copy of your CV, or
6 your curriculum vitae or resume?
7 A. Yes.
8 Q. Is it relatively up-to-date as of today's date,
9 March 12th --
10 A. Yes.
11 Q. -- 2002?
12 I notice on your CV, Dr. Wong, that you teach.
13 A. Yes.
14 Q. Where do you teach?
15 A. I teach at Tulane University in New Orleans. I
16 have an appointment at full professor level.
17 Q. Do you teach at other academic institutions
18 besides Tulane University?
19 A. I also teach at the Chinese University of
20 Hong Kong in Hong Kong. I also have a full professor
21 appointment over there.
22 I also hold a visiting appointment at the Fudan
23 University Medical Center in Shanghai -- and that spells
24 F-U-D-A-N.
25 And I also hold a visiting professorship at a

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1 public health school in Taiwan, as well.

2 Q. Are you currently conducting any
3 epidemiological studies for any of the academic
4 institutions for which you hold a professorship?

5 A. In fact, we are doing a major study of leukemia
6 and non-Hodgkins lymphoma in Shanghai, and we are
7 working with Fudan University Medical School as well as
8 the Shanghai Center for Disease Control.

9 Q. How long have you been an epidemiologist?

10 A. Too long. For about 20-some years, 30 years.

11 Q. What degree do you hold?

12 A: I have a doctoral degree from the University of
13 Pittsburgh.

14 Q. And in what year did you receive that degree?

15 A. If I tell you that, that would give away my
16 age, but I guess I have to answer that. 1975.

17 Before you were born.

18 Q. You're very kind. Of course, depending on how
19 you look at when life starts, I'm two years old. If you
20 use George W. Bush's philosophy that life doesn't begin
21 until 40.

22 After you received your doctorate degree from
23 the University of Pittsburgh, what did you do?

24 A. I got an appointment at Georgetown University
25 Medical School, and I taught there and I did research

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1 there for about three years.

2 Q. Did you conduct any epidemiology studies at
3 Georgetown?

4 A. Yes.

5 Q. What kinds, if you can recall?

6 A. We did some occupational epidemiologic studies,
7 and I was also responsible for the epidemiology unit at
8 the Lombardi Cancer Center at Georgetown University
9 Hospital.

10 Q. What did you do when you left Georgetown? I
11 guess that would have been about 1978.

12 A. After I left Georgetown, I worked for a number
13 of contract research organizations, and I came out to
14 California in 19 -- 1981 to start a new company to do
15 occupational health.

16 Q. Okay. What were those -- do you recall the
17 names of those contract research organizations that you
18 worked for from, I guess, 1978 to 1981?

19 A. I worked for Tabershaw Occupational Medical
20 Associates -- T-A-B-E-R-S-H-A-W -- for a couple of
21 years. And then I worked for Biometric Research
22 Institute for a year or so before I came out to
23 California.

24 Q. And you came California in 1981. 25 A. Yes.

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1 Q. What company did you start in 1981?

2 A. We started a company by the name Environmental
3 Health Associates.

4 Q. With whom did you start that company?

5 A. Dr. Robert Morgan. At that time, he was the
6 chairman of the Department of Preventive Medicine at the
7 University of Toronto in Canada. Another partner would
8 be Dr. Donald Whorton, W-H-O-R-T-O-N. And at that time,
9 he was, I believe, on the faculty of University of
10 California at Berkeley. So, the three of us started
11 Environmental Health Associates.

12 Oh, there was a third partner for a little bit
13 of time: Dr. Thomas Milby, M-I-L-B-Y. So, there were
14 the four of us. But Dr. Milby left us a couple of
15 years -- maybe a year after we started.

16 Q. And how long did you have the company,
17 Environmental Health Associates, you and your partners?

18 A. We started in 1981. In 1987, we merged with a
19 company called ENSR, E-N-S-R. It's a large
20 environmental engineering company. Actually, the
21 headquarters at that time were in Houston, I think.

22 So, we became a division of ENSR. And I
23 continued to work for the ENSR, or for that division,
24 until 1990.

25 Q. And what did you do in 1990?

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1 A. Well, I left ENSR at the end of 1990 and start
2 my own organization in 1991.

3 Q. And that would be Applied Health Sciences?

4 A. Yes.

5 Q. While you were at Environmental Health
6 Associates, did you conduct epidemiologic studies?

7 A. Yes, we did.

8 Q. What types of organizations -- let me ask you
9 this: How would you come about doing an epidemiological
10 study while you were at Environmental Health Associates?

11 A. We specialized in occupational and
12 environmental epidemiology, so we would, I guess, write
13 proposals in response to what we call RFPs, request for
14 proposals, from different organizations. Let's say if a
15 company or an industry or the government puts out an RFP
16 for a certain project, we would prepare a proposal and
17 compete with other organizations, including
18 universities, to get the contract to do the research.

19 Q. So it's similar to a grant?

20 A. Yes.

21 Q. Are you familiar with what universities do
22 when a similar request comes out, a university scientist
23 will write a proposal to attempt to get the grant for
24 that research to bring to his university; correct?

25 A. Yes. In fact, our competitors were mostly

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1 universities.

2 Q. You mentioned that you had sent proposals based
3 on requests for proposals that were sent out by
4 companies, industries, or governments.

5 A. Right.

6 Q. Have you conducted any epidemiological studies
7 for governments?

8 A. Some of them, when I was at Environmental
9 Health Associates. I believe we -- one project I do
10 remember is we did a study on banana farmers in Hawaii.
11 I remember because it was in Hawaii. We did a study
12 there. The study was funded by NIOSH, the National
13 Institute for Occupational Safety and Health.

14 Q. And was that study eventually turned into a
15 written document?

16 A. I think that we submit -- I mean, we submitted
17 a report to NIOSH.

18 Q. Okay. Did you publish that study?

19 A. No. It's not a research project per se, but it
20 is an occupational medical project.

21 Q. Okay. And you've done epidemiological studies
22 for industries and companies; right?

23 A. Yes, I have.

24 Q. Okay. What industries?

25 A. All kinds of industries. I mean, my specialty

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1 is industrial epidemiology, occupational epidemiology.

2 Therefore, I work with the industry.

3 To give you some examples, it would be -- you
4 know, some industries would be the petroleum industry,
5 the chemical industry, the paper industry, the stone
6 industry, paint manufacturers, and so on.

7 Q. And does the same hold true for today, with
8 Applied Health Sciences?

9 A. Yes.

10 Q. Dr. Wong, have you ever done an epidemiological
11 study on vinyl chloride monomer exposure?

12 A. Yes, I have.

13 Q. I'm going to spend some time and talk about
14 that study.

15 How did it come about that you did a study on
16 vinyl chloride monomer?

17 A. It is some time ago now, but if I remember
18 correctly, in either early or mid 1980s, the Chemical
19 Manufacturers Association, CMA, sent out a request for
20 proposal to update a cohort study of vinyl chloride -
21 workers. And we respond to the request for proposal,
22 and subsequently, we obtain a contract or a grant to do
23 the update of that study.

24 Q. Who would that contract -- that contract would
25 have been between the Chemical Manufacturers Association

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1 and Environmental Health Associates?

2 A. Yes.

3 Q. Okay. You mentioned that this was a request
4 for a proposal to update a cohort study?

5 A. Yes.

6 Q. Does that mean that there was already a study
7 of vinyl chloride workers out there?

8 A. Yes.

9 Q. What study was that?

10 A. Actually, that study had already been updated
11 once or twice, even before the 19 -- the mid 1980s. I
12 believe the study started by Dr. Tabershaw and
13 Dr. Gaffey, G-A-F-F-E-Y. And subsequently, that study
14 was updated by Dr. Cooper, and we were asked to update
15 that study, I guess -- I forgot how many years after
16 Dr. Cooper completed the previous update.

17 Q. Okay. So, the study that you're going to
18 update has been updated a couple of times before?

19 A. At least once or twice, yes.

20 Q. You mentioned that the first study was done by
21 Dr. Tabershaw and Dr. Gaffey. Is this the same
22 Dr. Tabershaw with whom you worked in 19 -- the late
23 1970s?

24 A. Yes. 25 Q. Did you work with Dr. Tabershaw on -that first
DEPOSITION OF OTTO WONG - VOLUME I 30

1 study?

2 A. No. That study was conducted before I worked
3 for him.

4 Q. Do you know how it is that Dr. Tabershaw and
5 Dr. Gaffey studied vinyl -- studied the vinyl chloride
6 workers?

7 A. In the early 1970s, I think there were a case
8 report -- I guess that's the best way to describe
9 that -- a case report of three cases of angiosarcoma, a
10 very rare form of liver cancer, occur among workers at
11 one location at a facility. And of course, you know,
12 that really was -- how should I describe it? That was
13 one of the biggest news in occupational medicine at that
14 time. And because of that, I guess, the company or the
15 industry decided that a formal epidemiologic study
16 should be conducted in addition to the case report.

17 Q. What is a case report?

18 A. A case report is exactly that: A report of
19 isolated cases. In other words, it's not a study.
20 For example, the case report that I just
21 described, you know, would be a report of those three
22 cases.

23 Q. Okay.

24 A. We don't have the entire cohort of workers
25 exposed to -- for example, to vinyl chloride, and we

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1 don't have a comparison group. But because of
2 angiosarcoma is so rare, even three cases in a group
3 would almost guarantee that if we do a formal study, the
4 result will be significant.

5 But that may not work for other cancers. For
6 very rare cancer, case reports may be very useful, but
7 not so for other cancers.

8 Q. So, there's a case report of three
9 angiosarcomas from a plant where vinyl chloride is
10 manufactured; correct?

11 A. Yes.

12 Q. Do you recall where that plant was?

13 A. I don't, but I think it's someplace in Ohio.

14 Q. And based on that, Dr. Tabershaw and Gaffey
15 then did the first study of vinyl chloride workers,
16 which later you updated; correct?

17 A. Yes.

18 (Whereupon, Defendants' Exhibit No. 2
19 was marked for identification.

20 MR. COLBERT: Q. Dr. Wong, I'm going to hand
21 to you what's been marked as Exhibit 2, and could you
22 identify that, please.

23 MR. STEWART: May I look at 1? Thank you.

24 THE WITNESS: That's my 1991 publication, the
25 report of my vinyl chloride study.

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1 MR. COLBERT: Q. When did you -- so your --
2 the report of your study was published in 1991 in the
3 American Journal of Industrial Medicine; correct?
4 A. Yes.
5 Q. When were the results available from your
6 study?
7 A. When we finished the study, we summarized the
8 study in a technical report and submit that to CMA. I
9 mean, that is one of the requirements in the contract.
10 That was in 1986.
11 And I believe CMA distribute the report to the
12 scientific and also to the government community because
13 that report was cited, referenced, you know, by many
14 other scientists.
15 I put off the report for a couple years and
16 then basically cut and paste, you know, that report and
17 make that into a manuscript, because no journal would
18 accept, you know, a full report, you know. It's simply
19 too long.
20 Q. How -- do you recall how long your full report
21 was that you submitted to CMA in 1986?
22 A. I don't remember but, you see, a very thick
23 report. And we talk about -- because the audience would
24 be different as well, you know. When we submit the
25 report to CMA, we were not necessarily talking to
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1 epidemiologists. We need to make it understandable in
2 the language. So, we go over some basic concepts, the
3 definitions and so on, in the report.
4 On the other hand, for a scientific journal
5 publication, the journal would not allow us to go over
6 those basic concepts, and it's not necessary. So,
7 basically, we shortened the report and make that into a
8 manuscript.
9 And I did that probably toward the -- around
10 1989 or 1990, submit to the journal, and then it usually
11 takes a year or two from the time you submit a
12 manuscript and by the time it actually comes out in a
13 journal. And this comes out in 1991.
14 Q. 1991.
15 So, you finished your study, which is an update
16 of previous studies, the Tabershaw and Gaffey study and
17 then the Cooper study, and you submit your report, your
18 final report, to the Chemical Manufacturers Association
19 on your study in 1986; right?
20 A. Yes, I believe toward the end of 1986, like
21 October or November or something.
22 Q. I want to talk about your study for a little
23 bit. What type of study is it?
24 A. It's a cohort mortality study.
25 Q. We talked about the types of epidemiology

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1 studies a little while ago, and you talked about there
2 being cohort studies and case-control studies. This
3 being a cohort study, this is the kind of study where
4 you observe over time the mortality in a population; is
5 that correct?

6 A. Yes.

7 Q. Over what period of time did you observe the
8 mortality in this study population?

9 A. From 1942 to the end of 1982.

10 Q. Who -- who did you study?

11 A. The cohort consisted of a little bit over

12 10,000 workers at 37 locations in the United States.

13 And these workers were engaged in the manufacture of, I
14 guess, vinyl chloride, used vinyl chloride, exposed to
15 vinyl chloride.

16 Q. Did you personally go to the 37 locations and
17 get the information from the locations on these workers?

18 A. No. Remember this is an update. Normally, if
19 we start the study, we would do that. We would go to
20 the location, collect employment information, exposure
21 information, and so on. But remember this is an old
22 study that we simply updated. So, the data, the
23 original data, were collected by Dr. Tabershaw's group
24 back in the seventies.

25 Q. If it's an old study, and it sounds like it's

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1 already been done, why would anybody want to update it?
2 ' A. I don't have -- I don't remember that now. But
3 for example, the study done by Dr. Cooper, the
4 observation would end sometime in the 1970s. And
5 basically, we extend the observation from whatever point
6 that he stopped to 19 -- 1982. So, by including more
7 years of observation, we collect information on what we
8 call new deaths, deaths that occur after the termination
9 of observation in Dr. Cooper's study, between that point
10 and 1982. Because the more information we have, the
11 better the study is.

12 Q. So, you're adding, what, roughly 10 more years
13 of time to looking at this population of people who
14 worked at these 37 plants?

15 A. That's the thing: I don't remember whether
16 it's 10 years or -- I don't remember how many years we
17 add to the -- to the study.

18 Q. Okay. But you're looking at them for a longer
19 period of time than what Dr. Cooper looked at?

20 A. Yes. That's why we call update.

21 Q. Were there other -- do you know if there were
22 other scientists, other epidemiologists, who also looked
23 at vinyl chloride monomer workers, besides yourself,
24 Dr. Cooper, and Dr. Tabershaw?

25 A. Yes.

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1 Q. Would one of those people have been Professor
2 Monson?

3 A. Yes, Professor Monson at Harvard University
4 looked at -- I mean, he did a study of vinyl chloride
5 workers as well.

6 Q. Do you know what -- which vinyl chloride
7 workers Dr. Monson looked at?

8 A. I don't remember, but I'm very sure that our
9 study overlapped with his study, if not completely, at
10 least to a large extent. I don't remember the time
11 period of his observation. Ours is from 1942 to 1982.

12 Q. But the people that Dr. Monson studied are
13 included in the people that you studied; is that --

14 A. To a large extent, I would say yes.

15 Q. Dr. Wong, in 1991, when your study was
16 published, how would you characterize the scope of your
17 study?

18 A. I'm not sure I understand the question. What
19 about?

20 Q. Would it be safe to say that in 1991, when your
21 paper came out, that with respect to vinyl chloride
22 monomer workers in the United States, that that was the
23 best literature available with respect to chronic
24 illnesses that might be caused by exposure to vinyl
25 chloride monomer?

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1 MR. STEWART: Objection. Form.
2 Mk'.' COLBERT: I'm sorry?
3 MR. STEWART: I said, objection. Form.
4 MR. COLBERT: What's your objection?
5 MR. STEWART: Objection. Form.
6 MR. COLBERT: What's the basis for your
7 objection?
8 MR. STEWART: Calls upon the witness to
9 speculate as to what is the best.
10 MR. COLBERT: Fair enough.
11 MR. STEWART: What is the basis of your
12 objection?
13 MR. COLBERT: Let me see if I can't rephrase
14 that.
15 Q. Dr. Wong, when your study is published in 1991,
16 and you have the study by Dr. Cooper and the study by
17 Dr. Tabershaw and the study by Dr. Monson, as an
18 epidemiologist, which of those studies would you look at
19 to determine the state of the epidemiologic science with
20 respect to vinyl chloride monomer workers?
21 A: Well, to start with, our study was what we call
22 an industry wide study. So, it's not just a
23 single-company study. It's the most comprehensive study
24 we have in the United States. And Dr. Monson's study
25 would be part of ours, you know. The workers would be
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1 part of ours as well. And also, I don't think
2 Dr. Monson subsequently update his study. So, in terms
3 of scope, we are the most comprehensive.
4 And in 19 -- well, I shouldn't say 1991. At
5 least when we submit our report to CMA in 1986, at that
6 time, in terms of time, it's also the most up-to-date.
7 Q. Would it be fair to say that your study in
8 1986, as it was submitted to CMA, subsumed the studies
9 by Professor Monson, Dr. Cooper and Dr. Tabershaw?
10 A. Yes, I would say so.
11 MR. COLBERT: Been going for about an hour.
12 Want to take a break?
13 THE WITNESS: Good suggestion.
14 MR. COLBERT: Okay.
15 THE VIDEOGRAPHER: Time is 9:53. We're off the
16 record.
17 (Recess taken: 9:53 a.m. until 10:07 a.m.)
18 THE VIDEOGRAPHER: Time is 10:07. We're on the
19 record.
20 MR. COLBERT: Q. Mr. Wong, I understand that
21 you have with you an original of the volume of the
22 American Journal of Industrial Medicine in which your
23 study appeared; correct?
24 A. You mean the issue in which my 1991 paper
25 appeared?

1 Q. Yes. Could you hold it up, please, so that the
2 jury can see it? (Witness complies.)
3 Who was the editor-in-chief of the American
4 Journal of Industrial Medicine in 1991?
5 A. At that time it was Dr. Selikoff.
6 Q. And do you know Dr. Selikoff?
7 A. I know of him. I don't know him personally.
8 Q. Okay. What do you know of Dr. Selikoff?
9 A. He -- at that time, he was the chairman of
10 preventive medicine at Mt. Sinai School of Medicine in
11 New York City, and he was also the chief editor of the
12 American Journal of Industrial Medicine.
13 Q. It looks like from the cover of the issue that
14 Eula Bingham was an advisory editor. Do you know Eula
15 Bingham?
16 A. No, I don't.
17 Q. It also looks like Phil Landrigan was an
18 associate editor.
19 A. Yes.
20 Q. Do you know Dr. Landrigan?
21 A. Yes, I do.
22 Q. How do you know Dr. Landrigan?
23 A. I ran into him at meetings, and in the 1980s I
24 did some work and -- that required me to be at NIOSH.
25 And at that time, I believe that Dr. Landrigan was a --
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1 exposure in the early days, before 1970 -- or the '40s,
2 '50s -- would definitely have been much higher. In the
3 1970s, once -- when the industry discovered the problem
4 of angiosarcoma, the exposure was greatly reduced. So,
5 we used time period as a surrogate for exposure.
6 That was one of the major findings regarding
7 liver cancer.

8 Q. Were there any other findings of elevated
9 cancers?

10 A. We also found an overall statistical increase
11 of brain cancer.

12 Q. When you say you found an overall statistical
13 increase of brain cancer, what do you mean by "an
14 overall statistical increase"?

15 A. Well, for example, in our study, we have 23
16 brain cancer cases. And based on the number of people
17 we have in the study, the age structure, and how long we
18 observed them and so on, we expect about 13 -- actually,
19 it's 12.76 -- about 13 cases. So, we compared the
20 observed number of cases, 23, to the expected -
21 "expected" meaning if there is -- let's put it this
22 way -- if the cohort had the same experience as the
23 general population, that would be the number we expect
24 to see. That would be the background risk, okay?

25 In this case, the expected number of brain

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1 cancer cases would be 12.76, and the standardized
2 mortality ratio, SMR, is simply the ratio of the two, 23
3 over 12.76, and that comes out to be 1.8. So, the risk
4 ratio is 1.8. And the 95 percent confidence interval
5 for that was 1.14 to 2.70. So, it's just above -- the
6 lower 95 percent limit was just above the norm, 1.0.
7 So, that's what we mean by an overall increase.
8 Q. Let's talk about that for just a little bit.
9 The standardized mortality ratio, that number is the
10 observed deaths divided by the expected deaths; right?
11 A. Yes.
12 Q. Okay. And then the 95 percent confidence
13 limits, that's a -- is that a means to determine whether
14 it's a real answer? A statistically real answer?
15 A. Well, basically, the 95 percent confidence
16 interval, as we talked about that earlier this morning,
17 tells us how confident we are in our results. And in
18 this case, we are 95 percent sure that the true risk is
19 somewhere between 1.14 and 2.70. It's just above the
20 one -- the lower limit was just above 1.0.
21 Q. With a finding of an SMR of 1.8 for brain
22 cancer in this population of 10,173 men who worked in
23 vinyl chloride facilities, did you come to a conclusion
24 regarding whether or not vinyl chloride monomer was
25 causally associated with brain cancer?

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1 A. Well, when we -- remember this morning we talk
2 about the criteria for causation? So, it's not -- it's
3 not sufficient to just look at the overall result. We
4 got to look at the pattern of risk in this group.
5 For example, if we compare the brain cancer
6 result to the liver cancer result, we see a drastic
7 difference between the two.
8 For example, the SMR for liver cancer in the
9 same group was 6.4, and the 95 percent confidence
10 interval ranged from 4.5 to 8.8. So, the lower limit
11 was much, much higher than 1.0, whereas for brain
12 cancer, the lower 95 percent confidence limit was just
13 barely above 1.0, okay? And a risk ratio of 1.8, you
14 know -- that's the one for brain cancer, 1.8 -- we would
15 label that as a modest increase.
16 For example, if we go to -- there is a textbook
17 that we use, written by Professor Monson, the same
18 Monson that we talked about this morning. He would
19 label a risk -- a risk ratio of 1.8 as only modest
20 increase.
21 So, the strength of association is -- is not -
22 is not as strong. The association is not very strong.
23 Q. This morning we talked about five criteria to
24 determine causation. Those were strength of
25 association, which we just talked about, consistency of
DEPOSITION OF OTTO WONG - VOLUME I
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1 association, specificity, dose-response relationship,
2 and latency. '

3 Did you apply the criteria of consistency of
4 association to your result in brain cancer?

5 A. Well, certainly, we should look at
6 dose-response.

7 Q. What is it about dose-response that we should
8 look at?

9 A. Well, remember dose-response meaning that if
10 chemical X causes disease Y, the higher, the longer we
11 have, in terms of exposure to chemical X, the higher the
12 risk we would have for developing the disease.

13 When we looked at the period of exposure --
14 now, unfortunately, in our study, we did not have
15 quantitative exposure information.

16 Q. What is quantitative exposure information?

17 A. Quantitative exposure information would be a
18 number of spec -- specifying how much of the chemical is
19 in the air, for example. In this case, it would be in
20 units of parts per million, ppm, okay? The higher the
21 ppm, the higher the concentration.

22 Q. And parts per million, to help the jury out,
23 that's one -- what is a part per million?

24 A. One part of chemical per a million part of air.

25 So, the higher -- the -- the concept that we need to

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1 understand is the higher the ppm, the higher the
2 concentration.

3 We did not have that information because we are
4 talking about exposure back to the '40s, back to the
5 '50s, and this is a very large study. We just simply
6 did not have that information.

7 So, instead, we used period of exposure as an
8 indication of exposure because we know that exposure
9 before 1950, for example, would be much higher than
10 exposure after 1960, let's say, because in the -
11 remember in the 1970s, early 1970s, the case report came
12 out on angiosarcoma -

13 Q. Right.

14 A. -- and at that time, the exposure was greatly
15 reduced, in the '70s.

16 So, what we did was we look at those people who
17 were exposed in 19 -- before 1950 and during the 1950s
18 and also after 1960, by comparison. And for liver
19 cancer, that works out exactly what we anticipated,
20 because for people who had the highest exposure before
21 1950, the SMR, the risk ratio for liver cancer was
22 actually close to eightfold, eight times. 7.79.

23 Q. And you're looking at Table 6 on page 328 of
24 your study; correct?

25 A. Yes. When we look at the middle time period,

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1 from 1950 to 1959, it dropped down to -- the SMR dropped
2 down to 4.4. And then for 1960 and thereafter, it
3 dropped down to 4.1, okay? So, we see a decrease of
4 risk of liver cancer as the exposure goes down.

5 So, it is consistent with our interpretation of
6 a causal relationship between exposure and the disease.
7 We take away or reduce the exposure, we reduce the risk.

8 Okay? So, that's what we call a negative dose-response.

9 Now, for brain cancer, it's completely
10 different.

11 Q. How is it different?

12 A. For people exposed in 19 -- in or before 1950,
13 the risk ratio was the lowest, was 1.5.

14 Q. So, during a period of time when the exposures
15 would have been highest, the risk for brain cancer is
16 the lowest?

17 A. Right. And for the middle time period, 1950 to
18 1959, it goes up a little bit to 1.6. But it really
19 goes up among people who are exposed after 1960. And
20 that goes up to -- the risk ratio goes up to 2.56. So,
21 what we're saying is as we reduce the exposure in the
22 industry, the risk for brain cancer actually goes up.
23 That argument really does not support a cause-and-effect
24 interpretation of the brain cancer finding.

25 Q. And why is that?

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1 A. Well, if you reduce the exposure, the disease
2 goes up. How can that be related to that exposure?
3 Q. You looked at the various cancers by year of
4 first exposure. Were there other ways that you looked
5 at the various cancers? For instance, did you look at
6 the occurrence of liver cancer or brain cancer by age at
7 first exposure?
8 A. Yes, we looked at age of first exposure
9 Q. And you're looking at
10 A. -- as well. And that's Table -- the previous
11 table, Table 5.
12 Q. What were your findings with respect to liver
13 cancer and age at first exposure?
14 A. For liver cancer, the younger one is exposed
15 to -- at a younger age, the higher the risk. For
16 example, if exposure occurred before age 25, the risk
17 for liver cancer was actually 16 times.
18 Q. What happens for those -- for other ages?
19 A. For age 25 to 34, it drops down to 8.13. And
20 then for those exposed after age 35, it was 3.45.
21 Q. Okay. These -- the SMRs for liver cancer at
22 age of first exposure of less than 25 years is 16.1, and
23 at age of first exposure at 25 to 34 at 8.1, and at 35
24 or more years at 3.45. Are those -- are all those SMRs
25 what you call statistically significant?

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1 A. Yes, they are all significant. In fact, they
2 are significant at the 1 percent level. Not only at the
3 5 percent level, but at a 1 percent level.-
4 Q. Is that a higher level than the 5 percent
5 level?
6 A. Yes. 7 Q. Does that mean -- what does that mean, to be
8 significant at the 1 percent level?
9 A. That means the 99 percent confidence interval,
10 the lower limit was actually above 1.0. There is no
11 question that the true risk is really different from
12 1.0.
13 Q. What does it say for brain cancer?
14 A. For brain cancer, again, we see exactly the
15 opposite. For people exposed before age 25, we have the
16 lowest risk, 1.1. And then for people exposed at ages
17 between 25 to 34, the risk goes up to 1.6. And then for
18 people exposed after age 35, we see a risk ratio of
19 2.39.
20 And that was significant at the 5 percent
21 level. That was the only one that was significant for
22 lung (sic) cancer.
23 Q. You mean for brain cancer?
24 A. I'm sorry. For brain cancer.
25 Q. The only one that was significant was the one
DEPOSITION OF OTTO WONG - VOLUME I 49

1 that was for exposure at age 35 or more years?

2 A. Right.

3 Q. So, it looks like the younger you are when
4 you're exposed to vinyl chloride monomer, the greater
5 your risk is of getting liver cancer; correct?

6 A. Yes. And that's consistent with a causation
7 interpretation.

8 Q. Yet it looks like for brain cancer, it's the
9 older you are?

10 A. That's exactly the opposite what we would
11 expect.

12 Q. Okay. And that's based on the application of
13 the Bradford Hill criteria?

14 A. Yes.

15 Q. I believe that you looked at liver cancer and
16 brain cancer in another fashion, as far as determining a
17 cause-and-effect association in -- through calculating
18 standardized mortality ratios. Is that -- is that
19 correct?

20 A. Yes. In fact, we look at the data by what we
21 call latency.

22 Q. Okay. And explain again for the jury what
23 latency is.

24 A. Latency is the time interval between exposure
25 and the appearance of disease. And for chronic disease,

DEPOSITION OF OTTO WONG - VOLUME I 50

1 we would expect we don't see an increase until 20, 30 -
2 20, 30 years later.

3 And for liver cancer, for latency less than 20
4 years, we see a risk ratio of 3.85. But then, as we
5 increase the latency to 20 to 30 years, the risk ratio
6 goes up to 5.9.

7 Q. And what is -

8 A. And then -

9 Q. I'm sorry.

10 A. I'm sorry. After 30 years, if we have a
11 latency of longer than 30 years, the risk ratio goes all
12 the way up to 12.18. And they are all significant at
13 1 percent level.

14 Q. It almost looks like, Dr. Wong, if you took
15 those numbers and drew them on a graph, it would be a
16 straight line up.

17 A. I don't know about a straight line, but it
18 would go up.

19 Q. What does Table 4 reflect with respect to brain
20 cancer?

21 A. For brain cancer, it doesn't show anything. It
22 is basically level, is flat if you draw a line.

23 For less than 20 years, the risk ratio was 1.8.

24 For the next latency period, 20 to 30 years, is 1.58.

25 And then for 30 year or more, is 2.1. So, it is

DEPOSITION OF OTTO WONG - VOLUME I 51

1 essentially flat. So, that means lung (sic) cancer
2 risk -- '

3 Q. Brain cancer risk?

4 A. I'm sorry. I keep thinking of liver cancer.

5 Brain cancer risk is not related to the
6 exposure in any fashion when we look at latency.

7 Q. And the standardized mortality ratios for brain
8 cancer on Table 4, are any of those statistically
9 significant?

10 A. None of them was significant.

11 Q. Okay. And what does that mean when you say
12 that they are not significant?

13 A. That means they are indistinguishable from the
14 background risk of 1.0.

15 Q. Dr. Wong, based on the study that you conducted
16 and submitted the results to the Chemical Manufacturers
17 Association in 1986 and had published in the American
18 Journal of Industrial Medicine in 1991, do you have an
19 opinion whether or not exposure to vinyl chloride
20 monomer causes brain cancer?

