

1 UNITED STATES DISTRICT COURT
2 FOR THE DISTRICT OF NEW JERSEY

3 GRACE M. GRASSO, :
4 EXECUTRIX OF THE : DOCKET NUMBER
5 ESTATE OF JOHN C. : 72-1552
6 GRASSO, DECEASED, :
7 PLAINTIFF, :
-V- : TRIAL
8 B.F. GOODRICH : VOLUME 3 ORIGINAL
9 COMPANY. :
10 DEFENDANT. :

11 BEFORE: THE HONORABLE STANLEY S. BROTHMAN,
12 UNITED STATES DISTRICT JUDGE

13
14 DATE: THURSDAY, JANUARY 22, 1991

15 APPEARANCES:

16 MESSRS. BROWN, CONNERY, KULP, WILLE,
17 PURNELL AND GREENE,
18 BY: MICHAEL J. VASSALOTTI, ESQUIRE,
19 ATTORNEYS FOR THE PLAINTIFF.

20 MESSRS. SCHUENEMANN AND GERCKE
21 BY: STEPHEN DUMSER, ESQUIRE,
22 AND

23 MESSRS. HARVEY, PENNINGTON, HERTING AND
24 RENNEISEN
25 BY: G. WAYNE RENNEISEN, ESQUIRE,
ATTORNEYS FOR THE DEFENDANT.



LEGAL SUPPORT SERVICES

1400 David Stott Building
Detroit, Michigan 48226
965-5445

ASI-PR 0004307

1 THE JURY PRESENT.)

2 THE COURT: CALL YOUR NEXT
3 WITNESS.

4 MR. VASSALOTTI: THANK YOU,
5 YOUR HONOR. DOCTOR SAMUEL EPSTEIN.
6 SAMUEL EPSTEIN SWORN.

7 DIRECT EXAMINATION BY MR. VASSALOTTI.

8 Q. DOCTOR, BY WHOM ARE YOU PRESENTLY
9 EMPLOYED?

10 A. THE UNIVERSITY OF ILLINOIS MEDICAL
11 CENTER IN CHICAGO.

12 Q. AND WHAT IS YOUR POSITION WITH THE
13 UNIVERSITY OF ILLINOIS MEDICAL CENTER?

14 A. I'M PROFESSOR OF OCCUPATIONAL AND
15 ENVIRONMENTAL MEDICINE.

16 Q. CAN YOU DESCRIBE THE AREA OF
17 MEDICINE AND/OR TOXICOLOGY THAT YOU ARE
18 INVOLVED WITH IN THAT POSITION?

19 A. MY MAJOR PROFESSIONAL INTERESTS
20 RELATING TO THE TOXICS AND CANCER CAUSING OR
21 CARCINOGENIC EFFECTS OF CHEMICALS IN THE
22 ENVIRONMENT WITH PARTICULAR REFERENCE TO
23 POLLUTANTS IN AIR, FOOD, WATER AND THE WORK
24 PLACE.

25 Q. YOU ARE A MEDICAL DOCTOR?

1 A. I AM.

2 Q. COULD YOU GIVE US A SUMMARY OF YOUR
3 EDUCATIONAL BACKGROUND IN THE MEDICAL FIELD?

4 A. I GRADUATED IN MEDICINE IN LONDON IN
5 1950, HAVING QUALIFIED BEFORE THAT AS A
6 PHYSIOLOGIST. I SPENT SEVERAL YEARS IN THE
7 ARMY AS A PATHOLOGIST. I THEN WORKED IN
8 LONDON UNIVERSITY TEACHING MEDICINE,
9 PATHOLOGY AND TOXICOLOGY AND ALSO DOING
10 RESEARCH IN AREAS OF CANCER. I CAME TO THIS
11 COUNTRY IN 1960 TO HARVARD AND WORKED AT THE
12 CHILDREN'S CANCER RESEARCH FOUNDATION IN
13 BOSTON ON PROBLEMS OF ENVIRONMENTAL TOXICOLOGY:
14 THAT IS AGAIN THE TOXIC EFFECT OF CHEMICALS
15 IN AIR, FOOD AND WATER AND WAS ALSO A
16 PATHOLOGIST AT HARVARD MEDICAL SCHOOL.

17 I WENT TO CASE WESTERN
18 RESERVE MEDICAL SCHOOL IN CLEVELAND WHERE I
19 HAD A CHAIR IN HUMAN ECOLOGY AND MOVED TO
20 CHICAGO IN 1975.

21 Q. AND THAT IS WHERE YOU WORK NOW, IN
22 CHICAGO?

23 A. THAT IS CORRECT.

24 Q. DOCTOR, HAVE YOU RECEIVED ANY AWARDS
25 FOR YOUR MEDICAL OR RESEARCH WORK?

1 A. YES. I RECEIVED A VARIETY AWARDS IN
2 THE WORLD ARMY MEDICAL CORP.

3 Q. THAT'S IS IN THE BRITISH ARMY?

4 A. BRITISH ARMY. I'VE ALSO RECEIVED
5 SOCIETY OF TOXICOLOGY. IT'S AN AWARD IN THIS
6 COUNTRY IN 1959, SOCIETY -- SOCIETY OF
7 TOXICOLOGY ACHIEVEMENT AWARD AND A VARIETY
8 OTHER PROFESSIONAL SCHOLARSHIP AND
9 DISTINCTION.

10 Q. WHAT IS TOXICOLOGY?

11 A. TOXICOLOGY IS THE SCIENCE OF ADVERSE
12 EFFECTS, THE STUDY OF ADVERSE EFFECTS
13 GENERALLY IN RELATION TO THE EFFECTS OF
14 CHEMICALS.

15 Q. AND YOU MENTIONED THAT YOUR PRIMARY
16 INTERESTS AS A PHYSICIAN WAS STUDYING THE
17 TOXIC AND CANCER CAUSING EFFECTS OF CHEMICALS
18 IN THE ENVIRONMENT?

19 A. THAT IS CORRECT.

20 Q. AND IN THE WORK PLACE AS WELL?

21 A. YES.

22 Q. DOCTOR, HAVE YOU SERVED ON ANY
23 GOVERNMENT COMMITTEES OR WORKED WITH ANY
24 GOVERNMENT AGENCIES AS A CONSULTANT OR ACTED
25 AS A CONSULTANT TO ANY OTHER ORGANIZATIONS

DIRECT EXAMINATION - SAMUEL EPSTEIN - MR. VASSALOTTI?

1 RELATED TO YOUR WORK IN THE FIELD OF
2 TOXICOLOGY AND ENVIROMENTAL AND OCCUPATIONAL
3 MEDICINE?

4 A. YES. I SERVE AS A CONSULTANT TO THE
5 UNITED STATES CONGRESS, THE SENATE COMMITTEE
6 OF PUBLIC WORKS FOR SEVERAL YEARS.

7 Q. WHEN WAS THAT?

8 A. ABOUT 1969 TO ABOUT 1974, SOMETHING
9 LIKE THAT.

10 AND VARIOUS OTHER
11 CONGRESSIONAL COMMITTEES ON SUBSEQUENT
12 OCCASIONS SINCE THEN. I'VE CONSULTED
13 EXTENSIVELY AND ACTED AS AN EXPERT WITNESS
14 FOR THE ENVIROMENTAL PROTECTION AGENCY IN
15 PROCEEDINGS RELATING TO CANCER CAUSING
16 PESTICIDES AND ACTIONS TAKEN TO REMOVE THESE
17 FROM THE MARKET. I'VE ALSO CONSULTED AND
18 ACTED AS AN EXPERT WITNESS FOR THE
19 OCCUPATIONAL SAFETY AND HEALTH COMMISSION
20 -- THAT GOES THE PART OF THE DEPARTMENT OF
21 LABOR THAT HAS AUTHORITY AND JURISDICTION ON
22 PROBLEMS OF WORKERS HEALTH AND PUBLISHED
23 SAFETY AND HAVE INTERESTS IN THIS CONNECTION,
24 I WAS ON A COMMITTEE ESTABLISHED IN 1973 BY
25 THE DEPARTMENT OF LABOR TO EXAMINE THE

1 QUESTION OF STANDARD SETTING FOR CANCER
2 CAUSING CHEMICALS IN THE WORK PLACE. AND I'VE
3 ALSO SERVED AS CONSULTANT AND EXPERT IN OTHER
4 AGENCIES, INCLUDING THE NATIONAL INSTITUTE OF
5 HEALTH. OCCASIONS, I'VE SERVED ON AN ADHOC
6 BASIS AS CONSULTANT TO LABOR, TO THE AFL-CIO,
7 I'VE ALSO SERVED AS CONSULTANT TO INDUSTRIES
8 THAT HAVE ASKED FOR MY SERVICES IN CONNECTION
9 WITH PROBLEMS IN THE WORK PLACE.

10 Q. DOCTOR, HAVE YOU WRITTEN ANY
11 ARTICLES THAT HAVE BEEN PUBLISHED IN ANY
12 SCIENTIFIC OR MEDICAL JOURNALS?

13 A. APPROXIMATELY, 250 ARTICLES I'VE
14 WRITTEN IN -- WHICH HAVE APPEARED IN
15 SCIENTIFIC JOURNALS. I'M AN AUTHOR OF 34 OR
16 35 BOOKS.

17 Q. WELL, HAVE ANY OF THOSE ARTICLES
18 -- LET'S STICK WITH THOSE FOR AWHILE --
19 OR THE BOOKS DEALT WITH ISSUES ARE CANCER OR
20 CANCER CAUSING CHEMICALS?

21 A. I WOULD SAY THE MAJORITY, THE GREAT
22 MAJORITY OF MY WRITINGS HAVE BEEN IN THE
23 AREAS OF CANCER, CANCER IN HUMANS, CANCER
24 CAUSATION, EXPERIMENTAL STUDIES IN ANIMALS
25 AND THE REGULATORY IMPLICATIONS OF THESE

1 SCIENTIFIC FINDINGS.

2 Q. HAVE YOU, IN FACT, ENGAGED IN
3 CLINICAL RESEARCH CANCER CAUSING CHEMICALS?

4 A. I'VE DONE VERY EXTENSIVE STUDIES IN
5 ANIMALS ON CERTAIN CARCINOGENICS, EFFECTS OF
6 CHEMICAL, THAT IS THE ABILITY OF CHEMICALS TO
7 INDUCE IN ANIMALS AND ALSO SUSCEPTIBILITY.

8 Q. NOW, DOCTOR, YOU'VE MENTIONED YOU'VE
9 WRITTEN -- I THINK YOU SAID FOUR BOOKS THAT
10 DEALT WITH THE SUBJECT -- WELL, DO THEY DEAL
11 WITH THE SUBJECT OF CANCER AND CANCER-CAUSING
12 CHEMICALS?

13 A. WELL, LET'S TRY TO REMEMBER. THE
14 FIRST BOOK WAS ON THE GENETIC HAZARD FROM
15 PESTICIDES, WHICH REALLY ISN'T DIRECTLY
16 RELATED TO CANCER, BUT THIS IS ANOTHER SET OF
17 HAZARDS. THESE ARE HAZARDS FROM EXPOSURE TO
18 PESTICIDES.

19 ANOTHER BOOK WAS ON THE NON-
20 PSYCHIATRIC EFFECTS, HAZARDOUS EFFECTS OF
21 DRUGS OF ABUSE, THE ABILITY OF DRUG ABUSE TO
22 PRODUCE BIRTH DEFECTS, CANCER, GENETIC
23 ABNORMALITIES. I'VE ALSO WRITTEN TWO VOLUMES
24 ON CONSUMER PRODUCT SAFETY, THE WHOLE
25 QUESTION OF HAZARD OF CONSUMER PRODUCTS,

1 AMONG OTHERS, REFERENCE TO THE AN ABILITY OF
2 PRODUCTS TO PRODUCE CANCER. THE RECENT BOOK
3 OF ONE IS ON THE -- IT WAS TITLED THE
4 POLITICS OF CANCER, WHICH DISCUSSES THE
5 SCIENCE OF CANCER. I HAD RANGE OF RELATED
6 PROBLEMS OF CANCER CAUSING CHEMICALS IN THE
7 ENVIRONMENT IN AIR, WATER FOOD AND THE WORK
8 PLACE AND DRUGS. I THINK THOSE ARE THE MAJOR
9 BOOKS WHICH I CAN RECALL.

10 Q. NOW, DOCTOR, IN YOUR WORK AS A
11 MEDICAL DOCTOR -- PHYSICIAN, SPECIALIZING
12 IN THE TOXIC AND CANCER CAUSING EFFECTS OF
13 CHEMICALS, HAVE YOU BECOME FAMILIAR WITH A
14 DISEASE AS ANGIOSARCOMA OF THE LIVER?

15 A. YES.

16 Q. WHAT IS ANGIOSARCOMA OF THE LIVER?

17 A. IT IS A MALIGNANT DISEASE OR CANCER
18 IN A GENERAL SENSE OF THE WORD. IT ISN'T A
19 TRUE CANCER, BECAUSE IT AFFECTS PARTICULAR
20 NON-EPITHELIAL CELLS IN THE BODY. IN THE
21 LAYMEN'S SENSE OF THE WORD, YOU CAN CALL IT A
22 CANCER OF BLOOD FORMING CELLS WHICH CAN OCCUR
23 IN DIFFERENT PARTS OF THE BODY, BUT IN
24 PARTICULAR IN THE LIVER, WHICH IS THE --
25 PERHAPS THE COMMONEST SIGHT OF WHICH IT HAS

1 BEEN NOTED.

2 Q. WELL, IS THAT A COMMON FORM OF
3 CANCER. I'M A LAYMAN. I'M GOING TO CALL IT
4 CANCER?

5 A. NO, IT'S A VERY RARE FORM OF CANCER.

6 Q. TO YOUR KNOWLEDGE, DOCTOR, ARE THERE
7 ANY KNOWN CAUSES OF ANGIOSARCOMA OF THE LIVER
8 THAT HAVE BEEN GENERALLY ACKNOWLEDGED OR
9 ACCEPTED IN THE MEDICAL COMMUNITY?

10 A. YES, I THINK IT'S FAIR TO SAY THERE
11 ARE FOUR RECOGNIZED CAUSES. THE FIRST IS
12 VINYL CHLORIDE, THE SECOND ARE ARSENIC
13 COMPOUNDS, THE THIRD IS THORIUM DIOXIDE OR
14 THORAS AND THE FOUR ARE ANTIBIOTIC STEROIDS.

15 Q. NOW, YOU MENTIONED, DOCTOR, THAT
16 VINYL CHLORIDE IS ACCEPTED AS A PROBABLE
17 CAUSE OF ANGIOSARCOMA OF THE LIVER. IS THAT
18 THE GAS USED IN THE MANUFACTURE OF PVC? ARE
19 YOU FAMILIAR WITH THE PVC INDUSTRY?

20 A. YES, YES.

21 Q. AND VINYL CHLORIDE IS USED IN THE
22 MANUFACTURE OF PVC?

23 A. CORRECT.

24 Q. DOCTOR, ARE YOU FAMILIAR WITH THE
25 -- STRIKE THAT.

1 WHEN DID IT BECAME --
2 STRIKE THAT, ALSO.

3 IN THIS CASE, DOCTOR, B.F.
4 GOODRICH COMPANY, I BELIEVE, IS TAKING THE
5 POSITION THAT IT WASN'T UNTIL THE VERY END OF
6 1973 OR THE BEGINNING OF 1974 THAT THEY
7 REALIZED THAT THERE WAS ANY CONNECTION
8 BETWEEN VINYL CHLORIDE AND ANGIOSARCOMA OF
9 THE LIVER. ARE YOU FAMILIAR WITH THE
10 SCIENTIFIC AND MEDICAL EVIDENCE IN RESEARCH
11 THAT LED TO THE CONCLUSION THAT VINYL
12 CHLORIDE WAS THE CAUSE OF CANCER AND
13 ANGIOSARCOMA OF THE LIVER BEFORE THAT TIME?
14 A. COULD I ASK YOU TO REPHRASE THAT,
15 BECAUSE --

16 MR. RENNEISEN: I'D LIKE TO
17 OBJECT TO THE QUESTION.

18 THE COURT: I'M GOING TO
19 SUSTAIN THE OBJECTION. LET'S ASK THE QUESTION.
20 LET'S NOT --

21 MR. VASSALOTTI: I'M SORRY,
22 YOUR HONOR.

23 THE COURT: GET TO THE
24 QUESTION AND LET'S NOT HAVE ANY STATEMENT.
25 BY MR. VASSALOTTI:

1 Q. ARE YOU FAMILIAR WITH THE
2 DEVELOPMENT OF SCIENTIFIC AND MEDICAL
3 EVIDENCE IN RESEARCH THAT LED TO THE
4 CONCLUSION THAT VINYL CHLORIDE IS A CAUSE OF
5 ANGIOSARCOMA OF THE LIVER?