21 A. You're talking what I -- what I said in my 1991
22 paper?

23 Q. Yes.

24 A. I did not make any conclusion on the causation
25 of brain cancer in our study. I did comment that the
DEPOSITION OF OTTO WONG - VOLUME I

1 pattern of risk for brain cancer looked very, very
2 different from the one we have for liver cancer. For
3 liver cancer, we know for sure it's related to exposure
4 to vinyl chloride. But the pattern of lung (sic) cancer
5 looks completely different, but we don't have an
6 explanation at that time.

7 Q. Pattern of brain cancer looks different?

8 A. Okay. I need some more coffee.

9 The pattern for brain cancer looks very
10 different. And we did not have a good explanation why
11 we see an increase overall for brain cancer in our
12 study. But one thing I do want to point out is that
13 neither in the 1986 report to CMA nor in my 1991
14 publication, we never, never make the conclusion, make
15 the statement, that exposure to vinyl chloride was
16 responsible for the excess of brain cancer that we
17 observed in our study.

18 Q. Dr. Wong, I understand that in light of your
19 study that was published in 1991 -- let me start over
20 again.

21 When you submitted your results in 1986 to the
22 CMA, you were not the only epidemiologist looking at
23 vinyl chloride monomer and whether or not it could cause
24 cancer; is that a fair statement?

25 A. Of course not. Because after the angiosarcoma

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1 case report came out, vinyl chloride was a so-called --
2 a hot topic for us to -- to look at.

3 Q. Do you know Sir Richard Doll?

4 A. Yes.

5 Q. How do you know Dr. Doll?

6 A. Everybody knows him. He's the -- he's the
7 grandfather of occupational epidemiology. He was the
8 first scientist who conducted an epidemiological study
9 of workers exposed to asbestos. That was in the 19 --
10 1950s. He was also the first one to conduct a study on
11 smoking and cancer. Everybody knows him. Even lawyers.
12 (Whereupon, Defendants' Exhibit No. 3
13 was marked for identification.)

14 MR. COLBERT: Q. I want to hand to you what's
15 marked as Exhibit No. 3, Dr. Wong. Could you identify
16 that document, please?

17 A. It is an article published by Sir Richard Doll
18 and published in the Scandinavian Journal of Work
19 Environment and Health. And the publication date was
20 1988. It is a review of all the scientific information
21 on vinyl chloride at that point in 1988.

22 Q. Is your study included in that review?

23 A. Yes. I believe it is reference No. 14 in
24 the -- in the article.

25 Q. Okay. Do you know -- I guess in 1986 you

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1 submitted your report to CMA, and your paper wasn't
2 published until 1991. Do you know how Dr. Doll received
3 your study?

4 A. I don't. But my report to CMA was widely
5 available at that time.

6 Q. In fact, in reference 14 it says,
7 "Environmental Health Associates. An update of an
8 epidemiologic study of vinyl chloride workers,
9 1942-1982: Final report to the Chemical Manufacturers
10 Association."

11 A. Yes.

12 Q. Dr. Wong, would you read for the jury, please,
13 here on page 62 of Sir Richard Doll's study, the first
14 sentence under " U. S. study"?

15 A. "The study carried out by Environmental
16 Health Associates (14)" -- reference 14 --
17 "on behalf of the US Chemical Manufacturers
18 Association is the largest and the most
19 informative investigation thus far
20 undertaken."

21 Q. So, this is 1988. And the grandfather of
22 epidemiology is basically saying that your study that
23 was done for the Chemical Manufacturers Association was
24 the biggest one at that time ever undertaken for the
25 United States; correct

DEPOSITION OF OTTO WONG - VOLUME I 55

1 A. What do you want me to say? Yes.

2 Q. Do you agree with that?

3 A. Yes.

4 Q. Does -- do you know if -- if Dr. Doll had any

5 criticisms of your study?

6 A. Yes, some minor ones. But that would be

7 typical of all the cohort studies. For example, we did

8 not find out 100 percent, you know, the vital status of

9 everybody and so on. He did mention a couple of minor

10 criticisms. But they are applicable to all cohort

11 studies.

12 Q. Do you know if Dr. Doll came to a conclusion in

13 1988 whether or not vinyl chloride monomer was

14 associated with causing brain cancer?

15 A. He did, and I'm trying to find where he said

16 that. I believe the best way to look at this would be

17 on page 70 in Sir Richard Doll's report, on the

18 right-hand column at the bottom. Basically, what Sir

19 Richard Doll did was he combined all the major studies

20 on vinyl chloride available to him at that point,

21 including our -- our -- our study, and also the study

22 from Europe. He combined all the studies, and

23 basically, he reported 24 observed deaths of brain

24 cancer compared against 18.3 expected. And he make the

25 statement that -- he make the conclusion that the

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1 difference between the two, the observed and the
2 expected, is "...a difference which might easily occur
3 by chance."

4 And basically, what he's saying is that the 95
5 percent confidence interval includes 1.0.

6 Q. Is -- is making the statement "might easily
7 occur by chance" the same as saying that's what I would
8 expect to find in a background rate?

9 A. Indistinguishable from the background risk,
10 yes.

11 Q. So, it's basically one.

12 A. Yes.

13 Q. So, Dr. -- so, Sir Richard Doll concludes that
14 vinyl chloride monomer does not cause or is not
15 associated with causing brain cancer?

16 A. I don't know whether he would use exactly those
17 words or not, but based on his review, he came to the
18 conclusion that there is no evidence support the
19 hypothesis that exposure to vinyl chloride would cause
20 brain cancer.

21 Q. Dr. Wong, I understand that after you published
22 your paper in 1991 that there was a letter to the editor
23 written by a Dr. Shah from the Chemical Manufacturers
24 Association.

25 A. Yes.

DEPOSITION OF OTTO WONG - VOLUME I

1 (Whereupon, Defendants' Exhibit No. 6
2 was marked for identification.)
3 MR. COLBERT: Q. Let me hand you what's been
4 marked as Exhibit No. 6. Would you identify that,
5 please?
6 A. It's a letter to the editor of the American
7 Journal of Industrial Medicine, and the author was
8 Dr. Shah, S-H-A-H.
9 Q. Okay. Who was Dr. Shah?
10 A. Dr. Shah at that time was employed by the
11 Chemical Manufacturers Association. He was in charge of
12 the so-called Vinyl Chloride Program.
13 Q. Were you ever employed by the Chemical
14 Manufacturers Association?
15 A. No.
16 Q. Were you ever a member of the Vinyl Chloride
17 Program for the Chemical Manufacturers Association?
18 A. I'm not sure what you mean by that. They have
19 a research program, a health research program, called
20 Vinyl Chloride Program. And Dr. Shah was in charge of
21 that at CMA. And they also have a task force for the
22 Vinyl Chloride Research Program. I don't know whether
23 you were asking me whether I'm a member of the task
24 force or not, but --
25 Q. Thanks. That was a bad question.

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1 Were you ever a member of the Vinyl Chloride
2 Monomer Task Force for CMA? '

3 A. No.

4 Q. Do you know who was on the task force?

5 A. Not really, no. My only contact at that time
6 with -- when I was doing the research project for CMA,
7 my contact was Dr. Shah.

8 Q. Okay. Dr. Shah's letter to the editor is
9 titled "Diagnostic Bias in Occupational Epidemiological
10 Studies"; is that correct?

11 A. Yes.

12 Q. What -- do you know what the impetus was to
13 cause Dr. Shah to write a letter to the editor of the
14 American Journal of Industrial Medicine?

15 A. Basically, Dr. Shah raised two points in his
16 letter to the editor, asking me to explain or clarify or
17 provide a more thorough discussion on those two issues.
18 And that's quite common, you know.

19 A lot of times you read an article in a
20 journal, and there are certain areas that you don't
21 understand or certain areas that you would like the
22 author to clarify. You will write a letter to the
23 editor, and the editor will look at the letter and see
24 whether it is reasonable, whether some of the questions
25 raised are indeed valid. If indeed the letter is valid,

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1 the editor would make the decision of forwarding the
2 letter to the original author to respond.
3 And when the author respond, again, the editor
4 would look at the response to see whether the response
5 is indeed valid and reasonable, and if he or she makes
6 the decision that indeed that should be published, then
7 the journal would publish the initial letter to the
8 editor, as well as the response, at the same time so
9 that the readers would understand those points more
10 thoroughly.

11 (Whereupon, Defendants' Exhibit No. 7
12 was marked for identification.)

13 MR. COLBERT: Q. Okay. Let me hand to you
14 what's marked as Exhibit No. 7, Dr. Wong. Could you
15 identify that document, please.

16 A. That was my response to Dr. Shah's inquiry.

17 Q. Okay. I understand that you have a copy of the
18 issue of the 1993 American Journal of Industrial
19 Medicine in which Dr. Shah's letter and your response
20 appeared; correct?

21 A. Yes.

22 Q. Okay. Could you hold that up, please, for the
23 jury.

24 Who was the editor-in-chief of the American
25 Journal of Industrial Medicine in 1993?

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1 A. It was and still is Dr. Philip Landrigan. I
2 think Dr. Tabershaw (sic) pass away in the early 1990s.
3 I don't remember the exact date.

4 Q. Dr. Selikoff?

5 A. Selikoff, yes, Selikoff. And Dr. Landrigan
6 took over Dr. Selikoff's job.

7 Q. Okay. What were the two points that Dr. Shah
8 raised in his letter to the editor that he wanted
9 clarification of?

10 A. In his letter to the editor, Dr. Shah stated
11 that we did not -- in our 1991 article, did not discuss
12 the possibility of something what we call diagnostic
13 bias as a possible explanation of the lung cancer -- I'm
14 sorry -- the brain cancer increase. The brain cancer
15 increase in our 1991 paper.

16 Q. Okay. Was -- and that was one point. Was
17 there another point that he was --

18 A. The other point is about emphysema, chronic
19 obstructive pulmonary disease findings that we have in
20 our study.

21 Q. Is it -- is it fair to say that the letter to
22 the editor by Dr. Shah is a request to you and
23 Dr. Whorton and Dr. Folliart and Dr. Ragland to offer an
24 explanation or your reasons why certain findings were
25 made or not fully discussed in your 1991 paper?

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1 A. Right.

2 Q. Now, Exhibit 7 is your response to Dr. Shah.

3 A. Yes.

4 Q. And I notice on page 255, which would be the
5 fifth page of the exhibit, that it is signed or -- it's
6 printed here, but I'm assuming this would be your
7 signature and Dr. Whorton's signature; correct?

8 A. Yes.

9 Q. Okay. Well, on the 1991 study, the names that
10 appear here are yours, Donald Whorton, Donna Foliart,
11 and David Ragland. Why were Drs. Foliart and Ragland
12 not included in the response to Dr. Shah's letter?

13 A. Well, Donna Foliart at that time was a
14 occupational physician, and her involvement in the
15 project was to review some of the medical records of
16 angiosarcoma cases, because in our 1991 paper, we had a
17 very detailed discussion of the angiosarcoma cases. And
18 that was her involvement in that project. She did not
19 participate in the analysis of, for example, brain
20 cancer or emphysema, okay? But to acknowledge her
21 involvement in the 1991 -- well, in the project -- we
22 put her name down as one of the coauthors in the 1991
23 paper.

24 And David Ragland at that time was a
25 biostatistician/programmer, and he performed all the

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1 programming. And again, to acknowledge his involvement,
2 we put his 'name down. He did not write the 1991 report.
3 Q. Okay. So, Dr. Foliart wasn't even involved in
4 the brain cancer research or the emphysema/COPD research
5 that was discussed in your 1991 paper?

6 A. No.

7 Q. And -- nor was Dr. Ragland?

8 A. No.

9 Q. So, you didn't -- you and Dr. Whorton didn't
10 just exclude them from writing the response to
11 Dr. Shah's letter. They didn't have anything to do with
12 those two issues, did they?

13 A. Because Dr. Shah raised two issues in our 1991
14 paper, and those two issues had to do with my writing
15 and Don Whorton's writing.

16 Q. Okay. 17 A. Basically, I respond to the brain cancer issue,
18 and Don Whorton respond to the emphysema issue.

19 Q. What was the gist of your response with respect
20 to the brain cancer issue to Dr. Shah?

21 A. Well, number one, I stated very clearly in my
22 1993 response was that in our 1991 paper, although we
23 reported a statistical significant increase of brain
24 cancer overall, we did not discuss our finding in
25 relation to findings reported in other studies, nor did

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1 we conclude that exposure to vinyl chloride was
2 responsible for the brain cancer increase.
3 So, we would like to use our response as a
4 vehicle to talk about the brain cancer finding in
5 general, not just our finding, but also findings from
6 studies published subsequent to our study, which goes
7 back to 1986.
8 Q. Okay. So, from the time your study was
9 submitted as a report to CMA, more -- other studies had
10 come out, also looking at the issue of whether exposure
11 to vinyl chloride monomer could cause brain cancer?
12 A. Yes.
13 MR. COLBERT: At this point, we'll need to take
14 a break so we can change the video.
15 THE WITNESS: Okay.
16 THE VIDEOGRAPHER: This marks the end of
17 Videotape No. 1 in the deposition of Dr. Otto Wong. The
18 time is 10:52. We're off the record.-
19 (Recess taken: 10:52 a.m. until 11:03 a.m.)
20 THE VIDEOGRAPHER: This marks the beginning of
21 Videotape No. 2 in the deposition of Dr. Otto Wong. The
22 time is 11:03. We're back on the record.
23 MR. COLBERT: Q. Dr. Wong, before we get to
24 your response to Dr. Shah, I want to ask you a couple
25 more questions about your study that was submitted to -;; .
DEPOSITION OF OTTO WONG - VOLUME I 64

1 as a report to CMA in 1986 and published in 1991. Were
2 you able to duplicate the results from the previous
3 studies in your study?

4 A. Yes. Of course, Dr. Cooper find an increased
5 risk ratio for angiosarcoma. We -- we found that as
6 well. Dr. Cooper also found an increased ratio of brain
7 cancer. I believe the risk ratio was a little bit above
8 2. We did find an increased risk ratio as well, but the
9 magnitude was somewhat reduced to 1. -- find the number
10 now -- 1.8.

11 Q. Were you able to -- in your results from your
12 study, did you have any new findings?

13 A. As I said, you know, nonangiosarcoma liver
14 cancer. We also find increase of liver cancer other
15 than angiosarcoma, and that finding, I believe, was new
16 at that time.

17 Q. Let's talk about your response to Dr. Shah's
18 letter. How is it -- or do you know how it is that
19 Dr. Shah's letter and your response came to be published
20 in the American Journal of Industrial Medicine?

21 A. I'm not sure I understand what you're asking.

22 Q. Is it customary in journals of the type of the
23 American Journal of Industrial Medicine to have letters
24 to the editor and responses to letters to the editor
25 published?

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1 A. It's very common in scientific journals, as I
2 explained before. If you see something that you don't
3 understand or certain things you may not agree, or you
4 need the author simply to provide a more thorough
5 discussion, the proper way to do it is to go through the
6 editor. You send your letter of your inquiry to the
7 editor of the journal, and the editor would take a look,
8 or at least ask someone to take a look or delegate that
9 to someone to, what we call, review it, to look at that
10 and see whether the issues raised in the letter to the
11 editor, the issues are valid and reasonable.
12 And if that's the case, then the letter to the
13 editor would be forwarded to the original author of the
14 paper and ask the authors of the original paper to
15 respond or to explain or to provide a more complete
16 discussion on the points raised.
17 And when the response comes in to the editorial
18 office, again, the editor or someone delegated by him
19 would look at the response and make sure the points,
20 again, would be valid and reasonable and the readers of
21 the journal would benefit from the discussion.
22 And after that process, then both the initial
23 letter to the editor as well as the response would be
24 published in the same issue of the journal. At least,
25 that's based on my experience. I'm also an editor of a

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1 journal as well.

2 Q. And what journal would that be, Dr. Wong?

3 A. The Analysis of Epidemiology is the official
4 journal of the American College of Epidemiology.

5 Q. And what -- the process you just described is
6 based on your experience as an editor in The Analysis of
7 Epidemiology?

8 A. Yes. And that would be the normal procedures
9 in most journals, if not all journals.

10 Q. Let's talk about your response to Dr. Shah.

11 From the time your report was submitted to CMA
12 in 1986 and your paper was published in the American
13 Journal of Industrial Medicine in 1991, and then your
14 response to Dr. Shah's letter published in 1993, had new
15 information come out regarding exposure to vinyl
16 chloride monomer and its association with causing
17 chronic health diseases?

18 A. Yes. At least two major, very important
19 studies.

20 Q. What were those two studies?

21 A. The first one was conducted by the scientists
22 at the National Institute for Occupational Health and
23 Safety, or NIOSH, and the first author's name is Wu,
24 W-U, Dr. Wu.

25 (Whereupon, Defendants' Exhibit No. 4

DEPOSITION OF OTTO WONG - VOLUME I 67

1 was marked for identification.)

2 MR. COLBERT: Q. Let me hand to you what's
3 been marked as Exhibit No. 4, Dr. Wong. Would you
4 identify that, please.

5 A. Yes, the article that I just talk about.

6 Q. And that's the article by Dr. Wu and the
7 scientists at the National Institute of Occupational
8 Safety and Health?

9 A. Right. And it was published in the Journal of
10 Occupational Medicine in 1989.

11 Q. Okay. You said there were two studies. What
12 was the second study that was published prior to your
13 response to Dr. Shah's letter in 1993?

14 A. The second paper was published by -- I would
15 say published by the International Agency for Research
16 on Cancer, the scientists there.

17 (Whereupon, Defendants' Exhibit No. 5
18 was marked for identification.)

19 MR. COLBERT: Q. Let me hand to you what's
20 been marked as Exhibit No. 5. Would you identify that,
21 please.

22 A. That's the paper I talk about.

23 Q. So, that's

24 A. It's published in the Journal -- Scandinavian
25 Journal of Work Environment and Health in 1991. The

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1 first author's name is Simonato, S-I-M-O-N-A-T-O.

2 Q. Is that the same journal that Dr. Doll's paper
3 was -- or Sir Richard Doll's paper was published?

4 A. Yes.

5 Q. Is that a very well-respected journal?

6 A. Yes.

7 Q. So those two studies came out after your 1986
8 report to CMA?

9 A. Yes. One came out in 1989, and the other one
10 in 1991.

11 Q. In your response to Dr. Shah's letter to the
12 editor published in 1993, did you rely on the study by
13 Dr. Wu and Dr. Simonato in your response?

14 A. Yes. Because I -- actually, I stated in my
15 1993 response, I said:

16 "Although Dr. Shah did not raise the
17 question explicitly in his letter, he seems
18 to ask that the most important question is,
19 does exposure to vinyl chloride increase
20 the risk of brain cancer? The answer to
21 this question should be based not only on
22 our study" -- our 1991 paper -- "but also
23 on all other pertinent studies in the
24 literature."

25 It's a broader question. It's not-- the

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1 ultimate question is, is not just based on my study.

2 Remember we talk about the criteria of

3 consistency? -

4 Q. Yes.

5 A. When you look at causation, you shouldn't just

6 look at one single study. You have to look at all

7 studies pertinent to that issue. And even though

8 Dr. Shah did not raise the question explicitly in his

9 letter, to me, the fundamental question is, the basic

10 question is, does exposure to vinyl chloride increase

11 the risk of brain cancer? And to answer the question,

12 we have to rely on not only my study but all other

13 studies as well. And that's why, in my 1993 response, I

14 include other studies in my discussion.

15 Q. Well, let's take a look at Dr. Wu's study. And

16 again, you mentioned that the scientists here, along

17 with Dr. Wu, these are people who are associated with

18 the National Institute of Occupational Safety and

19 Health; correct?

20 A. Yes.

21 Q. And do they make a statement in this article

22 regarding whether or not vinyl chloride monomer is

23 associated with causing brain cancer?

24 A. They did.

25 Q. And what is that statement?

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1 A. Basically, they conclude that there is no
2 causal relationship between exposure to vinyl chloride
3 and brain cancer.

4 Q. How did they go about deriving that conclusion,
5 Dr. Wong?

6 A. Well, it turns out that NIOSH, the NIOSH
7 study -- let's just label that as the NIOSH study. The
8 NIOSH study is also part of our study, the workers in
9 the NIOSH study. In fact, most of our angiosarcoma
10 cases and brain cancer cases came from two locations in
11 our study. We have 37 locations. And NIOSH actually
12 studied those locations, that facility. So, they have
13 most of the data in our -- in our study.

14 Q. That sounds to me like a nested case-control
15 study.

16 A. No, it's not. It's just our data overlap,
17 okay? They conduct their own independent cohort study
18 first.

19 Q. Okay.

20 A. Okay. And they look at the overall brain
21 cancer risk. And indeed, their result was quite similar
22 to ours, and that is, when they look at the overall
23 cohorts -- I'm looking at Table 4

24 Q. Yes.

25 A. -- in Dr. Wu's paper -- the SMR, the
DEPOSITION OF OTTO WONG - VOLUME I 71

1 standardized mortality ratio was 1.6. Remember we have
2 1.8. So, those two are very similar, okay?
3 But one tremendous advantage that-the NIOSH
4 study had over our study was that they had quantitative
5 exposure information in their study, which we did not
6 have for the industry wide study.
7 Q. So, they actually -- they had the amount, or a
8 number corresponding to the amount of vinyl chloride
9 that these people were exposed to?
10 A. Yes. Yes. In fact, the paper states very
11 clearly that -- on page 519 -- "...this same plant was
12 included in an industry-wide study ...of workers exposed
13 to VCM," okay? And make reference to our study, okay?
14 And then Dr. Wu and his colleagues went on to
15 say, "The industry-wide study," meaning our study,
16 "...did not assign exposure levels to specific jobs and
17 did not conduct a dose-response analysis" in terms of
18 quantitative exposure information.
19 Okay? Whereas they did. In fact, they did a
20 cohort study, and then after that, they did nested
21 case-control analysis of liver cancer, lung cancer, and
22 brain cancer.
23 Q. Okay. And do they report their results from
24 their analysis of brain cancer in the nested
25 case-control study?

1 A. Yes.

2 Q. Okay. And where is that reported in their
3 study? _

4 A. It's starting with Table 5.

5 Q. Would that be including Table 5, Table 6, Table
6 7 and Table 8?

7 A. Table 7 and Table 8, yeah.

8 Q. As I read Table 5, it says, "Cancer Risk by
9 Duration of Employment in VCM-Exposed Jobs for the
10 Subcohort with Greater than 15 Years Since First
11 Exposure."

12 A. Yes.

13 Q. What does that mean?

14 A. That means they only look at people have a
15 latency of more than 15 years.

16 The underlying concept of that is, what the
17 NIOSH scientists were saying is that the exposure 15
18 years prior to diagnosis would not have any impact on
19 the disease process. Therefore, they exclude anybody
20 who had a latency of less than 15 years.

21 Q. And that's based on the Bradford Hill criteria
22 of latency?

23 A. Yes, Bradford Hill include that as one of the
24 criteria. But the basic reasoning for that is the
25 chronic disease process. What we're saying is exposure

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1 within the last 15 years of diagnosis would not be
2 effective in the disease process. That is the
3 underlying rationale for the analysis.

4 Q. And what do they conclude with respect to
5 cancer risk by duration of employment?

6 A. Well, they conclude that that is an association
7 between vinyl chloride exposure and liver cancer because
8 when you look at the SMR for liver cancer, it goes up as
9 the duration of exposure goes up. But that's not so
10 for -- for brain cancer. In fact, they conclude that
11 these results -- referring to Table S -- indicate that
12 the risk of mortality due to cancer of the liver was
13 consistently elevated for all duration categories after
14 five years of exposure. No such increase with duration
15 of exposure was seen for lung cancer and brain cancer.

16 Q. So, they didn't see a dose-response
17 relationship?

18 A. No, that's not correct. They did see a
19 dose-response relationship for liver cancer --

20 Q. Liver cancer.

21 A. -- but they did not see one for lung cancer or
22 brain cancer.

23 Q. Thank you.

24 What do the NIOSH scientists say in Table 6?

25 A. Well, that's the nested case-control results.

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1 Their conclusion is the results based on the nested
2 case-control study support or confirm the findings from
3 the cohort study. In fact, on the same page, page 522,
4 Dr. Wu stated:
5 "The lack of significant findings in the
6 cohort analyses for these two cancers" -
7 meaning lung cancer and brain cancer -
8 "was further supported by the lack of a
9 dose response in the case-control studies
10 for exposure to either VCM or PVC dust."
11 Q. And would he be talking for cumulative dose?
12 Is that what he's talking about in Table 8?
13 A. Yes. That's Table 8 we used the cumulative
14 exposure, duration times concentration.
15 Q. And I think if we look at Table 8, we see for
16 liver cancer the coefficient, which is the duration of
17 exposure?
18 A. The coefficient is a measure of risk.
19 Q. Okay.
20 A. And for liver cancer and VCM, that was
21 significant, meaning a significant increase in relation
22 to cumulative exposure to vinyl chloride, whereas for
23 brain cancer, is not significant.
24 Q. Is there anyplace in the article by Dr. Wu and
25 the scientists from NIOSH that they talk about whether
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1 or not there -- they find an association between brain
2 cancer and exposure to either vinyl chloride monomer or
3 PVC?

4 A. Yes. Their conclusion is stated on page 522.

5 First they -- they stated, "These data confirm the
6 well-known association between VCM and liver cancer."

7 And then they went on to say:

8 "On the other hand, our data do not support
9 the hypothesis that the excess risk of lung
10 cancer and brain cancer which have been
11 observed at this plant is associated with
12 exposure to either VCM or PVC dust."

13 So, they conclude that, indeed, they confirm
14 the causal relationship between vinyl chloride and liver
15 cancer, but at the same time, they also conclude that
16 there is no evidence to support the hypothesis that
17 there is a causal relationship between exposure to vinyl
18 chloride and either lung cancer or brain cancer.

19 Q. Now, this is -- this study comes from the
20 National Institute of Occupational Safety and Health;
21 correct?

22 A. Yes.

23 Q. This is the United States government -

24 A. Yes.

25 Q. -- saying that there is no association between

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1 exposure to vinyl chloride monomer or PVC dust and brain
2 cancer?

3 A. That's what the NIOSH scientists said.

4 Q. That's a pretty powerful statement.

5 A. Well, that's NIOSH.

6 Q. The other study that came out after your study
7 came out and prior to the publication of your letter in
8 1993 was the -- what you referred to as the IARC study,
9 International Agency for Research on Cancer, which is
10 Exhibit 5, and it's titled "A Collaborative Study of
11 Cancer Instance and Mortality Among Vinyl Chloride
12 Workers." And the first author's name is Simonato; is
13 that correct?

14 A. Yes.

15 Q. What is the importance of the Simonato study?

16 A. Because it's a large study. It's a
17 comprehensive study. They are really two large-scale
18 studies: that study that I did, the CMA study in the
19 United States, which is an industry wide, national study;
20 and the other one would be the IARC study. It is an
21 international study in Europe. The cohort size was
22 quite large.

23 Q. How large was the cohort size in the IARC
24 study?

25 A. About the same size as ours, 12,000. We -- our

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1 study was a little bit more than 10,000. The difference
2 is we observed over a longer period of time, whereas
3 they -- their observation would be a little bit shorter
4 than ours.

5 Q. Do you know how long their observation period
6 was?

7 I might be able to help you. On page 160, in
8 the left-hand column, the last paragraph, they talk
9 about the observation period being basically from 1955
10 until 1986.

11 A. That's correct.

12 Q. Do the IARC scientists make any conclusions
13 with respect to whether or not vinyl chloride monomer is
14 associated with causing brain cancer?

15 A. Yes. Actually, it's right on the very first
16 page of the article, in the summary, in the abstract,
17 the last sentence.

18 Q. And what do they say?

19 A. "Other cancer sites investigated on the basis
20 of a priori hypotheses were either not in excess," and
21 then in parenthesis, "(lung) or apparently unrelated to
22 the exposure variables," in parenthesis "(brain and
23 lymphoma)."

24 In other words, they concluded -- the IARC
25 scientists concluded that there is no relationship

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1 between exposure to vinyl chloride and brain cancer.
2 Those two are unrelated. That's what they say. I
3 Q. So, at about the same time with the IARC study
4 in 1991, and the Wu study, we have the International
5 Agency for Research on Cancer and the National Institute
6 of Occupational Safety and Health both saying that there
7 is no association between vinyl chloride monomer
8 exposure and brain cancer?
9 A. That's correct.
10 Q. In the IARC study, do they calculate a risk, a
11 relative risk, or -- for exposure to vinyl chloride
12 monomer and brain cancer?
13 A. Yes, they did. It was a cohort study, and in
14 that study, they have 14 brain cancer deaths, and they
15 expect the number was 13.1. And the standardized
16 mortality ratio, SMR, was 1.07, and that's, you know,
17 practically 1.0.
18 Q. Which is what would you expect to find in a
19 population of people anywhere?
20 A. Right.
21 Q. Have we discussed what's important about the
22 NIOSH paper and the IARC paper with respect to your
23 response to Dr. Shah's letter to the editor?
24 A. Yes. I guess the important thing to remember
25 is that the NIOSH study is actually part of our -- our
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1 data. We share the same database. The only difference
2 being that NIOSH had exposure information, and they did
3 a more thorough or detailed analysis than we did in our
4 industry wide study.

5 Q. And that's because they had the exposure data
6 that you didn't have?

7 A. That's right. Because I took over the study
8 from Dr. Cooper, and Dr. Cooper did not collect
9 information on exposure.

10 Q. Dr. Wong, did you ever conclude, either in your
11 1986 report to CMA or your 1991 article that was
12 published in the American Journal of Industrial
13 Medicine, that the statistical increase in brain cancer
14 was associated with vinyl chloride monomer exposure?

15 A. No, I never make that statement.

16 (Whereupon, Plaintiffs' Exhibit No. 8
17 was marked for identification.)

18 MR. COLBERT: Q. Dr. Wong, I understand that
19 there's been some controversy around the vinyl chloride
20 industry, and I'm not sure how that started or where it
21 started, but unfortunately, it appears that someone
22 tried to include you in that controversy.

23 And I'd like to show you Exhibit 8 to your
24 deposition, which is -- I will represent to you is a
25 copy of a Houston Chronicle article by Jim Morris. It's

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1 from the Houston Chronicle's web site.

2 Are you familiar with that -- with that article
3 from the Houston Chronicle, Dr. Wong?

4 A. I know about it.

5 Q. How did you come to know about it?

6 A. Well, Mr. Morris contact me. I don't remember
7 the year now. Must be sometime before he wrote the
8 article, I assume.

9 Q. Do you know how it -- why it is that Mr. Morris
10 contacted you?

11 A. Well, he said that he was working on a story of
12 vinyl chloride, and he would like to talk to me about my
13 study, my paper, and also the exchange of letters to the
14 editor in the journal. He called me up and asked me
15 to -- to give him some information, which I did.

16 Q. Do you recall what information you gave him?

17 A. Basically, I told him how I did the study, what
18 I reported in the 1986 report and also the 1991
19 publication. He was particularly interested in brain
20 cancer.

21 So, I told him that although we found -- just
22 like I answered you this morning -- we did find a
23 statistical increase of brain cancer in our study, but
24 when we look at the pattern of risk, the pattern for
25 brain cancer was very different from the pattern for

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1 liver cancer. And we know that liver cancer is causally
2 related to vinyl chloride exposure. Based on that, we
3 would say that brain cancer is most likely not related
4 to exposure to vinyl chloride.
5 And I also explained to him subsequent to my
6 study there had been two studies, two major studies that
7 came out, and I explained to him the findings, just like
8 I did to you a few minutes ago, the NIOSH study and also
9 the IARC study. I explained all that to him.
10 Dr. Shah raised a question of diagnostic
11 sensitivity bias. And certainly, for a disease like
12 brain cancer, we cannot rule that out as an explanation.
13 There is an explanation.
14 Q. What is diagnostic sensitivity bias?
15 A. That term refers to a disease or cancer that
16 requires extensive diagnostic procedures to confirm the
17 diagnosis. And in the literature, we have seen studies
18 in which we see an increased risk of certain cancers,
19 and later on, the researchers find out that that
20 increased cancer was due to an increased reporting or
21 increased diagnosis of that condition in workers.
22 Because workers who are employed by a large corporation
23 have better health care than other members of the
24 populace, okay?
25 That term was first created by Dr. Peter

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1 Greenwald. And Dr. Greenwald is an epidemiologist,
2 medical epidemiologist, at the National Cancer
3 Institute. And subsequently, a lot of people observed
4 that as well.

5 Q. The article by Jim Morris is unfortunate and
6 rather unflattering for you, Dr. Wong. He mentions here
7 that you hadn't received permission from the Chemical
8 Manufacturers Association to publish your data.
9 How did it come about that you published your
10 study that ended up being -- your -- how did it come
11 about that you published the results of your study that
12 came out to be published in the American Journal of
13 Industrial Medicine?

14 A. Well, for major studies -- I would always like
15 to publish the results of major studies. I mean,
16 that's -- that's one of the things that we do as a
17 scientist.

18 Q. Does that require the permission of the
19 sponsor?

20 A. Absolutely not. I mean, the report writing,
21 publication, I regard that as my right.
22 Anyway, is a moot point because we reported the
23 finding, our conclusion, our interpretation of the study
24 to CMA in 1986. And that report was widely available to
25 anyone. In fact, as you -- as we have gone through,

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1 Dr. Wu, the people at the NIOSH, they cited my study.
2 That means they have a copy, at least, okay? When you
3 look at the -- Sir Richard Doll's review paper,
4 Sir Richard Doll cited our study, the 1986 report. So,
5 again, Sir Richard Doll had a copy. In fact, anybody
6 who's interested can get a copy from CMA.
7 So, I don't understand why there is any concern
8 of publication, because the information is already out
9 there in the public domain.
10 Q. Do you maintain the right to publish whenever
11 you sign a contract with a sponsor of a study?
12 A. Yes, we do. And I have published all the major
13 studies, whether the results are positive or negative.
14 If it's a major study, we're entitled to publish, we
15 will.
16 Q. Do you have a copy of your contract with CMA
17 for your 1986 study?
18 A. No, I don't. The contract was with
19 Environmental Health Associates, later on became ENSR,
20 and I left ENSR in 1990.
21 Q. Okay. Did Mr. Morris ever send you a draft
22 copy of the article that he published in the Houston
23 Chronicle for your review prior to his publication?
24 A. I wish he had, but he did not.
25 Q. So, you didn't have a chance to determine
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1 whether or not what Mr. Morris said in here was
2 accurate, based on the conversation you had with
3 Mr. Morris; correct?

4 A. I have no way of seeing that the story that he
5 was going to publish, whether that's accurate or
6 complete or things left out by, you know -- purposely or
7 whatever.

8 Q. I want to point something out to you in this
9 article. There's a statement from Dr. Landrigan in
10 Mr. Morris's article. Is that the same Dr. Landrigan
11 who was the editor-in-chief of the American Journal of
12 Industrial Medicine in 1993, when Dr. Shah's letter to
13 the editor and your response to Dr. Shah's letter was
14 published?

15 A. Yes.

16 Q. Do you have any understanding of how
17 Dr. Landrigan came about making the statement that he
18 did that there was a retraction?

19 A. I have no idea. I assume Mr. Morris talked to
20 Dr. Landrigan, and I don't know what question Mr. Morris
21 asked Dr. Landrigan. But certainly, Dr. Landrigan make
22 some statement. If that statement refers to -- I'm --
23 I'm not sure whether that statement refers specifically
24 to my 1991 publication and my subsequent response to
25 Dr. Shah or to letters to the editor in general. I -- I

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1 don't know which is the case.

2 Q. It seems to me, Dr. Wong, that the conclusions
3 that you reached in your paper that was published in
4 1991 were the same conclusions that NIOSH reached in the
5 Wu study and that IARC reached in their study.

6 A. No, actually, I would say NIOSH and IARC went
7 beyond what I conclude. I, in the 1996 -- I'm sorry --
8 in the 1986 report to CMA and in the 1991 publication, I
9 simply reported an overall statistical increase of brain
10 cancer. I did talk about the inconsistency of pattern
11 of risk between brain cancer and liver cancer. I never
12 make any conclusion regarding the causation or the
13 etiology of brain cancer in our study. I did not make
14 that statement, okay?

15 Dr. Wu and other scientists at NIOSH went
16 beyond that. They make the statement saying that there
17 is no connection between vinyl chloride exposure and
18 brain cancer. And IARC also went beyond that, saying
19 there is no relationship between the two. So, actually,
20 they make much stronger conclusion than I did.

21 But going back to Dr. Landrigan's statement,
22 let me first read the statement. The statement says,
23 "This is extremely unusual." I don't know what "this"
24 refers to, okay? But that's what he said. "This is
25 extremely unusual."

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1 Q. Does he say anything besides this is extremely
2 unusual?

3 A. Well, the next part of the sentence is, "I have
4 never seen a retraction of epidemiological findings like
5 this with almost no defense by the authors." Okay?

6 Now, if that statement -- if Dr. Landrigan's
7 statement indeed refers to my study, then I would say
8 there are two points I would like to comment on.

9 Q. And what would those be?

10 A. The first one is, there was never a retraction
11 to start with.

12 Q. Okay. So, you never retracted anything from
13 your 1991 study?

14 A. Right. Because I never conclude that exposure
15 to vinyl chloride was responsible for the brain cancer
16 increase. I did not make that conclusion in my 1986
17 report nor in the 1991 publication. So, there was no
18 conclusion to retract, to start with. That's number
19 one.

20 Q. What's number two?

21 A. Number two is, he refers to "with no defense --
22 with no defense by the authors." Okay?

23 I would not use the word "defense." But my
24 discussion of my 1991 and my 1986 report, the brain
25 cancer finding was based on additional new studies that

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1 subsequently came out after I have completed my own
2 study. And we talk about those two major studies.

3 Q. That would be the IARC study and the NIOSH
4 study?

5 A. Exactly. So, to say that there is no defense,
6 meaning no new evidence, I guess that's -- that's not
7 true at all.

8 I do not know why Phil Landrigan would make
9 that statement, not -- I'm really surprised because
10 he -- especially he was the editor of the journal. I
11 submit my response to him. I would assume either he
12 look at my response or he asked someone -- or he
13 delegate that job, the review, to someone to look at
14 that before the journal accepted my response.

15 Q. That assumption is based on your experience as
16 an editor in the industry --

17 A. That's the normal procedure, you know, when you
18 submit something to the journal. The editor, either
19 him- or herself, would look at the manuscript or the
20 letter to the editor or whatever piece that the authors
21 submit and make a decision whether to publish that or
22 not, or at least delegate that to someone who can make
23 that decision.

24 Q. Dr. Wong, I understand that the inquiries into
25 your article published 1991, your study published in
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1 1991, and your response to Dr. Shah's letter published
2 in 1993 did not end with Mr. Morris; that you were
3 contacted -- were you indeed contacted by someone else
4 after that?

5 A. Yes.

6 Q. And who would that have been, sir?

7 A. I was contacted by someone from NBC Dateline.

8 (Whereupon, Defendant's Exhibit No. 9

9 was marked for identification.)

10 MR. COLBERT: Q. And I've handed to you what's

11 marked as Exhibit 9. Could you identify that document,
12 please.

13 A. Yes. A letter from me, dated November 9th,
14 1998, to someone by the name Mable Chan. And she -- at
15 least at that time, she was at Dateline NBC.

16 Q. How did it come about that you wrote this

17 letter, this Exhibit 9 --

18 A. I wrote the letter, not --

19 Q. Yes, that you wrote the letter to Ms. Chan on
20 November 9, 1998?

21 A. Well, she called me, must be around that time,
22 informing that NBC Dateline would like to do a story on
23 the vinyl chloride and brain cancer. And she was also
24 aware of the Houston Chronicle article, and she wanted
25 to listen to my side of the story and explain to her.

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1 So, I did. Basically, I went through the same
2 thing that we went through this morning.
3 Q. Right. 4 A. And I guess I was a little bit older and
5 smarter in 1998, and I was burnt once by Jim Morris, so
6 after the conversation, I make sure that Mable Chan at
7 NBC Dateline would have all the information that they
8 need to do the story. So, I wrote a letter summarizing
9 the main points that I told her during our phone
10 conversation. I think on top of that, I also send her
11 the original -- the original -- the 19 -- 1990 -- yes,
12 1993 letter to the editor.
13 Q. Okay. And the document that you have there
14 before you, Exhibit No. 9, is that a true and correct
15 copy of the letter that you wrote to Ms. Mable Chan?
16 A. Yes.
17 Q. And was that letter written on or about the
18 time that the date is, November 9, 1998?
19 A. Yes.
20 Q. And you discuss in the letter to Ms. Chan,
21 dated November 9th, 1998, that -- let me ask you: Read
22 the first sentence in paragraph 1.
23 A. "We never concluded that there was a causal
24 relationship between vinyl chloride and brain cancer in
25 our 1991 paper."
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1 Q. And you also point out in your letter to
2 Ms. Chan, dated November 9th, 1998, the results found by
3 NIOSH, the United States government; and the results
4 found by IARC, I believe. Is that correct?
5 A. Yes. I talk about the NIOSH study in my point
6 number 3 in the letter, and I talk about the IARC study
7 in number 4.
8 Q. Okay. Did you receive a response from
9 Ms. Chan?
10 A. No. Actually, I also mentioned that -- well, I
11 did not -- I did not send her a copy of the NIOSH study
12 with my letter dated November 9th, 1998.
13 Q. Would you have sent her a copy of the NIOSH
14 study on your letter dated November 11th, 1998?
15 A. Yes. A couple -- a couple days later I
16 actually found the NIOSH paper, and I sent her a copy of
17 that.
18 (Whereupon, Defendant's Exhibit No. 10
19 was marked for identification.)
20 MR. COLBERT: Q. Did you get a response from
21 Ms. Chan in light of your November 9th, 1998 letter and
22 your November 11th, 1998 letter?
23 A. No. I -- she did not call me. And I guess,
24 you know, several weeks passed by, and I was wondering
25 what the status of that story is, because I was
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1 expect -- I was expecting to turn on the TV and -- and
2 watch the program, which never happened.
3 So, I called her up -- I don't remember when,
4 but several weeks later -- and I asked her -- basically,
5 I wanted to find out when the story would be
6 broadcast -
7 Q. And did she say -
8 A. -- so that I can -- I can watch that. And
9 she -- I was surprised. She told me that they were not
10 going to do the story.
11 Q. Did she tell you why they were not going to do
12 a story?
13 A. I don't remember the exact words that she used,
14 but basically she said there's not much of a story
15 there.
16 Q. Okay. Did she -- do you recall if she said
17 anything else?
18 A. No. That's about it.
19 Q. And did you -- have you heard from Ms. Chan or
20 anybody else at NBC Dateline since 1998 or -
21 A. No.
22 Q. -- about the time that those letters were
23 written?
24 A. No. They never -- they never did the story.
25 Q. Dr. Wong, do you have an opinion as an
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1 epidemiologist whether or not there is a causal
2 association between exposure to vinyl chloride monomer
3 and brain cancer?

4 A. Yes, I do.

5 Q. And what is your opinion?

6 A. My opinion is based on the epidemiologic
7 studies. When we look at the data and apply the Hill
8 criteria to the data -- not just to my study but to the
9 most recent update of the CMA study, the IARC study, the
10 study done by NIOSH -- when you look at all the data,
11 there is simply no evidence to support a causal
12 relationship between exposure to vinyl chloride and
13 brain cancer.

14 MR. COLBERT: Dr. Wong, those are all the
15 questions I have. Thank you very much.

16 THE VIDEOGRAPHER: Time is 11:53. We're off
17 the record.

18 (Discussion off the record.)

19 (Whereupon, the luncheon recess was taken at
20 11:53 a.m.)

21

22

23

24

25

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1 AFTERNOON SESSION 1:27 P.M.
2 EXAMINATION BY MR. STEWART
3 THE VIDEOGRAPHER: Time is 1:27. We're on the
4 record.
5 MR. STEWART: Q. Dr. Wong, because we're
6 changing interrogators, I'll ask about three questions
7 that are repetitive, and then I'll try not to be
8 repetitive.
9 Would you state your name for the record,
10 please, sir.
11 A. Otto Wong.
12 Q. And where do you live?
13 A. My business address?
14 Q. Yes.
15 A. 181 Second Avenue, Suite 628, San Mateo,
16 California.
17 Q. And what is your occupation?
18 A. I am an epidemiologist.
19 Q. How old are you?
20 A. Do I have to answer that?
21 MR. COLBERT: I'm sorry. Unfortunately, you
22 do.
23 MR. STEWART: Q. Well, I am 68. How old are
24 you?
25 A. Close to your age.
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1 No, I'm 54.
2 Q. Fifty what?
3 A. Four.
4 Q. Four? Okay.
5 And we are taking your deposition today in
6 San Francisco; is that correct?
7 A. Yes, sir.
8 Q. All right. Who asked you to give testimony in
9 this case?
10 A. Mr. Colbert.
11 Q. And do you have an understanding of who
12 Mr. Colbert and his law firm represent in this case?
13 A. Shintech.
14 Q. And do you know what Shintech is?
15 A. Not a whole lot.
16 Q. Do you know anything about Shintech?
17 A. Not much.
18 Q. Huh?
19 A. Not much.
20 Q. Okay.
21 A. Not much.
22 Q. Okay. What is -- do you know anything?
23 A. They are the defendant in this case. I assume
24 they have something to do with the exposure in this
25 case.

1 Q. Okay. You do not know what product -- assuming
2 Shintech is a manufacturer, 'do you know what product
3 they manufacture?
4 A. No, I don't. Not at this point.
5 Q. Shintech is a wholly-owned corporation (sic) of
6 a Japanese corporation known as Shin-Etsu. Are you
7 familiar with Shin-Etsu?
8 A. No, I'm not.
9 Q. Have you ever given testimony in another case
10 in which the victim died of a malignant brain tumor and
11 the victim had worked in a polyvinyl chloride
12 manufacturing plant?
13 A. I don't believe so.
14 Q. Is this the first time you have ever testified
15 in a case involving vinyl chloride and its potential for
16 causing disease or death in humans?
17 A. I believe so.
18 Q. Over the years, has most of your testimony,
19 whether by deposition or in court, had to do with
20 benzene?
21 A. Yes. I have done a lot of work -- a lot of
22 work on benzene.
23 Q. Have you done more work on benzene than you
24 have on vinyl chloride?
25 A. I would say so.

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1 Q. When I was looking this morning at your CV, I
2 noticed that you got a bachelor of science degree in
3 physics and mathematics.

4 Is that accurate?

5 A. Yes.

6 Q. And where did you get that degree?

7 A. From the University of Arizona in Tucson,
8 Arizona.

9 Q. And then you continued your education and got a
10 master of science degree in experimental physics; is
11 that correct?

12 A. Yes, sir.

13 Q. What is experimental physics?

14 A. In physics, I guess it -- two groups,
15 experiments as opposed to theoretical physics. And I
16 choose the path of doing experiments, physics
17 experiments.

18 Q. Does experimental physics include quantum
19 physics?

20 A. Both. I mean quantum -- quantum physics, you
21 can talk about theoretical aspects of quantum physics.
22 You can also talk about experimental aspects of quantum
23 physics.

24 Q. When you started to college and you elected to
25 be a major in physics and mathematics, did you know

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1 early on what you ultimately wanted to do by way of
2 profession or occupation?

3 A. I ask my son the same question not too long
4 ago. Does any 18-year-old know what they want to do at
5 that age? No, I did not.

6 Q. At what point did you make the decision that
7 you wanted to utilize your physics and mathematical
8 education and become a biostatistics and -- well, let me
9 back up.

10 You also have a master's degree in
11 biostatistics and occupational epidemiology?

12 A. Yes.

13 Q. Did you -- from what institution did you get
14 those master's degrees?

15 A. The physics degree, I earned that at
16 Carnegie-Mellon University in Pittsburgh, and that was
17 in 1972.

18 Then I decided to switch my major and switch to
19 public health. So, I went to the graduate-school of
20 Public Health of the University of Pittsburgh, in
21 Pittsburgh. And in 1973, I earned a master degree of
22 science in biostatistics and occupational epidemiology.

23 Q. What is biostatistics?

24 A. Biostatistics is the application of statistics
25 in biomedical field. And in my -- in my case, it's

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1 really the application of statistics in epidemiology.

2 Q. All right. In order to go into occupational
3 epidemiology, was it necessary that you had taken any
4 type of medical training along the way?

5 A. No, not before you go into the program. Once
6 you get into the program, there are some basic
7 biological classes that you have to take.

8 Q. Was that something that you did when you were
9 working on your master's in biostatistics and
10 occupational epidemiology?

11 A. Yes, when I was at the University of Pittsburgh
12 graduate School of Public Health.

13 Q. What courses did you take that would fall
14 within the medical field?

15 A. I take some occupational physiology, some
16 pulmonary courses, you know, reaction to air pollutants
17 and so on. I took some classes from the occupational
18 health department in the public health school.

19 Q: Did you take two courses?

20 A. More than two. I don't remember all the names.
21 Those are the two that come into mind now.

22 Q. How long did you have to remain in school in
23 order to get a doctorate in biostatistics? How long did
24 it take to get the doctorate after you got your
25 master's?

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1 A. In my case, it was two years. It all depends
2 on how many hours you want to work on your thesis. Once
3 you -- once you have your master degree, once you passed
4 your qualifying exam, so to speak, into the doctoral
5 program, then the only thing that holds you back would
6 be your thesis. The sooner you can complete your
7 thesis, the sooner you will get your doctoral degree.
8 Q. And you got your doctorate degree from what
9 school? I don't have your CV in front of me or I
10 wouldn't be asking all these questions.
11 A. I'll let you look at it.
12 Q. All right. You got your doctorate from --
13 A. From the same school, graduate School of Public
14 Health.
15 Q. Oh, at the Uni
16 A. University of Pittsburgh.
17 Q. University of Pittsburgh. Okay. And that was
18 in 1975.
19 A. Yes, sir. 20 Q. Now, while you were in school at the University
21 of Pittsburgh, working on your doctorate degree, were
22 you also working outside of school?
23 A. No, I was working at school. .Actually, I had a
24 fellowship at school. In return -- I mean, I get
25 tuition and also a stipend from the school. In return,
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1 I do some research for some -- for some professors.
2 Q. Okay. Do you know who funded the research that
3 you did while you were in the doctorate program at the
4 University of Pittsburgh?
5 A. Yes. It was the National Institute for
6 Occupational Safety and Health.
7 Q. NIOSH?
8 A. Yes, sir.
9 Q. And what was the subject of your thesis?
10 A. My thesis was -- have to look at the title. Is
11 on lung cancer among carbon workers at steel mills.
12 Q. Now, you say NIOSH funded this study. Did you
13 do any other studies while you were in college working
14 on your master's or your doctorate, studies which were
15 funded by some outside agency or person?
16 A. No. My entire stipend was provided by NIOSH.
17 Q. All right. And back in the 1970s, do you know
18 where NIOSH got their funding?
19 A. NIOSH?
20 Q. Uh-huh.
21 A. They get their funding from you and me. Tax
22 money.
23 Q. Well, does it come from the General Accounting
24 Office?
25 A. I have no idea.

1 Q. You don't know the --

2 A. I don't know. I mean, it's government. NIOSH
3 is part of government. I assumed that that comes from
4 the taxpayers' money.

5 Q. Did you know any of the persons who were
6 members of NIOSH back at the time that you were doing
7 this work which was funded by them?

8 A. No.

9 Q. You never did meet any of them?

10 A. No.

11 Q. Never met -- did you ever meet Dr. Infante?

12 A. No.

13 Q. Have you ever heard of him, Peter Infante?

14 A. Not when I was in school.

15 Q. You've heard of him since then?

16 A. Yes.

17 Q. Dr. Richard Lemon, had you ever heard of him?

18 A. Not when I was in school.

19 Q. Vernon Rose?

20 A. No.

21 Q. Ever heard of him?

22 A. No.

23 Q. Waxweiler

24 A. No.

25 Q. Never heard of him?

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1 A. No.
2 Q. Dr. Joe Wagner? Ever heard of him?
3 A. No.
4 Q. Now, you have taken also a course in
5 accounting; is that correct?
6 A. Oh, yeah. Many years later, yes.
7 Q. And you've taken a course in financial
8 management; is that correct?
9 A. Yes.
10 Q. And you've also taken a course in environmental
11 toxicology; is that right?
12 A. Yes.
13 Q. And where did you take the course in
14 environmental toxicology?
15 A. University of California.
16 Q. At what town?
17 A. At Santa Cruz.
18 Q. And how long did the toxicology course last?
19 A. It's what we call continuing education.
20 Basically, we met every Saturday for about, I believe,
21 three months. For semester, close to a semester.
22 Q. What is toxicology?
23 A. Toxicology is, you know, basically about the
24 reaction of the body to substances we inhale, we ingest.
25 Q. And this course in toxicology that you took,
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1 did you go so far as to actually perform animal tests?

2 A. No, we did not.

3 Q. Did you read about that in this course?

4 A. Yes.

5 Q. About doing animal studies of chemical
6 compounds and things of that nature?

7 A. Yes.

8 Q. So, even though you have your degree in
9 biostatistics and occu -- well, actually, your doctorate
10 is just in biostatistics; is that correct?

11 A. I got my degree from the Department of
12 Biostatistics, but my thesis was actually an
13 occupational epidemiologic study, steelworkers.

14 Q. Okay. Assuming that you had not wanted to go
15 into epidemiology but had you a doctorate in
16 biostatistics, what are some of the other available
17 occupations that you could have gone into?

18 A. I'm not sure I understand your question.

19 Q. Well, one who has a doctorate degree in
20 statistics -- and in your case, biostatistics -- do you
21 necessarily have to become an epidemiologist, or could
22 you have gone into some other profession?

23 A. People with a degree in biostatistics can get
24 into, for example, clinical trial, get into vital
25 statistics organizations. There are all kinds of

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1 opportunities for them. But as I said, the thesis work
2 that I did when I was in graduate school: was actually an
3 epidemiologic study. So, that was the path that I have
4 chosen to do, occupational epidemiology.

5 Q. Okay. Now, in working as a biostatistician and
6 epidemiologist, you do have to work with numbers much
7 the same as perhaps a mathematician would have to?

8 A. I'm not so sure that analogy is that similar
9 because we -- in doing epidemiologic study, we do use
10 statistics, but that's a minor part of it. The
11 important thing is study design, the collection of data,
12 and so on, whereas a mathematician would not do that.

13 Q. If -- well, let me try to gain some
14 understanding about the work that you have done over the
15 years. If you do an epidemiological study to determine
16 whether or not chemical X causes disease Y, and you are
17 sponsored or you are hired by a group of people who are
18 in the business of manufacturing vinyl chloride or
19 polyvinyl chloride, describe for me what is essential to
20 you in order to perform an epidemiological study for the
21 vinyl chloride industry and answer the question of
22 whether or not vinyl chloride, being chemical X, causes
23 disease Y? What do you have -- what do you have to have
24 and how do you get it?

25 MR. COLBERT: Objection. Form.

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1 THE WITNESS: Regardless of who sponsor the
2 project, the research, the approach would still be the
3 same, and that is, if we want to do a cohort study, we
4 would need to have employment records to identify the
5 cohort, or the population of workers, who were employed
6 at the facilities that we want to include in the study.
7 Once we have identified the cohort of workers,
8 then we need to find out their vital status, whether
9 they are still alive or dead as of today. And if they
10 die, what they die from, and compare the number of
11 certain cancer deaths to what we would expect based on
12 the general population. And at the same time, also
13 compare within the cohorts those people with longer or
14 higher exposure to people with shorter or lower
15 exposure, and come up with some comparisons.
16 And based on the comparisons, we would draw our
17 conclusion.

18 MR. STEWART: Q. Okay. Now, the first thing
19 that you need is a study group, and you call the study
20 group a cohort; is that right?

21 A. Yes.

22 Q. Does it matter how few or how many people are
23 in the study group?

24 A. Yes, it does, because if you have only a few
25 people -- for example, if you do a study of 10 people,

1 most likely you won't see enough cancer cases to make
2 any sense out of it. So, depending on what cancer you
3 want to study, the sample size is very important. To
4 study a rare disease, you need a large group. To study
5 something very common, you need a smaller group.

6 Q. Okay. "Large" and "small" are relative. What
7 do you mean by "large group"?

8 A. It depends on what disease we are talking
9 about.

10 Q. Okay. Is 10 -- the number 10,000, is that
11 sufficient to constitute a study group, regardless of
12 the type of cancer that you're considering?

13 A. I would say 10,000, in the form of a cohort
14 study, would be sufficient for most cancers.

15 Q. Okay. Now, in addition to needing a study
16 group -- and hopefully, that it would have 10,000 humans
17 in it -- what other data do you have to have?

18 A. Well, we need a comparison group, people not
19 exposed to that chemical, or exposed at a lower level or
20 for a shorter duration. Most of the time in a cohort
21 study, we just use the general population.

22 Q. Let me back up.

23 A. Can I finish? Can I finish?

24 We would use the outside comparison, the
25 general population, as one of the comparison groups.

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1 That's what we would do. And at the same time, we would
2 also contrast different groups within our cohort, people
3 with higher and longer exposure to people with shorter
4 and lower exposure.

5 Q. Okay. If you had your -- your druthers, would
6 you rather have a study group of 10,000 humans who work
7 in this particular industry and who fall into the
8 category of being exposed and then have another group of
9 10,000 humans who work in this industry but fall into a
10 group that is not exposed?

11 A. Well, depends on how common the exposure is in
12 the industry. Sometimes everybody in that industry is
13 exposed to that chemical.

14 Q. No, I'm just -- I'm making the assumption that
15 we can come up with 10,000 humans who work within the
16 same industry, who have zero exposure.

17 A. The same industry?

18 Q. To be -- to be our control group.

19 A. In the same industry?

20 Q. Yes.

21 A. That's what I said. Sometimes it's difficult
22 to find a group with no exposure in the same industry.
23 The best we can hope for is to compare people with
24 longer, higher exposure to people with minimal exposure,
25 lower and shorter exposure. That's what I said before.

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1 Q. I know it would be difficult. But would there
2 be anything illegitimate from a scientific standpoint,
3 if you could actually come up with 10,000 humans within
4 industry A who could be documented as having been
5 exposed to chemical X, and you could come up with 10,000
6 humans in industry A who could be documented as never
7 having any exposure to chemical X?

8 A. Yes, that would be desirable.

9 Q. All right. But that is difficult to do, so
10 rather than having a control group of 10,000 nonexposed
11 against whom you can compare your results, what you're
12 saying is you make your comparison against the
13 population in general?

14 A. One of the comparisons would be in reference to
15 the general public.

16 Q. Okay. Now, you have to work your way through
17 some type of epidemiological formula in order to answer
18 the question, does chemical X cause disease Y. Go ahead
19 and tell me the steps that would have to be taken.
20 We've got our cohort. You have got data on the
21 employees who fall within the category of being exposed.
22 What else do you need?

23 A. Well, we need, of course, some basic
24 demographic information: How old they are.

25 Q. Okay.

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1 A. Because when we calculate the risk, we need to
2 know the age. And basically, that's the fun -- the
3 basic information we need. We need the age. We need
4 the number of people we have in the study, how long we
5 observe them and when we observe them. And at the same
6 time, find out what happened to them, what they die
7 from, and compare the number of cancer -- the number of
8 a specific kind of cancer in our study group to the
9 comparison group.

10 Q. Okay. Now, if your study confirms a causal
11 relationship between chemical X and disease Y, and then
12 five years later, you did the same study, but your data
13 as you're doing the study is showing you that this
14 second study cohort group has greater exposures over a
15 longer period of time for exposure to chemical X, can
16 you at that point conclude, a priori, that in this
17 second study group that you're going to find an excess
18 of disease Y?

19 A. I don't follow your question. What you're
20 saying is, in the first study, you find an increase, and
21 in the second study you have more exposure.

22 Q. Uh-huh.

23 A. Longer observation.

24 Q. Uh-huh.

25 A. And you also find increase.

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1 Q. Uh-huh.