6 A. YES..

7 Q. ARE YOU ABLE TO TRACE THE
8 DEVELOPMENT OF THAT LITERATURE FOR US HERE?

9 A. YES. I WOULD ALSO LIKE TO INCLUDE IN
10 THIS TRACING A VERY BRIEF STATEMENT OF
11 EFFECTS OTHER THAN CANCER INDUCED BY VINYL
12 CHLORIDE, WHICH I THINK IT WOULD BE HELPFUL
13 TO THE COURT'S UNDERSTANDING OF THIS ISSUE,
14 IF I MAY.

15 Q. OKAY.

16 A. I'LL --

17 MR. RENNEISEN: YOUR HONOR, I
18 WOULD OBJECT. I THINK COUNSEL SHOULD ASK
19 QUESTIONS AND THE WITNESS SHOULD ANSWER THE
20 QUESTIONS. THAT'S THE WAY --

21 THE COURT: I'M GOING TO
22 ALLOW HIM TO INCLUDE THAT. OVERRULED. LET'S
23 PROCEED.

24 A. LET ME LIST BRIEFLY THE CHRONOLOGY
25 OF INFORMATION THAT DEVELOPED BEFORE 1974

1 WHEN IT FIRST PUBLISHED RECOGNITION OF THE
2 CANCER HAZARD OF VINYL CHLORIDE IN THE WORK
3 PLACE WERE KNOWN, AND I'LL DIVIDE MY ANSWER
4 INTO TWO CLASSES. FIRST OF ALL, INFORMATION
5 KNOWN WITH RESPECT TO ANIMAL STUDIES AND
6 SECONDLY, INFORMATION KNOWN WITH RESPECT TO
7 HUMAN DATA.

8 THERE'S VERY EXTENSIVE
9 LITERATURE GOING BACK TO 1930 ON THE EFFECTS
10 OF VINYL CHLORIDE IN ANIMAL STUDIES AND AS
11 EARLY AS 1930, THERE WERE REPORTS IN THE
12 LITERATURE THAT VINYL CHLORIDE HAD VERY HIGH
13 CONCENTRATIONS, FIVE PERCENT CONCENTRATIONS,
14 COULD PRODUCE ACUTE TOXICITY IN ANIMALS.
15 SUBSEQUENT TO THAT, FROM ABOUT 1930 ON WARD,
16 FROM 1930 TO 1950, THERE WERE SEVERAL
17 PUBLICATIONS, AGAIN CONFIRMING THE ACUTE
18 TOXICITY -- THAT'S THE ABILITY OF HIGH
19 CONCENTRATION OF VINYL CHLORIDE TO KILL --
20 AND IT WAS SHOWN THAT A CONCENTRATION OVER
21 FIVE PERCENT, IT WOULD PRODUCE NARCOSIS, IT
22 WOULD PRODUCE CARDIAC ARREST, AND PULONARY
23 EDEMA, THE LUNGS WOULD BECOME FULL OF FLUID.
24 FROM ABOUT 19 -- FROM ABOUT 1940 ONWARD,
25 THERE WERE A SERIES OF PUBLICATIONS,

1 PREDOMINANTLY IN THE EUROPEAN LITERATURE, AND
2 IT WAS KNOWN THAT VINYL CHLORIDE COULD
3 PRODUCE A WIDE RANGE OF EFFECTS IN ANIMALS,
4 DEGENERATIVE EFFECTS IN THE LIVER,
5 DEGENERATIVE KIDNEY CHANGES, TOO. AND BY THE
6 EARLY SIXTIES, IT WAS ALSO SHOWN THAT VINYL
7 CHLORIDE PRODUCED A TOXIC EFFECT ON BLOOD
8 VESSELS AND ALSO ON BONE, TOO.

9 Q. WHAT WAS THAT?

10 A. A TOXIC EFFECT ON BLOOD VESSELS,
11 CALLED ANGIOFIBROSIS AND ALSO AN EFFECT ON
12 BONE, THE LINING OF BONE, CALLED THE
13 PERIOSTEUM.

14 IN 1970, AN ITALIAN
15 PATHOLOGIST CAME OVER TO THIS COUNTRY AND
16 PRESENTED A PAPER AT THE INTERNATIONAL CANCER
17 CONGRESS IN HOUSTON, SHOWING THAT VINYL
18 CHLORIDE INDUCED CANCER IN RATS. THIS IN 1970
19 WAS THE FIRST PUBLISHED AND OPEN INFORMATION
20 ON THE CANCER CAUSING ABILITY OF VINYL
21 CHLORIDE.

22 Q. WHO WAS IT, THE RESEARCHER WHO MADE
23 THOSE FINDINGS?

24 A. HIS NAME WAS VIOLA. HE WAS AN
25 EMPLOYEE OF ITALIAN INDUSTRY CALLED SULVATE

1 INDUSTRIES LIMITED IN ITALY.

2 SUBSEQUENT TO VIOLA'S
3 FINDINGS, THESE -- THIS INFORMATION WAS
4 CONFIRMED AND EXTENDED BY ANOTHER ITALIAN
5 PATHOLOGIST CALLED MATALONI, WHO BY 1972, BY
6 AUGUST -- OR BY THE FALL OF 1972, HAD
7 CONFIRMED AND EXTENDED THESE FINDINGS,
8 ALTHOUGH INFORMATION ON THIS WAS NOT MADE
9 AVAILABLE UNTIL 1974, THE SAME DAY THAT THERE
10 WAS THE PUBLISHED ANNOUNCEMENT OF THE
11 OCCURRENCE OF THE CANCER IN THE B.F. GOODRICH
12 WORKERS. THAT VERY BRIEFLY IS THE STATEMENT
13 OF IT IN ALL LITERATURE.

14 AS FAR AS THE HUMAN STUDIES
15 ARE CONCERNED, THE EARLY LITERATURE ON THIS,
16 VERY INTERESTINGLY, IS EUROPEAN. THERE WERE
17 VERY LITTLE IN THE WAY OF AMERICAN STUDIES
18 PUBLISHED ON THE HUMAN EFFECTS OF VINYL
19 CHLORIDE.

20 ONE OF THE VERY EARLY
21 IMPORTANT PAPERS WAS A RUSSIAN PAPER IN 1949,
22 WHICH SHOWED THAT EXPOSURE TO VINYL CHLORIDE
23 COULD PRODUCE CHRONIC HEPATITIS -- THAT'S
24 TOXIC EFFECT IN THE LIVER, GASTRITIS, SKIN
25 IRRITATION, AND THIS WAS SHOWN IN A GROUP OF

1 73 RUSSIAN WORKERS. AND THIS WAS SUBSEQUENT
2 TO THAT.

3 IN 1957, IT WAS SHOWN THAT AT
4 LEVELS LOWER THAN RUSSIAN STANDARDS -- THE
5 RUSSIAN STANDARD THEN WAS ABOUT 390 PARTS PER
6 MILLION -- THAT IT WAS SHOWN AT LEVELS
7 BELOW THAT THAT VINYL CHLORIDE WOULD PRODUCE
8 TOXIC EFFECTS KNOWN AS TOXIC ANGIONEUROPATHY.

9 Q. WHAT IS THAT?

10 A. IT MEANS AN IRRITANT EFFECT OF BLOOD
11 VESSELS AND NERVES TO THE BLOOD VESSELS.

12 IN THE SAME YEAR, IT WAS
13 SHOWN THAT VINYL CHLORIDE WOULD PRODUCE
14 RAYNAUD'S DISEASE. RAYNAUD'S DISEASE IS A
15 DISEASE WHICH IS RECOGNIZED IN LAY TERMS BY
16 HANDS GOING VERY COLD AND BECOMING NUMB AND
17 GOING VERY COLD AND THE SKIN BECOMING WHITE.
18 AND THIS WAS ASSOCIATED WITH SOME BONEY
19 CHANGES KNOWN AS ACROOSTEOLYSIS. BY 1953, A
20 CHARACTERISTIC PICTURE HAD EMERGED OF THE
21 TOXIC EFFECTS OF -- OF VINYL CHLORIDE AND
22 THIS WAS WELL SUMMARIZED, AGAIN, IN A FOREIGN
23 PUBLICATION BY SUCIO, S-U-C-I-O, IN 1953,
24 WHERE IT WAS SHOWN THAT VINYL CHLORIDE
25 PRODUCED HEPATITIS, SPLENOMEGALY, A BIG

1 SPLEEN, DERMATITIS, IRRITATION OF THE SKIN,
 2 RAYNAUD'S DISEASE, WHICH WE'VE TALKED ABOUT
 3 ALREADY, GUT UP DISTURBANCE, CENTRAL NERVOUS
 4 SYSTEM DISTURBANCES AND THIS WAS VERY WELL
 5 DESCRIBED, AS I SAY, IN 1953. THREE YEARS
 6 LATER IN A BELGIAN PUBLICATION, THERE WAS A
 7 FURTHER CONFIRMATION OF VINYL CHLORIDE
 8 PRODUCED ACROOSTEOLYSIS THAN RAYNAUD'S
 9 DISEASE, AND BY 1970, 1972, IT WAS SHOWN THAT
 10 A DOSE RESPONSE EFFECT COULD BE PRODUCED; IN
 11 OTHER WORDS, OVER THE HIGH CONCENTRATIONS OF
 12 VINYL CHLORIDE, THE WORST THESE DISEASES --
 13 THE WORST THE DISEASE, THE WORST WERE THE
 14 INCIDENCES OF THE DISEASE AND THE WORST WERE
 15 THE SYMPTOMS. AND IT WAS SHOWN THEY WERE
 16 PRODUCED OVER A RANGE OF 35 TO 900 PARTS PER
 17 MILLION AND THE DIFFICULTY WAS EVEN NOTED AT
 18 LEVELS OF 40 PARTS PER MILLION.

19 NOW, COMING CLOSER TO --

20 Q. DOCTOR, LET ME INTERRUPT YOU FOR A
 21 SECOND.

22 ALL THESE PUBLICATIONS AND
 23 ARTICLES THAT YOU REFER TO, WERE THESE
 24 ARTICLES GENERALLY AVAILABLE IN MEDICAL
 25 LITERATURE TO PERSONS WHO MAY HAVE BEEN

1 INTERESTED IN FINDING OUT ABOUT THE TOXICITY
2 OR EFFECTS OF VINYL CHLORIDE?

3 A. CERTAINLY. THESE ARTICLES WERE
4 PUBLISHED IN THE OPEN SCIENTIFIC LITERATURE
5 AND ANYBODY WHO HAD ANY INTEREST AT ALL IN
6 THIS ISSUE COULD HAVE HAD ACCESS TO THIS
7 MATERIAL

8 NOW, THERE ARE SOME OTHER
9 INTERESTING POINTS. PRIOR TO -- WELL, LET
10 ME JUST GO BACK ON THAT FOR ONE MOMENT.

11 PRIOR TO 1971, EIGHT CASES OF
12 CANCER OF THE LIVER HAD BEEN NOTED IN VINYL
13 CHLORIDE WORKERS. EIGHT CASES OF CANCER OF
14 THE LIVER HAD BEEN NOTED IN VINYL CHLORIDE,
15 POLYVINYLCHLORIDE WORKERS PRIOR TO 1971. ONE
16 OF THESE HAD OCCURRED IN SWEDEN, SEVEN
17 OCCURRED IN THE UNITED STATES, THREE OF WHICH
18 WERE IN B.F. GOODRICH. ALL THESE EIGHT CASES
19 WERE SUBSEQUENTLY REDIAGNOSED AS ANGIOSARCOMA.
20 IT IS OF INTEREST THAT ONE OF THESE THREE
21 CASES OCCURRED IN A B.F. GOODRICH WORKER WHO
22 IN 1965 HAD RECEIVED WORKMEN'S COMPENSATION
23 FOR TOXIC HEPATITIS BUT HAD BEEN RETURNED TO
24 WORK SUBSEQUENTLY.

25 NOW, OVER AND ABOVE THESE

1 EIGHT CAUSES OF LIVER CANCER IN VINYL
2 CHLORIDE WORKERS WHICH HAD OCCURRED PRIOR TO
3 1975, THERE'S SOME OTHER INTERESTING
4 INFORMATION ON THE CANCER-CAUSING EFFECTS OF
5 VINYL CHLORIDE IN HUMANS. DOCTOR MATALONI IN
6 1959 HAD DEMONSTRATED MALIGNANT TYPE CELLS IN
7 THE SPUTUM OF VINYL CHLORIDE WORKERS. IN
8 OTHER WORDS, ONE WAY OF DIAGNOSING LUNG
9 CANCER, EFFECTIVELY IF YOU'RE TRYING TO PICK
10 IT UP AT AN EARLY STAGE, TO GET SOMEBODY TO
11 SPIT INTO A LITTLE POT. YOU GET THE SPUTUM,
12 YOU LOOK IN THE CELLS AND BY LOOKING AT THE
13 CELLS YOU CAN TELL WHETHER THEY'RE CANCER
14 TYPE CELLS OR NOT. ANIMALS IN 1959, HAD
15 ALREADY SHOWN THAT THERE WAS A HIGH INCIDENCE
16 OF CANCER LIKE CELLS IN THE SPUTUM OF VINYL
17 CHLORIDE WORKERS. INTERESTINGLY ENOUGH, THIS
18 INFORMATION WAS NOT MADE AVAILABLE IN THE
19 OPEN SCIENTIFIC LITERATURE UNTIL 1975. SO, IT
20 IS -- TO SUMMARIZE, I WOULD SAY THAT THERE
21 WAS EXTENSIVE EVIDENCE OF TOXIC EFFECTS OF
22 VINYL CHLORIDE, BOTH IN ANIMALS AND IN HUMANS,
23 PRIOR TO 1974, THE BULK OF THIS LITERATURE ON
24 THE CHRONIC TOXIC EFFECTS COMING FROM THE
25 EUROPEAN LITERATURE. BUT THERE WERE ALSO VERY

1 CLEAR INDICATIONS OF ITS CARCINOGENICITY AS
2 EVIDENCED BY THE VIOLA PAPER IN 1970, THE
3 EIGHT CASES OF LIVER CANCER WHICH HAD
4 OCCURRED IN THIS COUNTRY AND IN SWEDEN, WHICH
5 WERE SUBSEQUENTLY DIAGNOSIED AS ANGIOSARCOMA,
6 AND PERHAPS LESS ACCESSIBLE WERE THE FINDINGS
7 OF MATALONI, THE TWO KINDS OF FINDINGS OF
8 MATALONI, ONE, THE EXPERIMENTAL CONFIRMATION
9 OF THE CANCER-CAUSING EFFECTS IN ANIMALS AND
10 THE MALIGNANT CELLS IN SPUTUM.

11 HOWEVER, I SHOULD MENTION
12 THAT MATALONI'S INFORMATION ON THE CANCER-
13 CAUSING EFFECT OF VINYL CHLORIDE IN ANIMALS,
14 WHICH AS I INDICATED BEFORE, HAD BEEN
15 OBTAINED BY THE FALL OF 1972, WAS
16 COMMUNICATED TO THE AMERICAN INDUSTRY, TO THE
17 MANUFACTURING CHEMISTS' ASSOCIATION.