2 A. So, what was your question?

3 Q. Well, my question was, in the second study,
4 before you got all of the data that you normally would
5 have to accumulate, that it became apparent that this
6 second study group had a much higher exposure and had it
7 for a longer period of time, would just that -- that
8 factor or that piece of data be enough for you at that
9 point to conclude that this second study group is going
10 to end up showing a greater excess of disease Y than did
11 the first?

12 A. One may anticipate that, but I don't think one,
13 would make a conclusion now of it.

14 Q. You would continue your study through
15 completion and find out what the numbers turn out to be?

16 A. Of course. If we have already collected the
17 data, there's no point in not analyzing the data.

18 Q. But you certainly would expect, if the first
19 group with exposure C, being the amount -- you reach the
20 occlusion -- the conclusion as to that study group that
21 there was a causal relationship between chemical X and
22 disease Y, and then in the second study group your
23 exposure is C plus 10, then certainly, you expect to
24 find a causal relationship between chemical X and
25 disease Y, do you not?

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1 A. Based on what you told me, yes.
2 Q. Yes, okay. This is all hypothetical.
3 Now, take the converse example. In your first
4 study group, you study a cohort and you -- you do not
5 confirm or conclude that there is a causal relationship
6 between chemical X and disease Y. That's your
7 conclusion. Your numbers just don't -- don't reach that
8 conclusion; okay?
9 And then five years later, you did Study No. 2,
10 and you did it with higher levels of exposure and you
11 confirmed a causal relationship between chemical X and
12 disease Y. First time you had lesser exposure; the
13 second study you had greater exposure. The first time,
14 you did not conclude a causal relationship between
15 chemical X and disease Y. The second time, you did
16 conclude a causal relationship between chemical X and
17 disease Y.
18 Can we then go a step further and conclude that
19 it's probably because the second study involved a cohort
20 that had greater exposure?
21 A. Everything being equal, I would say that would
22 be the logical conclusion.
23 Q. Okay. Now, in the second study, where you do
24 confirm a causal relationship, it's because the number
25 of diseases or deaths rise to a -- a particular level so
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1 that when you compare that number to the general
2 population, you see an excess.

3 My question is, what does that excess have to
4 be for you to be of the opinion that there's a causal
5 relationship between chemical X and disease Y?

6 A. Well, actually, it's more complicated than
7 that.

8 Q. Okay.

9 A. What you're talking about is just looking at
10 the data from the overall point of view, looking at the
11 entire group. To answer the question, I cannot give you
12 a fixed number because whether something is significant
13 or not depends on the underlying data, how large the
14 group is, okay? The larger the group, the smaller the
15 95 percent confidence interval. So, in order to declare
16 something that's statistically significant, that is,
17 statistically distinguishable from the background, 1.0,
18 we need a large group, okay? That's just one aspect of
19 an epidemiologic analysis. That alone, in and by
20 itself, is not sufficient to arrive at a causation
21 conclusion.

22 This morning we went through a number of ,
23 criteria that we use to determine causation. We need to
24 use those criteria in addition to looking at the overall
25 risk ratio.

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1 Q. Well, if, between the two studies involving
2 chemical X and disease Y, we can show that the first
3 study group or cohort was subjected to what you would
4 categorize as low exposure, but the second group was
5 exposed to what would you categorize as high exposure of
6 X, and -- could you then draw the overall conclusion, in
7 my opinion, low chronic exposure to X does not cause
8 disease Y, but high exposure to X does cause disease Y?

9 A. If you don't have anything else, that would
10 seem to be a reasonable interpretation of the data at
11 that point.

12 But again, this morning we talk about causation
13 criteria, and one of them is consistency. In other
14 words, you cannot base your entire conclusion on just
15 one or two studies. That has to be -- the result has to
16 be consistent. That means the same results from
17 different studies.

18 Q. All right. This morning you were talking about
19 using these criteria. Is "criteria" the word that's
20 used for those Bradford Hill principles?

21 A. That's the word I would use, yes.

22 Q. Huh?

23 A. That's the word I would use.

24 Q. Okay. Do some epidemiologists refer to it as
25 Bradford Hill principles?

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1 A. Some may.
2 Q. Okay. All right. Assume that you have done
3 Wong Study No. 2 and Wong Study No. 2 in my hypothetical
4 situation. In the first study, the exposure was low,
5 and you concluded no causal relationship between X and
6 Y. The second study, there was a higher exposure. You
7 reached the conclusion that there was a causal
8 relationship, okay?
9 Assume that five years after Wong 2, an
10 individual comes to see me -- I'm an epidemiologist --
11 and says, "My father died. My father worked in an
12 industry where he got a lot of exposure to chemical X,
13 and I've heard that there may be some connection between
14 chemical X and disease Y. Can you do a study and give
15 me an opinion?"
16 And I agree to take the case because nobody's
17 walked in my door in five years, and I need the money.
18 So, I take -- I take on the task.
19 The only thing that's available to me, as far
20 as studies go, is Wong 1 and Wong 2. There -- they've
21 both been published in prestigious journals.
22 Assuming that fact situation, what would I, as
23 a reasonably prudent epidemiologist, do to try to answer
24 this person's question about the deceased father?
25 MR. COLBERT: Objection. Form.
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1 THE WITNESS: I have some difficulty with your
2 hypothetical. You try to characterize in each study --
3 you gave me two hypothetical studies.
4 MR. STEWART: Q. Uh-huh.
5 A. And you only give me one result from each
6 study.
7 Q. Uh-huh.
8 A. The one with lower exposure did not find an
9 association. The one with high exposure did find an
10 association. But in reality, it is not that. When we
11 look at either one of the studies, within the study
12 itself, there are some people with high exposure, and
13 there's some people with low exposure within each study.
14 Number one, we need to interpret the data
15 according to internal consistency, okay? In other
16 words -- in other words, when you look at the second
17 study, the one define an elevated risk, you don't call
18 that association right away. You still have to go
19 through the dose-response analysis within the second
20 study.
21 If, indeed, in the second study you do see an
22 upward trend as the exposure goes up within the second
23 study, the risk of the cancer of the people in the
24 second study also goes up, then I would say yes, there
25 is good evidence for a causal association.

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1 It's not just looking at two points. You try
2 to oversimplify the situation by saying there's one
3 study with low exposure; there's one study-with high
4 exposure. That's -- that's oversimplification of the
5 situation.

6 Q. Okay. So, what you're saying is it's extremely
7 important to look at all of the data that you collect in
8 both studies?

9 A. Yes.

10 Q. That's essential to your reaching a valid
11 scientific conclusion, is it not?

12 A. Absolutely.

13 Q. And the data has to be accurate, does it not?

14 A. Of course.

15 Q. Okay. Well, let me inquire into this
16 situation: Epidemiologist Z agrees to do a study for a
17 group of manufacturers that use chemical X, and
18 thousands of their employees get varying amounts of
19 exposure year in and year out to chemical X.
20 Epidemiologist Z drafts a protocol.

21 Now, is that something that you do before you
22 undertake a study, is to draft a protocol outlining how
23 you're going to conduct the study?

24 A. Either protocol, a proposal of how to do the
25 study.

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1 Q. Either a protocol or proposal. In your
2 vocabulary, those words would be pretty much the same
3 thing?

4 A. Well, a proposal would be you submit it to a
5 sponsor, a potential sponsor, and in the -- in the
6 proposal, you outline how you're going to do the study.
7 That part of the proposal would be the protocol.

8 Q. Okay. All right. So, Epidemiologist Z drafts
9 the proposal, and he comes up with a proposal that is
10 identical to the one that Dr. Wong used in his Study
11 No. 2, where he found a causal relationship.

12 With me?

13 A. Yes.

14 Q. Okay. But Z is told by these people in this
15 industry who hired him that Z cannot validate any data,
16 that he can merely write out questionnaires asking for
17 the information, give it to the supervisory personnel at
18 the various plants, let them fill out the questionnaires
19 and provide the data and give it to Epidemiologist Z,
20 and Epidemiologist Z cannot validate whatever data is
21 received from the various plants.

22 Do you follow me so far?

23 A. No.

24 Q. What -

25 A. Because I don't know what you're referring to

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1 when you say "data."

2 Q. Huh?

3 A. I don't know what you're referring to when you
4 say "data." What kind of data? Data about employment?

5 Data about vital status? Causes of death or what?

6 Q. Well, let's take -- let's say that the -- one
7 of the questions you're interested in is what members of
8 the cohort are living and what portion of the cohort's
9 deceased. And as to the living members of the cohort,
10 the plants tell Epidemiologist Z, with regard to all
11 those who are living, you're going to have to take our
12 word for this information that you've asked.

13 And I don't know what all information that you
14 would ask about. But whatever it is, you're going to
15 have to take the word of the plant personnel.

16 Is that the way you conduct your studies?

17 MR. COLBERT: Objection. Form.

18 THE WITNESS: We actually send the data out to
19 a place called the National Death Index, and the
20 National Death Index would tell us whether somebody is
21 still alive or dead.

22 MR. STEWART: Q. Well, with regard to doing a
23 study on a cohort and considering the living members of
24 the cohort, what information are you interested in about
25 the living members of the cohort?

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1 A. How old they are, what gender they -- they are
2 in, what ethnic background they have. Because all those
3 are factors that in -- that can influence the disease
4 rate. We would like to know how long and when they
5 worked for the industry. And hopefully, if possible,
6 the exposure level.

7 Q. All right. Are you willing, when you do a
8 study, to have that data that you just described to me
9 provided to you by the industry that's being studied,
10 without your having a right to validate?

11 A. Those are basic, fundamental data, and I don't
12 see -- let me -- let me go back, okay?

13 The way that I conduct the cohort study would
14 be normally, if I don't just take over somebody's study
15 and update it, I would go out and collect the data
16 myself. I would send a team out to the location, to the
17 plants, and basically, we would copy the employment
18 records, and we would abstract the information, such as
19 gender, race, birthday, and also the job titles, length
20 of employment, from the employment records.

21 Q. Okay. What if the plant manager said, sorry,
22 you're not coming onto the premises. You write down
23 what information you want. We'll gather the
24 information. We'll do the copying, and we'll send it to
25 you.

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1 Will you go ahead and do the study?

2 A. I have to find out how they do the copying, how
3 thorough they are, and would I be able to see at least
4 copies of the original document.

5 Q. So, it wouldn't bother you that you and your
6 employees or colleagues who are doing the study -- if
7 you were not allowed to come onto the premises of the
8 plant and gain access to the personnel records?

9 MR. COLBERT: Objection. Form.

10 THE WITNESS: That's not what I would prefer.

11 But on the other hand, if there is some way to at least
12 do an audit, a sample of that, then I would be satisfied
13 with that, if I can do an independent audit of the
14 accuracy and the completeness of the data.

15 MR. STEWART: Q. But you can't do that.

16 A. If I cannot do that, then I would have some
17 questions.

18 Now, there are ways that epidemiologists can do
19 some -- what we call internal auditing. Try to see
20 whether there is any data gap, to see whether the data
21 are consistent or not, based on the data that they are
22 provided with. But that is not as good as being able to
23 see the source document, to see the original documents
24 themselves.

25 Q. Okay. Assume further that the management

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1 personnel at these plants say, Dr. Wong, one of the
2 things that you asked us for is all of the cohort
1 members who are deceased, and you wanted a copy of their
4 death certificate.

5 Is that something that you sometimes ask for,
6 is a copy of the death certificates?

7 A. That's something that would save us some time.

8 But it's not required. It's not essential. Because as
9 I said a minute ago, we actually use a government agency
10 called National Death Index to determine whether someone
11 in our study is still alive or dead. And if they die,
12 we'll get a copy of the death certificate from National
13 Death Index, or the cause of death from National Death
14 Index, or from the state health department.

15 The fact that -- if the company can provide us
16 with a copy of the death certificate, that would just
17 save a little bit of time. But that's not essential.

18 Q. Well, what I'm asking is this: You can't get
19 access to death certificates. All can you get from the
20 company is the company's promise and word that they will
21 provide you the information that's on the death
22 certificate.

23 A. You don't understand my answer.

24 Q. Is that -- is that sufficient for you?

25 A. You don't understand my answer.

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1 Q. Yes, I do.
2 A. Let me -- let me repeat one reformation for
3 you.
4 Q. No, we're looking for -
5 MR. COLBERT: Objection. Form.
6 MR. STEWART: Q. -- causes of death.
7 A. Yes.
8 Q. And you have no access, because you don't have
9 sufficient identifying information, to go out to some
10 third source and get a copy of the death certificate.
11 The only source of information that you have as to cause
12 of death is what the employer tells you is on the death
13 certificate.
14 Would that be sufficient for you?
15 MR. COLBERT: Objection. Form.
16 THE WITNESS: Well, you changed your
17 hypothetical. Now you're telling me that I don't know
18 anything about the study subjects in my study. I don't
19 know their name; I don't know their Social Security
20 number. But that's not what you said before.
21 I told you when we do a study, we go out and
22 copy records, copy employment records, and they will
23 have name, Social Security number, birthday, and so on.
24 And now you're telling me that I don't have the name. I
25 don't have the name; I don't have the Social Security
DEPOSITION OF OTTO WONG - VOLUME I 123

1 number. I don't have anything. And the only
2 information I have is from someone who said, "Believe
3 me, this is what the guy died from."
4 MR. STEWART: Q. Exactly.
5 A. Of course, that's not sufficient.
6 Q. Okay. And you would not want to conduct a
7 study on that basis, would you?
8 A. I don't think you can do a study that way.
9 Q. Okay.
10 MR. STEWART: (To the videographer) Well, go
11 ahead and change it, then.
12 THE VIDEOGRAPHER: Okay. This concludes
13 Videotape No. 2 in the deposition of Dr. Wong. The time
14 is 2:16. We're off the record.
15 (Recess taken: 2:16 p.m. until 2:22 p.m.)
16 THE VIDEOGRAPHER: This marks the beginning of
17 Videotape No. 3 in the deposition of Dr. Otto Wong. The
18 time is 2:22. We're on the record.
19 MR. STEWART: Q. Okay. Dr. Wong, I understood
20 your answers to be, under my hypothetical about your
21 being denied the ability to validate death certificates
22 and so forth, that that's not something that you would
23 want to do; is that correct?
24 A. Not validate death certificate, because we get
25 the death information from the National Death Index.
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1 what I'm saying is validate the demographic information,
2 the -
3 Q. Well, I -
4 A. -- employment records.
5 THE REPORTER: I'm sorry. The employment
6 records?
7 THE WITNESS: Yes.
8 MR. STEWART: Q. I keep using that word, and
9 that's not an -- not a proper word because that's not
10 the question I'm intending to answer (sic).
11 You said that you would not want to have as
12 your sole source of information on cause of death just
13 what some plant manager told you was on a death
14 certificate. And you had no other access to any other
15 manner or means of confirming or denying what was on the
16 death certificate.
17 MR. COLBERT: Objection. Form.
18 THE WITNESS: Certainly, if that's the only
19 information on death certificates that we would get,
20 then I would say I have -- I would not want to do a
21 study because, number one, the industry, the manager or
22 whoever, they are not epidemiologists. They don't know
23 how to collect the data.
24 Number two, for people who left the company and
25 die subsequently, they would not have that information.
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1 MR. STEWART: Q. Right.

2 Q. So, I don't see how an epidemiologist would
3 accept that kind of data, provided what you say is -- I
4 mean you're giving me a hypothetical, I mean.

5 Q. Right.

6 A. Given the hypothetical situation, I don't think
7 anybody would want to do a study.

8 Q. Okay. Well, our -- our Epidemiologist Z, for
9 whatever reason, agrees to go along with this ridiculous
10 plan. And Epidemiologist Z collects all of his data by
11 way of answers to questionnaires from the plant
12 managers. And once he's collected all of the data, he
13 analyzes the data and so forth, and he comes to a
14 conclusion.

15 And assume further that the data is just
16 nothing but garbage. Would the conclusion that
17 Epidemiologist Z comes to be nothing but garbage?
18 MR. COLBERT: Objection. Form.

19 THE WITNESS: Well, if he doesn't have any way
20 to validate that, to compare that to, I don't see how he
21 or she can come to a conclusion that the data was
22 garbage. To -- to prove something's wonderful or to
23 prove something's garbage, you need some external,
24 independent documents to compare to either way. So,
25 if -- somehow your hypothetical doesn't make sense to me

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1 because if there is no additional data one way or
2 another to demonstrate, to indicate whether the data are
3 authentic, real, or just garbage, how do you prove
4 either way?

5 MR. STEWART: Q. Well, let's make the
6 assumption that Epidemiologist Z gets data information
7 which, on paper, says that a large number of the members
8 of the cohort received large dosages of chemical X over
9 a prolonged period of time. Now, if he got that kind of
10 data, would you expect him, assuming all other things
11 match your testing protocol or proposal, would you
12 expect him to reach a conclusion that, yes, your father,
13 you know, his disease Z was probably caused from
14 exposure Y?

15 A. I -- I don't follow your question at all.
16 You're mixing up a situation where an epidemiologist has
17 some data. The only source of information for him or
18 her is through the company, unvalidated, unconfirmed.
19 There is no comparison -- you cannot compare that to any
20 other documents. And based on that, he or she is
21 supposed to make a conclusion? I -- I just don't follow
22 you.

23 Q. Okay. Let's take it a step further. Let's --

24 A. Don't take any step further. Let's get through
25 this step first. I don't understand this step.

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1 Q. Okay. Let's assume that the data which is
2 presented to Epidemiologist Z grossly understates
3 exposure.
4 A. Can I interrupt you for one minute?
5 Q. Yeah.
6 A. How do we know that?
7 Q. Because we go in after the fact and find out.
8 A. But he or she, the epidemiologist, doesn't know
9 that at that time.
10 Q. Let's make it real simple. Epidemiologist Z is
11 furnished by these plant managers with information
12 pertaining to human beings in the cohort who never, ever
13 were exposed to chemical X, yet these plant managers are
14 telling Epidemiologist Z that these cohort members did
15 have exposure to chemical X.
16 A. Okay. I'm with you.
17 Q. All right. Would that false data right there,
18 in and of itself, create a false conclusion --
19 MR. COLBERT: Objection. Form.
20 MR. STEWART: Q. -- by Epidemiologist Z?
21 A. Okay. Depending on what the conclusion is.
22 Let's say -- there are two outcomes in terms of
23 disease from that study, right? Either Epidemiologist Z
24 finds or doesn't find an elevated risk of that disease.
25 Q. Right.

1 A. If he or she does not find an increased risk
2 for that disease, then I guess his or her conclusion
3 would be we did not find an increased risk in people who
4 were exposed. But in reality, those people were not
5 exposed.
6 Q. Right.
7 A. Okay. That's one scenario.
8 The other scenario is she did find an increase.
9 That would be interesting because people not exposed,
10 yet you have an increased risk of that disease. So,
11 that disease, the increased risk must come from
12 something else or just due to chance.
13 Okay? Those are the two scenarios.
14 Q. Okay. So, the first scenario that you
15 describe, where these plant managers are reporting
16 members of the cohort as being exposed when in fact,
17 they never have been exposed, if the conclusion reached
18 is going to be false, then it's probably going to be
19 false in the sense that the conclusion will be there's
20 no causal relationship between chemical X and disease Y.
21 MR. COLBERT: Objection. Form.
22 THE WITNESS: Right.
23 MR. STEWART: Q. Okay. So, if -- if the data
24 as to the -- the very honest description of the cohort
25 is garbage, then the result that's going -- that's

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1 reached with that -- with that false data, is going to be
2 garbage?

3 A. Well, if the data was incorrect to start with,
4 you know -- this is what we call misclassification. In
5 other words, you classify people who were nonexposed as
6 exposed. That is a misclassification, the same as you
7 call a nonsmoker a smoker. If you study a group of
8 nonsmokers, you don't find increased risk of lung
9 cancer, of course, you cannot make a statement that
10 smoking does not cause lung cancer.

11 Q. Okay. But the conclusion that our
12 epidemiologist reaches in the first scenario that you
13 described, where nonexposed cohort members were reported
14 as being exposed, the epidemiologist's conclusions are
15 going to be invalid conclusions regardless, because the
16 information that the epidemiologist got was invalid.

17 A. Of course, because the classification was
18 incorrect.

19 Q. Right. So, if it's garbage in, it's garbage
20 out?

21 A. Yes.

22 Q. Dr. Wong is approached a third time and asked
23 to do a study on the causal relationship between
24 chemical X and disease Y. And you make your same
25 proposal to your sponsors, and it's acceptable, and you

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1 undertake to perform your study.
2 And your final numbers that you achieve from
3 this third study match up very, very closely with the
4 numbers that you had achieved in Wong 2. But this time,
5 you note -- in addition to an excess of deaths from
6 disease Y, you also notice an excess -- in this third
7 study group or cohort exposed to chemical X -- an excess
8 of deaths from renal cell carcinoma. But the excess of
9 deaths from renal cell carcinoma does not really rise to
10 the level of prompting you to just haul off and say,
11 "Aha. In addition to chemical X causing disease Y, it
12 also caused renal cell carcinoma." But there's enough
13 there that it arouses your concerns or your suspicions.
14 And my question is, is there another
15 specialized study that you might want to recommend to
16 your sponsors to do on just the question of relationship
17 between chemical X and renal cell carcinoma?
18 A. It depends on what you have already done in the
19 first study, assuming we are talking about a cohort
20 study still, okay?
21 This morning I talk about some study designs.
22 Cohort study, case-control studies. A lot of times when
23 we do a cohort study, we are talking about tens of
24 thousands of workers, and it is very difficult to get
25 detailed exposure information on every single study

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1 subject. If time is no concern, if money is no concern,
2 maybe we can do that. But a lot of times, because of
3 practical reasons, we don't do what we call a full
4 cohort exposure characterization. Instead, if we have
5 identified a certain disease that we're interested in,
6 we would do what we call a nested case-control study.

7 Q. Now, say that -- say that again? I heard that
8 this morning, but I -- the first word you're saying is
9 what?

10 A. Nested, N-E-S-T-E-D, case-control study. In
11 other words, we want to conduct a case-control study
12 nested within the cohort.

13 Q. Now, is a nested case-control study aimed, in
14 my hypothetical, at trying to either confirm or deny
15 some relationship between chemical X and renal cell
16 carcinoma?

17 A. Exactly.

18 Q. Okay.

19 A. That -- because in a case-control study, we are
20 not talking about tens of thousands of workers anymore.

21 We are talking about a number much smaller than that.

22 Let's say in that hypothetical example you have, we
23 have, let's say, just for the sake of discussion, 50
24 renal cell carcinoma, 50 cancers that we're interested
25 in. We would have twice or three times that many

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1 controls, okay? People without the cancer, but from the
2 same cohort. So, we are talking about 2-, 300 study
3 subjects altogether.

4 And so you can see it is more practical, it is
5 feasible, to do exposure assessment on the few hundred
6 people than on tens of thousands of workers.

7 Q. Have you ever recommended something like that
8 to your sponsors?

9 A. Depending on the studies, yes, we have. Yes, '
10 we have.

11 Q. Okay. Now, in what year did you begin your
12 practice of epidemiology? Would it have been in 1975?

13 A. I was a graduate student from 1972 to 1975. To
14 some extent, I practiced epidemiology as a student.

15 But, I mean, there was no full-time job. My full-time
16 job started in 1975, after I graduate.

17 Q. All right. Let's talk about your first job
18 after you completed your graduate studies. Who was that
19 with?

20 A. My first job?

21 Q. Yes, sir.

22 A. I was professor at -- assistant professor at
23 the Division of Epidemiology and Biostatistics in the
24 School of Medicine at Georgetown University -

25 Q. And for how long?

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1 A. -- in Washington, D.C.
2 For three years. 3 MR. STEWART: Delightful school, isn't it,
4 Dear?
5 MS. STEWART: Yes, it is.
6 THE WITNESS: The what?
7 MR. STEWART: She went to -
8 MS. STEWART: I spent a summer there.
9 MR. STEWART: -- summer school at Georgetown.
10 THE WITNESS: It's a good school. It's still a
11 good school, even though I left them.
12 MR. STEWART: Well, I mean, it's not as good
13 now, but...
14 Q. So, you were at Georgetown from '75 until '78?
15 A. Yes.
16 Q. And during that time, were you only going to
17 the classroom every day and teaching students, or were
18 you also doing epidemiological studies for sponsors?
19 A. You know by now that professors don't go to
20 class every day. Only students do.
21 Q. Well, that's true. I apologize for that.
22 A. We don't teach every day. I did teach both
23 graduate students and medical students. But we also do
24 research. We also did research.
25 Q. Okay. What research did you do while you were
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1 at Georgetown?

2 A. I did a lot of research under my boss.

3 Q. Who was your boss?

4 A. My boss at that time was Dr. Chiazze.

5 C-H-I-A-Z-Z-E.

6 Q. Oh, really? Hmm.

7 All right. Did outside companies, industry
8 groups, trade organizations and so forth, come to the
9 Georgetown University between '75 and '78 and ask the
10 Epidemiological Department to conduct studies for them?

11 A. I believe so, yes.

12 Q. Do you recall who any of those organizations or
13 industries were or any of the compounds that you
14 studied?

15 A. I only remember one -- one group, Motor Vehicle
16 Manufacturers Association. I believe that was -- yeah,
17 that was the name of that group. And that was a project
18 that Dr. Chiazze had even before I joined his
19 department. But I was asked to work in that project. I
20 don't even -- I don't even remember any details of the
21 project. I only remember the name of the sponsor.

22 Q. All right. Were you studying the question of
23 whether chemical X causes disease Y for the motor
24 vehicle people?

25 A. We were trying to find out, I believe, the

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1 cancer experience of the workers in that industry. But
2 I'm not sure we have any specific chemicals in mind.
3 Q. And this was funded by this organization, Motor
4 Manufacturers Association?
5 A. Motor Vehicle Manufacturers Association.
6 Q. Did they fund it?
7 A. I believe so.
8 Q. Is that the only one you remember?
9 A. That's the only sponsor I remember.
10 Q. All right. Is that the only study that you
11 remember while you were at Georgetown?
12 A. We also did some clinical trials of medication.
13 Not occupational health, but pharmaceutical projects.
14 Q. When you left Georgetown University, your next
15 job was what?
16 A. I worked for a very short period of time --
17 Q. I'm sorry?
18 A. I worked for a very short period of time at a
19 place called Equitable Environmental Health, outside of
20 Washington. For only a few months.
21 Q. That's for a few months during what, the year
22 of 1978 or --
23 A. '78, yes. The end of '77 and '78.
24 Q. All right. Tell me what your job title was.
25 A. I was the manager for the epidemiology program.
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1 Q. And the office that you worked in was located
2 where?

3 A. Is located outside of Washington, D.C.

4 Q. In Rockville, Maryland?

5 A. Rockville, yes.

6 Q. And who were some of the other epidemiologists
7 or medical doctors that worked with you during that few
8 months during 1977 and '78 at Equitable Environmental
9 Health?

10 A. My boss at that time was Dr. Michael Utidjian,
11 U-T-I-D-J-I-A-N.

12 Q. Now, when Dr. Michael Utidjian left Equitable
13 Environmental Health, where did he go to work?

14 A. He got a job with, I believe, a chemical
15 company.

16 Q. Union Carbide?

17 A. Union Carbide, that's right. He became an
18 associate medical director for Union Carbide.

19 Q. All right. While you were working for the few
20 months at Equitable Environmental Health in 1977 and
21 1978, did you have any business dealings or did you do
22 any work with Dr. Tabershaw and Gaffey?

23 A. No. 24 Q. How about Dr. Tabershaw? 25 A. No.

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1 Q. How about Dr. Cooper?

2 A. No.

3 Q. Okay. Did you do any work during those few
4 months that you were at Equitable Environmental Health
5 on vinyl chloride?

6 A. I don't believe so, no.

7 Q. And during the few months that you were at
8 Equitable Environmental Health, did you do any work that
9 was being sponsored by the Chemical Manufacturers
10 Association?

11 A. That I don't remember.

12 Q. Do you remember what work you did perform
13 during the few months that you were with Equitable
14 Environmental Health?

15 A. I believe we wrote a lot of proposals, try to
16 get the business going, and I also worked on what they
17 call at that time the NIOSH criteria document.
18 Equitable Environmental Health Associates at that time
19 had a number of criteria document projects from NIOSH,
20 and I basically looked at the epidemiologic studies for
21 those programs.

22 Q. Who owned Equitable Environmental Health?

23 A. The Equitable Insurance Company.

24 Q. Equitable Insurance Company?

25 A. Yes.

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1 Q. And during those few months, were you an
2 employee who was paid a monthly salary for your services
3 to Equitable Environmental Health?

4 A. Yes.

5 Q. All right. When you left Equitable
6 Environmental Health in Rockville, Maryland, where did
7 you next go to work?

8 A. I worked for Dr. Tabershaw.

9 Q. Where?

10 A. Actually, also in Rockville, Maryland.

11 Q. Dr. Irving Tabershaw?

12 A. Yes.

13 Q. Did he call his business at that time TCA?

14 A. No.

15 Q. What did he call his business?

16 A. I guess the official name was Tabershaw
17 Occupational Medicine Associates.

18 Q. And how long did you work in Rockville,
19 Maryland for Dr. Tabershaw's business?

20 A. I would say almost two years.

21 Q. And during the two years that you were working
22 for Dr. Tabershaw in Rockville, Maryland, can you tell
23 me the names of any chemical compounds you did studies
24 on?

25 A. We started to do some research on benzene.

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1 That was one of the major programs that I -- that I
2 manage.

3 Q. Who was the sponsor of that study?

4 A. The project was sponsored by both American
5 Petroleum Institute, API, and also by the Chemical
6 Manufacturers Association, CMA.

7 Q. I've heard you use the term "CMA" several
8 times. What is CMA?

9 A. CMA stands for Chemical Manufacturers
10 Association. It is an association whose members are, I
11 would say -- most of them would be chemical companies.

12 Q. Well, what does this association do?

13 A. I don't know that association that well. I
14 only know one aspect, and that is they sponsor
15 epidemiologic studies of chemical workers of their
16 member companies from time to time. That's the extent
17 of my knowledge of CMA.

18 Q. Did you know who was the president of CMA
19 during the two years that you worked for Dr. Tabershaw
20 in Rockville, Maryland?

21 A. I have no knowledge.

22 Q. And do you know what plants -- were you doing
23 studies on employees at particular plants who were
24 getting benzene exposure?

25 A. We were in what we call the design stage of the
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1 program. We want to find out where can we get enough

2 people to do a study of workers exposed to benzene.

3 Q. Okay. Is that all that you did during the

4 whole two years that you worked for Dr. Tabershaw?

5 A. No. We did not do the project for two years.

6 That was one of the projects that took up a lot of time

7 during that period of time.

8 Q. Okay. What else did you do?

9 And this was paid for, so far as you know, by

10 API and CMA?

11 A. Yes.

12 Q. Okay. And what else did you do while you were

13 there with Dr. Tabershaw?

14 A. Dr. Tabershaw or his group was, I guess, what

15 he would call external medical director to a number of

16 small companies. Those companies did not have their own

17 medical directors, so they'd hired Dr. Tabershaw as

18 their external medical director. And a lot of health

19 data collected on a routine basis for those companies,

20 and I analyzed some of those data.

21 Q. Do you recall the chemical compounds that were

22 involved in the studies that you did for these companies

23 for which Dr. Tabershaw was the external medical

24 director?

25 A. No, I do not.

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1 Q. Do you recall other projects that you worked on
2 during the two years that you were working for
3 Dr. Tabershaw in Rockville, Maryland?
4 A. That's -- that's pretty much it.
5 Q. And the studies that you were doing for the
6 companies for whom Dr. Tabershaw was the external
7 medical director, were those companies paying
8 Dr. Tabershaw's company for Dr. Tabershaw's services and
9 for your services?
10 A. Yes.
11 Q. Okay. After two years with Dr. Irving
12 Tabershaw in Rockville, Maryland, what was your next
13 job?
14 A. I was con --
15 I thought were you saying something.
16 MR. COLBERT: No.
17 THE WITNESS: I was contacted by someone from
18 the Biometric Research Institute in Washington, D.C.
19 His name is Frank Hurley. And Frank wanted me to start
20 occupational epidemiology at his organization.
21 MR. STEWART: Q. Are you saying E-A-R-L-Y?
22 A. Hurley.
23 Q. Hurley. Oh, Hurley?
24 A. H-U-R-L-E-Y.
25 And I said fine. So, I joined them and tried

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1 to start a program of occupational epidemiology at
2 Biometric Research Institute.

3 Q. How long were you there?

4 A. I was there for maybe a year or so, until I
5 have a proposal that I could not refuse.

6 Q. Specifically, what did you do while you were
7 working for Frank Hurley?

8 A. Well, Biomedical -- Biometric Research
9 Institute, at that time they specialized in clinical
10 trials. They were not in the business of doing
11 occupational epidemiologic research, but they want to
12 get into that area. So, they hire me, try to develop
13 that area.

14 But it takes more than just a couple years to
15 do that, and before we really get things going, somebody
16 in California contact me and wanted me to come out to
17 California, and that's what I did.

18 Q. Out of curiosity, did Mr. Hurley's company ever
19 expand into occupational epidemiological or
20 environmental work?

21 A. Not in any substantial way, no.

22 Q. Okay. All right.

23 After you left Mr. Hurley, your next job was
24 what?

25 A. As I described this morning, in 1981, I came

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1 out to California and started a company to do contract
2 research in occupational and environmental health with a
3 number of scientists.

4 Q. Okay. I heard so many names I don't remember
5 the name of the company. What was the name of the
6 company?

7 A. The name of the company at that time was
8 Environmental Health Associates.

9 Q. And it was located where?

10 A. We moved several times. At that time, it was
11 located adjacent to U.C. Berkeley's campus because one
12 of the principals at the -- at the organization, at that
13 time, he was a professor at U.C. Berkeley.

14 Q. And the other places besides Berkeley that you
15 were located were what?

16 A. Later on we moved to Oakland, California.

17 Q. Oakland?

18 A. Yes. And then later on, we moved to -- we end
19 up in Alameda, California.

20 Q. Okay. Oakland -- are Oakland and Alameda close
21 together?

22 A. Very much so.

23 Q. All right. Did the same group of individuals
24 remain together as Environmental Health Associates after
25 the company moved from Berkeley to Oakland?

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1 A. Okay. Depends on what you mean by the group of
2 people. We started with four partners or principals or
3 whatever you call -- call them. One left shortly after
4 we -- we -- must have left in 1982 or something like
5 that. But the three of us, Dr. Morgan, Dr. Whorton, and
6 myself, we remained the principals of Environmental
7 Health Associates for a long time.

8 Q. Who left?

9 A. Dr. Milby.

10 Q. All right. Now, while Environmental Health
11 Associates was headquartered in Berkeley, that would
12 have been 1981 through

13 A. I have no idea. I don't remember.

14 Q. A couple of years or --

15 A. More than a couple years.

16 Q. All right. Tell me the work that Environmental
17 Health Associates performed during the years that it was
18 located in Berkeley. What chemical compounds did you
19 study? What sponsors did you perform work for and
20 things of that nature?

21 A. I cannot tell you exactly the things that we
22 did if you limit that to the Berkeley address because I
23 don't remember when we moved from Berkeley to Oakland.
24 But if you ask the general question what we did at
25 Environmental Health Associates, you make life a lot

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1 easier.

2 Q. Let's make life a lot easier. With regard to
3 everything that Environmental Health Associates did
4 while you were affiliated with Environmental Health
5 Associates, what did you do?

6 A. Well, I can give you whatever I can remember at
7 this point. We actually conduct the benzene study that
8 I started when I was at Tabershaw.

9 Remember when I was at Tabershaw -

10 Q. Uh-huh.

11 A. -- we were looking how to do a study,
12 basically? We didn't actually do the study, but we
13 wanted to find out which company would have enough
14 exposed workers to do that -

15 Q. Okay. Who hired you after you went with
16 Environmental Health Associates to do this benzene
17 study?

18 A. CMA.

19 Q. CMA?

20 And was it a study of a number of workers at a
21 number of plants?

22 A. Yes.

23 Q. Okay. All right. Now, in addition to a
24 benzene study sponsored and paid for, I assume, by
25 CMA -- is that correct?

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1 A. Well, when you say "sponsored," that means paid
2 for by CMA.
3 Q. Oh. Oh. Okay.
4 What else? What other jobs did Environmental
5 Health Associates work on while you were affiliated with
6 them?
7 A. If I remember, we did a study in Fresno County,
8 looking at leukemia and stomach cancer in relation to
9 underground water.
10 Q. Underground water that had been polluted with
11 what compound?
12 A. With a pesticide called DBCP.
13 Q. DBCP?
14 A. Yes.
15 Q. Started out to be a compound to kill nematodes
16 and ended up being a male contraceptive.
17 Do you recall that?
18 A. Well --
19 MR. COLBERT: Objection. Form.
20 THE WITNESS: Well, it impairs reproductive
21 function in males.
22 MR. STEWART: Q. It rendered people completely
23 azoospermic, too. Do you recall that?
24 MR. COLBERT: Objection. Form.
25 THE WITNESS: .I did not do those studies.
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1 MR. STEWART: Q. What else did Environmental
2 Health Associates -- well, let me back up.
3 Who paid Environmental Health Associates for
4 doing the underground water DBCP studies?
5 A. I believe that was sponsored by Shell Chemical
6 Company.
7 Q. Dow didn't chip in and help pay that bill?
8 A. I don't think so. I'm not sure, but I don't
9 think so.
10 Q. Okay. What other work did you do?
11 A. We did a number of petroleum refinery studies,
12 some for Chevron and some for Mobil.
13 Q. On benzene?
14 A. No, just refinery studies in general.
15 Q. And if you did the work for Chevron, they paid
16 your bill. If you did the work for Mobil, they paid
17 your bill; is that correct?
18 A. That's only fair.
19 Q. Well, I agree. I mean, Mother Theresa didn't
20 pay your bill. Shell -- or I mean Chevron or Mobil did?
21 MR. COLBERT: Objection. Form.
22 THE WITNESS: Is there a question?
23 MR. STEWART: Yes.
24 MR. COLBERT: Same objection.
25 THE WITNESS: Whoever --
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1 MR. STEWART: Q. All right. What other work
2 did you do?
3 Forget it.
4 A. We did a study of workers exposed to gasoline,
5 an industry wide study for API.
6 Q. Okay. API was the sponsor of the gasoline
7 study?
8 A. Yes.
9 Q. All right. And what other work did you do
10 while you were affiliated with Environmental Health
11 Associates?
12 A. We did a study for a paper-product
13 manufacturer, the Mead -- M-E-A-D -- the Mead
14 Corporation.
15 Q. What were you studying for the paper
16 manufacturing company?
17 A. Basically, we studied the mortality patterns of
18 their employees at pulp and paper mills.
19 Q. You did it not with an eye toward any
20 particular chemical compounds?
21 A. We didn't have any specific compounds in mind.
22 But we did analyze the data by different craft,
23 different job title and so on. And if we see an excess,
24 then we try to go back and link to certain exposure.
25 Q. Who else did you perform work for while you
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1 were affiliated with Environmental Health Associates?
2 A. Oh, we did a study for the International Lead
3 and zinc Research Organization. It's a cohort study of
4 workers exposed to lead.
5 Q. Okay. The international organization was the
6 sponsor of the study?
7 A. Yes.
8 Q. Where was that organization headquartered?
9 A. Someplace in North Carolina, I think. I'm not
10 sure. North Carolina, in Research Triangle Park.
11 Q. Okay. North Carol --
12 A. I'm not sure about the address.
13 Q. Is International Lead and Zinc a group of
14 manufacturing entities?
15 A. It's an industry association.
16 Q. Okay. And your studies were confined to lead
17 and zinc, or just to lead?
18 A. I told you, we study workers exposed to lead.
19 I didn't say zinc.
20 Q. Oh. That's just the name in the organization?
21 A. But our study concerns lead only.
22 Q. Concerned lead. Okay.
23 What other work did you do while you were
24 affiliated with Environmental Health Associates?
25 A. I think those are the major ones that I can

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1 remember.

2 Q. Okay. Did you not do any work on vinyl
3 chloride monomer while you were affiliated with
4 Environmental Health Associates?

5 A. Of course I did. That's the one that I forgot,
6 yes. We talk about the study that we talk about this
7 morning. In the mid 1980s, yes, we did that study. The
8 vinyl chloride study.

9 Q. And you were hired by CMA to do that?

10 A. Yes.

11 Q. Any other studies you can think of while you
12 were affiliated with the organization known as
13 Environmental Health Associates?

14 A. That's the ones I can remember now.

15 Q. All right. Do you recall where you were
16 working when you were first called upon to render an
17 opinion in a lawsuit?

18 A. Probably around mid 1980s.

19 Q. So, that would have been while you were
20 affiliated with Environmental Health Associates?

21 A. Yes.

22 Q. All right. And what was that first lawsuit
23 about?

24 A. I think that case was a -- someone who used
25 Chevron's product, and supposedly, the product contained
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1 a certain amount of benzene in it.
2 Q. And was somebody killed, somebody develop
3 leukemia or a blood disorder or what?
4 A. The plaintiff developed a form of leukemia.
5 Q. And who hired you to get involved in that
6 lawsuit?
7 A. Somebody by the name Janssen, J-A-N -- either
8 J-A-N-S-E-N or whatever.
9 Q. Mr. Janssen a lawyer?
10 A. Yes.
11 Q. Was Mr. Janssen representing Chevron?
12 A. Yes.
13 Q. And did you give your deposition in that case?
14 A. I don't think I -- I don't think I gave a
15 deposition. I did testify --
16 Q. You went to court and testified?
17 A. Yes, yes.
18 Q. And where was that case tried?
19 A. In Portland, Oregon.
20 Q. Okay. Tell me the next lawsuit in which you
21 were hired to express a -- an expert opinion.
22 A. I don't remember the next one. I mean, I don't
23 remember which is my next one.
24 Q. Okay. Well, forget the sequence. Just tell me
25 another one while you were still affiliated with
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1 Environmental Health Associates. If there was one.

2 Maybe there wasn't one. '

3 A. When I was at Environmental Health Associates,
4 from time to time I worked with attorneys to help them
5 in litigation matters. And most of the litigations
6 would concern benzene or petroleum products because by
7 that time, we were doing a lot of studies on that
8 subject.

9 Q. Were you always asked to get involved in
10 benzene litigation by lawyers who were representing
11 industry?

12 A. Defendants, yes.

13 Q. When you entered into your contract with CMA to
14 do vinyl chloride studies, do you recall who the
15 president of the Chemical Manufacturers Association was?

16 A. No, I don't.

17 Q. Did you ever know a person by the name of Carol
18 Stack?

19 A. Yes.

20 Q. And who is or was that?

21 A. She was what they call a program manager at
22 CMA.

23 Q. Did you know Kenneth Johnson?

24 A. No.

25 Q. During the time that you were affiliated with

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1 Environmental Health Associates and you were working on
2 the vinyl chloride study, did you have an opportunity to
3 meet persons who worked for some of the vinyl
4 industries, who were members of the CMA?

5 A. No.

6 Q. For example, did you ever get to meet Ted
7 Torkelson?

8 A. I know of him, but I did not have any meeting
9 with him on that project.

10 Q. Did you ever meet with him on any project?

11 A. I must have met him in meetings, some other
12 meetings, because I remember seeing him maybe once or
13 twice in my lifetime.

14 Q. Do you recall having any meetings concerning
15 vinyl chloride with Nick Wheeler from Union Carbide?

16 A I don't know the person.

17 Q. You were acquainted with Dr. Gaffey, I assume.

18 A. From the old days, yes.

19 Q. His first name, is it William or Bill?

20 A. Goes by either way.

21 Q. Bill Gaffey? You knew him from the old days
22 when he worked for TCA?

23 A. Tabershaw/Cooper Associates, yes.

24 Q. When he left Tabershaw/Cooper Associates, he
25 went to work where?

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1 A. Monsanto.
2 Q. Monsanto?
3 A. Yes.
4 Q. Did you continue to have contacts with Bill
5 Gaffey after he went to work at Monsanto?
6 A. Not really, no.
7 Q. Do you recall any of the individuals from
8 B.F. Goodrich who were involved in the Vinyl Chloride
9 Task Force?
10 A. I never met them.
11 Q. You never met any of the B.F. Goodrich people?
12 A. No.
13 Q. Mr. McCormick?
14 A. No.
15 Q. Dr. D-I-E-T-Z, Dietz?
16 A. I don't recall those people at all. I don't
17 know them.
18 Q. All right. We've talked about one lawsuit.
19 Tell me about another lawsuit in which you were asked
20 to -- well, you said a number of benzene cases.
21 Do you recall specifically any cases during
22 your Environmental Health days in which you were called
23 upon to be an expert witness and you actually gave a
24 deposition or went to court and testified?
25 A. I did, but I just don't recall any specifics at

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1 this point. I don't remember the name. I don't -- I
2 told you I worked with attorneys on a number of cases
3 related to benzene exposure.
4 Q. Okay. Do you know how many times you testified
5 in court while with Environmental Health Associates --
6 Environmental Health Associates? Do you know how many
7 times during your Environmental Health Associates years
8 you actually went to court and testified?
9 A. I don't have that number.
10 Q. More than one?
11 A. Oh, I'm sure it was more than one.
12 Q. Well, I'm sure it wasn't as many as a hundred.
13 Was it as many as five?
14 A. More than five.
15 Q. Ten?
16 A. More than 10 most likely.
17 Q. Fifteen?
18 A. I'm not sure about that now.
19 Q. Between 10 and 15?
20 A. Around that number, I would say.
21 Q. All right. And on the 10 to 15 occasions that
22 you appeared as an expert witness in your Environmental
23 Health Associates days, you were always employed by the
24 defendant; is that correct?
25 A. I was retained by the defendants.
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1 Q. Okay. Now, when you were asked during your
2 Environmental Health Associate years to work in a
3 lawsuit on behalf of a defendant, I assume you were
4 compensated for your time probably by some law firm,
5 were you not?

6 A. Environmental Health Associates, the company,
7 our company, received fee for the service.

8 Q. Okay. That's what I was going to get at. Even
9 though you were the individual who was called upon to
10 testify for the company, whatever fees you collected
11 from the defense attorneys went to Environmental Health
12 Associates as opposed to going to you individually?

13 A. I don't even collect the fee. The company --
14 we have a bookkeeper. She would send out an invoice to
15 the client and collect the fee.

16 Q. And the check for your services as an expert
17 witness for defendants would be made out to
18 Environmental Health Associates or to Otto Wong?

19 A. To Environmental Health Associates.

20 Q. Did the same thing apply if somebody asked,
21 say, Dr. Whorton to appear as a witness, and he was paid
22 by some law firm, and the law firm sent the money in?

23 It would go to Environmental Health Associates as
24 opposed to Dr. Whorton?

25 A. It better be that way. If I did it that way,

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1 my partner better did the same.
2 Q. Well, I would think so, too.
3 A. You have something to tell me? I still know
4 Don. I'm going to call him up tonight and find out.
5 Q. I promised I wouldn't tell.
6 A. Are you implying something?
7 Q. Yes.
8 After -- when did you leave the business known
9 as Environmental Health Associates, or when did it
10 dissolve or whatever happened to it?
11 A. Well, as I stated this morning, in 1987,
12 Environmental Health Associates became a division of
13 ENSR Health -- ENSR Company, and the division is called
14 ENSR Health Sciences, E-N-S-R.
15 Q. E-N-S-R?
16 A. Right. Yes. An environmental engineering
17 company headquartered in Houston.
18 Q. Okay. Let me get this straight.
19 In 1987, Environmental Health Associates became
20 merged with E-N-S?
21 A. R.
22 Q. E-N-S-R? `
23 A. Right.
24 Q. Is that what happened?
25 A. Yes. That's what I told you.
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1 Q. But you -- did you continue doing business as
2 Environmental Health Associates but now, comma, "a
3 subsidiary of ENSR," or did you just do business as
4 ENSR?

5 A. We did business as ENSR. I told you we became
6 a division of ENSR.

7 Q. Are you still working for ENSR?

8 A. Today?

9 Q. Uh-huh.

10 A. No.

11 Q. When did you leave ENSR?

12 A. I guess I to have repeat everything that I
13 discussed this morning.

14 Q. Yes, that's probably true.

15 A. I left in 1990.

16 Actually, at the beginning of the deposition,
17 when you start asking me question, you said you would
18 only repeat three questions.

19 Q. Where did you go when you left ENSR, or what
20 business did you become affiliated with?

21 A. After I left ENSR in 1990, I started my own
22 group in 1991. I started Applied Health Sciences.

23 Q. And you're the sole proprietor of that
24 business?

25 A. I wish. My wife owns half of that.

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1 Q. And is that the name that you operate under up
2 until today?
3 A. Yes.
4 Q. Now, during the ENSR years, who was the head of
5 the main office in Houston?
6 A. I'm sorry, I don't remember the name.
7 Q. Did you know anybody from ENSR who worked in
8 the Houston office?
9 A. Yes. We -
10 Q. Who?
11 A. I don't remember the names.
12 Q. What kind of services did ENSR provide?
13 A. They are really big on environmental
14 engineering projects, and I assumed that they wanted to
15 get into the health aspects of environmental problems,
16 and that's why they want us to join them.
17 Q. All right. While you were affiliated with
18 ENSR, did you perform work in the nature of
19 epidemiological studies?
20 A. Yes.
21 Q. Do you recall the name of either the compounds
22 that you studied or the sponsors of any of the jobs that
23 you worked on while you were with ENSR?
24 A. When I answered your question earlier what I
25 did at Environmental Health Associates, I really did not

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1 make any distinction between ENSR and Health --
2 Environmental Health Associates. So, all the projects
3 that I told you, some of those projects I actually did
4 as an ENSR employee.

5 Q. Okay. They were carried -- some of those
6 projects were carried forward from Environmental Health
7 Associates into the new company, ENSR, of which
8 Environmental Health Associates was a division?

9 A. Yes.

10 Q. Were there any additional projects which you
11 have not told me about that you recall working on during
12 the years that you were affiliated with ENSR?

13 A. I'm sure I left out some projects. I just
14 don't remember all of them at this point.

15 Q. All right. Well, did you -- did you perform
16 epidemiological studies for them over and above -- not
17 for them, but on -- as -- as an employee of the company,
18 over and above the environmental projects which you have
19 already discussed? I mean epidemiological projects.
20 I'm sorry.

21 A. Well, we became a division of ENSR in 1987. So
22 we are talking about three years I was an employee of
23 ENSR. And I'm sure there's some projects we started new
24 from scratch one --

25 Q. Uh-huh.

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1 A. -- during that period of time. I just cannot
2 place a specific time on each project.
3 Q. All right. Can you tell me some of the
4 sponsors or companies that you worked for during that
5 three years?
6 A. No. I told you, the samples I gave you would
7 apply to the entire duration, ENSR as well as
8 Environmental Health Associates. I cannot put a date on
9 every project.
10 Q. Okay. Now, when you became Applied Sciences -
11 A. Applied Health Sciences.
12 Q. I'm sorry.
13 -- in 1990 -
14 A. In 1991.
15 Q. '91?
16 -- where was the office -- initial office of
17 Applied Health Sciences?
18 A. In San Mateo, California.
19 Q. Same place it is today?
20 A. Yes.
21 Q. And since you have been working as Applied
22 Health Sciences, have there been other professionals who
23 have worked in the company with you?
24 A. I have a number of part-time professionals who
25 work with me.

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1 Q. In other words, if you get a particular project
2 that requires a certain professional expertise, then you
3 will bring them in for that project?

4 A. It's more than that. The people that I work
5 with are also the people who used to work for me at
6 Environmental Health Associates. Subsequently, they
7 also left Environmental Health Associates and they
8 become part of my group.

9 Q. Okay. Who -- who is -- who are the people
10 that -- are there any individuals who are permanent
11 members of Applied Health Sciences, in addition to you?

12 A. I'm the only permanent -- I don't know what
13 that word means, in terms of a job. If I don't get
14 projects, even my job is not permanent. I'm a full-time
15 employee. Let's put it that way. I am the only
16 full-time professional at Applied Health Sciences. The
17 other professionals, how much I need them depends on
18 different projects, depends on different stages of the
19 projects.

20 Q. Now, since you have been operating as Applied
21 Health Sciences, have you performed any -- any work for
22 the Chemical Manufacturers Association?

23 A. No.

24 Q. When the bids went out for the follow-up study
25 after your 1991 study on vinyl chloride, did you make a

1 proposal?

2 A. No, I did not.

3 Q. And that would have been the -- the study that
4 was done by Mundt. You didn't apply -- I mean, you
5 didn't bid on that job?

6 A. I did not.

7 Q. Did you receive an offer to submit a proposal?

8 A. I don't know whether I received formal
9 announcement, but certainly I was made aware of that,
10 that CMA was looking for a group to update a study. I
11 don't remember whether I receive a package, you know,
12 the so-called RFP, request for proposal, from CMA.

13 Q. By that's the way it had worked in the past, is
14 that you would receive a request for proposal from CMA,
15 and you would make your proposal, Monson would make his
16 proposal, Michigan would make their proposal, and then
17 CMA would decide upon who to give the contract to?

18 A. Yes, almost correct, but not completely.

19 Q. I mean that -

20 A. I mean, CMA makes its own decision -

21 Q. Right.

22 A. -- whom to send the request for proposal to.

23 Q. That's my point. They don't -- they don't
24 invite the world. They narrow down a certain group to
25 whom they send their proposals or requests for

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1 proposals; is that correct?

2 A. That's -- that's correct.'

3 Q. All right. Now, since 1991, have you continued
4 doing studies such as the study you did that resulted in
5 your 1991 paper that was published? Whether it was on
6 vinyl chloride or some other compound.

7 A. Are you referring to epidemiologic studies?

8 Q. Yes, sir.

9 A. Of course I did.

10 Q. Have they mainly been benzene or some other
11 compound?

12 A. On benzene, on petroleum products. I updated
13 my pulp-and-paper study that I talked to you about.

14 THE REPORTER: I'm sorry. Your what paper?

15 THE WITNESS: Pulp and paper. For the Mead
16 Corporation.

17 I updated -- I updated lead study for the
18 International Lead and Zinc Association. I don't know
19 how many other studies that I have done. I have done a
20 lot of studies for the last 10 years.

21 MR. STEWART: Q. During the last 10 or 11
22 years since you've been working as Applied Health
23 Sciences, have all of your studies been updates, or have
24 you done any original cohort studies?

25 A. We did some original cohort studies, yes.

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1 Q. And after you became Applied Health Sciences,
2 did you continue, as in the past, to serve as a -- an
3 expert witness for law firms who were representing
4 defendants in cases involving some type of chemical
5 compound?

6 A. Yes, I have been.

7 Q. Do you know how many times in your career you
8 have been hired by a law firm representing a chemical
9 defendant to testify on behalf of the defendant?

10 A. I don't have that number.

11 Q. Would it be a hundred?

12 A. No.

13 Q. Be less than that or more than that?

14 A. What time period you're talking about?

15 Q. Your whole career.

16 A. My whole career. As I told you, I started
17 working with attorneys probably in the mid 1980s, and I
18 would say on the average -- are you talking about
19 testifying or just consulting or --

20 Q. No, I'm talking about being hired by a law firm
21 that is representing a company that has been sued, and
22 either you went so far as to give a deposition or you
23 went so far as to appear in court and testify, or maybe
24 you just got hired and wrote a report.

25 A. Or not a report at all.

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1 Q. Or not a report at all?

2 A. Sometimes, yes. And sometimes I'm retained and
3 look at some -- or talk to them for a little while, and
4 then the case went away.

5 Q. Okay.

6 A. I really don't have a number, but I would say I
7 spent about 25 to 30 percent of my time working in that
8 area, working with attorneys. Twenty-five to 30 percent
9 of my time.

10 Q. And would it be accurate to say that over the
11 last 15 or 20 years that 25 to 30 percent of your income
12 has been from law firms representing defendants in
13 lawsuits involving chemical compounds?

14 A. I would say probably less than that because the
15 other income that I generate from projects, those are
16 bigger projects, more long-term, much larger scale. And
17 also it involve more people in the study. So, I would
18 say the income from that would be disproportionately
19 larger.

20 Q. Have you ever been hired by a lawyer in your
21 career who was representing a plaintiff, and you
22 testified by deposition or in court that the plaintiff
23 died or was sick because of exposure to some chemical
24 compound?

25 A. I don't think that's a case of exposure to

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1 chemical compounds. I was hired by a plaintiff attorney
2 to talk about some study in a hospital, and I testified
3 by phone to a judge at a hearing. But I don't think
4 chemical was involved in that -- in that lawsuit.
5 Q. That's the only time you've been called upon by
6 a plaintiff to get involved in litigation?
7 A. There are a couple other cases that I was
8 retained, and I did some work for them, but it never
9 went as far as deposition or trial.
10 Q. Who were the lawyers?
11 A. I don't remember their names. That's some time
12 ago.
13 Q. What years?
14 A. Probably in the 19 -- late 1980s.
15 Q. Do you recall what compounds?
16 A. I remember one lawyer was from Las Vegas, and
17 the compound was some kind of solvents, cleaning fluid.
18 I -- I don't have the chemical name.
19 Q. And you never gave a deposition in that matter?
20 A. No.
21 Q. And did not testify in court?
22 A. No.
23 Q. Do you recall the name of the other plaintiff's
24 lawyer that -- that you did some work for?
25 A. The other one was some exposure -- I don't even

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1 remember the name of the exposure anymore -- developed
2 some pulmonary reaction. And there were some papers on
3 that subject, and I asked -- and I was asked to look at
4 those papers.

5 Q. Okay. But you were not called upon to give a
6 deposition or testify in court?

7 A. I don't think the case went that far. I think
8 the case was settled.

9 Q. Are those the only occasions when you have been
10 asked to get involved in litigation by the plaintiff?

11 A. Yes.

12 Can we take a short break?

13 MR. STEWART: Sure.

14 THE VIDEOGRAPHER: This marks the end of

15 Videotape No. 3 in the deposition of Dr. Otto Wong. The
16 time is 3:39. We're off the record.

17 (Recess taken: 3:39 p.m. until 3:53 p.m.)

18 THE VIDEOGRAPHER: This marks the beginning of

19 Videotape No. 4 in the deposition of Dr. Otto Wong. The
20 time is 3:53. We're back on the record.

21 MR. STEWART: Q. Dr. Wong, the initial CMA
22 vinyl chloride epidemiological study was done by
23 Dr. Gaffey, was it not?

24 A. The authors of the first report were

25 Dr. Tabershaw and Dr. Gaffey.

DEPOSITION OF OTTO WONG - VOLUME I

1 (Whereupon, Plaintiffs' Exhibit No. 1
2 was marked for identification.)
3 MR. STEWART: Q. I'm going to hand you what's
4 identified as Wong Exhibit No. 1 and ask you to take a
5 look at that.
6 Does this appear to be a document that was
7 submitted by Tabershaw/Cooper Associates in 1974,
8 "Epidemiological Study of Vinyl Chloride Workers," that
9 was submitted to the Manufacturing Chemists Association?
10 A. Yes.
11 Q. Now, in the initial study that was done, how
12 many persons were in the cohort?
13 A. I don't remember. I -- I mean, I to have look
14 at the paper for -
15 Q. If you look on page -- at the bottom, there's
16 some numbers, 1055, and you'll see -
17 A. Okay.
18 Q. -- "Summary"?
19 A. 1055. Yes. Yes.
20 Q. All right. How many people were in the
21 original cohort?
22 A. 8,384.
23 Q. And on that same page, under "Summary," the
24 major findings of the study were, and it lists six
25 things. Under No. 5 was one of the major findings:
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1 "Cancers of the liver (primarily angiosarcomas),
2 respiratory system, brain, and cancers of unknown
3 primary site, as well as lymphosarcoma..."_

4 A. Yes. Right.

5 Q. Did I read that correctly?

6 A. Yes.

7 Q. As I understand, angiosarcoma of the liver is a
8 disease process that affects the lining of the blood
9 vessels. Have you read that or heard that?

10 A. Yes.

11 Q. And angiosarcoma of the liver, of course, is a
12 very rare type of cancer, is it not?

13 A. Yes.

14 Q. Do you happen to know approximately how many
15 recorded cases in the United States there are each year
16 of angiosarcoma of the liver?