18 MR. RENNEISEN: OBJECTION,
19 YOUR HONOR, UNLESS THERE'S EVIDENCE IT WAS
20 COMMUNICATED TO B.F. GOODRICH COMPANY. HE
21 SAID IT WASN'T MADE AVAILABLE TO THE PUBLIC.
22 AND IT'S GROSS HEARSAY AS TO --

23 THE COURT: WELL, THIS HAS
24 BEEN AN EXPERT IN THE FIELD. I'M GOING TO
25 ALLOW IT. I'M GOING TO ALLOW IT.

1 MR. VASSALOTTI: YOUR HONOR,
2 I MIGHT FURTHER ADD --

3 MR. RENNEISEN: THE JUDGE HAS
4 RULED. I DON'T THINK IT'S TIME FOR COUNSEL
5 TO MAKE A SPEECH. I OBJECT.
6 BY MR. VASSALOTTI:

7 Q. DOCTOR, YOU MENTIONED THAT PROFESSOR
8 MATALONI'S FINDINGS WERE COMMUNICATED TO AN
9 ORGANIZATION CALLED THE MANUFACTURING
10 CHEMISTS ASSOCIATION?

11 A. THAT IS CORRECT.

12 Q. AND WHEN WAS THAT?

13 A. LET ME GIVE YOU THE DETAILS OF THIS.

14 IN AUGUST, 1972, THE
15 MANUFACTURING CHEMISTS' ASSOCIATION -- THAT
16 IS, THE TRADE LOBBY, THE ASSOCIATION IN THIS
17 COUNTRY THAT REPRESENTS THE CHEMICAL INDUSTRY
18 -- ENTERED INTO AN UNDERSTANDING WITH A
19 CONSORTIUM OF AMERICAN-EUROPEAN INDUSTRIES.

20 MR. RENNEISEN: YOUR HONOR, I
21 OBJECT. THIS IS SIMPLY NOT MEDICAL EXPERT
22 TESTIMONY.

23 THE COURT: I'M GOING TO
24 SUSTAIN THE OBJECTION. IT'S GONE A LITTLE BIT
25 TOO FAR.

1 BY MR. VASSALOTTI:

2 Q. IF YOU COULD, DOCTOR EPSTEIN, JUST
3 LIMIT YOURSELF TO THE DEVELOPMENT OF
4 KNOWLEDGE REGARDING --

5 A. FINE. BY OCTOBER, '72, MATALONI HAD
6 CONFIRMED -- HAD REPEATED THE KIND OF
7 STUDIES THAT VIOLA HAD DONE AND HAD SHOWN
8 EFFECTS AT LOWER CONCENTRATIONS AND ON A
9 WIDER RANGE OF ORGANS.

10 Q. WHAT CONCENTRATIONS, WHAT LEVELS OF
11 EXPOSURES DID HE TEST?

12 A. MATALONI WENT DOWN TO THE HUNDRED
13 P.P.M. KIND OF BALLPARK LEVEL AND HAD, IN
14 FACT, LEVELS WERE FOUND, CONCENTRATIONS --
15 MATALONI'S SUBSEQUENT STUDIES HAD, IN FACT,
16 DEMONSTRATED CARCINOGENIC EFFECTS DOWN TO ONE
17 PART PER MILLION IN SUBSEQUENT STUDIES OF
18 MATALONI. BUT BY '72, EFFECTS IN THE HUNDRED
19 PARTS PER MILLION HAD BEEN DEMONSTRATED. AND
20 THIS INFORMATION FIRST BECAME AVAILABLE IN
21 JANUARY, 1974, THE SAME DAY AS THERE WAS A
22 THE PUBLIC ANNOUNCEMENT BY B.F. GOODRICH ON
23 THE OCCURRENCE OF FOUR CANCERS IN ITS WORKERS
24 IN THE LOUISVILLE -- FOR ANGIOSARCOMAS IN
25 THE LIVER IN WORKERS IN ITS B. F. GOODRICH

1 PLANT, IN ITS PLANT IN LOUISVILLE, KENTUCKY.

2 Q. DOCTOR, YOU'VE MENTIONED ANIMAL
3 TESTS WERE DONE. DID THAT INCLUDE TESTS ON
4 RATS? IS THAT WHAT MATALONI AND VIOLA DID?

5 A. VIOLA'S STUDIES WERE ON RATS.
6 MATALONI STUDIES WERE MORE EXTENSIVE. THEY
7 INCLUDED MICE, RATS, HAMSTERS AND THEY WERE A
8 VERY, VERY EXTENSIVE SET OF STUDIES.

9 Q. WHAT'S THE SIGNIFICANCE OF THE
10 MEDICAL FIELD AND PARTICULARLY IN THE FIELDS
11 OF CANCER-CAUSING CHEMICALS OF ANIMAL TESTS
12 IN THE STUDIES?

13 A. IT'S GENERALLY ACCEPTED BY ALL
14 AUTHORITIES IN THE FIELD THAT TESTS IN
15 ANIMALS AFFORD A PROPER METHOD OF PREDICTING
16 WHETHER A CHEMICAL IS LIKELY TO INDUCE CANCER
17 IN HUMANS. AND TESTS IN ANIMALS FOR THIS
18 REASON ARE STANDARD METHODS OF FINDING
19 WHETHER A CHEMICAL IS LIKE TO BE CARCINOGENIC
20 OR OTHERWISE AND THE METHODOLOGY FOR CANCER
21 TESTING IN ANIMALS ARE FAIRLY WELL DEVELOPED
22 AND HAVE BEEN SO WELL DEVELOPED FOR DECADES.
23 THERE'S A WIDE RANGE OF EXPERT, BODIES
24 NATIONALLY AND INTERNATIONALLY THAT HAVE
25 UNEQUIVOCALLY CONCLUDED THAT INFORMATION

1 DERIVED FROM WELL DEVELOPED ANIMAL TESTS GIVE
2 YOU A REAL PREDICTION AS TO THE LIKLIHOOD OF
3 WHETHER A CHEMICAL WOULD INDUCE CANCER IN
4 HUMANS OR NOT.

5 Q. DOCTOR, DOES THE MEDICAL LITERATURE
6 OR STATE OF THE MEDICAL ART AT THE PRESENT
7 TIME ESTABLISH HOW VINYL CHLORIDE CAUSES
8 CANCER?

9 A. THE ANSWER IS NO, AND IT'S ALSO
10 CLEAR TO SAY THAT WE DON'T KNOW THE MECHANISM
11 OF ACTION OF ANY CHEMICAL CARCINOGEN. YOU CAN
12 DESCRIBE SOME OF THE EFFECTS OF A CHEMICAL
13 CARCINOGEN, THAT IT PRODUCES A DISTURBANCE OF
14 THIS METABOLIC SYSTEM, THIS BIOCHEMICAL
15 SYSTEM, THIS IMMUNOLOGICAL SYSTEM, BUT WE
16 DON'T KNOW THE MECHANISM OF ACTION OF
17 CARCINOGENS, INCLUDING VINYL CHLORIDE.

18 WE KNOW MANY THINGS ABOUT THE
19 OCCURRENCE OF THE -- HOW THE CARCINOGENIC
20 PROCESS DEVELOPS, BUT WE DON'T KNOW THE
21 MECHANISM.

22 Q. DOCTOR, HAVE ANY OF THE MEDICAL OR
23 SCIENTIFIC STUDIES DONE TO DATE SHOWN THAT
24 THERE IS ANY SAFE LEVEL OF VINYL CHLORIDE
25 EXPOSURE TO WHICH A HUMAN COULD BE EXPOSED?

1 A. LET ME ANSWER THAT IN TWO PARTS:
2 FIRSTLY, BY SAYING THAT IT IS THE CONSENSUS
3 OF THE INFORMED SCIENTIFIC COMMUNITIES THAT
4 WE DON'T KNOW OF ANY WAY OF SETTING SAFE
5 LEVELS FOR CHEMICAL CARCINOGENS AND THERE'S
6 OVERWHELMING EVIDENCE IN LITERATURE TO
7 SUPPORT THIS. WE JUST DON'T KNOW OF ANY SAFE
8 WAY. AND THE SAME OBTAINS AS FAR AS VINYL
9 CHLORIDE IS CONCERNED

10 WITH VINYL CHLORIDE, HOWEVER,
11 OVER AND ABOVE THE VERY GENERAL STATEMENT
12 THAT WE DON'T KNOW OF ANY WAY OF SETTING SAFE
13 LEVELS FOR SAFE LEVELS FOR CHEMICAL
14 CARCINOGENS, I SHOULD POINT OUT THAT WE HAVE
15 EXTENSIVE INFORMATION ON THE FACT THAT VINYL
16 CHLORIDE CAN PRODUCE CARCINOGENIC EFFECTS AT
17 LOW CONCENTRATIONS. NOW, WHEN I SAY LOW
18 CONCENTRATIONS, I HAVE TO EXPLAIN WHAT I MEAN
19 BY LOW CONCENTRATIONS. ONE PART PER MILLION
20 MAY SOUND VERY LITTLE INDEED. ONE PART PER
21 MILLION IS ABOUT 2,500 MICROGRAMS PER CUBIC
22 METERS, WHICH MEANS IF YOU WANT TO TRANSLATE
23 ONE PART PER MILLION IN TERMS OF NUMBER OF
24 MOLECULES YOU BREATHE IN EVERY BREATH OF AIR,
25 WE'RE TALKING ABOUT -- NOT MILLIONS OF

1 MOLECULES, NOT BILLIONS, WE'RE TALKING ABOUT
2 MORE THAN QUADRILLIONS OF MOLECULES.

3 NOW, AS I SAID BEFORE, WE
4 HAVE EXTENSIVE EVIDENCE ON THE
5 CARCINOGENICITY OF VINYL CHLORIDE AT LOW
6 CONCENTRATIONS AND LET ME, IF I MAY, BRIEFLY
7 SUMMARIZE THIS FOR YOU.

8 Q. COULD YOU, DOCTOR?

9 A. FIRST OF ALL, IN THE OVERWHELMING
10 MAJORITY OF CARCINOGENS OF THE TESTS THAT
11 HAVE BEEN SHOWN ON VINYL CHLORIDE IN ANIMALS,
12 CANCER-CAUSING EFFECTS HAVE BEEN DEMONSTRATED
13 AT THE LOWEST LEVEL TESTED. LET'S SAY 50
14 PARTS PER MILLION WAS THE LOWEST LEVEL TESTED.
15 CANCER CAUSING EFFECTS WERE DEMONSTRATED AT
16 THAT. THAT DOESN'T MEAN TO SAY THAT 50 PARTS
17 PER MILLION IS A SAFE LEVEL -- THERE'S NO
18 SUCH THING AS A SAFE LEVEL. THAT SIMPLY MEANS
19 THAT 50 PARTS WAS THE LOW TEST DOSE TESTED.

20 HOWEVER, MATALONI HAS DONE
21 EXPERIMENTS IN WHICH HE HAS FOUND THE
22 INDICATION OF CANCER OF THE BREAST IN RATS AT
23 ONE POINTS PER MILLION. WITH INTERMITTENT
24 EXPOSURE OVER A YEAR. WITH INTERMITTENT
25 EXPOSURE OF RATS TO LEVELS OF VINYL CHLORIDE

1 AT ONE PART PER MILLION, HE HAS DEMONSTRATED
2 CANCER INDUCED BY VINYL CHLORIDE. OVER AN AND
3 ABOVE THIS, WE ALSO KNOW THAT YOU DON'T NEED
4 VERY LONG AND SUSTAINED EXPOSURES TO VINYL
5 CHLORIDE TO GET CANCER. AS LITTLE AS ONE
6 HOUR IS ENOUGH TO GIVE YOU CANCER.

7 Q. HAS THERE BE ANY RESEARCH IN THAT
8 REGARD, DOCTOR?

9 A. YES. THERE IS A VERY EXTENSIVE STUDY
10 BY THE CONSUMER PRODUCTS SAFETY COMMISSION
11 THAT SHOWS THAT ONE HOUR EXPOSURE OF ANIMALS
12 TO VINYL CHLORIDE WILL PRODUCE CANCER-CAUSING
13 EFFECTS. AND THE SAME DOCUMENT FROM THAT
14 CONSUMER PRODUCTS SAFETY COMMISSION WARNS
15 EXPLICITLY OF THE DANGERS OF SPILLS OF VINYL
16 CHLORIDE BECAUSE ONE EXPOSURE AS SHORT AS AN
17 HOUR CAN PRODUCE THESE EFFECTS. SO, ALREADY
18 WE HAVE SEEN WITHOUT REVIEWING THE WIDE RANGE
19 OF ANIMAL TEST ON -- ON THE CARCINOGENIC
20 EFFECTS OF VINYL CHLORIDE, WE'VE SEEN ONE
21 POINT ONE, THE LOWEST LEVEL TESTED SO FAR.
22 ONE PART PER MILLION, CANCER CAUSING EFFECTS
23 WERE INDUCED BY VINYL CHLORIDE. TRUE, CANCER
24 CAUSING EFFECTS WERE CAUSED BY AS SHORT A
25 PERIOD OF AN HOUR.

1 LET'S EXAMINE THAT.

2 Q. DOCTOR, IS THERE ANY INDICATION --
3 WE'VE BEEN TALKING ABOUT ANIMALS OF THESE
4 LOWER LEVELS. IS THERE ANY MEDICAL LITERATURE
5 WHICH INDICATES THAT HUMANS ARE AT RISK OF
6 DEVELOPING CANCER, AND ANGIOSARCOMA OF THE
7 LIVER IN PARTICULAR, FROM THESE LOW LEVELS OF
8 VINYL CHLORIDE EXPOSURE?

9 A. YES, --

10 MR. RENNEISEN: YOUR HONOR, I
11 OBJECT TO THE QUESTION. I DON'T THINK AT RISK
12 IS WHAT WE'RE TALKING ABOUT HERE.

13 THE COURT: WHY DON'T YOU
14 REPHRASE YOUR QUESTION.

15 BY MR. VASSALOTTI:

16 Q. DOCTOR, IS THERE ANY MEDICAL
17 EVIDENCE TO INDICATE THAT HUMANS EXPOSED TO
18 LOW LEVEL CONCENTRATIONS OF VINYL CHLORIDE
19 CAN DEVELOP AND DO DEVELOP CANCER AND
20 PARTICULARLY ANGIOSARCOMA OF THE LIVER?

21 A. YES, THERE IS SUCH EVIDENCE.

22 Q. CAN YOU DESCRIBE --

23 A. AND THE EVIDENCE RELATES TO TWO
24 TYPES OF -- TO TWO LINES OF STUDY. THE
25 FIRST ARE THE OCCUPATIONAL STUDIES IN THE

1 WORK PLACE. THE SECOND ARE STUDIES IN THE
2 COMMUNITY, PEOPLE WHO LIVE CLOSE TO PLANTS.
3 AND LET ME FIRST OF ALL DISCUSS THE EVIDENCE
4 FOR THE CARCINOGENICITY OF VINYL CHLORIDE IN
5 THE WORKPLACE AT LOW LEVELS OF EXPOSURE.

6 NOW, I SHOULD EXPLAIN THAT
7 THERE'S THREE KINDS OF PROCESSES IN WHICH A
8 WORKER IN THE -- IN THE VINYL CHLORIDE,
9 POLYVINYLCHLORIDE PLASTIC INDUSTRY IS
10 ASSOCIATED, THE FIRST IN THE MANUFACTURE OF
11 VINYL CHLORIDE. VINYL CHLORIDE IS A SMALL
12 BUILDING BLOCK WHICH WHEN STRUNG TOGETHER
13 FORMS LONG CHAINS CALLED POLYVINYLCHLORIDE.
14 SO, IN THE PROCESS, THE WORKER CAN BE EXPOSED
15 TO VINYL CHLORIDE WHEN HE MAKES THE VINYL
16 CHLORIDE, THAT'S ONE; TWO, WHEN THE VINYL
17 CHLORIDE IS COOKED IN A PRESSURE POT, WHEN
18 THE SMALL MOLECULES ARE STRUNG TOGETHER TO
19 FORM POLYVINYL CHLORIDE, AND WHEN YOU MAKE
20 THE VINYL CHLORIDE AND WHEN YOU MAKE THE
21 POLYVINYLCHLORIDE, LEVELS OF EXPOSURE CAN BE
22 VERY HIGH, CAN BE PARTICULARLY IF WORK
23 PRACTICES ARE BAD.