17 A. I don't have the exact number. Suffice to say
18 that it is a very rare condition.

19 Q. Would it be maybe 20 to 25?

20 A. I don't know the number.

21 Q. You've never seen the number?

22 A. I must have seen those numbers, but I don't
23 remember the numbers.

24 Q. All right. In the major finding No. 5, it says
25 cancers of the liver, and it doesn't really break out

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1 angiosarcoma of the liver from the other types of liver
2 cancer, does it?

3 A. No, it did not. In fact, this morning I
4 testified that we -- I believe we were the first one to
5 break angiosarcoma down -- I'm sorry -- to break down
6 liver cancer into angiosarcoma and nonangiosarcoma liver
7 cancer.

8 Q. Does angiosarcoma-type cancer attack organs
9 other than the liver?

10 A. That I don't know.

11 Q. You've never read that or heard that?

12 A. I did not look into that.

13 THE REPORTER: I'm sorry. You did not -

14 THE WITNESS: I did not look into that.

15 MR. STEWART: Q. But suffice it to say,
16 livers -- livers? -- cancers of the liver are much more
17 apt to be some disease process other than angiosarcoma?
18 Is that accurate?

19 A. In the general population?

20 Q. Yes, sir.

21 A. Yes.

22 Q. Directing your attention over to page 1069, on
23 the copy that I gave to you, did I do some underlining?

24 A. Yes.

25 Q. Okay. Read to me what I underlined. I meant

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1 to keep the underline, but I gave it to you.
2 A. Why don't I switch copies with you?
3 Q. Okay. Here.
4 Okay. At the top of 1069, the folks who are
5 working on the initial vinyl chloride study for CMA once
6 again make the -- make a statement that refers to brain
7 cancer and say that, "About 40 percent of the observed
8 deaths were due to brain cancer."
9 Do you see that sentence at the top?
10 A. Yes.
11 Q. And then it goes on, "In the general male
12 population, about 22 percent of this category is due to
13 brain cancer..."
14 Do you agree with that statement?
15 A. I don't know what "this category" refers to.
16 Q. All right. "...so that not only is the
17 mortality from this cause excessive, but brain cancer is
18 over represented."
19 Was that the finding that was made in this
20 initial study that was given to the CMA?
21 A. Yes.
22 Q. Now, on page 1085 -- well, I don't have it.
23 This is Table 14 in this report, and it is talking about
24 other malignancies. Would you read off to me those
25 diseases which you believe to be brain tumors? Because
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1 some of them have -- they have different names, and I
2 don't know whether they're talking about brain tumor or
3 what.

4 A. Some of these may be brain tumors, by what it
5 says there -- but the I.C.D. coding, assuming that that
6 was done correctly, that was not labeled as brain cancer
7 because the I.C.D. coding, if you read the heading, it
8 would be 190 to -- I can't read that. I'm sorry.

9 Q. But these diseases over here -- I'm reasonably
10 sure that malignant melanoma of the back is not a brain
11 tumor.

12 But here we have "brain tumor (carcinoma)," and
13 then "astrocytoma malignant." Is that a brain tumor?

14 A. Yes, sir.

15 Q. "Carcinoma of the brain." Is that a brain
16 tumor?

17 A. Yes, sir.

18 Q. "Brain tumor glioblastoma multiforme." Is that
19 brain tumor?

20 A. Yes, sir.

21 Q. "Brain tumor, malignant." I guess that's a
22 brain tumor?

23 A. Uh-huh.

24 Q. "Brain tumor, malignant." And I believe that's
25 all.

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1 So, those were the names of the various brain
2 tumors that were recorded in the initial report that was
3 made by Tabershaw/Gaffey to the Chemical Manufactures
4 Association --

5 A. Yes.

6 Q. -- was it not?

7 THE REPORTER: Is there a page missing from
8 this, then?

9 MS. STEWART: Not from the one we have marked.

10 MR. STEWART: I'll find it. Yes, there is.

11 THE WITNESS: The page is not missing.

12 (displaying)

13 (Whereupon, Plaintiffs' Exhibit No. 2

14 was marked for identification.)

15 MR. STEWART: Q. I'm now handing to you what's

16 identified as Wong Exhibit No. 2, and what does that
17 purport to be, Dr. Wong?

18 A. The title --

19 MR. COLBERT: I'm sorry. Just for a matter of

20 housekeeping, I believe we've already had Exhibits 1

21 through 9 this morning. Are we duplicating numbering

22 systems this afternoon?

23 MR. STEWART: The what?

24 MS. STEWART: We already did 1 through 9. Or

25 did you want to call it PX 1 and PX 2?

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1 MR. STEWART: Yes, this is PX 2.
2 Q. What does this Exhibit PX 2 purport to be,
3 Dr. Wong?
4 A. It is a mortality study of B.F. Goodrich
5 workers.
6 Q. All right. And this was done by whom?
7 A. By Tabershaw/Cooper Associates.
8 Q. Okay. This report is dated May 17, 1974.
9 Would Dr. Gaffey have still been with Tabershaw/Cooper
10 Associates?
11 A. I don't know.
12 Q. You don't know that?
13 A. I don't know the exact date when Dr. Gaffey was
14 there.
15 Q. Okay. If you will use the Bates stamp numbers
16 up on the -- these long numbers -- and I'll just give
17 you the last three digits. 014. 014, which happens to
18 be page 11.
19 A. I got it.
20 Q. You got it?
21 In the very last paragraph, this document is
22 talking not about the Gaffey cohort, but it's talking
23 strictly about B.F. Goodrich employees, is it not?
24 A. According to the title, this is about
25 B.F. Goodrich workers.

1 Q. Okay. And at the bottom of page 11:
2 "Specific organs in which Louisville
3 appears to have contributed more than its
4 'share' of 38 percent of the cases of
5 malignant neoplasm include the digestive
6 organs and peritoneum, the liver, genital
7 organs and possibly the brain."

8 Do you see that?

9 A. Yes.

10 Q. Okay. And then over on page -- at the bottom
11 of the page 15, does this report, in talking about
12 Table 10, there in the very last paragraph, make the
13 finding as to just the Goodrich workers:

14 "While the number of cases is not large,
15 the trend is evident within certain
16 neoplasm groups, including neoplasms of the
17 digestive tract and peritoneum, the liver
18 and the brain."

19 Is that what it says?

20 A. That's what it says.

21 Q. All right. And then on page -- using the Bates
22 stamp number 023, because I can't read the number at the
23 bottom of the page. It's the page that's the
24 discussion.

25 Do you see that?

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1 A. Yes.

2 Q. All right. In the last paragraph, in the
3 second sentence, does the report say this:

4 "All companies should be alert to the
5 likelihood that angiosarcoma is not the
6 only effect which may be alleged to result
7 from occupational exposures to vinyl or
8 polyvinyl chloride."

9 Did I read that correctly?

10 A. Yes.

11 Q. Now, on page 056, "Addendum" -- do you find
12 that?

13 A. Yes.

14 Q. What would an addendum mean when attached to a
15 document such as this?

16 A. I don't know. The word itself means they add
17 something afterwards.

18 Q. Well, it says, "Since this report was typed."
19 would that -- would this mean that since the
20 original data was gathered and the original report was
21 typed, then this new information comes in, and so we're
22 putting it in the addendum?

23 A. That's what it says.

24 Q. Okay. And does it say that, in the second
25 paragraph there, that one of the things that came in --

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1 well, the things that came in were two additional death
2 certificates, and one was on James Leonard Morris, who
3 was employed for two and a half years as a chemical
4 helper, terminating on September 11, 1952. "The death
5 certificate indicates that Morris died of glioblastoma
6 multiforme on May 17, 1970 at age 43."

7 Is glioblastoma multiforme a brain tumor?

8 A. Yes.

9 Q. Now, on page 099, Table 4, "Malignant
10 neoplasms, brain." For the B.F. Goodrich Louisville
11 plant, there are four listed in this document, are there
12 not?

13 A. Yes.

14 Q. In other words, this astrocytoma, that is a
15 form of brain tumor, is it not?

16 A. Yes.

17 Q. Okay. And is it your recollection that this
18 B.F. Goodrich plant in Louisville, Kentucky, is the
19 plant where the report was written by Dr. Creech
20 concerning three employees being diagnosed with
21 angiosarcoma of the liver?

22 A. Yes.

23 Q. Kind of where the story broke, so to speak?

24 Isn't that what you said this morning, or something to
25 that effect?

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1 A. Yes.

2 Q. When you were doing these epidemiological
3 studies for CMA, were you required to periodically draft
4 these interim reports before you finished your final
5 draft?

6 MR. COLBERT: Objection. Form.

7 THE WITNESS: I don't remember the specific
8 project, this -- the vinyl chloride project that we had
9 with CMA. In some projects we do have to write periodic
10 progress reports. Basically, tell the sponsor -- I
11 mean, give the information to the sponsor to let them
12 know whether we are on schedule or not. But routinely,
13 we would not analyze -- we would not put any analysis in
14 the report -- in those reports themselves. We would say
15 we are at a stage of analysis or we are at a stage of
16 getting death certificate or whatever. But we would not
17 report results in those progress reports.

18 (Whereupon, Plaintiffs' Exhibit No. 3

19 was marked for identification.)

20 MR. STEWART: Q. Okay. I'm going to hand you
21 what's identified as Wong Exhibit No. 3 and ask you what
22 that purports to be.

23 A. This is "Epidemiologic Study of Vinyl Chloride
24 Workers," dated April 15, 1974.

25 Q. All right. So, that would obviously be a

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1 report that's talking about the original study done with
2 the cohort that had the 8,000-and-some-odd members?

3 A. I don't know. I assume that's the case.

4 Q. Well, can you look at it and see? 8,384?

5 A. In the summary it says 8,384, yes.

6 Q. All right. So, we're still in the initial
7 study that was done of the lesser numbered cohort; is
8 that accurate?

9 A. Lesser compared to?

10 Q. As compared to the study done by Clark Cooper
11 and then the study done by Wong?

12 A. Yes.

13 Q. There's all kinds of writing in ink pen on this
14 draft. Did such ink pen remarks ever show up on any
15 drafts that you submitted to the Chemical Manufacturers
16 Association in connection with an epidemiological study
17 that you were doing?

18 MR. COLBERT: Objection, form.

19 THE WITNESS: Normally, we want a more formal
20 response. If we send a draft report to a sponsor, we
21 want them to give us comments in writing, and it would
22 be labeled comment number 1, number 2, number 3, and so
23 on. And we would address those comments, explain to
24 them why we did a certain way.

25 MR. STEWART: Q. All right. On page -- once

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1 again, I'm using the Bates stamp number at the bottom
2 because that's the only number I see. The last three
3 digits are 762. Up at the top is "Epidemiological Study
4 of Vinyl Chloride Workers

5 A. Yes.

6 Q. In that second paragraph, do they -- do the
7 folks who are working on this initial study make the
8 statement that, "However, there was a measured
9 excess" -

10 A. "Measurable," I think.

11 Q. "Measurable." Mine's covered up by the word

12 "DRAFT."

13 "measurable" --

14 A. Mine is, too. Just took an educated guess.

15 Q. "...measurable excess of" -- "digestive"? Is
16 that the word?

17 A. Yes.

18 Q. -- "cancers, especially liver, respiratory

19 cancers, and" -- it's covered up. Do you -

20 A. "...unspecified can" -

21 Q. "...unspecified cancers in which brain cancer
22 predominated."

23 Is that what it says?

24 A. Yes.

25Q. Okay. Now, on page -- well, actually, we're

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1 starting to get some numbers at the top. At the top
2 it's No. 10. Mine is difficult to read, but see if this
3 appears to be correct, starting with the first
4 paragraph: "There appear to be relatively more deaths
5 from cancer of the" -- is it "buccal cavity"?

6 A. "Buccal cavity."

7 Q. Buccal? What's the buccal cavity?

8 A. The mouth.

9 Q. Mouth?

10 "There appear to be relatively more deaths
11 from cancer of the buccal cavity and
12 pharynx than in the general population.
13 This is also true for liver cancer, cancer
14 of the respiratory system, brain cancer,
15 and" -

16 A. Most likely that word is "lymphosarcoma."

17 Q. Lymphosarcoma. Okay.

18 Now, in this reference to "the general
19 population," is this probably the same general
20 population that you make your comparisons to when you
21 note causes of death in your studies?

22 A. The U.S. population, except the time period
23 would be different.

24 Q. Okay. All right.

25 And then in the second paragraph, once again,

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1 my copy didn't come through too well. Does it say:

2 "The fact that a higher percentage of the

3 study population deaths is due to

4 malignancies, especially of the buccal

5 cavity, liver and brain, is suggestive."

6 Is that what the word is, "suggestive"?

7 A. Yes.

8 Q. Okay. Of course it doesn't say suggestive of

9 what, but it says suggestive.

10 All right. Now, on page -- at the -- where the

11 Bates stamp number at the bottom is 774. I guess the

12 number at the top is 14. I can't -- or 13. Now, down

13 in the very last paragraph on that page, the -- the

14 authors make this statement:

15 "Based on reported animal work, one would

16 expect to find an excess mortality from

17 liver cancer, that is, angiosarcoma,

18 cancers of the brain and buccal cavity and

19 perhaps respiratory cancer."

20 Do you see that sentence?

21 A. Yes.

22 Q. Do you know what "reported animal work" would

23 have reference to?

24 A. No, I don't.

25 Q. You've never heard the term "animal work"?

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1 A. No, I do. I thought you were referring to what
2 specific animal work that this report refers to. I
3 don't have the reference.

4 Q. Well, I mean, what is animal work?

5 A. Animal work meaning you do an experiment,
6 expose the animal to certain chemicals, and see whether
7 the animal develops certain cancers.

8 Q. Toxicological study?

9 A. Well, yes.

10 Q. As of April the 15, 1974, do you know of any
11 toxicologists in the world who had done animal studies
12 on vinyl chloride monomer?

13 A. I'm sure they did, if this is correct. I'm
14 sure they -- this must -- this statement must have been
15 making reference to some published studies of animal
16 work. But I don't -- I don't know the literature.

17 Q. You never did read any of the animal studies
18 that were done on lab animals exposed to vinyl chloride?

19 A. I might have very superficially when I did the
20 vinyl chloride study 15, 20 years ago. But certainly, I
21 don't remember anything at this point.

22 Q. Did you ever read any published papers on
23 animal studies of vinyl chloride monomer written by
24 Dr. Cesare Maltoni?

25 A. I believe he did some work on vinyl chloride.

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1 I don't remember whether specifically I have read his
2 papers or not.

3 Q. Did you read any papers that were written about
4 vinyl chloride animal studies that were written by
5 Dr. P.L. Viola?

6 A. I don't think so.

7 Q. Have you ever heard that name?

8 A. I may have, but I have forgotten it. I have
9 not worked in the vinyl chloride area for many years.

10 Q. Did you have any familiarity with the Chemical
11 Manufacturers Association-sponsored animal study of
12 vinyl chloride that was begun by Industrial Biotest
13 Laboratories?

14 A. No, I don't.

15 Q. Have you ever heard of that lab?

16 A. No.

17 Q. Now, on page -- once again, I'll use the Bates
18 stamp number -- '776. The second sentence begins with
19 "Table 11."

20 Do you see that sentence? At the top of the
21 page.

22 A. Yes.

23 Q. Okay.

24 "Table 11 shows the relevant circumstances
25 of the 17 deaths included in this category.

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1 Of the 12 deaths for which a primary site
2 could be identified, the majority were due
3 to brain cancers."

4 Is that the finding that's recorded here in
5 this document?

6 A. Yes.

7 Q. And then in the last sentence in that
8 paragraph, do the authors say, "In the present study it
9 is about 40 percent, so that brain cancer is present in
10 excess"?

11 A. That's what the statement says.

12 Q. Okay. And then in the paragraph in the middle
13 of the page, which I really have a hard time reading
14 because it's covered up, "The overall picture indicates"
15 -- do you see that --

16 A. Yes.

17 Q. -- paragraph?

18 A. I see that paragraph.

19 Q. -- "indicates an excess risk from cancer of" --

20 I don't know -- "the"? -- "buccal cavity and pharynx,
21 liver cancer, specifically angiosarcoma, and brain
22 cancer, and a slight excess risk from lung cancer," --
23 Can you read the rest of that?

24 A. -- "even though none of these is statistically
25 significant."

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1 Q. Okay. Now, to you, what does something being
2 in excess but not being statistically significant mean?
3 A. I don't know exactly what statistics they used.
4 This morning we talk about the risk ratio.
5 Q. Uh-huh.
6 A. And we also talk about the 95 percent
7 confidence interval.
8 Q. Uh-huh.
9 A. When somebody say the finding is not
10 statistically significant, that means the 95 percent
11 confidence interval includes 1.0, includes the
12 background risk. In other words, their finding is not
13 significant; it could be due to chance.
14 Q. Okay. That's all on that one.
15 (Whereupon, Plaintiffs' Exhibit No. 4
16 was marked for identification.)
17 MR. STEWART: Q. I'm now handing you what's
18 identified as Plaintiffs' Exhibit No. 4, and on the
19 cover at the bottom, it appears to say "Equitable
20 Environmental Health Inc."
21 Is that the company that you worked for for a
22 period of time?
23 A. Yes.
24 Q. And this states that it's "Epidemiological
25 Study of Vinyl Chloride Workers, Final Report," and it's
DEPOSITION OF OTTO WONG - VOLUME I 188

1 dated January of 1978.

2 Were you working at Environmental -- or
3 Equitable Environmental Health during that-time?

4 A. I was there for a few months, '77 and '78.

5 Q. Okay. Do you recall doing any work at
6 Environmental -- at Equitable Environmental Health on
7 this epidemiological study of vinyl chloride workers?

8 A. No, I did not get involved in this at all.

9 Q. Do you know who at Equitable would have worked
10 on this particular job?

11 A. I don't know for sure, but I would assume that
12 it was Dr. Michael Utidjian. He was my boss, and he was
13 a medical epidemiologist at that time.

14 Q. And he is the gentleman who later went to work
15 for Union Carbide?

16 A. Yes.

17 Q. Okay. Directing your attention to pages 19 and
18 20, I don't know what in the devil that is at the top,
19 but we'll just admire it and read around it.

20 There's a paragraph that begins, "Tumors of
21 Brain and Other," and then it gets all wiped out by
22 something or another. So, I'm going to pick up the
23 sentence that says, "Of these."

24 Do you see that sentence?

25 A. Yes.

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1 Q. "...4 are classified as glioblastoma
2 multiforme" -- and we have already concluded that that's
3 a brain tumor; is that correct?
4 A. Yes.
5 Q. " but only one of these 4 was definitely
6 confirmed by autopsy, and in two cases,
7 autopsy was certified as not performed."
8 When you were doing mortality studies, did you
9 discount a cause of death if there was not an autopsy
10 study?
11 A. No. It really depends on what the
12 international classification of the disease code for
13 that particular death certificate is. If it's the
14 underlying cause of death, we would count that no matter
15 what.
16 Q. I suppose if you had an autopsy, well, that
17 would be good insofar as your study goes. It would be
18 further information into the cause of death?
19 A. Well, yes and no. In epidemiology, the biggest
20 concern we have is bias. In other words, if you compare
21 something to something else, make sure that they are
22 com -- that they are similar or comparable, except for
23 the thing that you want to compare. So, if you compared
24 death certificate information in your cohort study to
25 death certificate information of the general population,
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1 that would be okay. Even though death certificate may
2 not be the most accurate diagnostic information.

3 Q. You're apt to have as many wrong in the cohort
4 as you are to have wrong in the general population --

5 A. If there --

6 Q. - percentage wise?

7 A. If the study is large enough, at least they're
8 comparable. May not be the most accurate, but
9 comparable.

10 Q. Right. Now continuing on, it says:

11 "Five of the brain tumors were classified
12 either as 'malignant brain tumors,' or
13 'carcinoma of the brain,' but none of these
14 diagnoses was definitely confirmed by
15 autopsy, and in 3 cases the absence of
16 autopsy was certified. Of the remaining 3
17 brain tumors, 2 were classified as
18 astrocytoma, both confirmed by autopsy, and
19 one as" -

20 What is that word? "Ep" -

21 A. I don't know what that word either.

22 Q. Have you ever seen that word?

23 A. No.

24 Q. I haven't either. "E-P-E-N-D-Y-M-O-M-A of the
25 fourth ventricle," confirmed by craniotomy.

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1 What's "craniotomy" mean?

2 A. I don't know exactly how to describe that
3 procedure.

4 This may be a death of the central nervous
5 system, not necessarily of the brain itself.

6 Q. Well, the brain's part of the central nervous
7 system, isn't it?

8 A. Yes, that's right.

9 Q. "Of the 12 brain tumors, 7 occurred in
10 workers from plants producing only PVC, two
11 were in plants producing both PVC and VC
12 (one of which also produced copolymers), 2
13 were in plants producing only homopolymers
14 (sic) or copolymers, and one was in a plant
15 producing only VC."

16 Is a plant which produces PVC the same thing as
17 a polyvinyl chloride manufacturing plant?

18 A. PVC -- I assume PVC stands for that.

19 Q. And you have to have vinyl chloride monomer in
20 order to manufacture PVC, do you not?

21 A. The monomer is the ingredient, yes.

22 Q. Right?

23 A. The raw material, right.

24 Q. It's mixed with other chemicals and deionized
25 water and made into PVC?

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1 A. You know more than I do.

2 Q. Okay. No, that's not true.

3 It says, "2 were in plants that produced both
4 PVC and VC."

5 Now, in doing your follow-up studies on this
6 vinyl chloride cohort, did you reach an understanding or
7 belief that there was a greater potential for exposure
8 to vinyl chloride monomer in particular types of plants,
9 that is, a PVC producing plant or a VC manufacturing
10 plant or a copolymer plant?

11 A. I don't remember which is which, but in our
12 study, in our 1991 paper, we did break the locations
13 into two categories, VCM and PVC.

14 Q. All right. Now, did you have -- make a finding
15 or collect data that indicated greater exposure in PVC
16 plants and opposed to VC plants?

17 A. I don't remember. That's why I have -- let me
18 take a look at this. I did not talk about that. I
19 assume I -- I did not know one way or another.

20 Q. Okay. Now, in the last sentence on that page:

21 "It is of interest to note that an excess
22 of malignant brain tumors was also reported
23 by Waxweiler, R.J., et al. of NIOSH,
24 (Annals of the New York Academy of Science
25 271:40-48, 1976) "

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1 Did you tell me earlier that you had never
2 heard of Waxweiler?
3 A. I believe you, when you asked me-the question,
4 you referred to the time when I was a graduate student.
5 Q. I referred to the time that you were working on
6 a project that was being funded by NIOSH, and I was
7 asking you if you either met or came to know who some of
8 the people serving on NIOSH at the time were. And I
9 mentioned several names, and I don't recall that you
10 indicated that you had ever heard of Waxweiler.
11 Have you ever heard of Waxweiler --
12 A. I did not --
13 MR. COLBERT: Object to the form. But you can
14 answer.
15 THE WITNESS: I did not know of him at that
16 point when I was a graduate student.
17 MR. STEWART: Q. Since that time, have you
18 heard of that name?
19 A. Yes. I have seen his name associated with some
20 publications later on.
21 Q. Have you ever met Waxweiler?
22 A. I am not sure. Not that I remember. The only
23 possible encounter would be at some kind of large
24 meetings that I may -- I might have met him, and with--
25 and not remembering it. I'm saying I don't know him
DEPOSITION OF OTTO WONG - VOLUME I 194

1 personally.

2 Q. Is it your understanding that R.J. Waxweiler -
3 I don't know if he's still alive or not -- is or was an
4 epidemiologist?

5 A. I don't know whether he's an epidemiologist by
6 training or what. I don't know.

7 Q. Now, on the next page, which has got 20 on it,
8 in the second sentence:

9 "These authors reported an SMR of 329 based
10 on only 3 deaths, all from glioblastoma
11 multiforme, all histologically confirmed."

12 What does "histologically confirmed" mean?

13 A. In other words, they confirm it by looking at
14 histology of the cells, of the cancer cells. So that
15 means, indeed, those cancer cases were confirmed.

16 Q. Okay. Either through surgery and removal of
17 the tumor and an examination by a pathologist or
18 possibly a postmortem?

19 A. Looking at the tissues, yes.

20 Q. Yeah. Okay. And it goes on to say:

21 "In fact the NIOSH group claimed in this
22 report to have identified altogether 9
23 histologically confirmed cases of
24 glioblastoma multiforme in workers exposed
25 to vinyl chloride in U.S. industry."

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1 Do you recall if the type of brain tumor that
2 you noted in your follow-up study, if the -- if the
3 predominant type of brain tumor was this glioblastoma
4 multiforme?

5 A. Yes.

6 Q. And then in the last sentence, it says:

7 "In view of all of the above, further
8 investigation of the question of malignant
9 brain tumors in workers exposed to vinyl
10 chloride should be pursued."

11 Do you have any way of knowing, from just
12 reading that sentence, whether the author of that
13 sentence is talking about that control study that you
14 were telling me about earlier or whether they're talking
15 about follow-up studies, or can you tell from that
16 sentence?

17 A. No, I don't. That statement simply says that
18 we should do more work in order to come to a, I guess,
19 more definitive conclusion.

20 Q. All right. Now, on page 21, "Discussion."

21 Do you see that? Down there in the last
22 sentence:

23 "With the single exception of the brain
24 tumors, already discussed above, none of
25 the SMR's (based on more than five deaths)

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1 that exceeded 100 was significantly
2 different from 100."
3 Is -- does that sentence say that the brain
4 tumors, the excess of brain tumors was significant, as
5 opposed to the other nonangiosarcoma neoplasms as being
6 insignificant?
7 A. Certainly that's the implication, that the risk
8 ratio for brain tumor was statistically significant.
9 Q. Was statistically significant?
10 A. Significant, yes.
11 Q. Now, on page 24, the beginning of the second
12 paragraph:
13 "Brain tumors were found to be in excess,
14 12 observed vs. 5.9 expected (significant
15 at the 0.05 level) but the incidence was
16 not related to either duration of exposure
17 or to intensity of exposure to VCM."
18 I know you've talked about it before, but I -
19 I still do not understand what the significance is. I
20 mean, if you find this excess, which is more than two
21 times, what difference does it make that the incidence
22 was not related either to duration of exposure or to
23 intensity of exposure to VCM?
24 A. Because that's twofold increase that you talk
25 about, 12 divided by 5.9. Could have been due to
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1 something else, some other exposure, not VCM. Could
2 have been due to reporting. Could have been due to
3 lifestyle factors that the study did not look at. Could
4 have been due to chance. All these are potential,
5 possible explanations. In order to see which
6 explanation is more likely, you need to look further,
7 not just the overall estimates, okay?
8 For example, if we do a study of workers
9 exposed to certain chemicals, chemical X, and overall,
10 we see an increase of lung cancer, we don't just start
11 from there. We want to find out if indeed we want to
12 make the causation conclusion that exposure to
13 chemical X indeed would result in an increased risk of
14 lung cancer. Then it would be logical to demand an
15 additional criteria, and that would be those workers who
16 have been exposed longer or who have been exposed to a
17 higher level would have a higher risk of lung cancer
18 than those workers with a shorter or lower exposure.
19 That only makes common sense.
20 Q. Yes.
21 A. Because the lung cancer in that group that you
22 observed the increase, could have been due to smoking.
23 Q. Right.
24 A. Or could have been due to some other chemicals
25 that we did not know about at this point. But if you do
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1 see a upward dose-response curve, as exposure goes up,
2 the risk goes up, then you can be pretty sure that,
3 indeed, the disease is related to the exposure.
4 On the other hand, if you don't see a
5 dose-response curve, if you don't see an upward trend,
6 then that observation would argue against a causation
7 interpretation.
8 Q. Okay. So, I take it, then, that it would be
9 very important in resolving the question of whether or
10 not the excess of brain tumors was due to vinyl chloride
11 or to something else, it would be very important that
12 the epidemiologist and his or her staff get accurate
13 exposure data on these 12 cases.
14 A. Oh, not just on those 12 cases, but on the
15 entire study.
16 Q. All right.
17 A. And that's exactly what the NIOSH study
18 accomplished that we discussed this morning. The study
19 author, the first author was Dr. Wu at NIOSH. They
20 looked at the largest facility in our study, and indeed,
21 similar to our study, they reported an overall increase
22 of brain cancers in that entire study. But they did not
23 just stop there. They went back and looked at the
24 pattern of increase, and they didn't find any. They did
25 not find a higher risk associated with longer or more

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1 intense exposure. They did that by cohort study. They
2 did that by a nested case-control study. And those
3 studies provide very consistent results.

4 And as -- based on that, based on both the
5 cohort study and the nested case-control study, that
6 those -- the dose-response analysis, NIOSH make the
7 conclusion that the brain cancer increase that they
8 reported in their study was not related to vinyl
9 chloride exposure.

10 Q. All right. But it is critical to the
11 conclusion that the epidemiologist have accurate data on
12 the exposures, is it not?

13 A. Yes. And that's why Dr. Wu and his group went
14 out and collect exposure information.

15 Q. And if the epidemiologist and his or her
16 colleagues are given data on exposure which in fact is
17 not accurate, then the conclusions reached by the
18 epidemiologist obviously are not going to be accurate,
19 are they?

20 A. That's correct.

21 (Whereupon, Plaintiffs' Exhibit No. 6
22 was marked for identification.)

23 MR. STEWART: Q. I'm now handing you what's
24 identified as Plaintiffs' Exhibit No. 6 and ask you to
25 tell me what this is, Dr. Wong.