24 THERE'S A THIRD KIND OF
25 EXPOSURE --

1 MR. RENNEISEN: YOUR HONOR, I
2 DON'T LIKE TO KEEP OBJECTING. BUT I WAS UNDER
3 THE IMPRESSION THAT HE WAS TELLING US ABOUT
4 HOW PEOPLE CAN GET CANCER FROM LOW LEVELS AND
5 HE'S JUST TOLD US ABOUT HIGH LEVELS.

6 MR. VASSALOTTI: YOUR HONOR,
7 I THINK HE'S DESCRIBING -- AND I DON'T WANT
8 TO PUT WORDS IN YOUR MOUTH, DOCTOR -- THE
9 DIFFERENCE IN EXPOSURE LEVELS.

10 MR. RENNEISEN: THAT WASN'T
11 THE QUESTION THEN. I ASK THAT THE ANSWER BE
12 STRICKEN AND THAT QUESTION BE ASKED.

13 THE COURT: I'M GOING TO
14 ALLOW IT. I THINK THE JURY SHOULD HEAR THIS
15 BACKGROUND. WE HAVE AN EXPERT. YOU HAVE NOT
16 OBJECTED TO HIS QUALIFICATIONS. THE COURT
17 FINDS HIM WELL QUALIFIED. THE COURT WILL
18 ALLOW THIS. IT BEARS EXACTLY ON THE ISSUES IN
19 THIS CASE.

20 THE WITNESS: THE THIRD KIND
21 OF EXPOSURE IS THE EXPOSURE WHERE LEVELS ARE
22 LOW. AND WHEN YOU TAKE THE POLYVINYL RESIN
23 AND YOU WORK ON IT, YOU MAKE PHONOGRAPHS, YOU
24 MAKE PLASTIC. THAT IS WHAT WE CALL
25 FABRICATION. SO, I'M MAKING DISTINCTIONS

1 BETWEEN TWO KINDS OF EXPOSURES TO VINYL
2 CHLORIDE.

3 THE VERY LOW LEVELS, WHEN YOU
4 TAKE THE VINYL -- THE PRODUCT, THE
5 POLYVINYLCHLORIDE PRODUCT AND MAKE THINGS
6 LIKE RECORDS OR WHAT HAVE YOU OR GARDEN HOSE,
7 AND WHEN YOU FABRICATE -- WHEN YOU
8 FABRICATE THE POLYVINYLCHLORIDE, THE LEVELS
9 OF VINYL CHLORIDE ARE VERY LOW, COMPARED TO
10 WHAT THEY ARE WHEN YOU EITHER MANUFACTURE THE
11 VINYL CHLORIDE OR WHEN YOU HANDLE THE
12 POLYVINYLCHLORIDE. OKAY.

13 SO, THE RELEVANCE OF ALL THIS
14 IS AS FOLLOWS: IN THE POLYVINYLCHLORIDE
15 FABRICATION, LEVELS OF VINYL CHLORIDE
16 EXPOSURE ARE LOW AND THERE WAS A STUDY BY THE
17 NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND
18 HEALTH IN 1978 WHICH DID A SURVEY OF
19 FABRICATING PLANTS, EVERY VINYL CHLORIDE
20 FABRICATING PLANT, IN WHICH THEY SHOWED THE
21 LEVEL OF VINYL CHLORIDE IN THE FABRICATING
22 PLANT, RANGED FROM THE NONDETECTABLE --
23 THEY WERE SO LOW YOU COULDN'T PICK THEM UP TO
24 A MAXIMUM OF ABOUT TWO PARTS PER MILLION.
25 OKAY. SO, WE'RE DEALING NOW WITH AN INDUSTRY,

1 THE POLYVINYLCHLORIDE FABRICATION INDUSTRY IN
2 WHICH THE LEVELS OF VINYL CHLORIDE EXPOSURE
3 IS DEMONSTRABLY LOW. LET US NOW EXPERIENCE
4 THE EXPERIENCE IN THIS INDUSTRY TO SEE WHAT
5 IS THE EFFECT AND YOU'LL GET SOME INDICATION
6 THERE.

7 WE FIND, FIRST OF ALL, IN A
8 PLANT IN CONNECTICUT IN PUBLICATION CHRISTINE,
9 1974, TWO ANGIOSARCOMAS OF THE LIVER WERE
10 DESCRIBED IN 1974. ONE OF THESE CASES WASN'T
11 EVEN A WORKER, HE WAS AN ACCOUNTANT, NOT
12 LIKELY TO BE TOOLING AND FABRICATING THE
13 STUFF ALL DAY LONG. SO, IN THESE PLANTS WHERE
14 LEVELS OF EXPOSURE ARE LOW, TWO ANGIOSARCOMAS
15 ARE DESCRIBED, INCLUDING ONE ACCOUNTANT.

16 WHAT ELSE DO WE FIND? IN A
17 PUBLISHED TEXT BY BAXTER IN 1947, AN
18 ANGIOSARCOMA OF THE WORKER IN A
19 POLYVINYLCHLORIDE FABRICATOR. WHAT ELSE DO WE
20 FIND?

21 COULD I TROUBLE YOU FOR A
22 DROP OF WATER, PLEASE?

23 WHAT ELSE DO WE FIND? IN
24 ANOTHER STUDY, IN A BRITISH PLANT, BY BAXTER,
25 WE FIND -- WE FIND AN EXAMPLE OF CANCER OF

1 THE STOMACH IN A GROUP OF ABOUT 700
2 FABRICATORS, CANCER OF ANOTHER SITE. AND
3 FINALLY, WE FIND IN A SERIES OF 17
4 POLYVINYLCHLORIDE PLANTS LOOKED AT IN THIS
5 COUNTRY, AN EXCESSIVE CANCERS OF VARIOUS
6 SITES, GUTS, LUNG, LYMPHATIC SYSTEM AND
7 BREAST. SO, MY SECOND LINE OF EVIDENCE --
8 I'VE ALREADY TOLD YOU ABOUT THE HUMAN DATA,
9 THE ANIMAL DATA. THE SECOND LINE OF EVIDENCE
10 RELATES TO THE OCCUPATIONAL DATA IN WHICH
11 ANGIOSARCOMAS AND OTHER MALIGNANCIES ARE
12 DESCRIBED IN WORKERS EXPOSED TO WHAT COULD IN
13 THIS CONTEXT BE CALLED RELATIVELY LOW LEVELS.

14 LET US NOW LOOK AT A THIRD
15 TYPE OF PIECE OF INFORMATION IN EVIDENCE;
16 THAT IS, COMMUNITY CANCER. COMMUNITY CANCER
17 --

18 Q. WHAT DO YOU MEAN BY COMMUNITY CANCER,
19 DOCTOR?

20 A. FINE. WHAT I MEAN BY COMMUNITY
21 CANCERS ARE CANCERS OCCURRING IN RESIDENTS
22 WHO LIVE IN -- PEOPLE LIVING IN CLOSE
23 PROXIMITY TO VARIOUS INDUSTRIES. AND THERE'S
24 A GROWING BODY OF INFORMATION SUGGESTING --
25 SUGGESTING IS PERHAPS NOT A SUFFICIENTLY

1 STRONG STATEMENT -- INDICATING THAT
2 PROXIMITY OF RESIDENTS TO CERTAIN INDUSTRY IS
3 WHAT WE CALL IN THE TRADE A RISK FACTOR. IT
4 PUTS YOU AT EXCESS RISK OF DEVELOPING CANCER.
5 AND THE BASE FOR THIS STARTED IN -- WITH A
6 PUBLICATION OF SOME MAPS BY THE NATIONAL
7 CANCER INSTITUTE, WHICH SHOWED -- AND THESE
8 WERE -- WOULD SHOW THAT IN CERTAIN PARTS OF
9 THIS COUNTRY, YOU HAD HIGH LEVELS, LIVING
10 ENCOUNTERS IN CERTAIN PARTS OF THIS --
11 THERE WERE VERY HIGH LEVELS OF CANCER AS
12 COMPARED TO OTHER PARTS OF THE COUNTRY. AND
13 THESE AREAS WERE THE HIGHLY INDUSTRIALIZED
14 NORTHEAST. AND IT'S NOT OVERALL CANCER
15 MORTALITY RATES, BUT IT'S CANCER FOR A WIDE
16 RANGE OF SITES. AND THESE STUDIES HAVE BEEN
17 AMPLIFIED AND VARIOUS STUDIES SHOWING AGAIN
18 IN CERTAIN PARTS OF AMERICA, IN CERTAIN
19 STATES IN CERTAIN COUNTIES, THERE ARE EXCESS
20 RATES OF CANCER. BEFORE I GET INTO THAT --
21 AND IN SOME OF THESE INSTANCES, THERE HAVE
22 BEEN WHAT WE CALL MONITORING STUDIES. THE AIR
23 HAS BEEN SAMPLED AND IT HAS BEEN SHOWN THAT
24 THE INDUSTRIES CONCERNED IN THESE AREAS WHERE
25 YOU HAVE HIGH LEVELS OF CANCER HAVE BEEN

1 PUTTING OUT CHEMICALS, CARCINOGENS INTO THE
2 AIR OF THE LOCAL COMMUNITIES. BUT LET US
3 RETURN NOW TO THE ANGIOSARCOMA.

4 THERE ARE EIGHT DOCUMENTED
5 CASES OF COMMUNITY ANGIOSARCOMA; THAT IS,
6 PEOPLE GETTING ANGIOSARCOMA, LIVING IN THE
7 VICINITY OF VINYL CHLORIDE --
8 POLYVINYLCHLORIDE PLANT. EIGHT CASES, WITH
9 MR. GRASSO, THAT'S NINE. LET'S TALK ABOUT THE
10 EIGHT CASES FIRST.

11 IN 1974, CHRISTINE REPORTED
12 ANGIOSARCOMA OF THE LIVER IN SOMEBODY LIVING
13 TWO MILES AWAY FROM A POLYVINYL CHLORIDE
14 PLANT IN CONNECTICUT. AND THIS WAS A MAN OF
15 AGE -- WHO DIED AT THE AGE OF 73 AND HE
16 LIVED -- INCIDENTALLY, HE DIED IN 1957. AND
17 HE LIVED TWO MILES AWAY FROM A PLANT IN
18 CONNECTICUT. AND THIS PLANT WAS A FABRICATING
19 PLANT; THEREFORE, LESS LIKELY TO PUT OUT
20 LARGE CONCENTRATIONS OF PVC. IN THIS SAME
21 PLANT WHERE THIS MAN LIVED IN, THERE WAS
22 ANOTHER OCCUPATIONAL CASE OF ANGIOSARCOMA, A
23 WORKER IN THIS PLANT ALSO DIED OF
24 ANGIOSARCOMA.

25 CHRISTINE ALSO DESCRIBED

1 ANOTHER CASE NEAR ANOTHER PLANT IN
2 CONNECTICUT.

3 Q. DOCTOR, LET ME INTERRUPT YOU FOR A
4 SECOND. YOU'RE TALKING ABOUT A REFERENCE TO
5 CHRISTINE. IS THAT AN AUTHOR OF A MEDICAL
6 ARTICLE?

7 A. YES, THAT'S AN AUTHOR OF A
8 SCIENTIFIC PUBLICATION WHICH I HAVE WITH ME
9 AND CAN MAKE AVAILABLE.

10 Q. BUT THESE ARE MATERIALS --

11 A. THIS IS PUBLISHED IN THE OPEN
12 LITERATURE. THERE WERE EIGHT INDICATIONS OF
13 ANGIOSARCOMA PUBLISHED IN THE OPEN SCIENTIFIC
14 LITERATURE AND LET ME, BEFORE GOING INTO THE
15 DETAILS, MAKE TWO POINTS ABOUT THEM: THAT
16 THESE PEOPLE ALL LIVED IN LESS THAN TWO MILES
17 -- OF THESE EIGHT CASES, THEY ALL LIVED
18 LESS THAN TWO MILES FROM THE PLANT -- FROM
19 THE PLANT, AND IN TWO OF THESE CASES, THE
20 LATENCY PERIOD WAS BRIEF, SIX YEARS IN ONE,
21 LIKE MR. GRASSO, AND EIGHT YEARS IN ANOTHER.

22 Q. DOCTOR, WE'LL GET TO THE LATENCY
23 PERIOD IN A MOMENT. RIGHT NOW LET'S TALK
24 ABOUT THE EVIDENCE OF THE DEVELOPMENT OF
25 ANGIOSARCOMA IN RELATIVELY LOW LEVELS OF

1 EXPOSURE?

2 A. WELL, WE'RE TALKING NOW ON THE THIRD
3 LINE OF EVIDENCE, NAMELY THE ACCOUNTS OF
4 ANGIOSARCOMAS IN COMMUNITY RESIDENTS, THIS
5 REPRESENTING THE THIRD LINE OF EVIDENCE FOR
6 THE ACCOUNTS OF ANGIOSARCOMAS AT LOW LEVELS
7 OF VINYL CHLORIDE EXPOSURE. I'VE ALREADY
8 MENTIONED TWO CASES.

9 THE THIRD CASE WAS DESCRIBED
10 BY BAXTER IN 1970; A MAN OF 51, WHO DIED IN
11 1970 WHO HAD LIVED FOR SIX YEARS NEAR A PLANT
12 AND IN THIS SAME PLANT WHICH HE LIVED NEAR,
13 THERE WAS ALSO A CASE OF A WORKER WHO DIED OF
14 ANGIOSARCOMA OF THE LIVER.

15 IN A PAPER BY BRADY IN 1977,
16 THERE WERE A TOTAL OF FIVE CASES OF WOMEN WHO
17 LIVED CLOSE TO PLANT. THE FIRST ONE DIED IN
18 1955. SHE LIVED LESS THAN A MILE FROM A PLANT.
19 THE SECOND WAS A WOMAN OF 45 WHO LIVED LESS
20 THAN A MILE FROM THE PLANT. THE THIRD WAS A
21 WOMAN OF 31 WHO LIVED A THIRD OF A MILE FROM
22 THE PLANT. THE FOURTH WAS A WOMAN OF 52 WHO
23 LIVED A THIRD OF A MILE FROM THE PLANT. AND
24 THE FIFTH WAS A WOMAN OF 31 WHO LIVED ABOUT
25 POINT ONE MILES FROM A PLANT. I SHOULD

1 MENTION THAT TWO OF THESE CASES, THE BAXTER
2 CASE, LIVED SIX YEARS, HAD ONLY SIX YEARS
3 EXPOSURE, WAS A SIX YEAR RESIDENT AND THE
4 BRADY CASE WAS AN EIGHT YEAR RESIDENT.

5 NOW, IN ADDITION TO THE
6 ANGIOSARCOMAS OCCURRING AS A COMMUNITY CANCER,
7 WE ALSO HAVE TWO OTHER KINDS -- WE ALSO
8 HAVE TWO OTHER REPORTS OF VINYL CHLORIDE
9 ASSOCIATED OR INDUCED CANCER IN COMMUNITY
10 RESIDENTS. AND THE PARTICULAR INTEREST OF
11 THESE IS AS FOLLOWS: THESE WERE BRAIN TUMORS.

12 NOW, WE KNOW THAT VINYL
13 CHLORIDE PRODUCES CANCER IN A WIDE RANGE OF
14 ORGANS AND VINYL CHLORIDE IS RECOGNIZED BY
15 THE INTERNATIONAL AGENCY FOR RESEARCH ON
16 CANCER AND VARIOUS OTHER GROUPS AS BEING WHAT
17 WE CALL A MULTI-SYSTEM CARCINOGEN FOR
18 PRODUCING CANCER IN A WIDE RANGE OF ORGANS,
19 NOT ONLY ANGIOSARCOMA OF THE LIVER BUT
20 PRODUCING CANCER OF THE LUNG, IN THE BRAIN
21 AND OTHER SITES.

22 NOW, IN THESE TWO COMMUNITY
23 CANCERS I'M TALKING ABOUT, NAMELY A STUDY BY
24 EINFANTI IN 1975, AN EXCESS IN BRAIN TUMORS
25 WAS DEMONSTRATED IN RESIDENTS IN OHIO

1 COMMUNITIES WHERE VC PVC PLANTS WERE LOCATED.
2 IN THE SAME YEAR, A STUDY WAS -- A CANADIAN
3 STUDY WAS PUBLISHED OF EXCESSIVE BRAIN TUMORS
4 OF PEOPLE LIVING IN A CANADIAN COUNTY NEAR A
5 VC PVC PLANT. THAT, VERY BRIEFLY, IS THE
6 EVIDENCE FOR THE CARCINOGENICITY AT WHAT
7 MAYBE CALLED LOW LEVELS, ALTHOUGH I WOULD PUT
8 QUOTATION MARKS AROUND THE WORD LOW.

9 Q. NOW, DOCTOR, IN DEALING WITH CANCER
10 CAUSING AGENTS LIKE VINYL CHLORIDE,, THE TERM
11 LATENCY PERIOD HAS COME UP IN THIS CASE AND
12 YOU JUST MENTIONED IT YOURSELF. WHAT DOES
13 LATENCY PERIOD MEAN?

14 A. THE LATENCY PERIOD IS REALLY THE
15 TIME FROM THE FIRST EXPOSURE TO A TOXIC OR
16 CANCER CAUSING CHEMICAL TO THE DATE OF
17 DIAGNOSIS OR DEATH FROM A PARTICULAR ADVERSE
18 EFFECT. NOW, THERE ARE OTHER WAYS OF DEFINING
19 LATENCY PERIOD, BUT I THINK THIS IS PROBABLY,
20 FOR THE CONTEXT -- FOR OUR CONTEXT,
21 PROBABLY THE MOST EFFECTIVE AND BEST
22 DEFINITION.

23 Q. DOCTOR, HAS THE MEDICAL RESEARCH
24 LITERATURE DETERMINED OR SUGGESTED THAT A
25 CERTAIN MINIMUM LATENCY PERIOD IS REQUIRED

1 FOR THE DEVELOPMENT OF ANGIOSARCOMA IN
2 PERSONS EXPOSED TO VINYL CHLORIDE?

3 A. WELL, IN GENERAL, I THINK IT'S FAIR
4 TO SAY THAT THE AVERAGE LATENCY PERIOD IN THE
5 LITERATURE FOR ANGIOSARCOMA IS SOMEWHAT IN
6 THE RANGES OF ABOUT 20 YEARS, SOMEWHERE IN
7 THAT KIND OF BALLPARK, 20 YEARS.

8 HOWEVER, THERE ARE REPORTS, A
9 WIDE RANGE OF REPORTS, OF ANGIOSARCOMAS AND
10 OTHER VINYL CHLORIDE INDUCED CANCER WITH
11 LATENCIES UNDER TEN YEARS.

12 Q. YOU'VE ALREADY MENTIONED, I THINK,
13 TWO OF THEM IN THE COMMUNITY CANCER CASES.

14 A. THAT IS CORRECT. LET ME JUST VERY
15 BRIEFLY RUN THROUGH THESE TEN -- THESE
16 REPORTS ON VINYL CHLORIDE INDUCED CANCER,
17 ANGIOSARCOMAS, UNDER TEN YEARS.

18 Q. AND AGAIN BEFORE YOU START, THESE
19 REPORTS THAT YOU'LL BE REFERRING TO ARE
20 MATERIALS THAT HAVE BEEN OUT IN THE PUBLIC
21 LITERATURE?

22 A. YES. IN 1975, THE ENVIRONMENTAL
23 PROTECTION AGENCY IN A PUBLIC DOCUMENT,
24 REFERRED TO TWO ANGIOSARCOMAS, ONE IN AN
25 ITALIAN WORKER, VINYL CHLORIDE WORKER, WHOSE

1 LATENCY PERIOD WAS SIX YEARS, SIX YEARS, THE
2 SAME AS MR. GRASSO; THE SECOND WAS AN
3 ANGIOSARCOMA IN A BRITISH WORK WITH A LATENCY
4 OF EIGHT YEARS. THE THIRD CASE IS CHRISTINE'S
5 CASE IN 1974; THAT IS, THE ACCOUNTANT WHO
6 WORKED IN A FABRICATING PLANT WHO HAD A
7 LATENCY OF TEN YEARS.

8 THE NEXT IS A CASE I
9 MENTIONED ALREADY, THE ANGIOSARCOMA OF THE
10 LIVER, WHO HAD A LATENCY OF SIX YEARS. THIS
11 WAS A RESIDENT WHO LIVED LESS THAN HALF A
12 MILE FROM A VC PVC PLANT. THE NEXT CASE WAS
13 AGAIN A LIVER CANCER WITH A LATENCY PERIOD OF
14 EIGHT YEARS, PUBLISHED BY BRADY IN 1977, WHO
15 WAS A RESIDENT A THIRD OF A MILE AWAY FROM A
16 VC PVC PLANT IN NEW YORK.

17 OVER AND ABOVE THESE LIVER
18 ANGIOSARCOMAS, THE LIVER CANCER, WHICH IS
19 ANOTHER KIND OF MALIGNANCY OF THE LIVER WHICH
20 IS DIFFERENT FROM ANGIOSARCOMA BUT IS LETHAL
21 TODAY, WAS REPORTED IN A WORKER IN A BRITISH
22 VC PVC PLANT WITH A LATENCY OF NINE YEARS,
23 ANOTHER WAS IN THE SAME PAPER BY FOX AND
24 COLLIER, A CANCER OF THE LUNG IN A WORKER IN
25 THE BRITISH PLANT WITH A LATENCY OF NINE

1 YEARS. IN THE SAME PAPER, ALSO CANCER OF THE
2 PANCREAS IN LESS THAN TEN YEARS IN A WORKER
3 IN A BRITISH PLANT. FINALLY, TWO BRAIN
4 CANCERS, A BRAIN CANCER IN A WORKER IN THE
5 UNITED STATES, VINYL CHLORIDE WITH A LATENCY
6 OF THREE YEARS, WAXWEILLER IN 1975. AND
7 FINALLY, A WORKER IN A SWEDISH PLANT WITH A
8 LATENCY OF LESS THAN ONE YEAR.

9 Q. DOCTOR, HAS BRAIN CANCER BEEN LINKED
10 WITH VINYL CHLORIDE?

11 A. IT MOST CERTAINLY HAS.

12 Q. DOCTOR, ARE YOU FAMILIAR WITH --
13 AS A PHYSICIAN AND A RESEARCHER, ARE YOU
14 FAMILIAR WITH THE ABILITY OF LUNGS TO BREATHE
15 IN PARTICLES OF VARIOUS SIZES?

16 A. YES, I WOULDN'T CLAIM PARTICULAR
17 EXPERTISE OF AREAS OF RESPIRATORY PHYSIOLOGY,
18 BUT I'M CONVERSANT WITH SOME ELEMENTS OF THE
19 FIELD.

20 Q. DOCTOR, IF A PERSON WAS EXPOSED TO
21 ATMOSPHERE HAVING WITHIN IT PVC DUST
22 PARTICLES WITHIN A SIZE RANGE OF ONE TO TEN
23 MICRONS -- DO YOU KNOW WHAT A MICRON IS?

24 A. YES.

25 Q. WOULD THOSE PARTICLES BE RESPIRABLE,

1 WOULD THEY ENTER INTO A PERSONS LUNGS?

2 A. SURE. THE SMALLER THE PARTICLE, --
3 CERTAINLY, WHEN YOU REACH MORE THAN -- WHEN
4 YOU REACH TEN MICRONS AND ABOVE, THE
5 PARTICLES TEND TO BE IRRESPIRABLE. THE LOWER
6 YOU GO, THE GREATER THE ABILITY OF THE LUNG
7 TO RETAIN THESE PARTICLES, SO THE LOWER, THE
8 SMALLER THE PARTICLE, JUNK MORE RESPIRABLE IT
9 IS WITHIN THIS RANGE.

10 Q. AND WOULD THEY BE -- ONCE RESPIRABLE,
11 WOULD THESE SMALL PARTICLES -- WOULD ANY OF
12 THESE SMALL PARTICLES BE SUBJECTED TO BE
13 RETAINED OR ENTRAPPED IN THE LUNG?

14 A. YES. AND THERE ARE VARIOUS STUDIES
15 ON THE EFFECTS OF POLYVINYLCHLORIDE PARTICLES
16 IN THE LUNG. THERE HAVE BEEN A WHOLE SERIES
17 OF PUBLICATION SHOWING THAT POLYVINYLCHLORIDE
18 CAN PRODUCE GRANULOMATOUS CHANGES IN THE LUNG
19 AND THERE ARE VARIOUS PUBLICATIONS ON THE
20 ABILITY OF PARTICLESS TO PRODUCE THESE
21 CHANGES IN THE PARTS QUITE APART FROM
22 INFORMATION THAT WE HAVE ON ITS
23 CARCINOGENICITY, ON THE CARCINOGENIC EFFECTS
24 OF POLYVINYLCHLORIDE.

25 THE COURT: I THINK WE'LL

1 TAKE OUR NOON RECESS, LADIES AND GENTLEMEN.
2 BE BACK HERE AT 1:30.

3 (AT WHICH TIME THE JURY
4 LEAVES THE COURT ROOM.).

5 THE COURT: WE WILL STAND IN
6 RECESS UNTIL 1:30

7 (LUNCHEON RECESS).

8 THE COURT: PLEASE CONTINUE.

9 MR. VASSALOTTI: THANK YOU,
10 YOUR HONOR.

11 BY MR. VASSALOTTI:

12 Q. DOCTOR, YOU WERE NOT IN THE COURT.
13 THIS MORNING WHEN I READ A HYPOTHETICAL FACT
14 SITUATION TO DOCTOR LAUCIUS, WERE YOU?

15 A. NO.

16 Q. DOCTOR, IN THAT CASE, I'LL HAVE TO
17 ASK YOU TO ASSUME THE FOLLOWING FACTS WITH
18 REGARD TO THIS CASE: FIRST THAT MR. JOHN
19 GRASSO WAS BORN ON DECEMBER 27, 1927 AND THAT
20 UP UNTIL HIS LAST ILLNESS IN MAY OF 1975,
21 THERE WAS NO HISTORY, MEDICAL HISTORY OF
22 CANCER OR LIVER DISEASE IN MR. GRASSO, AND
23 THAT ALSO, THERE WAS NO HISTORY OF CANCER OR
24 LIVER DISEASE IN EITHER OF HIS PARENTS OR HIS
25 BROTHERS OR SISTERS. I FURTHER ASK YOU TO

1 ASSUME THAT MR. GRASSO BEGAN WORKING AT THE
2 DUPONT CHAMBERSWORKS IN DEERWATER, NEW JERSEY
3 IN APPROXIMATELY 1947 AND THAT EXCEPT FOR
4 PERIODS WHEN HE WAS LAID OFF FROM THAT
5 FACILITY, HE WORKED THERE UNTIL MAY OF 1975;
6 AND THAT IN THAT EMPLOYMENT AT THE DUPONT
7 CHAMBERSWORKS, HE DID NOT WORK WITH ARSENIC
8 OR ARSENIC COMPOUNDS OR WITH VINYL CHLORIDE.
9 DURING THE PERIODS THAT HE WAS LAID OFF FROM
10 THE DUPONT CHAMBERSWORKS, HE HELD SUCH JOBS
11 AS WORKING AT AN GROCERY STORE, AN AUTO PARTS
12 SALESMAN, A GAS STATION ATTENDANT, A
13 CONSTRUCTION LABORER, AN AUTO MECHANIC AND A
14 SHEET METAL WORKER. I ASK YOU TO FURTHER
15 ASSUME THAT DURING THE YEARS OF 1970 THROUGH
16 1975, MR. GRASSO WAS AWAY FROM HIS HOME
17 APPROXIMATELY 50 TO 55 HOURS PER WEEK;
18 THEREFORE, HE WAS AT HOME OR IN THE AREA OF
19 HIS HOME APPROXIMATELY -- OR OVER 50
20 PERCENT OF THE TIME DURING THOSE YEARS.

21 IN ADDITION, I ASK YOU TO
22 ASSUME THAT IN FEBRUARY OF 19 -- BETWEEN
23 FEBRUARY OF 1973 AND SEPTEMBER OF 1973, MR.
24 GRASSO WAS AT HOME VIRTUALLY ALL THE TIME, AS
25 HE WAS RECUPERATING FROM CORONARY ARTERY

1 BYPASS SURGERY. I FURTHER ASK YOU TO ASSUME
2 THAT DURING THE PERIOD OF MARCH OF 1973
3 THROUGH DECEMBER, 1975, MR. GRASSO LIVED
4 APPROXIMATELY ONE POINT SEVEN MILES FROM A
5 PVC PRODUCTION PLANT OWNED AND OPERATED BY
6 THE R.F. GOODRICH COMPANY. DURING THOSE YEARS,
7 IT HAS BEEN ESTIMATED THAT THAT PVC PLANT
8 EMITTED BETWEEN THE ONE POINT FOUR AND FOUR
9 POINT THREE POUNDS OF VINYL CHLORIDE INTO THE
10 ATMOSPHERE. AND IT'S BEEN FURTHER ESTIMATED
11 THAT DURING THOSE YEARS THAT THE PVC PLANT
12 ALSO EMITTED INTO THE ATMOSPHERE AMOUNTS OF
13 PVC DUST PARTICLES THAT RANGED IN SIZE
14 BETWEEN ONE AND TEN MICRONS AND THAT SUCH PVC
15 DUST PARTICLES CONTAINED ENTRAPPED UNREACTED
16 VINYL CHLORIDE IN LEVELS RANGING FROM 40
17 PARTS PER MILLION UP TO 2,000 PARTS PER
18 MILLION.

19 IT HAS BEEN FURTHER ESTIMATED
20 THAT DURING THE YEARS 1970 THROUGH 1975, THAT
21 THERE EXISTED LEVELS OF VINYL CHLORIDE IN THE
22 AIR AND AROUND THE GRASSO HOME AND THAT THOSE
23 LEVELS HAVE BEEN ESTIMATED TO RANGE FROM ONE
24 POINT ONE PARTS PER MILLION TO 28 PARTS PER
25 MILLION, AND THAT THESE LEVELS OF VINYL

1 CHLORIDE AT OR AROUND THE GRASSO HOME WERE
2 PRESENT FOR A TOTAL OF 1,500 HOURS OF
3 CONDITIONS WHEN THE WIND WAS FAVORABLE TO
4 BRING THOSE MATERIALS THERE DURING THE YEARS
5 IN QUESTION.

6 FURTHER, ON -- IN HAZE OR
7 POLLUTION CONDITIONS, THE LEVEL OF EXPOSURE
8 AT THE GRASSO HOME RANGED AS HIGH AS FROM TEN
9 TO 90 PARTS PER MILLION.

10 FINALLY, DOCTOR, IN ADDITION
11 TO THOSE EXPOSURES OR THOSE LEVELS OF
12 EXPOSURE AT THE AREA OF THE GRASSO HOME,
13 THERE WERE IN ADDITION SHORT PERIODS OF TIME
14 DURING THE YEARS IN QUESTION RANGING ANYWHERE
15 FROM FIVE TO 15 MINUTES DURING WHICH IT HAS
16 BEEN ESTIMATED THAT LEVELS OF VINYL CHLORIDE
17 EXPOSURE IN THE AREA OF THE GRASSO HOME
18 RANGED AS HIGH AS SEVERAL HUNDRED PARTS PER
19 MILLION.

20 NOW, DOCTOR, BASED UPON THAT
21 INFORMATION, AND BASED UPON YOUR EXPERIENCE
22 AS A PHYSICIAN AND A TOXICOLOGIST, AND YOUR
23 KNOWLEDGE OF THE LITERATURE AND MEDICAL
24 EVIDENCE IN THE AREA OF CANCER AND CANCER
25 CAUSING CHEMICALS, DO YOU HAVE AN OPINION AS

1 TO WHAT CAUSED THE ANGIOSARCOMA OF THE LIVER
2 THAT MR. JOHN GRASSO HAD?

3 A. YES.

4 Q. AND WHAT IS YOUR OPINION, DOCTOR?

5 A. MY OPINION IS THAT THERE'S A
6 SUBSTANTIAL PROBABILITY THAT IS HIS
7 ANGIOSARCOMA WAS DUE TO RESIDENTIAL EXPOSURE
8 TO VINYL CHLORIDE EMITTED FROM THE B.F.
9 GOODRICH PLANT.