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1 A. This is one of the so-called "IARC Monographs
2 on the Evaluation of Carcinogenic Risk of Chemicals."
3 Q. Okay. The International Agency for Research on
4 Cancer, is it headquartered in a particular town or
5 city?
6 A. Yes.
7 Q. Where?
8 A. Lyon.
9 Q. In France?
10 A. In France.
11 Q. Now, how often does the International Agency
12 for Research on Cancer publish a monograph on the
13 Evaluation of the Carcinogenic Risk of Chemicals to
14 Humans?
15 A. I don't know. I guess they publish a number of
16 them each year. This is Volume 19. The one that you
17 handed me is labeled Volume 19. And the date of that is
18 1979.
19 Q. Uh-huh.
20 A. I think it's up to Volume 70 or something like
21 that now.
22 Q. Okay. Does a different group of individuals
23 get together and work on these monographs year after
24 year, or does the same group of people, once they join
25 the International Agency for Research on Cancer, remain
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1 a part of that agency until they die or retire, or do
2 you know how that works?
3 A. I think what you're referring to is the working
4 group on the specific chemical. The working group would
5 be external experts. They are not employees of IARC.
6 And I would assume the composition of the working group
7 change from chemical to chemical.
8 Q. Do you know how the working group for any
9 particular chemical is selected?
10 A. No, I don't. I assume they would have some
11 expertise on different aspects of that chemical.
12 Q. Well, I would assume that, too. But do you
13 know what person or what body makes the selection?
14 A. I would say the people within IARC make the
15 selection.
16 Q. And the working group is made up of people who
17 are what, epidemiologists, toxicologists, medical
18 doctors?
19 A. Industrial -
20 Q. A lot of different professions -
21 A. Industrial hygienists, chemists. People who
22 know the manufacturing process, people who know the
23 exposure in the area in the industry, people who know
24 toxicological data of the chemical, and people who
25 understand epidemiology.

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1 Q. Okay. So, the International Agency for
2 Research on Cancer, whenever it undertakes to do an
3 evaluation of the carcinogenic risk of a human, performs
4 that evaluation through the utilization of people from
5 many different professions as opposed to, say, your
6 company which does an epidemiologic study, and you and
7 your fellow professionals who might be an M.D. or
8 whatever, do yours? I mean, there's a lot more people
9 involved in these International Agency for Research on
10 Cancer studies, are there not?

11 A. I'm not so sure the comparison is -- makes any
12 sense. The working group consists of maybe 10 to 12
13 people, of that size. When you say my company, I don't
14 know what you're referring to because when we operate
15 Environmental Health Associates in the 1980s, our
16 company was very large. We have toxicologists. We have
17 industrial hygienists. We have occupational physicians.
18 We have nurse. We have epidemiologists. We have
19 program nurse. I would say definitely our company was
20 larger than a working group.

21 Q. Have you ever been invited by the International
22 Agency for Research on Cancer to be a part of the
23 working group to assess the risk of exposure to any
24 chemical?

25 A. No, I have not.

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1 Q. Has anyone who has worked with you ever been
2 invited to be a member of the IARC working group?
3 A. No, I have not.
4 And there is a rule, too, is the working
5 group -- the primary function of the working group is to
6 critically review studies, the literature on that
7 substance. And if you have done studies on that
8 substance, you almost disqualify yourself being invited
9 to that group because you cannot be the investigator and
10 be the critique at the same time.
11 Q. Why?
12 A. Why? I assume people may be biased and say
13 their study is better than other people's.-
14 Q. Oh.
15 Turn over to page 417, entitled "Vinyl Chloride
16 and Polymers."
17 Do you see that at the top of the page?
18 A. Four? 417? Okay. I got it.
19 Q. Yes, sir. And then under that it says, "Human
20 data."
21 Do you see that?
22 A. Yes.
23 Q. Okay. The second paragraph:
24 "Several independent but mutually
25 confirmatory studies have shown that
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1 exposure to vinyl chloride results in an
2 increased risk" -- "increased carcinogenic
3 risk in humans, involving the liver, brain,
4 lung and haemo-lymphopoietic system."

5 Do you see that?

6 A. Yes.

7 Q. As of February of 1979, do you believe that
8 that was an accurate statement?

9 A. I have some problem with the exact language
10 they use here. Number one, I have some problem with the
11 word "independent." I don't think all those studies
12 were independent.

13 For example, the NIOSH study, I guess the very
14 first study was conducted by Dr. Waxweiler, subsequently
15 updated by Dr. Wu. That study is actually part of the
16 CMA study as well. They overlap. The data overlap.
17 So, I don't think those studies are independent.
18 So, I don't think the working group really
19 understand the details of those studies. If you simply
20 read the paper, you may or may not get that. Okay? In
21 fact, I did not find out until Dr. Wu published his
22 paper and specifically he said that his data were part
23 of our industry wide study.

24 Q. Part of yours meaning Wong?

25 A. Right. And that, of course, is the CMA study,

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1 the same as Tabershaw/Gaffey and also Cooper study.

2 Q. Are you saying that Wu's opinions are based on,
3 at least in part, on studies that you did-that
4 culminated in your 1991 paper?

5 A. No, no, no, no, no. I'm saying the workers in
6 his study are also in my study. His study is a subset
7 of my study.

8 Q. Okay.

9 A. His opinion was based on his own analysis.

10 Q. Of what?

11 A. Of his data.

12 Q. All right. His opinion had nothing to do with
13 the study that you did?

14 A. No. Except for the fact that there is an
15 overlap of data between the two studies.

16 Q. How did that happen?

17 A. We picked 37 plants across the country. He
18 picked one of the largest plant, and that plant happened
19 to be one of the 37.

20 Q. Okay. To some minor extent, then, Wu's
21 conclusions would have been based upon matters that you
22 considered in making your study which culminated in the
23 1991 paper?

24 A. Assuming that the detailed analysis that he did
25 in his study would be very helpful for me to interpret

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1 the literature, the -- not just my study, but the entire
2 literature on vinyl chloride.

3 Q. All right. Further down -- up --

4 A. I --

5 Q. -- do you know --

6 A. -- I mentioned I have a couple problems with
7 that statement, and we discussed only one of them.

8 Q. Okay.

9 A. The other one is, the language is not clear at
10 all. It says that in an increased -- "results in an
11 increased carcinogenic risk." It doesn't say whether it
12 is significant or not. Okay? And some of the -- the
13 exhibits or the reports you asked me to go through to
14 read and so on for the last couple hours indicate that
15 even though there was an increase, the increase was not
16 statistically significant.

17 And also, what this statement left out was the
18 fact that, for example, in the EEH study by --

19 Equitable -- Equit --

20 MR. COLBERT: EEH.

21 THE WITNESS: EEH. We're getting the initials
22 right. Equitable Environmental Health Associate report,
23 it clearly says that the increase was not related to
24 either the duration or the intensity of exposure.

25 That's a very important criteria, and they left it out.

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1 MR. STEWART: Q. Do you happen to know how the
2 International Agency for Research on Cancer is funded,
3 who pays the rent, who pays the light bill-, who pays the
4 employees and so forth?

5 A. Organizationally, IARC is part of WHO, the
6 World Health Organization, and I believe that is part of
7 the United Nations. And therefore, members of United
8 Nations pay certain fee to keep WHO and IARC going.

9 Q. Okay. The money would initially come from many
10 different countries in the world and paid into WHO, and
11 then WHO would pay out a portion of its money to IARC?

12 A. I assume that's how it work because IARC, as I
13 said, is part of WHO, and WHO gets the funding through
14 U.N.

15 Q. Okay. To your knowledge, does the
16 International Agency for Research on Cancer get any of
17 its funding from the Chemical Manufacturers Association?

18 A. I have no idea. I don't know.

19 Q. Would you -- do you have any earthly idea as to
20 whether the CMA contributes money to this organization?

21 A. I don't know.

22 Q. Now, on down the page, paragraph 4.3,
23 "Evaluation."

24 Do you see that?

25 A. Yes.

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1 Q. It says, "Vinyl chloride is a human
2 carcinogen."

3 You agree with that, do you not?

4 A. Yes.

5 Q. "Its target organs are the liver, brain, lung
6 and haemo-lymphopoietic system."

7 Do you agree or disagree with that sentence?

8 A. I agree with part of it. Certainly liver, we
9 know that, you know, as demonstrated by my study.

10 Liver, the risk for liver cancer is increased as a
11 result of exposure to vinyl chloride.

12 For brain cancer, when you look at some

13 subsequent studies, I would say that's -- the evidence
14 would argue against this statement.

15 Remember, this was done in 1979.

16 Q. Uh-huh.

17 A. Before a lot of studies that we today rely on
18 were published.

19 Q. Do you agree that one of the target organs of
20 vinyl chloride is the lung?

21 A. I don't believe so. I don't believe that.

22 Because again, if you go to, for example, the NIOSH
23 study, Dr. Wu's study, very clearly he says that lung
24 cancer was not related to vinyl chloride exposure.

25 Q. What is emphysema?

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1 A. Emphysema is a form of nonmalignant respiratory
2 disease.

3 Q. Does it -- does it have an adverse effect upon
4 the lung?

5 A. Yes. It impair the lung functioning but is not
6 a neoplastic process.

7 Q. Well, didn't you find a causal relationship
8 between exposure to vinyl chloride monomer and
9 emphysema?

10 A. We suspect that there is a strong relationship
11 between the two, although we were the first one to
12 report that, and we could not make a definitive
13 conclusion based on one single study.

14 (Whereupon, Plaintiffs' Exhibit No. 7
15 was marked for identification.)

16 MR. STEWART: Q. Okay. I'm now handing you
17 what's identified as Plaintiffs' Exhibit No. 7. Can you
18 tell me what that is?

19 A. It is a draft report called "Epidemiologic
20 Study of Vinyl Chloride Workers."

21 Q. And it was prepared by Environmental Health
22 Associates, Inc.?

23 A. Yes.

24 Q. And this would -- this would be a draft report
25 that talks about an epidemiological study in which you

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1 participated?

2 A. Yes.

3 Q. Isn't it --

4 MR. COLBERT: Before we have any questions on
5 this document, I'd like to point out that there is a
6 stamp on this document that says, "CONFIDENTIAL Subject
7 to Protective Order in Ross vs. Conoco Inc., No.
8 90-4837," I believe, in the 14th Judicial District in
9 Calcasieu Parish in Louisiana.

10 I'm not going to --

11 MS. STEWART: You don't know the
12 circumstances --

13 MR. COLBERT: Well, exactly right. I don't
14 know the circumstances. But I will tell you anytime I
15 see a document that indicates it is subject to a
16 court-ordered protective order, I rather hesitate to,
17 one, have a copy of the document attached to a
18 deposition; and two, have the witness answer questions
19 concerning the document.

20 MR. STEWART: I'm the one that's asking the
21 questions, and I'm the one that's going to attach it.
22 It is not subject to any confidential order. You can
23 get it off of the Internet.

24 MR. COLBERT: I don't think that necessarily
25 means anything.

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1 MR. STEWART: Q. On page 1 --
2 MR. COLBERT: Nevertheless --
3 MR. STEWART: Q. -- the summary--
4 MR. COLBERT: Nevertheless, I'm pointing out
5 this document -- that I will allow Dr. Wong to answer
6 this under objections.
7 MR. STEWART: Q. Do you see page 1, "Summary"?
8 MR. COLBERT: (To Ms. Stewart) Are you going
9 to ask the questions, or are you going to allow
10 Mr. Stewart to ask the questions?
11 THE WITNESS: Yes.
12 MR. STEWART: Q. Down in the -- about the
13 middle of the paragraph there is a sentence that begins,
14 "The study confirmed..."
15 Do you see that?
16 A.
17 Q. -- "that the vinyl chloride workers
18 experienced significant mortality excesses
19 in angiosarcoma (15 deaths) cancer of the
20 liver and biliary tract (SMR - 641) and
21 cancer of the brain and other central
22 nervous system (SMR - 180)."
23 Are you and your colleagues saying that the
24 vinyl chloride workers experienced a significant
25 mortality excess of cancer of the brain?
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Yes.

1 A. Overall, yes.

2 Q. Okay. Now, on page -- well, once again, I
3 guess I'm going to have to refer to the Bates stamp
4 number down at the very bottom, and it's 1552, and at
5 the top of the page it says, "Introduction."

6 A. What page? I'm sorry.

7 Q. I mean that's -- see that? The only number -

8 A. Introduction? Okay. Okay.

9 Q. Got it? Okay.

10 Now, in the first paragraph, down about the
11 last sentence, where it says, "In addition to
12 angiosarcoma of the liver" -

13 Do you see that?

14 A. Yes.

15 Q. -- "a number of other cancer sites have also
16 been implicated, including the overall digestive
17 system," and then you and your colleagues cite -- I
18 suppose it's a study by -- how do you pronounce
19 T-H-E-R-I-A-U-L-T?

20 A. Theriault.

21 Q. And Allard, 1987.

22 Do you recall what that study had to do with?

23 Was it an epidemiological study -

24 A. It must be an epidemiologic study.

25 Q. Okay. And then you also cite your former

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1 colleague, don't you? Isn't that the gentleman you used
2 to work for
3 A. My former boss, Dr. Chiazze.
4 Q. What kind of study are you -- did he make that
5 you are citing here?
6 A. I assume that's an epidemiologic study.
7 Q. All right. Those two studies obviously have to
8 do with the overall digestive system and then, comma,
9 "the respiratory system," and then you cite Monson and
10 Buffler and Waxweiler.
11 Monson is what, an epidemiologist?
12 A. Yes.
13 Q. At Harvard -
14 A. At Harvard University.
15 Q. School of Public Health or whatever?
16 A. Yes.
17 Q. He was asked to submit a proposal or -- on the
18 19 -- the follow-up study that you ended up doing, did
19 he not?
20 A. I have no idea.
21 Q. Oh, you don't know that?
22 A. I don't know.
23 Q. Okay. The next -- do you recall what the
24 article that you cite here was about, or that you and
25 your colleagues cite that Monson wrote in '74?
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1 A. No, I don't. I mean, we have to go back and
2 take a look at it.
3 Q. Then you refer to Patricia Buffler and others
4 in a '79 article. Do you recall what that was about?
5 A. That would be an epidemiologic study.
6 Q. All right. And she and her colleagues had
7 found that the respiratory system was implicated among
8 people exposed to vinyl chloride?
9 A. I mean, that's what the sentence says. What it
10 says is, for example, Chiazzo find increased risk in
11 overall digestive cancer, but he did not find increase
12 of respiratory cancer. On the other hand, Monson found
13 an increase of respiratory cancer but not digestive
14 cancer. That's what that sentence says.
15 Q. All right. And what did Buffler find?
16 A. The sentence says Buffler find an increase of
17 respiratory cancer but not the other kinds of cancer.
18 Q. Okay. And Waxweiler the same thing. And then
19 it says, "and the brain and other central nervous
20 system" was also implicated, and you cite Monson,
21 Waxweiler, Cooper.
22 Would Cooper be the gentleman who did the vinyl
23 chloride cohort study immediately before yours?
24 A. Yes. In fact, those -- all those three studies
25 overlap because Monson study only one plant, which is

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1 part of the industry wide study. Waxweiler is -- we talk
2 about that many times today. Waxweiler did a study at
3 NIOSH. And that was later updated by Dr. Wu. And
4 Dr. Wu make it very clear that their data was also part
5 of the industry wide study, the Cooper study.
6 So, all these studies overlap. In fact, the
7 data are the same.

8 Q. Do you know who Byren is, B-Y-R-E-N?

9 A. Byren, I believe he is an epidemiologist in
10 Germany.

11 No, I'm sorry. In Sweden.

12 Q. In Sweden?

13 A. Yes.

14 Q. How many vinyl chloride plants do they have in
15 Sweden?

16 A. I have no idea. But I have some information on
17 him. He write 1993 letter to the editor. The study was
18 very, very small, 771, and he observed two brain cancers
19 and expect about one-third of a case. So, that was an
20 increase.

21 But later on, I think that his data were
22 included in the IARC study.

23 Q. Okay. Now, down in your last paragraph on that
24 page, in the second sentence, you and your colleagues
25 say:

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1 "A recent review paper indicated that the
2 results for brain cancer were consistent
3 with an etiologic role for vinyl chloride,
4 whereas the data for lung cancer were not
5 consistent with an etiologic role, in that
6 the two studies with very high power
7 yielded negative results."

8 Do you see that sentence?

9 A. Yes. That's what those authors said.

10 Q. Okay. Do you know what recent review paper you
11 and your colleagues are referring to here?

12 A. We were referring to a paper published in 1981
13 by Beaumont and Breslow. But that was based on whatever
14 information available to them. Must be sometime before
15 1981 because the paper was published in 1981.

16 Q. Now, on page 16 on your draft, the numbers now
17 start appearing on the top right-hand side.

18 A. What page? What page?

19 Q. Page 16. Top right-hand corner there's some
20 numbers all of a sudden appearing.

21 A. Okay.

22 Q. First of all, do you know whose handwriting is
23 on your draft here?

24 A. No.

25 Q. Would it more likely than not be somebody

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1 associated with the CMA?
2 MR. COLBERT: Objection. Form.
3 THE WITNESS: I don't know.
4 MR. STEWART: Q. I mean, this is -- you
5 submitted this draft to the CMA, did you not?
6 A. Yeah. But once we submit it, we don't know
7 where it went. I mean, people make copies and
8 distribute and send to other people.
9 Q. Okay. Okay.
10 A. I mean, you obtained a copy; right?
11 MR. COLBERT: Apparently subject to protective
12 order.
13 MR. STEWART: Q. The -- on page 16, the second
14 sentence says:
15 "The excess came primarily from the
16 following sites: cancer of the liver and
17 biliary tract (hereafter referred to as
18 'liver'), and cancer of the brain and other
19 central nervous system."
20 Now, was that an accurate statement at the time
21 that you and your colleagues made it?
22 A. Yes.
23 Q. Okay. Skipping down to three sentences after
24 that:
25 "For cancer of the brain and other central
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1 nervous system, 23 deaths were observed and
2 12.76 expected."
3 Was that an accurate statement as to the
4 findings that you and your colleagues had made as of the
5 date of this draft?
6 A. Yes.
7 Q. Okay. All right, now, on page 17, down toward
8 the bottom, you have a heading that says "Analysis by
9 Length of Exposure."
10 Do you see that?
11 A. Yes.
12 Q. Now, that's one of the criteria that you have
13 told me that you should look at over and above just the
14 mere fact that you got an excess of deaths; is that
15 accurate?
16 A. Yes.
17 Q. In the second sentence, it says:
18 "No obvious increasing trends by length of
19 exposure was identified for any cause of
20 death, except for cancer of the liver and
21 perhaps cancer of the brain and other
22 central nervous system."
23 Was that statement by you and your colleagues
24 accurate at the time that you made it?
25 A. Yes. We made that statement, and the same

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1 statement is in my 1991 publication as well.

2 Q. Now, on page 18, in the third paragraph, you
3 and your colleagues say:

4 "For cancer of the brain and other central
5 nervous system, among those employees with
6 less than 10 years of exposure, 13 deaths
7 were observed and 7.90 expected."

8 Was that sentence accurate -

9 A. Yes.

10 Q. -- at the time you and your colleagues wrote
11 it?

12 A. Yes. 13 Q. "The brain cancer SMR for this group was 164.7,
14 not significant at 0.05 level."

15 Now, on down a couple of sentences, you say -
16 you and your colleagues say:

17 "However, for those employees with 20 or
18 more years of exposure, there were 6
19 deaths, compared to only 1.55 expected.

20 The brain cancer SMR for this exposure
21 group was 385.9."

22 Was that sentence accurate at the time you and
23 your colleagues wrote it?

24 A. That's the sentence I wrote in 1986. That's
25 the same sentence I have in my 1991 report.

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1 Q. Now, on page 20, in the first paragraph, you
2 and your colleagues reported:
3 "For cancer of the brain and other central
4 nervous system, the trend by latency was
5 not at all obvious."
6 Was that an accurate statement -
7 A. Yes.
8 Q. -- at the time it was made?
9 "The brain cancer SMRs were 183.8, 158.3,
10 and 210.7, respectively, for those
11 employees with less than 20, 20 to 30, and
12 30 or more years of latency."
13 Now, are these three categories of years -- do
14 they match up with the SMRs that are in the preceding
15 sentence? That is, 210.7 would match up with the 30 or
16 more years of latency?
17 A. There is only one sentence there. What are you
18 referring to?
19 Q. The second sentence says -- talks about SMRs.
20 A. Right.
21 Q. And you list three different numbers.
22 A. Right, right.
23 Q. Okay.
24 A. It says those three numbers respectively for
25 three time intervals, and that means the first one would
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1 go with the first interval; the second number goes with
2 the second interval; and the third number goes with the
3 third interval.

4 Q. I've very inartfully asked the question -

5 A. That's what the sentence says.

6 Q. Okay. Now, on page 21, in the second
7 paragraph, the last sentence, you and your colleagues
8 reported:

9 "For those who were first exposed at age 35
10 or older, the brain cancer SMR of 239.5" -

11 THE REPORTER: I'm sorry. After "239.5," I
12 didn't hear what you said.

13 MR. STEWART: Well, you're getting old.

14 THE REPORTER: That's true.

15 MR. STEWART: I'll start over.

16 "For those who were first exposed at age 35
17 or older, the brain cancer SMR of 239.5 (.11
18 observed versus 4.59 expected) was
19 statistically significant at the 0.05
20 level."

21 That was an accurate statement at the time it
22 was written, was it not?

23 A. It was accurate in 1986; it was accurate in
24 1991.

25 Q. Right. On page 24, down toward the bottom of
DEPOSITION OF OTTO WONG - VOLUME I 222

1 the paragraph, there's a sentence that begins, "For the
2 cohort of PVC employees."

3 Do you see that sentence?

4 A. Yes.

5 Q. "For the cohort of PVC employees, 16
6 deaths were due to brain cancer and other
7 central nervous system, when only 9.47 were
8 expected."

9 Was that an accurate statement at the time that
10 you made it?

11 A. Yes.

12 Q. Now, in specifically talking about a cohort of
13 PVC employees and the number of brain cancer deaths, are
14 you distinguishing employees who might have been in a
15 cohort of workers in a VC plant or a copolymer plant?

16 A. We are talking about people in the -- in a
17 plant that deals with PVC as opposed to VCM. That's the
18 distinction between the two. If you go back to our
19 report, either the 1986 report or the 1991 paper, we
20 describe how we make that classification.

21 Q. All right. Did you observe more deaths from
22 brain cancer among the cohort of employees who worked in
23 PVC facilities as opposed to VCM facilities?

24 A. No. Actually, both. Because for PVC
25 facilities, we have a standardized mortality ratio of

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1 1.69. For VCM, we have a standardized mortality ratio
2 of 2.19.

3 Q. So, you have -- actually have a higher standard
4 mortality rate for exposed workers in a vinyl chloride
5 monomer plant than for exposed workers in a polyvinyl
6 chloride manufacturing plant?

7 A. It's not completely true because the finding
8 for the VCM plants was based on only two brain cancer
9 deaths, and as a result, the 95 percent confidence
10 interval was very large. And basically, the two 95
11 percent confidence intervals from the PVC and the VCM
12 plants overlapped. So, epidemiologically speaking, they
13 are indistinguishable.

14 MR. STEWART: Okay. We have to change tapes,
15 he says.

16 THE VIDEOGRAPHER: This marks the end of
17 Videotape No. 4 in the deposition of Dr. Otto Wong. The
18 time is 5:32. We're off the record.
19 (Discussion off the record.)

20 THE VIDEOGRAPHER: This marks the beginning of
21 Videotape No. 5 in deposition of Dr. Otto Wong. The
22 time is 5:48. We're on the record.

23 MR. STEWART: Q. Turning to page 32 of the
24 report that you and your colleagues did...

25 THE VIDEOGRAPHER: Your microphone.

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1 MR. STEWART: Oh, I'm sorry.
2 I never could make it as a rock star. I forget
3 my microphone.
4 Q. Are you with me on page 32?
5 A. I am with you on page 32.
6 Q. Okay. Now, the second paragraph, about -- oh,
7 halfway down, there's a sentence that begins, "Instead,
8 the CMA task force."
9 Do you see that?
10 A. Right.
11 Q. All right.
12 "Instead, the CMA task force and EHA
13 decided at that time that the option of
14 case-control studies would be considered,
15 should the results of the mortality study
16 indicate excesses in any cause-specific
17 mortality. Contrary to cohort mortality
18 studies, in case-control studies we deal
19 with a limited number of subjects and it
20 becomes both feasible and practical to
21 collect detailed exposure information on
22 all study subjects."
23 That's the case-control or nested case-control
24 study that you've talked about earlier?
25 A. Yes. That would be the natural extension of
DEPOSITION OF OTTO WONG - VOLUME I
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1 the study.

2 Q. All right. Continuing on:

3 "In addition, it may also be possible to
4 collect other information, such as life
5 style as well as occupations outside the
6 vinyl chloride industry. Furthermore, it
7 may also be possible to review pathological
8 reports, which would produce useful
9 histological cell type information on liver
10 cancer and cancer of the brain and other
11 central nervous system. With this update,
12 the study has now identified enough cases
13 of liver cancer and brain cancer for
14 further case-control studies."

15 Was that the opinion of you and your colleagues
16 at the time that you wrote this?

17 A. Yes.

18 (Whereupon, Plaintiffs' Exhibit No. 5
19 was marked for identification.)

20 MR. STEWART: Q. I'm going to hand you what's
21 identified as PX 5. Which doesn't sound right, but --

22 MS. STEWART: We skipped one.

23 MR. STEWART: That's right. We went from 4 to
24 6.

25 Q. Are you familiar with that document there,
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1 Dr. Wong?

2 A. No.

3 Q. You've never -- or have you ever heard of

4 Dr. -- Dr. Mundt?

5 A. Yes, I heard of the name.

6 Q. Were you not aware that Dr. Mundt and some of

7 his colleagues did a vinyl chloride mortality study

8 after your -- your last -- or after your study? Excuse

9 me.

10 A. They updated the CMA vinyl chloride study.

11 Q. Okay. Well, you were familiar with that?

12 A. Yes, but I associate him with the University of

13 Massachusetts. I did -- I did not associate him with

14 Applied Epidemiology, ' Inc.

15 Q. Okay. On the -- well, the date of this

16 document is January 8, 1999, is it not?

17 A. Yes.

18 Q. And do you know if this -- if this report has

19 been published?

20 A. I believe subsequently a report has been

21 published.

22 Q. And generally speaking, is -- well, have you

23 read Dr. Mundt's report?

24 A. I have never seen this report before. I have

25 seen the publication, a much shorter version.

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1 Q. Okay. Is the Mundt publication which you have
2 seen a follow-up of the cohort which you had studied?
3 A. Yes.
4 Q. And that Clark Cooper had studied?
5 A. Yes.
6 Q. And that Tabershaw/Gaffey had studied?
7 A. Yes.
8 Q. Okay.
9 Oh, hush, Ms. Reporter. I'm getting there.
10 THE REPORTER: I can say nothing.
11 MR. COLBERT: Oftentimes that's best.
12 MR. STEWART: Q. Okay. Page 80 of Dr. Mundt's
13 study. Instead of me reading bedtime stories to you,
14 would you mind reading the section under "Brain Cancer,"
15 and then I can ask you a couple of questions.
16 A. Okay. I've read that paragraph. What do you
17 want to ask?
18 Q. Okay. You see anything in there that you
19 disagree with?
20 A. No. In fact, that first couple sentences,
21 that's exactly what I've been saying as well.
22 What this report says is that all those several
23 studies have reported elevations in mortality from brain
24 cancer among VCM/PVC workers. All of the elevated SMR's
25 were seen in earlier studies of this cohort, meaning the
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1 CMA cohort -- and the reference were made to Tabershaw
2 and Gaffey, 1974; Cooper, 1981; Wong, et al., 1986 and
3 1991 -- or in the subcohorts -- and reference to Monson,
4 1974; Waxweiler, 1976; and Wu, 1989.
5 And that's exactly what we've been talking
6 about today: That only one study showed significant
7 increase, and that study is the CMA study.
8 Q. Okay. So, your answer to my question is that
9 there's not anything that you read under the heading of
10 brains that was written by Dr. Mundt -
11 A. No -
12 Q. -- and his colleagues with which you disagree?
13 A. I read the first paragraph. That carries on to
14 the next page. Do you want me to read it -
15 Q. You don't have to read it out loud. You can
16 read it -
17 A. How many pages do you want me to read?
18 Q. Well, it's not very long, is it?
19 MR. COLBERT: I guess what he's asking is, do
20 you want him to read from page 80, where it says "Brain
21 Cancer" to -
22 MR. STEWART: It stops at "Conclusions" on page
23 82.
24 THE WITNESS: Okay. Then let me continue. 25 (Reading document.)
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1 Okay. I've finished reading that.
2 As I think we comment on the first paragraph to
3 some extent, I would certainly agree with this report
4 that all the elevated SMRs were seen in earlier studies
5 of the same cohorts. I mean, that's -- that's number
6 one.
7 And then, of course, that the largest study,
8 the multicenter -- or actually the multinational study
9 done by IARC, which is the second largest study,
10 reported no increase. Fourteen brain cancer deaths
11 versus 13.1. Certainly, I have no argument with that.
12 And also, there was no -- in the second
13 paragraph on page 81, the report talks about "...there
14 was no clear trend with the SMR for brain cancer over
15 decade of follow-up." And I would agree with that.
16 And then the next paragraph, the third
17 paragraph on page 81, talk about the latency. That's
18 what he observed in his study. I would not be able to
19 comment on that. That's what he reports.
20 And then the last paragraph on page 81 talk
21 about different types of brain tumor in the study, and
22 certainly, I would assume that's accurate.
23 And then on page 82, the report talks about
24 diagnostic sensitivity bias raised by Dr. Shah in the
25 letter to the editor in 1993. And basically, I think

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1 that the report says that diagnostic sensitivity may not
2 be a major issue because the tumors are not difficult to
3 diagnose.

4 That is not necessarily the issue here. It may
5 not be difficult to diagnose if you have the right
6 procedure. The issue is, do employees of large
7 corporations have a better chance of being diagnosed,
8 have easier access to the diagnostic procedures? That
9 is really the key question. There have been many, many
10 studies talking about brain cancer, the same type of -
11 different cell types of brain cancer being more
12 completely reported, more completely diagnosed in
13 employed populations. And I'm disappointed not to see
14 those references here. So, I would say I disagree with
15 the report on this discussion. It's not a complete
16 discussion.

17 The last paragraph in the section on brain
18 cancer on page 82, certainly I would agree that the risk
19 of brain cancer keep goes down with every update, and
20 the report makes the statement that the new cases -- any
21 new cases that we see in this cohort -- well, let me
22 just read what it says: "...it is highly unlikely that
23 new cases will be related to VCM/PVC exposures..."
24 And I certainly would agree with that.

25 Q. Okay. Is that all of it?

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1 A. That's the last paragraph.