10 Q. DOCTOR, WHY DIDN'T ANYBODY ELSE IN
11 THE GRASSO FAMILY GET THE ANGIOSARCOMA OF THE
12 LIVER?

13 A. WELL, I HAVE THREE RESPONSIVE
14 COMMENTS: FIRST OF ALL, I BELIEVE ON THE
15 BASIS OF THE EXPOSURE DATA THAT WE HAVE, THAT
16 THE GRASSO FAMILY IS AT RISK AND WHILE NOBODY
17 IN THAT FAMILY HAS DEVELOPED CANCER SO FAR, I
18 BELIEVE THAT THE FAMILY IS AT RISK AND
19 THEREFORE ONE CAN'T ANSWER THAT QUESTION
20 UNTIL THE REST OF THE FAMILY AND LOCAL
21 RESIDENTS HAVE BEEN FOLLOWED UP FOR LIFETIME,
22 POINT ONE.

23 POINT TWO, MR. GRASSO MAY
24 WELL -- AND I'M NOT PREPARED TO EXCLUDE THE
25 POSSIBILITY -- MAY WELL HAVE BEEN

1 SENSITIZED TO THE VINYL CHLORIDE BY OTHER
2 EXPOSURES, SUCH AS CHEMICALS, A WIDE RANGE OF
3 CHEMICALS, NON-CARCINOGENIC AND CARCINOGENIC
4 WHICH HE HANDLED WHILE WORKING AT DUPONT.

5 AND THIRDLY, IN ANY
6 POPULATION OF ANIMALS OR HUMANS WHO ARE
7 EXPOSED, THERE IS A DISTRIBUTION, WHAT WE
8 CALL A GAUSSIAN, TYPE OF DISTRIBUTION OF
9 SENSITIVITY. SOME INDIVIDUALS FOR GENETIC AND
10 OTHER REASONS HAVE HIGH SENSITIVITY; SOME
11 INDIVIDUALS ARE THE OTHER KIND -- END OF IT,
12 HAVE A LOW SENSITIVITY AND SOME HAVE
13 INTERMEDIATE SENSITIVITY. THIS IS A
14 CHARACTERISTIC, BIOLOGICAL SENSE, WHEN YOU TAKE
15 ANY POPULATION, RATS, HUMANS, THE SENSITIVITY
16 IS -- SOME ARE VERY SENSITIVE, SOME
17 RESISTANT, SOME INTERMEDIATE. AND IT MAY WELL
18 BE THAT MR. GRASSO FELL INTO THE -- THE END
19 OF THE SPECTRUM, REPRESENTING THOSE WHO, FOR
20 GENETIC AND OTHER REASONS, ARE MORE SENSITIVE
21 THAN OTHERS.

22 MR. VASSALOTTI: THANK YOU,
23 DOCTOR, NO FURTHER QUESTIONS, YOUR HONOR.

24 THE COURT: CROSS-EXAMINE
25 CROSS EXAMINATION

1 BY MR. RENNEISEN:

2 Q. DOCTOR EPSTEIN, YOU USED TERM
3 SUBSTANTIAL PROBABILITY. WHAT DO YOU MEAN BY
4 SUBSTANTIAL PROBABILITY?

5 A. I THINK THE TERMS ARE
6 SELF-EXPLANATORY, BUT I'M WILLING TO OFFER
7 YOU SYNONYMS FOR SUBSTANTIAL AND SYNONYMS FOR
8 PROBABILITY, IF THIS IS WHAT YOU WISH.

9 Q. IN OTHER WORDS, IT SHOULD BE
10 INTERPRETTED WITHOUT ANY MEDICAL SIGNIFICANCE?
11 IT'S SIMPLY WHAT THE WORDS MEAN IN AN
12 ORDINARY DICTIONARY MEANING; IS THAT CORRECT?

13 A. NO. IT IS A STATEMENT OF -- MY
14 MEDICAL AND SCIENTIFIC OPINION THAT THERE IS
15 A SUBSTANTIAL PROBABILITY THAT HIS
16 ANGIOSARCOMA WAS DUE TO RESIDENTIAL EXPOSURE.

17 Q. I UNDERSTAND YOU'VE SAID THAT,
18 DOCTOR.

19 CAN YOU EXPAND UPON THAT AND
20 EXPLAIN WHAT YOU MEAN?

21 A. CERTAINLY. I THINK THAT SCIENCE --

22 Q. PROBABILITY MEANS MORE LIKELY THAN
23 NOT, DOES IT NOT?

24 A. YES. MEDICAL SCIENCE IS UNABLE IN
25 ANY PARTICULAR CASE OF AN ADVERSE EFFECT TO

1 TALK IN ABSOLUTE TERMS. ONE CAN ONLY DEVELOP
2 POSITIONS, INFERENTIALLY AND ON THE BASIS OF
3 PROBABILITIES. WITH VERY RARE EXCEPTION --
4 I'M GOING TO GIVE YOU AN EXCEPTION IN A
5 MOMENT -- THERE IS NO SINGLE ONE-CAUSE FOR
6 ANY ONE DISEASE AND YOU CAN'T NECESSARILY IN
7 ANY ONE CASE TALK ABOUT ABSOLUTE CAUSALITY.
8 YOU CAN'T SAY, "I'M 100 PERCENT CERTAIN," OR
9 IF SOMEBODY SAYS THEY'RE 100 PERCENT CERTAIN,
10 THEY'RE ON SHAKY SCIENTIFIC GROUNDS. THERE
11 ARE CERTAIN KINDS OF CANCERS MESOTHELIOMA
12 THAT -- A CANCER INDUCED BY ASBESTOS --
13 WHICH FOR ALL INTENTS AND PURPOSES, HAS NEVER
14 -- ALTHOUGH THEY HAVE -- IT IS DANGEROUS
15 AT -- HAS NEVER, IF AT ALL BEEN INDUCED BY
16 AGENTS OTHER THAN ASBESTOS. THEREFORE, IF WE
17 WERE TALK ABOUT MESOTHELIOMA, THE LIKLIHOOD
18 IS ONE WOULD TALK IN MORE ABSOLUTE TERMS.

19 BUT IN A CASE LIKE THIS, I
20 THINK THAT IT IS SCIENTIFICALLY APPROPRIATE
21 TO TALK ABOUT THE MOST LIKELY AND THE MOST
22 PROBABLE. AND THE TERM SUBSTANTIAL
23 PROBABILITY REALLY EXPRESSES WHAT ARE THE
24 MOST LIKELY EXPLANATIONS FOR THIS CONDITION.
25 Q. THANK YOU, DOCTOR. NOW, WITH RESPECT

1 TO ANGIOSARCOMA, I BELIEVE YOU HAVE ALREADY
2 TOLD US THAT THERE ARE FOUR AGENTS OR
3 CHEMICALS THAT HAVE BEEN IDENTIFIED TO DATE
4 AS CAUSATIVE -- AS AGENTS WHICH WILL CAUSE
5 ANGIOSARCOMA.

6 A. WELL, I'M NOT ABSOLUTELY -- JUST
7 ONE SLIGHT CAVEAT IF I MAY.

8 WHEN IT COMES TO THE ANABOLIC
9 STEROIDS, I DON'T THINK ONE CAN DEFINITELY
10 INCRIMINATE THOSE. ONE CAN TALK ABOUT
11 PROBABILITY. THE AUTHORS OF THE PAPER, FAULK
12 ET AL WERE VERY CAUTIOUS ABOUT THIS. THEY
13 DIDN'T INCRIMINATE THEM UNEQUIVOCALLY IN THE
14 SAME SENSE THAT VINYL CHLORIDE IS
15 INCRIMINATED. THEY TALKED ABOUT PROBABILITY
16 AND TO USE THE LANGUAGE, IF YOU WISH ME TO
17 QUOTE FROM THE LANGUAGE THEY USED -- THEY
18 SAY IT IS SUGGESTED THAT LONG TERM ANABOLIC
19 STEROIDS IS THE FORTH CAUSE AGAIN. THE
20 SUGGESTED ASSOCIATION WITH THE ANABOLIC
21 STEROIDS AND ANGIOSARCOMA REMAIN TO BE
22 CONFIRMED. I THINK WHAT WE CAN SAY IS THERE
23 ARE THREE CLEARCUT CAUSES AND A FOURTH --

24 Q. AND A POSSIBLE FOURTH?

25 A. AND A POSSIBLE FOURTH WHICH IS

1 PROBLEMATIC, POSSIBLE.

2 Q. THE ARTICLE BY HENRY FAULK AND HIS
3 ASSOCIATES YOU'RE REFERRING TO, IS THAT THE
4 ARTICLE IN THE LANCET, IS IT NOT, NOVEMBER 24,
5 1979?

6 A. YES.

7 Q. IS IT TRUE, DOCTOR, THAT IN THAT
8 ARTICLE, THEY IDENTIFY APPROXIMATELY 25
9 PERCENT OF THE CASES WHICH HAVE CAUSES?

10 A. THAT'S RIGHT, YES.

11 Q. WHICH WOULD MEAN 75 PERCENT OF THE
12 CASES HAVE NOT YET BEEN IDENTIFIED AS HAVING
13 A CAUSE?

14 A. WELL, THAT'S A VERY INTERESTING
15 POINT, BECAUSE THAT'S NOT EXACTLY WHAT THEY
16 SAY.

17 Q. WELL, LET'S LOOK --

18 A. LET ME JUST COMPLETE MY ANSWER. WHAT
19 THEY SAY IS AS FOLLOWS: THEY SAY THAT OF THE
20 CASES DESCRIBED SOMETIME -- NAMELY BETWEEN
21 64 AND 74 -- THESE ARE THE ONLY RECORDED
22 CAUSES. THEY DON'T SAY THEY ARE THE ONLY
23 NECESSARY CAUSES. IN FACT, THEY GO TO POINT
24 OUT AT THE END OF THE ARTICLE --

25 Q. SUPPOSE --

1 A. THE LAST SENTENCE READS.

2 THE COURT: LET THE DOCTOR
3 FINISH. YOU STARTED THE LINE OF QUESTIONING.

4 THE WITNESS: THE LAST
5 SENTENCE READS: "THE MOST IMPORTANT PURPOSE
6 IN CALLING ATTENTION TO THIS RANGE OF
7 CONDITIONS IS TO ENCOURAGE THE SEARCH OR
8 ETIOLOGIC FACTOR ENDOGENOUS, MEDICAL AND
9 ENVIROMENTAL AND INDUSTRIAL, WHICH ARE
10 RESPONSIBLE FOR THE CASE CONSIDERED SO FAR TO
11 BE IDIOPATHIC." BY IDIOPATHIC, ONE MEANS THE
12 CASES FOR WHICH THERE IS NO KNOWN RECORDED
13 ETIOLOGY. SO THE AUTHORS OF THIS PAPER SAY,
14 WE SHOULD LOOK A GREAT DEAL BETTER THAN WE
15 REALLY HAVE FOR CAUSES, FOR ANGIOSARCOMA
16 WHICH UP TILL NOW HAVE BEEN REGARDED AS
17 IDIOPATHIC. AND, IN FACT, THERE IS A
18 SUBSEQUENT LITERATURE, THE ARTICLE BY BRADY,
19 MAKES IT VERY CLEAR THAT THE -- THERE ARE
20 MORE KNOWN CAUSES -- OR AS MANY KNOWN
21 CAUSES OF ANGIOSARCOMA AS THERE ARE UNKNOWN
22 CAUSES.

23 Q. WOULD YOU READ THE FIRST SENTENCE OF
24 THE SUMMARY FOR ME, PLEASE?

25 A. CERTAINLY.

1 Q. THE VERY FIRST SENTENCE IN THE
2 ARTICLE.

3 A. A RETROSPECTIVE
4 EPIDEMIOLOGICAL STUDY OF DEATHS FROM HEPATIC
5 ANGIOSARCOMA HAS IN THE U. S. SHOWED DURING
6 1954-74 THERE WERE 158 SUCH CASE, OF WHICH
7 37, 22 PER CENT, WERE ASSOCIATED WITH
8 PREVIOUSLY KNOWN CAUSES, VINYL CHLORIDE,
9 THOROTRAST AND INORGANIC ARSENIC AND FOUR,
10 THREE POINT ONE PERCENT, OF THE REMAINING 131
11 CASES WITH THE USE OF ANDROGENIC-ANABOLIC
12 STEROIDS.

13 Q. AM I CORRECT, DOCTOR IN
14 UNDERSTANDING THERE IS NO DISCUSSION OF THE
15 CAUSE OF THE OTHER 75 PERCENT?

16 A. THAT'S NOT MY POINT. MY POINT IS
17 THAT THEY CONCLUDE THAT FOR THE OTHER CASES,
18 WE SHOULD LOOK FOR THE CAUSES AND THAT --
19 LET ME REPEAT AGAIN. THAT WE SHOULD LOOK --
20 THE MOST IMPORTANT PURPOSE, THE BOTTOM LINE
21 OF THE ARTICLE -- AND I REMEMBER -- THE
22 MOST IMPORTANT PURPOSE IN CALLING ATTENTION
23 TO THIS RANGE OF CONDITIONS IS TO ENCOURAGE
24 THE SEARCH FOR THE ETIOLOGIC FACTORS,
25 ENVIROMENTAL, INDUSTRIAL, ENDOGENOUS AND

1 MEDICAL, WHICH ARE RESPONSIBLE FOR THE CASES
2 CONSIDERED SO FAR TO BE IDIOPATHIC. FOR THE
3 CASES WHICH UP TO NOW WHICH HAVE BEEN
4 CONSIDERED TO HAVE NO CAUSE. HIS POINT IS FOR
5 THESE REMAINING CASES, WE SHOULD TRY TO FIND
6 THE CAUSE, SUCH AS COMMUNITY RESIDENCES,
7 WHICH TILL RELATIVELY RECENTLY, HAVEN'T BEEN
8 WELL DOCUMENTED.

9 Q. WOULD THE COURT REPORTER READ BACK
10 MY QUESTION, PLEASE? I DON'T THINK IT WAS
11 ANSWERED. IF IT HAS BEEN, I'LL APPOLOGIZE.
12 BUT I'D LIKE THE QUESTION READ BACK.

13 THE COURT: READ BACK THE
14 QUESTION.

15 (QUESTION READ).

16 BY MR. RENNEISEN:

17 Q. CAN YOU ANSWER THAT QUESTION YES OR
18 NO, DOCTOR?

19 A. THE ANSWER IS, THERE IS A DISCUSSION.

20 Q. THERE IS A DISCUSSION?

21 A. YES.

22 Q. AND IS YOUR -- THE ANSWER YOU'VE
23 JUST GIVEN ME, THE DISCUSSION THAT EXISTS?

24 A. THAT IS THE BOTTOM LINE OF THE
25 ARTICLE, YES; THERE ARE OTHER REFERENCES TO

1 THIS PROBLEM THROUGHOUT THE PAPER. BUT THE
2 -- I REPEAT, IT SAYS THE MOST IMPORTANT
3 PURPOSE. THE PAPER SAYS THE MOST IMPORTANT
4 PURPOSE IS TO LOOK FOR CAUSES FOR THOSE
5 ANGIOSARCOMAS WHICH UP TILL NOW HAVE BEEN
6 CONSIDERED NOT TO HAVE A CAUSE. THAT IS WHAT
7 THE PAPERS SAYS.

8 Q. THE PAPER SAYS LOOK FOR CAUSES. DOES
9 THE PAPER DISCUSS POSSIBLE OTHER CAUSES?

10 A. NO. IT DOESN'T. BECAUSE WE HAVE A
11 RANGE OF CAUSES, FOUR CAUSES, AND IN THESE
12 154 CASES, WHAT HAVE YOU, IT IS IMPORTANT
13 THAT EACH OF THEM SHOULD BE CAREFULLY SERCHED
14 TO EXAMINE FOR THE POSSIBILITY OF EXPOSURE TO
15 THESE AGENTS. AND IN THE LITERATURE IN THE
16 PAST, THERE HASN'T BEEN DOCUMENTATION OF SUCH
17 EXPOSURES. IN THE SAME WAY AS SOME OF THE
18 COMMUNITY CANCER CASES HAVEN'T BEEN
19 RECOGNIZED IN THE PAST AS BEING DUE TO
20 ANGIOSARCOMA. AND THIS IS THE POINT OF THE
21 PAPER. IN CASES WHICH ARE CONSIDERED NOT TO
22 HAVE A CAUSE, LOOK FOR THE CAUSES, LOOK AND
23 SEE IF THEY LIVE CLOSE TO A PLANT, LOOK AND
24 SEE IF THEY WORK IN A PVC FABRICATION PLANT,
25 LOOK FOR THESE CAUSES.

1 Q. PRESENTLY DOCTOR, ARE THERE CASES
2 FOR WHICH CAUSES ARE UNATTRIBUTABLE FOR THE
3 CENTER OF DISEASE CONTROL AND HENRY FAULK AND
4 IS --

5 A. MOST CERTAINLY.

6 Q. AND CURRENTLY, IS THAT ABOUT 75
7 PERCENT OF THE TOTAL NUMBER OF CASES?

8 A. I WOULDN'T AGREE WITH THAT FIGURE
9 AND LET ME GIVE YOU THE REASONS FOR NOT
10 AGREEING.

11 LET US TURN TO --

12 THE COURT: LET ME SAY THIS,
13 DOCTOR: DO YOU WANT HIM TO CONTINUE ON.

14 MR. RENNEISEN: NO, SIR, BUT
15 EVERYTIME I CUT HIM OFF, YOUR HONOR, I'VE
16 BEEN --

17 THE COURT: THIS SHOULD BE
18 MORE OF A QUESTION AND ANSWER. HE'LL ASK THE
19 QUESTION. I'VE GIVEN YOU BROAD LATTITUDE. BUT
20 REMEMBER, HE'S QUESTIONING YOU AND YOU'LL
21 RESPOND TO HIS ANSWERS. WHEN IT COMES BACK
22 FOR REDIRECT, IF THERE'S SOMETHING THAT
23 COUNSEL FOR THE PLAINTIFF WANTS TO GET OUT OF
24 YOU, HE'LL GET OUT OF YOU. BUT, DO IT BY
25 QUESTION AND ANSWER AND SORT OF STAY AWAY

1 FROM THE VOLUNTEERING. GO AHEAD.

2 MR. RENNEISEN: WHAT WAS MY
3 LAST QUESTION?

4 (DESIGNATED QUESTION IS READ.)

5 BY MR. RENNEISEN:

6 Q. SO, DOCTOR, I WAS ASKING YOU AT THE
7 PRESENT TIME, ARE APPROXIMATELY 75 PERCENT OF
8 THE TOTAL CASES OF ANGIOSARCOMA ATTRIBUTED BY
9 THE CENTER FOR DISEASE CONTROL TO UNKNOWN
10 CAUSES?

11 A. YES.

12 Q. THANK YOU.

13 Q. DOCTOR, WHEN YOU TESTIFIED
14 CONCERNING YOUR QUALIFICATIONS, YOU GAVE US A
15 GREAT DEAL OF BACKGROUND ABOUT YOURSELF. HAVE
16 YOU DONE ANY ANIMAL STUDIES YOURSELF WITH
17 RESPECT TO VINYL CHLORIDE?

18 A. I'VE DONE NO CARCINOGENICITY STUDIES.
19 I DID SOME MUTAGENICITY STUDIES ABOUT TEN
20 YEARS AGO, BUT I'VE DONE NO CARCINOGENICITY
21 STUDIES WITH THE WITH IT.

22 Q. YOU TESTIFIED THIS MORNING THAT
23 ANGIOSARCOMA IS A VERY RARE FORM OF LIVER
24 CANCER. HOW MANY CASES CAN WE EXPECT A YEAR
25 IN THE ENTIRE COUNTRY; DO YOU KNOW, DOCTOR?

1 A. WELL, THERE HAVE BEEN VARYING
2 ESTIMATES ON THIS, SOMEWHERE IN THE RANGES OF
3 ABOUT 25 TO 30 A YEAR, SOMEWHERE IN THAT BALL
4 PARK. THAT WAS A C.D.C. ESTIMATE OF A FEW
5 YEARS AGO.

6 Q. IN TALKING ABOUT THE HISTORY OF THE
7 LITERATURE SHOWING INFORMATION ABOUT VINYL
8 CHLORIDE, YOU, I BELIEVE, SAID THAT BACK IN
9 AROUND 1930, IT WAS FOUND THAT CONCENTRATIONS
10 OF FIVE PERCENT PRODUCED ACUTE TOXICITY IN
11 ANIMALS. FIVE PERCENT IS HOW MANY PARTS PER
12 MILLION?

13 A. IT'S VERY HIGH, ABOUT 50 THOUSAND,
14 P.P.M..

15 Q. AND NATIONALS HIGHER THAN IT IS
16 EXPLOSIVE LIMIT?

17 A. OH, YES, VERY HIGH CONCENTRATIONS
18 INDEED.

19 Q. AND AT THAT LEVEL, IT WOULD MAKE AN
20 ANIMAL UNCONSCIOUS POSSIBLY?

21 A. SURE, ABSOLUTELY.

22 Q. AND NOBODY -- NOBODY EVER WORKED
23 IN LEVELS THAT HIGH, DID THEY?

24 A. THERE HAVE BEEN RECORDED HIGH LEVELS
25 IN AUTOCLAVES. I CAN'T RECALL THE EXACT

1 LEVELS, BUT I WOULD AGREE WITH YOU THAT IN
2 ALL PROBABILITY, THIS IS AN EXTRAORDINARY
3 HIGH LEVEL, WHICH PROBABLY ISN'T COMMONLY
4 FOUND IN THE WORK PLACE.

5 Q. AND IF SOMEBODY STRUCK A MATCH IN
6 THAT LEVEL, BOOM, IT WOULD GO OFF, RIGHT?

7 A. IT WOULD GO OFF, SURE.

8 Q. IN YOUR REVIEW OF THE LITERATURE
9 -- AND I THINK YOU SAID IT WAS MOSTLY
10 EUROPEAN LITERATURE -- TALKING ABOUT
11 TOXICITY, YOU DIDN'T FIND ANY REFERENCE TO
12 ANGIOSARCOMA, DID YOU, ABOUT THE PERIOD FROM
13 1949 TO 1970?

14 A. TO -- I MISSED --

15 Q. IN THE PERIOD FROM 1949 UNTIL VIOLA
16 IN 1970 --

17 A. THAT'S RIGHT.

18 Q. -- THERE WAS NO REFERENCE TO --

19 A. CORRECT.

20 Q. -- ANGIOSARCOMA.

21 NOW, I THINK YOU HAVE SAID
22 THAT THAT LITERATURE WAS AVAILABLE AND COULD
23 BE READ BY ANYONE WHO WAS INTERESTED IF THEY
24 DID A LITERATURE SEARCH; IS THAT CORRECT?

25 A. YES.

1 Q. WERE YOU FAMILIAR WITH THE
2 LITERATURE BEFORE 1970?

3 A. OF VINYL CHLORIDE?

4 Q. YES.

5 A. I DON'T THINK SO. BUT THEN I DIDN'T
6 HAVE RESPONSIBILITIES IN THE AREA.

7 Q. YOU WERE IN THE ENVIROMENTAL AREA AT
8 THAT TIME, WERE YOU NOT?

9 A. YES. I I WAS INTERESTED IN THOUSANDS
10 OF CHEMICALS.

11 Q. ALL RIGHT. DOCTOR, IS IT TRUE THAT
12 THERE WAS A PERIOD OF TIME -- I BELIEVE IT
13 WAS IN 1950'S BUT IT MAY HAVE BEEN IN THE
14 1960'S -- WHEN BECAUSE OF ITS NARCOTIC
15 EFFECT, VINYL CHLORIDE WAS -- WAS
16 EXPERIMENTED WITH BY THE MEDICAL PROFESSION
17 AS AN ANESTHETIC?

18 A. ABSOLUTELY.

19 Q. I KNOW THAT STUDY WAS ABANDONED, BUT
20 IT DIDN'T PRODUCE ANY CANCER RESULTS THAT
21 ANYBODY KNOWS ABOUT, DOES IT?

22 A. I HAVE NO IDEA WHETHER THE PEOPLE
23 HAVE BEEN FOLLOWED UP. I JUST HAVE NO IDEA. I
24 THINK IT WOULD BE AN INTERESTING THING TO DO.
25 THAT MAY BE ONE OF THE UNEXPLAINED CAUSES OF

1 ANGIOSARCOMA.

2 Q. IT DIDN'T PRODUCE -- WHEN THE
3 EXPERIMENT TO USE IT AS AN ANESTHETIC STOPPED,
4 THERE WERE NO ACCOMPANING PAPERS DISCUSSING
5 CANCER, WERE THEY?

6 A. I DON'T THINK -- I DON'T THINK
7 THESE PAPERS HAVE BEEN FOLLOWED UP. I THINK
8 IT'S AN EXCELLENT IDEA TO FOLLOW THEM UP TO
9 SEE HOW MANY OF THEM HAVE GOT ANGIOSARCOMA OR
10 IF ANY HAVE. SPLENDID CONCEPT.

11 Q. YOU MENTIONED THAT PRIOR TO 1971,
12 THERE WERE EIGHT CASES OF ANGIOSARCOMA IN
13 VINYL CHLORIDE WORKERS.

14 WHEN DID THAT KNOWLEDGE --
15 WHEN WAS THAT KNOWLEDGE COLLECTED?

16 A. WELL, IT IS IT CAME IN TWO STAGES:
17 FIRST OF ALL, THESE WORKERS WERE KNOWN TO
18 HAVE DIED FROM CANCER OF THE LIVER. HOWEVER,
19 THE DIAGNOSIS OF ANGIOSARCOMA WAS ONLY MADE
20 AFTER THE B.F. GOODRICH ANNOUNCEMENT IN
21 JANUARY, 74, THAT SOME OF ITS WORKERS HAD
22 DIED OF ANGIOSARCOMA AND THIS WAS FIVE YEARS
23 AFTER THE VIOLA PUBLICATION OF THE
24 CARCINOGENICITY IF YOU RECALL. AND THE
25 REFERENCE TO THE -- THESE ANGIOSARCOMAS IS

1 A LITTLE MIXED UP ON HIS DATES

2 HIS FIRST STUDIES WERE 1972.

3 HIS FIRST STUDIES WERE DISCUSSED IN A PAPER
4 PRESENTED IN 1972; IS THAT CORRECT?

5 A. NO, SIR, NO, NO, NOT AT ALL.

6 MATALONI STARTED -- AFTER
7 VIOLA'S PUBLICATION AND PRESENTATION,
8 MATALONI WAS GIVEN A CONTRACT TO CONFIRM AND
9 EXTEND THE FINDINGS. BY OCTOBER OF 1972, HE
10 HAD CONFIRMED A CARCINOGENICITY AND EXTENDED,
11 HAD GONE TO MUCH LOWER DOSES. THREE MONTHS
12 AFTER THAT, THIS INFORMATION WAS PASSED ON TO
13 THE MANUFACTURING CHEMISTS ASSOCIATION.

14 Q. EXCUSE ME?

15 A. BUT.

16 THE COURT: JUST A MOMENT.

17 MR. RENNEISEN: I DON'T THINK
18 I ASKED HIM THAT. I ASKED HIM WHAT DATE --

19 THE WITNESS: I'M GOING TO
20 TELL YOU.

21 BY MR. RENNEISEN:

22 Q. LET ME ASK YOU FIRST OF ALL, ARE WE
23 CORRECT IN UNDERSTANDING THAT HIS STUDIES
24 WERE IN SOME SENSE COMPLETED IN OCTOBER OF
25 1972?

1 A. NO, SIR, THAT'S NOT WHAT I SAID.

2 Q. WELL, WHEN WERE THEY COMPLETED?

3 A. LET ME ANSWER YOU, IF I MAY

4 HE STARTED A SERIES OF
5 ONGOING STUDIES IN ABOUT -- WITHIN SIX TO 9
6 MONTHS OF VIOLA'S COMMUNICATION. BY 1972, IN
7 THE ONGOING STUDIES, HE HAD DEMONSTRATED THE
8 CARCINOGENIC EFFECTS OF VINYL CHLORIDE AND
9 HAD EXTENDED VIOLA'S INDEPENDENT FINDINGS.
10 THE FIRST STATEMENT OF THIS CAME -- WAS
11 RELEASED IN JANUARY, 1974 ON THE SAME DAY AS
12 B.F. GOODRICH AND ANOUNCED THE DEATH FROM
13 ANGIOSARCOMA. THE FIRST PUBLICATION OF
14 MATALONI CAME SUBSEQUENT TO THAT. SO, AFTER
15 74.

16 Q. I'M SORRY, OKAY.

17 NOW, WHAT LEVELS WAS HE USING
18 IN THE STUDIES THAT WERE RELEASED IN JANUARY
19 OF 1974?

20 A. WELL, THE -- BY THEN, HE WAS
21 WORKING WITH CONCENTRATIONS OF ABOUT 50
22 P.P.M.. WHEN -- 50 P.P.M. BALL PARK. TO THE
23 BEST OF MY KNOWLEDGE, WHEN B.F. GOODRICH MADE
24 THE ANNOUNCEMENTS IN JANUARY, 1974, I DON'T
25 THINK THEY DISCLOSED DETAILS OF THE MATALONI

1 TESTS. THE INFORMATION ON THE MATALONI TEST
2 CAME FROM THE SUBSEQUENT PUBLICATIONS NOT NEW
3 YORK ACADEMY OF SCIENCE VOLUME AND OTHER
4 PLACES. BUT IT WAS ABOUT 50 P.P.M. BY 1974.

5 Q. THEN LATER, HE CONTINUED STUDIES. IS
6 THAT RIGHT?

7 A. THAT'S CORRECT, YES. A SET OF
8 ONGOING STUDIES.

9 Q. AND THEY, ARE THEY STILL ONGOING?

10 A. TO THE BEST OF MY KNOWLEDGE, THE
11 OVERWHELMING MAJORITY OF THEM ARE COMPLETE
12 AND HAD BEEN COMPLETED BY 1978. THEY WERE
13 INFLUENCED -- THEY WERE PRESENTED IN COLD
14 SPRING HARBOR SYMPOSIUM IN 1978.

15 Q. I THINK YOU MENTIONED THAT IN ANIMAL
16 STUDIES, A SINGLE DOSE OF VINYL CHLORIDE DID
17 PRODUCE TUMORS OR DO I RECALL YOUR TESTIMONY
18 INCORRECTLY?

19 A. YOU RECALLED IT CORRECTLY BUT YOU'RE
20 LINKING IT NOW WITH MATALONI WHICH IS NOT
21 WHAT HE STUDIED.

22 Q. WHO DID THAT?

23 A. THAT WAS A CONSUMER PRODUCT SAFETY
24 COMMISSION ON STUDY ON BRIEF EXPOSURES TO
25 VINYL CHLORIDE.

1 Q. WHAT WAS THE DOSAGE FOR THAT BRIEF
2 KNOWLEDGE?

3 A. WELL IT WAS A RANGE OF YOUR DOSAGE
4 GOING FROM 50 P.P.M. TO ABOUT, I THINK, 5,000
5 OR SO AND THE RANGE AT -- AT THE ONE HOUR
6 LEVEL, THE LEVEL -- THE LEVEL AT WHAT THEY
7 -- AT WHICH THEY GOT TUMORS AT ONE HOUR WAS
8 50 -- WAS 500 P.P.M.. SO, FOR THE ONE HOUR
9 EXPOSURE, THAT -- WHICH WASN'T A MATALONI
10 STUDY, WHICH WAS IT IS CONSUMER PRODUCT
11 SAFETY COMMISSION, THEY GOT EFFECTS AT --
12 AT 500 P.P.M.. THE MATALONI STUDY, WHICH I
13 WAS REFERRED TO OF THE LOWEST LEVEL, THE ONE
14 P.P.M., THAT WAS AN INTERMITTENT EXPOSURE
15 OVER THE COURSE OF A YEAR, AT WHICH THE
16 BREAST CANCER WERE DEVELOPED FOLLOWING.