2 Q. Okay. Now, would you turn over to page 85 of

3 Dr. Mundt's report, and the very last sentence on the
4 page, at the bottom there:

5 "To maximize the efficiency of an exposure
6 reconstruction/validation exercise, a
7 nested case-control approach is highly
8 recommended, with two case series (brain
9 cancer and connective and soft tissue
10 cancer deaths) and a random sample of the
11 cohort, using density sampling, as
12 controls."

13 Do you agree with that?

14 A. Well, basically, to a large extent, the
15 recommendation of further study in the form of a nested
16 case-control study was quite similar to what we stated
17 in our 1986 report. We also said that, with one major
18 difference: In 1986, the NIOSH study was not completed,
19 the Wu study. The NIOSH study actually include a nested
20 case-control study, at least for brain cancer. So, I am
21 not sure whether we still need a nested case-control
22 study as of 1999. At least on brain cancer.

23 Now, I don't know much about the connective and
24 soft-tissue cancer finding, so I cannot comment on that.

25 Q. All right. So, your opinion of this

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1 recommendation for a nested case-control approach is
2 that you do not strongly support such a follow-up study?
3 A. I think when we -- when we make that
4 recommendation in 1986, that was reasonable because we
5 did not have any nested case-control study at that
6 point. We did not have any exposure information in our
7 study. But subsequently, Dr. Wu published a nested
8 case-control study based on the largest location in our
9 study. And that was published in 1989, subsequent to my
10 study, which was completed by 1986.
11 So, I'm not sure today, or -- not today -- I
12 mean in 1999 -- whether that was still the need to do a
13 nested case-control study for brain cancer --
14 Q. I --
15 A. -- because that was done by NIOSH.
16 Q. Okay. The sentence that I read you about the
17 nested case-control approach from Dr. Mundt's paper
18 here, Dr- Mundt uses the term "a nested case-control
19 approach is highly recommended." And you disagree with
20 "highly recommended", do you not?
21 A. No. He refers to two types of cancer, brain
22 cancer -- if you read the sentence further -- brain
23 cancer and also for connective and soft-tissue cancer.
24 Q. Uh-huh.
25 A. Okay? What I'm saying is with the NIOSH nested

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1 case-control study published in 1989, I don't think it
2 would be highly necessary to do to repeat that process.

3 Q. To your knowledge, as of today, has there been
4 a nested case-control study done in connection with
5 brain cancer/vinyl chloride exposure?

6 A. The NIOSH study did.

7 Q. That's a nested case-control study?

8 A. Yes, sir.

9 Q. And what made up the study group in that NIOSH
10 study? Was it your cohort?

11 A. Not the entire cohort, but it was the largest
12 location.

13 Q. A portion of your cohort?

14 A. Yes. The largest plant.

15 Q. Okay. Now, were the same people who were in
16 the Tabershaw/Gaffey cohort included in your cohort?

17 A. I did not do a cross check, but I assume they
18 were.

19 Q. Did Dr. Robert Morgan ever work on any vinyl
20 chloride epidemiological studies?

21 A. Not that I know of.

22 Q. Do you know Dr. Robert Morgan?

23 A. Yes.

24 Q. Tell us who Dr. Robert Morgan is.

25 A. We started -- as I told you, we started a

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1 company in 1981, and he was one of the principals of the
2 company.

3 Q. When did he leave the company?

4 A. Remember I told you in 1987, we became part of
5 ENSR Corporation? And according to the agreement
6 that -- the employment agreement, I would work for them
7 for -- all of us, the principals, would work for them
8 for three years. I left after three years. Dr. Morgan
9 left before the three years were up.

10 Q. Where did he go?

11 A. He started his own company.

12 Q. And to your knowledge, he never did -- did. any
13 work on the vinyl chloride epidemiological studies that
14 you did?

15 A. Not that I am aware of, no.

16 Q. Okay. Were there any people in your cohort who
17 had not been in Clark Cooper's cohort?

18 A. I believe, essentially, it's the same cohort.

19 Whenever you look at cohorts of tens of thousands of
20 workers, some of them may have some problems with the
21 name, problems with the birthday, you know, that kind of
22 thing, a very minority of them, and it -- depending on
23 how critical your cohort inclusion criteria were, you
24 may or may not keep that person in the cohort. But
25 essentially, I would say the people were the same.

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1 Q. All right. The original cohort studied by
2 Tabershaw/Gaffey was increased by Clark Cooper; is that
3 correct?

4 A. I don't remember the details, the difference
5 between Tabershaw and Gaffey study and the Cooper study.

6 Q. Can you tell me whether you are convinced that
7 your cohort consisted of 10,173 men?

8 A. That's the number we have in our study.

9 Q. Do you believe that to be accurate?

10 A. In what sense is accurate? That is an accurate
11 number of the people in our study. Are you referring to
12 the accuracy of the number? We count the number of
13 people in the study. It was 10,173.

14 Q. Men?

15 A. Men.

16 Q. Now, the first cohort that was studied by
17 Tabershaw and Gaffey had in it a total of 800 -- excuse
18 me -- 8,384 men. If you want to go back and look at the
19 1974 article, I think that you can confirm that that's
20 the correct number.

21 A. I don't have the 1974 article.

22 Q. All right. Did your cohort that you studied
23 for your 1991 article include the same individuals in
24 the original cohort of Tabershaw and Gaffey which
25 numbered 8,384 men?

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1 A. I do not have the data from the
2 Tabershaw/Gaffey study, so I would not be able to do a
3 cross check.
4 MR. STEWART: Where is Exhibit 1?
5 You're a lot of help, Ms. Reporter.
6 THE REPORTER: That could be 1 or 2. It's
7 somewhere in there.
8 MR. STEWART: Q. All right. I'm going to show
9 you once again Exhibit No. 1 and ask you to look at that
10 page and tell me how many people Tabershaw/Gaffey
11 reported as being in the original cohort that they
12 studied.
13 A. 8,384.
14 Q. Now, were those 8,384 subsumed into the cohort
15 studied by Clark Cooper?
16 A. I would think so.
17 Q. And so those 8,384 men in the original
18 Tabershaw/Gaffey cohort would have been in your cohort;
19 is that accurate?
20 A. I would -- I would think so, yes.
21 Q. And not only the 8,384 men that were in the
22 original Tabershaw/Gaffey cohort, but also the people
23 who were added to the cohort by Cooper to bring the
24 total up to 10,173, those would have been in your
25 cohort, would they not?

1 A. Yes.

2 Q. And they would have been in Clark Cooper's
3 cohort?

4 A. Yes.

5 Q. Tell the jury how many of those people in your
6 cohort of 10,173 were actually exposed to vinyl
7 chloride.

8 A. They are all employees at those facilities, and
9 to that extent, I would say other than maybe some
10 administrative personnel, everybody would have been
11 exposed to different levels of vinyl chloride.

12 Q. Were you able to validate that 10,173 men in
13 your cohort were exposed to vinyl chloride?

14 A. We did not validate the data. We obtained the
15 data through the previous study, Dr. Cooper's study.

16 Q. In your published paper of 1991, it's entitled,
17 "An Industry-Wide Epidemiologic Study Of Vinyl Chloride
18 Workers, 1942-1982.11

19 Is that correct?

20 A. Yes.

21 Q. Where did you come up with 1942?

22 A. 1942 would be -- the cohort was defined as
23 such, and the 1942 was from the previous study.

24 Q. Was 1942 mentioned in the Tabershaw/Gaffey
25 study?

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1 A. It would have been Dr. Cooper's study.
2 Q. Okay.
3 A. Because I -- basically, I update Dr. Cooper's
4 study.
5 Q. Do you have Dr. Cooper's study?
6 A. No, I do not. Not with me.
7 Q. I know where it is. Well, I looked at it just
8 a minute ago.
9 MR. COLBERT: I believe it's Plaintiffs'
10 Exhibit 4.
11 MR. STEWART: It's what?
12 MR. COLBERT: It's Plaintiffs' Exhibit 4.
13 MR. STEWART: Four? This court reporter keeps
14 hiding my exhibits from me.
15 Well, actually, I've got the one that was
16 published here somewhere.
17 Turn your machine off, please.
18 THE VIDEOGRAPHER: The time is 5:21 (sic).
19 We're off the record.
20 (Discussion off the record.)
21 THE VIDEOGRAPHER: The time is 6:22. We're
22 back on the record.
23 MR. STEWART: Q. Dr. Wong, I'm going to hand
24 you Clark Cooper's draft that you looked at earlier,
25 dated January of 1978, and ask you to look through
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1 whatever pages you want to to find out the definition of
2 Clark Cooper's cohort.

3 A. On page 6 of Exhibit PX 4, it says that "...it
4 was decided to omit a group of 15 workers who had
5 terminated employment before 1942." Okay?
6 And then later on he said, "For the 10,173
7 workers who terminated employment in 1942 or later,
8 9,677 were traced."

9 In other words, the cohort consisted of 10,173
10 workers who were employed as late as of 1942.

11 Q. No workers were included in Clark Cooper's
12 cohort who worked in the vinyl industry and were perhaps
13 exposed to vinyl chloride prior to 1942?

14 A. No, that's not what -- that's not what I just
15 told you.

16 Q. Well, is there someplace in here where Clark
17 Cooper gives a definition of his cohort?

18 A. Well, in those sentences, it could say that
19 people who work in or after 1942 were being included.
20 Those people who terminated their employment before 1942
21 would not be included. But that's different from what
22 you just said. You are getting tired.

23 Q. Well, I'm old.

24 (Whereupon, Plaintiffs' Exhibit No. 8
25 was marked for identification.)

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1 MR. STEWART: Q. I hand you what's identified
2 as Plaintiffs' Exhibit No. 8. That's a letter to
3 Dr. Milby.
4 Did he work with you back in August of 1982?
5 A. Tom Milby, as I said, was one of the
6 principals. I -- in fact, when he was there, he was --
7 he had the title of president of the company.
8 Q. And this letter to Dr. Milby, dated 5 August
9 1982, is from T.R. Torkelson of the Dow Chemical
10 Company, is it not?
11 A. Yes.
12 Q. And whether or not Dr. Milby was working with
13 you at the time, at least the letter was addressed to
14 Thomas H. Milby, Environmental Health Associates, 2150
15 Shattuck Avenue, Berkeley, California; is that correct?
16 A. Yes.
17 Q. Was that your address when you were in
18 Berkeley?
19 A. That was the address for Environmental Health
20 Associates.
21 Q. All right. Now, in this letter to
22 Environmental Health Associates, is Dr. Torkelson
23 telling Environmental Health Associates that as to most
24 Michigan-located employees who were included in the
25 cohort, that Dow would not furnish personal identifiers,
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1 nor had they previously furnished personal identifiers.
2 Dow "...will provide personalized data on all these
3 employees whom we cannot document to be alive at the
4 study cut-off date but not for those known to be alive."
5 Does that mean that Environmental Health
6 Associates was getting data that it had to take the Dow
7 Chemical Company's word for as being accurate because
8 you had no right to go in and validate the data?
9 A. Based on this, what it says here is for those
10 workers that Dow cannot document to be alive at the end
11 of the study, they would not provide personalized data.
12 On those they can document.
13 Q. Did any of the other companies invoke that type
14 of restraint on Environmental Health Associates during
15 your epidemiological study for CMA on vinyl chloride?
16 MR. COLBERT: Objection. Form.
17 THE WITNESS: I don't really remember. In
18 fact, I -- I don't even remember seeing this document.
19 (Whereupon, Plaintiffs' Exhibit No. 9
20 was marked for identification.)
21 MR. STEWART: Q. When you're doing an
22 epidemiological study, would you not prefer to have the
23 right to go in and collect the data yourself or through
24 your staff and then have the freedom to validate
25 anything that you copied to make sure that it was
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1 accurate?

2 A. Yes, we would.

3 Q. Okay. I'm now going to hand you what's
4 identified as Plaintiffs' Exhibit No. 9. Is that a
5 letter addressed to you and dated January 6, 1983?

6 A. Yes.

7 Q. And it appears to be from somebody named
8 Stephen Illes, who purports to be an industrial
9 hygienist for PPG Industries.

10 Was PPG Industries one of the plants in your
11 cohort?

12 A. I don't really recall.

13 Q. In this letter, Stephen Illes says we cannot
14 estimate -- well, let me read the whole letter.

15 "Your letter of December 23, 1982, requests
16 an estimate of time needed to complete the
17 data sheets on 35 identified individuals.

18 We cannot estimate this, however, we will
19 complete these data sheets once it has been
20 determined that the unidentified
21 individuals at PPG and other participating
22 companies will not have a significant
23 impact upon the study."

24 Do you recall getting such a letter?

25 A. It was addressed to me. I must have read this
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1 some time ago. I must say that I still don't understand
2 what it says.

3 Q. What do you not understand?

4 A. The last sentence is kind of strange:

5 "We will complete these data sheets once it
6 has been determined that the unidentified
7 individuals at PPG and other participating
8 companies will not have a significant
9 impact upon the study."

10 I don't understand what that means.

11 Q. Well, did you write a letter to somebody at PPG
12 and ask them to provide you only data that would not
13 have a significant impact upon your study?

14 A. I don't understand the sentence. This sentence
15 does not come from me. I don't know what that means.

16 Q. When you asked one of the companies in your
17 cohort for data, did you put any limitations such as,
18 however, if you people think that such data may have an
19 impact upon the outcome of my study, well, don't send it
20 to me?

21 A. Of course not. I don't understand the
22 sentence. I don't understand what that means.

23 Q. That's not something that you would do, is it?

24 A. Absolutely not.

25 Q. Because if -- if companies are sitting around

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1 and making an informed decision from their standpoint,
2 at least, as to whether or not the data is going to have
3 some impact upon your study before they give it to you,
4 that's not the proper way to conduct an epidemiological
5 study, is it?

6 MR. COLBERT: Objection. Form.

7 THE WITNESS: No. And I must emphasize I don't
8 understand impact on what aspect of the study.

9 MR. STEWART: Q. Do you have any reason to
10 believe that there were workers in the United States who
11 worked for companies that were in your cohort who were
12 exposed to vinyl chloride before 1942?

13 A. They would be in our cohort if they worked for
14 those 37 locations that were in our study, as long as
15 they have worked in or after 1942.

16 Q. Do you recall ever talking to Sir Richard Doll?

17 A. On my study or -

18 Q. Do you recall ever in your life having talked
19 to Sir Richard Doll?

20 A. Not on a personal basis, no.

21 Q. Well, what other basis would there be?

22 A. I don't know whether at meetings, you know, if
23 he's -- gave a presentation, whether I asked some
24 questions or not. That I don't remember. But
25 certainly, I have not talked to him one to one.

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1 Q. Right. You've never talked to him on the
2 telephone, have you?
3 A. No.
4 Q. Would you agree with me that the information
5 about the 1986 study that you did was furnished to Sir
6 Richard Doll by William Gaffey?
7 A. That I don't know.
8 Q. Hmm?
9 A. I don't know. I don't know whether that's the
10 case or not.
11 Q. Well, you never sent any kind -- any
12 information to Sir Richard Doll, did you?
13 A. Not that I recall right now.
14 Q. Are you familiar with a company in the U.K. by
15 the name of Imperial Chemicals, Incorporated? ICI?
16 A. I heard of the name.
17 Q. Have you ever known or talked to anybody who is
18 affiliated with that company?
19 A. Not that I remember.
20 Q. Have you ever -- do you recall ever having any
21 communication with a Dr. Bennett, who worked with ICI,
22 U.K.?
23 A. Bennett? That doesn't ring a bell.
24 (Whereupon, Plaintiffs' Exhibit No. 10
25 was marked for identification.)
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1 MR. STEWART: Q. Okay. I'm going to hand you
2 what's identified as No. 10, and this document says it's
3 a Status Report on Chronic Vapor Inhalation Study and
4 Recommendations on In-Depth Audit. Then on down toward
5 the bottom, we see "Equitable Environmental Health,
6 Inc."
7 Looking at the names on the first page of this
8 document, do you know any of those persons: Bell,
9 Benya, Hatfield, Henry, Torkelson, Olson, Seawall --
10 Seawell?
11 A. I heard of the name Torkelson.
12 Q. Did you know J.T. Seawell?
13 A. He was an employee of MCA.
14 Q. And you were acquainted with him?
15 A. No, not that I can -- I dealt with Dr. Shah, I
16 believe, when I did the study.
17 Q. Now, the second page of that exhibit, in the
18 second paragraph, it says:
19 "In addition to the necessary corrections
20 cited above, the Panel was unanimous in its
21 recommendation that the following
22 additional work be performed by EEH in
23 order that the final report be as
24 scrupulously correct as possible:
25 "1. That it be recorded in an appropriate
DEPOSITION OF OTTO WONG - VOLUME I 247

1 section of the report that the
2 investigators observed that the incidence
3 of brain tumors was found to be in excess,
4 twelve observed versus 5.9 expected
5 (significant at the 0.05 level). However
6 the incidence was not related either to
7 duration of exposure nor to intensity of
8 exposure to vinyl chloride monomer."
9 Now, that's a recommendation coming to you and
10 your company from the Chemical Manufacturers
11 Association?
12 MR. COLBERT: Objection. Form.
13 THE WITNESS: I have to stop you right here.
14 This refers to the Cooper study, not my study. This
15 refers to the report prepared by Equitable Environmental
16 Associates. I was not involved in that study at all.
17 It is a big distinction.
18 MR. STEWART: Q. Okay. So, this is a
19 recommendation being made by the Chemical Manufacturers
20 Association to Clark Cooper that he was to go further in
21 his final study or final report and say that there was
22 an incidence of brain tumors found to be in excess, but
23 CMA wanted him to add that the incidence was not related
24 either to duration of exposure nor to intensity of
25 exposure to vinyl chloride monomer.

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1 Is that what that is?
2 MR. COLBERT: Objection. Form.
3 THE WITNESS: That's what it says. But then I
4 don't know whether this document was mailed to
5 Dr. Cooper or not. I don't know who received this
6 document. This document that you're talking about. I
7 don't know who -- who's the receiver of this document.
8 I don't know whether that statement, "However, the
9 incidence was not related either to the duration of
10 exposure nor to intensity of exposure to vinyl chloride
11 monomer," whether that statement is justified or not.
12 It doesn't matter who wrote that. The basic
13 question is, is it true? And we can look at the data to
14 determine whether that statement is true or not.
15 MR. STEWART: Q. Well, did you ever submit any
16 draft final reports of your study to CMA, only to have
17 them mark it up and tell you that they wanted you to
18 make certain changes in your draft?
19 A. Well, that would be included in the comments.
20 Comments would come in different forms.
21 "This is a typo," is one of the comments.
22 THE REPORTER: I'm sorry. "This is a typo"?
23 THE WITNESS: A typo, one type of comment.
24 "The sentence is not clear. Clarify that." "The
25 numbers don't match up with what you said earlier."
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1 That would be comments.
2 Or, "Justify what you say. Give a reference."
3 It depends on what the comments are. The
4 sponsor would be entitled to comment on the report.
5 They have the right to do that. But at the same time,
6 we have the right to accept or not to accept the
7 comments. If they're reasonable, if they're valid, we
8 explain what -- why we did it. If it's typo, we make
9 the correction. But if something that we don't agree,
10 we would not accept. We would not change that, and we
11 would tell them why.
12 MR. STEWART: Q. Well, when you made your
13 proposals and you got your contract with CMA to do the
14 vinyl chloride study, did CMA tell you at that time that
15 you were not going to be able to validate certain
16 information, as was set forth in Ted Torkelson's letter
17 to you?
18 A. Because some information was missing from the
19 Cooper database, and we understand that's one of the
20 limitations of the data, that we will not be able to go
21 back and verify every case, all the employment
22 information. That's the limitation of the study.
23 Q. Well, have you ever done an epidemiological
24 study on another chemical compound than vinyl chloride
25 in which you had a large cohort working at a number of

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1 plants, and have the management personnel at one or more
2 of the plants tell you that you would not be able to
3 validate information on any of their employees whom they
4 could not confirm to be dead?

5 A. I think we are mixing different types of
6 information again.

7 Q. No.

8 A. This morning we talk about we need to
9 sometimes, for some cases, we need to verify demographic
10 information: name, Social Security number, gender and
11 race and so on. For vital status, we went outside. We
12 used Social Security Administration. We used the
13 National Death Index.

14 Q. Well, if you were reading some data that was
15 furnished to you by some of the management personnel
16 from the plants included in the study group, and you
17 came across -- oh, let's say 10 or 11 names that we
18 usually associate with female gender -- and bearing in
19 mind that this cohort is supposed to be all male, is it
20 not?

21 A. Yes, that's correct.

22 Q. -- would you think that it would be reasonable
23 and prudent for you, as an epidemiologist, to contact
24 that plant and find out whether or not these people with
25 a first name Linda and Mary and so forth were male or

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1 not?

2 MR. COLBERT: Objection. Form.

3 THE WITNESS: Yes, we would do that. But if
4 there is no note to document the information, to confirm
5 one way or another, then we look at the "what if"
6 question. If we take these 10 people out, if we take
7 these 15 people out, would that have any real impact on
8 the finding?

9 There is no study that's perfect. But if none
10 of those people die from angiosarcoma, none of those
11 people die from brain cancer, it doesn't matter. We are
12 looking for a small number.

13 If we had another brain cancer, yes. If there
14 is another angiosarcoma, yes, the number may change
15 somewhat.

16 Q. Well, let's assume that you in fact had the
17 situation where one of the plants in your cohort had a
18 total of 59 people employed, and this plant furnished to
19 you all the data that you asked for, and it turns out
20 that this plant is reporting to you 11 females with
21 exposure. Now, is that just a minor typographical error
22 or oversight, in your opinion?

23 MR. COLBERT: Objection, form.

24 THE WITNESS: Well, I think you changed your
25 question somewhat. Because early on, you said the names

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1 would suggest a female. Now you are saying female for
2 sure.
3 What I'm saying, if there is no document to
4 confirm the gender either way, then we analyze the data
5 by looking at the situation: What if? If we take these
6 people out, would the result change completely? That is
7 really the key question.
8 I think it's easy to make a big deal out of,
9 yes, you include some females in the study. But the
10 bottom line is, does that make any difference to the
11 results? Do those female employees die from
12 angiosarcoma? Do those employees, those few employees,
13 die from brain cancer?
14 MR. STEWART: Q. Well, isn't it also important
15 to your study that the companies who are providing you
16 with data are not representing to you that certain of
17 their employees have had vinyl chloride exposure when in
18 fact, they've never been exposed?
19 MR. COLBERT: Objection. Form.
20 THE WITNESS: If indeed that's the case, as we
21 said this morning, then we would have some
22 misclassification problem. We classify -- classify -
23 classify people into the exposed group when they were
24 not exposed.
25 MR. STEWART: Q. What if one-third of the

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1 10,173 members of your cohort had never been exposed to
2 any amount of vinyl chloride monomer?
3 A. They work at the location and they have zero
4 exposure?
5 Q. No. What if one-third of the 10,173 members of
6 your cohort had been represented to you as having been
7 exposed, when in fact, they had never been exposed?
8 Would that affect the legitimacy of the conclusions that
9 you reached in your study?
10 MR. COLBERT: Objection. Form.
11 THE WITNESS: I need to know a little bit more
12 before I can answer the question.
13 My question to you is, would those people work
14 at the same location as the exposed workers, the same
15 plant, and they have zero exposure?
16 MR. STEWART: Q. Well, if we're talking about
17 one-third of 10,000 people, that's 300-and-some-odd
18 folks. If you've got --
19 MS. STEWART: Three thousand.
20 MR. STEWART: Huh?
21 MS. STEWART: Three thousand.
22 MR. STEWART: Three thousand.
23 Q. If you've got bum information on 3,000
24 people -- bum information being that you're told that
25 they were exposed when in truth, they never had been
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254

1 exposed -- would that affect the legitimacy of your
2 conclusion?

3 MR. COLBERT: Objection. Form.

4 THE WITNESS: I find it very difficult to
5 envision a situation that somebody who work at the same
6 location, at the same plant, would not have at least
7 some exposure, indirect or minimal exposure. "Exposure"
8 is a relative term.

9 MR. STEWART: Well, I agree with that.

10 Q. Do you think that it would have affected the
11 outcome of your study if -- if the companies who were in
12 the cohort represented to you that as many as 3,000
13 employees were exposed when in truth, they had not been
14 exposed?

15 MR. COLBERT: Objection. Form.

16 THE WITNESS: I said at least three or four
17 times now that I find it very difficult to believe that
18 somebody -- somebody who work at the same location, at
19 the same plant, would not have some minimal, indirect
20 exposure, just by walking through the area, just by
21 exposing to the general environment. So, everybody at
22 the location would have been exposed. Some, exposed
23 directly, would have been exposed to a higher level than
24 the others.

25 Now, if I do some analysis by level of

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1 exposure, than I would run into trouble because some of
2 those people with minimal exposure, with indirect
3 exposure, if I include them in the high-exposure group,
4 that would be a problem. But we never did any analysis
5 by level of exposure in our study.

6 MR. STEWART: Q. How did you define your
7 cohort?

8 A. Everybody employed for at least one year,
9 between certain years, at those locations.

10 Q. What did your cohort definition have to say
11 about exposure versus nonexposure?

12 A. According to -- I get a cohort from
13 Dr. Tabershaw.

14 Q. That's right.

15 A. According to Tabershaw, everybody was exposed
16 in his study.

17 Q. Well, the first study done by
18 Tabershaw/Gaffey, it broke the categories into -- am I
19 correct? -- high, medium, and low exposure and no
20 exposure.

21 Is that accurate?

22 A. That's what they call. I think that's the
23 case.

24 Q. Go ahead.

25 A. I assumed that was the case.

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11_ Q. It was the same -- the same thing done by Clark
2Cooper, that is, to categorize exposed cohort members as
3 high, medium, and low, and not exposed?
4 A. I don't recall what the classifications were.
5 Q. Well, didn't you collapse yours down to exposed
6 and nonexposed?
7 A. No. I assumed everybody who worked there
8 would have some exposure. Some minimal exposure at
9 least.
10 Q. Well, when you were seeking data from the
11 companies in the cohort, did you continue to use the
12 questions that you propounded to the plants with regard
13 to exposures: I want you to break it down into high,
14 medium, and low?
15 A. No, we did not.
16 Q. So, you collapsed yours?
17 A. I did not collapse mine because I never have
18 any exposure category to start with.
19 Q. But Cooper did?
20 A. Cooper may have, but we did not use that.
21 Q. And Gaffey did?
22 A. We did not use his classification either.
23 (Whereupon, Plaintiffs' Exhibit No. 11
24 was marked for identification.)
25 MR. STEWART: Q. I'm going to hand you what's
DEPOSITION OF OTTO WONG - VOLUME I 257

1 identified as Plaintiffs' Exhibit No. 11, and this is
2 dated October 28, 1982. It purports to be an
3 interoffice communication at Conoco.
4 Now, Conoco was one of the plants included in
5 your cohort, was it not?
6 A. I don't recall, but I assume that's the case.
7 Q. Number 1: "It was decided as general
8 guideline that an employee would be classed
9 as exposed if his or her routine job
10 duties" -- "if in his or her routine job
11 duties, 25% or more of the time an exposure
12 'potential' existed. This basically means
13 being in the process area."
14 Is that satisfactory to you for identifying an
15 exposed member of the cohort?
16 MR. COLBERT: Objection. Form.
17 THE WITNESS: That's one way to identify
18 exposed employees, yes. That would be a reasonable
19 definition to use.
20 MR. STEWART: Q. Well, I thought you defined
21 your cohort, number one, as being 10,173 men?
22 MR. COLBERT: Objection. Form.
23 THE WITNESS: Well, I'm talking about referring
24 to the 25 percent or more time. I don't know where
25 that -- if this statement refers in general to exposure
DEPOSITION OF OTTO WONG - VOLUME I 258

1 or, indeed, this person was given a list of names with
2 females on' the list. I don't know that.

3 MR. STEWART: Q. What this letter talks about
4 is exposure, and they put it in quotes, "potential."

5 A. Yes.

6 Q. Now, did you, in your seeking data from members
7 of the cohort, did you ask the companies for data on
8 employees with exposure potential?

9 A. No, I did not. In fact, in our study, we
10 decided not to use any exposure classification, high,
11 medium, and low, because the terminology, the
12 definition, may change from location to location. We
13 find that not consistent, and therefore, we did not use
14 that at all. We analyzed the entire group as being
15 exposed.

16 Q. Right. And you did that based upon the
17 information that was given to you by the various
18 companies that were in your cohort?

19 A. Not true. I based that on Dr. Cooper's data.

20 Q. Well, Dr. Cooper got -- had to get his
21 information from the companies that were in the cohort,
22 didn't he?

23 A. That's correct.

24 Q. Okay.

25 MR. COLBERT: We're running a little past

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1 7 o'clock, Vaughan. Is this a good place to stop?
2 MR. STEWART: Is that when the parking garage
3 closes, in a minute?
4 MR. COLBERT: That's when we may be staying
5 here the night whether we want to or not.
6 MR. STEWART: Well, we'll go off and resume.
7 THE VIDEOGRAPHER: This concludes Volume 1 of
8 the deposition of Dr. Otto Wong. The time is 7:04.
9 We're off the record.
10 (Whereupon, the deposition was adjourned at
11 7:04 p.m., to be continued on Wednesday, March 13, 2002,
12 at 8:00 a.m.)
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16 OTTO WONG
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1 CERTIFICATE OF REPORTER

2

3 I, KAREN E. THOMPSON, a Certified-Shorthand
4 Reporter of the State of California, do hereby certify:

5 That OTTO WONG in the foregoing
6 deposition named, was present and by me sworn as a
7 witness in the above-entitled action at the time and
8 place therein specified;

9 That said deposition was taken before me
10 at said time and place, and was taken down in
11 shorthand by me, a Certified Shorthand Reporter
12 of the State of California, and was thereafter
13 transcribed into typewriting, and that the foregoing
14 transcript constitutes a full, true, and correct record
15 of said deposition and of the proceedings which took
16 place;

17 That I am a disinterested person to the said
18 action.

19 IN WITNESS WHEREOF, I have hereunder subscribed
20 my hand on this 18th day of P4arch_, 20_Q2,

21

22

23

24 KAREN E. THOMPSON, CSR No. 2792

25

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