17 Q. WHEN YOU SAY INTERMITTENT, EIGHT
18 HOURS ON, EIGHT --

19 A. NO, BASICALLY IT WAS A FOUR HOUR.
20 FOR THE ONE PART PER MILLION STUDY, IT WAS
21 -- TO THE BEST OF MY RECOLLECTION, IT WAS
22 FOUR HOURS A DAY FOR FIVE DAYS A WEEK ON AND
23 OFF FOR THE YEAR. THAT WAS -- THAT WAS AN
24 INTERMITTENT LEVEL.

25 Q. FOUR HOURS A DAY --

1 A. FIVE DAYS A WEEK.

2 Q. FIVE DAYS A WEEK.

3 A. YEAH.

4 Q. IS THERE A WAY TO RELATING DOSE IN
5 RATS AND DOSAGE IN MAN, TAKING INTO
6 CONSIDERATION THEIR RESPECTIVE WEIGHTS OR
7 ISN'T THAT NECESSARY?

8 A. WELL, YOU KNOW, I CAN'T REALLY TELL
9 YOU WHETHER IT'S NECESSARY. IT'S POSSIBLE TO
10 DEVELOP A LOT OF PAPER CALCULATIONS ON THIS
11 RESPECT. AND RELATING DOSE ON THE BASIS OF
12 SURFACE AREA OR WEIGHT. THIS COULD BE DONE. I
13 DON'T HAVE -- I HAVEN'T MADE THESE
14 CALCULATIONS.

15 GENERALLY, I THINK IN
16 CARCINOGENESIS EXPERIMENT, ONE USES ANIMAL
17 DATA, NOT FOR MAKING QUANTITATIVE INFERENCE,
18 BUT SIMPLY FOR SAYING WHETHER THE MATERIAL IS
19 CARCINOGENIC FOR NOT OR NOT. THAT'S WHY I
20 -- HESITATED A BIT ABOUT --

21 Q. YOU MADE REFERENCE TO, I THINK,
22 TESTS CONDUCTED BY THE CONSUMER PRODUCT
23 SAFETY COMMISSION, THAT PRODUCED BREAST
24 TUMORS, IS THAT RIGHT?

25 A. NO. I'M AFRAID -- I APPEAR TO BE

1 CONFUSING YOU.

2 THE MATALONI STUDY AT ONE
3 PART PER MILLION PRODUCED BREAST TUMORS.

4 Q. WHAT DID THE C.P.S. -- THE
5 CONSUMER SAFETY PRODUCTS --

6 A. FINE. THE CONSUMER PRODUCT
7 COMMISSION PRODUCED PULMONARY ADENOMAS AND
8 THESE ARE SO CALLED BENIGN TUMORS OF THE LUNG
9 AND PULMONARY ADENOCARCINOMAS.

10 O. AND THE ANGIOSARCOMA --

11 A. NO, NO. NO, THOSE WERE PULMONARY
12 TUMORS.

13 Q. DOCTOR, YOU HAVE REFERRED TO A
14 SERIES OF ARTICLES AND I THINK I HAVE COPIES
15 OF MOST OF THEM HERE.

16 IF I REFER TO AN ARTICLE THAT
17 YOU DON'T HAVE, I THINK I HAVE AN EXTRA COPY,
18 BUT IF YOU CAN LOCATE YOURS, THAT WOULD BE
19 FINE.

20 BUT BEFORE WE GET TO ARTICLES,
21 I HAVE A COUPLE OTHER QUESTIONS I'D LIKE TO
22 ASK YOU.

23 I BELIEVE YOU ALREADY HAVE
24 TESTIFIED THAT ARSENIC IS A KNOWN CAUSE OF
25 ANGIOSARCOMA; IS THAT CORRECT?

1 A. YES, SIR.

2 Q. AND YOU KNOW THAT FROM LITERATURE
3 STUDIES THAT YOU HAVE READ; IS THAT CORRECT?

4 A. YES, SIR.

5 Q. DO YOU KNOW THAT MR. GRASSO LIVED IN
6 SALEM COUNTY, NEW JERSEY AND THAT SALEM
7 COUNTY IS RURAL AND, FURTHERMORE, THAT
8 ARSENIC WAS USED AS AN INSECTICIDES IN SALEM
9 COUNTY. DO YOU KNOW THAT?

10 A. I DIDN'T KNOW THAT, BUT I WOULDN'T
11 BE SURPRISED.

12 Q. I TAKE IT YOU KNOW THAT ARSENIC IS
13 AN INGREDIENT IN INSECTICIDES?

14 A. I DO.

15 Q. ARSENIC IS A MINERAL, IS IT NOT?

16 A. WELL, I ANYONE PERHAPS MORE
17 CORRECTLY CALL IT A METALLOID, BUT I CALL IT
18 A MINERAL BY ALL MEANS.

19 Q. WELL, I DON'T WANT TO BE
20 UNSCIENTIFIC. WHAT IS THE DIFFERENCE BETWEEN
21 A MINERAL AND A METALLOID?

22 A. I THINK THAT TECHNICALLY THE TERM IS
23 THE METALLOID, BUT I'D RATHER NOT GET INTO

24 --

25 Q. IN ANY EVENT, AFTER YOU SPRAY IT ON

1 THE GROUNDS, IT DOESN'T DISSOLVE INTO
2 SOMETHING ELSE, DOES IT?
3 A. WELL, THE METABOLIC NATURE OF
4 ARSENIC IS -- SOME OF IT IS INTERESTING.
5 SOME OF IT CAN BECOME INCORPORATED, SOME OF
6 IT CAN BECOME METALLATED, SOME OF IT CAN
7 BECOME SOLUABLE AND LEACH INTO WATERS. SO,
8 IT'S -- AND SOME OF IT, ON THE OTHER HAND,
9 CAN ALSO BECOME AERSOLIZED AND BLOW UP INTO
10 DUST WHICH CAN BECOME WIDELY DISSEMINATED IN
11 A COMMUNITY.

12 Q. DID YOU CONSIDER ARSENIC AS A
13 POSSIBLE CAUSE FOR MR. GRASSO'S ANGIOSARCOMA?

14 A. I CONSIDERED EVERY POSSIBLE CAUSE,
15 NAMELY OF THE FOUR WHICH WE HAVE CONSIDERED.
16 THERE WAS ONLY ONE FOR WHICH THERE APPEARED
17 TO BE SUBSTANTIAL DOCUMENTATION AND THAT IS
18 THE BASIS FOR MY VIEWPOINTS OF SUBSTANTIAL
19 PROBABILITY -- OR PART OF THE BASES FOR THE
20 VIEW POINT OF SUBSTANTIAL PROBABILITY.

21 Q. IN RULING OUT ARSENIC, DID YOU MAKE
22 ANY INQUIRY AS TO THE ARSENIC LEVEL OR
23 EXPOSURE OF ARSENIC IN SALEM COUNTY?

24 A. SIR, I DID NOT RULE OUT ARSENIC. MY
25 ANSWER TO T-E QUESTION WAS -- I WAS TALKING

1 ABOUT SUBSTANTIAL PROBABILITY. I'M NOT
2 PREPARED TO EXCLUDE ARSENIC. I JUST DON'T
3 HAVE THE INFORMATION ON THE BASIS OF WHICH I
4 COULD INCLUDE THAT IN A STATEMENT ON
5 CAUSATION. THE ONLY INFORMATION I HAVE OF THE
6 FOUR AGENTS WHICH ARE KNOWN TO INDUCE
7 ANGIOSARCOMA IS THAT HE WAS EXPOSED TO WHAT
8 APPEARS TO BE SUSTAINED AND INTERMITTENT AND
9 EPISODIC VERSUS OF VINYL CHLORIDE OVER A
10 PERIOD OF FIVE TO SIX YEARS. I DON'T HAVE
11 THIS INFORMATION FOR ANABOLIC STEROIDS OR
12 THORIUM OR FOR ARSENIC. BUT I'M NOT EXCLUDING
13 THESE POSSIBILITIES.

14 Q. DOCTOR, I BELIEVE YOU'VE TOLD US
15 THAT THERE IS NO SAFE LEVEL FOR EXPOSURE TO
16 VINYL CHLORIDE; IS THAT CORRECT?

17 A. NO, SIR. THAT'S NOT WHAT I SAID.
18 I SAID WE DON'T KNOW OF
19 ANYWAY OF SETTING SAFE LEVELS OF EXPOSURE TO
20 ANY CARCINOGEN, INCLUDING VINYL CHLORIDE.
21 THAT ISN'T THE SAME AS SAYING THERE IS NO
22 SAFE LEVEL..

23 Q. WOULD YOUR STATEMENT BE THE SAME FOR
24 ARSENIC AS FOR --

25 A. OH, CERTAINLY, FOR ANY CARCINOGEN WE

1 DON'T KNOW OF ANYWAY OF SETTING SAFE LEVELS.

2 Q. IS THERE A SAFE LEVEL?

3 A. I'VE JUST TOLD YOU, WE DON'T KNOW OF
4 ANY WAY OF SETTING SAFE LEVELS. IT IS THE
5 CONSENSUS OF THE INFORMED INDEPENDENT
6 SCIENTIFIC COMMUNITIES THAT WE KNOW OF NO WAY
7 OF SETTING SAFE LEVELS OF EXPOSURE TO ANY
8 CHEMICAL CARCINOGEN. THE HIGHER THE LEVEL OF
9 THE EXPOSURE, THE HIGHER THE RISK. THE LOWER
10 THE LEVEL OF THE EXPOSURE, THE LOWER THE RISK.
11 BUT WE DON'T KNOW OF ANY WAY OF SETTING SAFE
12 LEVELS.

13 Q. AND I BELIEVE YOU HAVE SAID A SINGLE
14 EXPOSURE COULD BE ENOUGH?

15 A. I SAID THAT ON THE BASIS OF THE
16 CONSUMER PRODUCT SAFETY COMMISSION STUDY, IT
17 APPEARS THAT AN EXPOSURE AS BRIEF AS ONE HOUR
18 TO VINYL CHLORIDE IS ENOUGH TO PRODUCE
19 CHEMICAL -- TO PRODUCE CARCINOGENIC EFFECTS.
20 WE KNOW FROM A WIDE RANGE OF STUDIES IN
21 CHEMICAL CARCINOGENESIS THAT SINGLE
22 ADMINISTRATION OF MANY DIFFERENT CARCINOGENS
23 IS ENOUGH TO PRODUCE CANCER.

24 Q. THEN A SINGLE EXPOSURE TO A
25 CARCINOGENIC INSECTICIDE CAN BE ENOUGH, TOO?

1 A. I'M NOT WILLING TO EXCLUDE THAT. BUT
2 WHEN IT COMES TO VINYL CHLORIDE, WE DO HAVE A
3 STRIKING STUDY, SET UP BY THE COMMISSION,
4 SIMPLY TO LOOK AT THE HAZARDS LIKE FIREMEN
5 AND POLICE, AT A TANK CAR INVOLVEMENT, THE
6 QUESTION IS ARE THESE PEOPLE AT RISK. AND
7 THEY CONCLUDED THAT EVEN FROM A SINGLE BRIEF
8 EXPOSURE TO VINYL CHLORIDE, THERE ARE
9 DEMONSTRABLE RISKS.

10 Q. I THINK IN YOUR DIRECT EXAMINATION,
11 YOU ANSWERED QUESTIONS ABOUT LATENCY AND I
12 BELIEVE YOU DEFINED --

13 THE COURT: WOULD YOU LIKE
14 SOME MORE WATER.

15 THE WITNESS: YES, SIR, I
16 WOULD APPRECIATE THAT.

17 BY MR. RENNEISEN:

18 Q. I WAS TALKING ABOUT LATENCY, DOCTOR,
19 AND I THINK YOU DEFINED LATENCY AS THE PERIOD
20 OF TIME FROM THE FIRST EXPOSURE TO DIAGNOSIS.

21 A. YES. YOU RECALL, WHEN I WAS
22 ANSWERING THIS, I INDICATED THERE ARE SEVERAL
23 WAYS OF DEFINING LATENCY AND I THINK ON THE
24 WHOLE, THE BEST ONE IS FROM THE TIME OF FIRST
25 EXPOSURE TO THE DATE OF DIAGNOSIS OR DEATH.

1 THERE ARE OTHER WAYS OF DEFINING IT, BUT I
2 THINK IN THIS CONTEXT, THAT'S THE MOST
3 APPROPRIATE ONE.

4 Q. I JUST WANTED TO MAKE SURE WE WERE
5 BOTH USING THE WORD THE SAME WAY.

6 A. YEAH.

7 Q. AND THE TERM EXPOSURE TIME I THINK
8 MEANS THE TIME THE PERSON WAS EXPOSED; ISN'T
9 THAT TRUE?

10 A. YES. OF COURSE, ONE CAN BE MORE
11 PRECISE ABOUT THIS WHEN IT COMES TO A WORKER
12 WHO HAS GONE INTO A PLANT AND WORKED WITH
13 VINYL CHLORIDE, YOU CAN ACTUALLY PUT A DAY ON
14 IT. WHEN IT COMES TO RESIDENTIAL EXPOSURE,
15 FOR WHICH WE HAVE TO NOW -- BECAUSE THERE
16 WASN'T ANY MONITORING DONE AT THE TIME
17 BECAUSE WE DIDN'T KNOW EXACTLY HOW MUCH VINYL
18 CHLORIDE WAS BEING PUT OUT IN THE STACK AND
19 THE PERIMETER OF THE PLANT WASN'T BEING
20 MONITORED AND THE COMMUNITY WASN'T MONITORED,
21 WE CAN'T PUT AN EXACT DATE WHEN EXPOSURE
22 COMMENCED. WE CAN SAY IN ALL PROBABILITY, MR.
23 GRASSO'S EXPOSURE COMMENCED IN 1970 WHEN THE
24 PEDRICKTOWN -- PEDRICKTOWN PLANT STARTED
25 OPERATION, BUT WE DON'T KNOW AN EXACT DATE.

1 THERE IS, I WOULD SAY, A LITTLE MORE
2 UNCERTAINTY WHEN IT COMES TO RESIDENTIAL THAN
3 WHEN IT COMES TO OCCUPATIONAL.

4 Q. WITH RESPECT TO THE B.F. GOODRICH
5 PLANT, WE KNOW THAT OPERATION BEGAN ON MARCH
6 25, 1970. SO, THAT ANY EXPOSURE MR. GRASSO
7 HAD TO VINYL CHLORIDE BEFORE THAT TIME CAME
8 FROM SOMEPLACE ELSE.

9 A. YES, BUT I'M SAYING WE DON'T KNOW
10 THE SPECIFICS OF THE EXACT TIME AND DATE AT
11 WHICH INDIVIDUAL EXPOSURES IN 1970 COMMENCED.

12 Q. THAT'S TRUE. BUT WE KNOW IT CAN'T BE
13 BEFORE THE PLANT BEGAN --

14 A. PRECISELY.

15 Q. -- TO OPERATE?

16 A. PRECISELY.

17 Q. DOCTOR, I HAVE HERE BOTH COPIES OF
18 YOUR BOOK, THE FIRST EDITION AND THE SECOND
19 EDITION.

20 DO YOU HAVE EITHER BOOK WITH
21 YOU?

22 A. I HAVE THE SECOND ONE, NOT THE FIRST.

23 Q. LET US TRY THEN TO USE THE SECOND
24 ONE BECAUSE THE PAGE NUMBERS ARE A LITTLE
25 DIFFERENT.

1 A. SURE.

2 Q. LAST NIGHT I HAD TO BUY THE SECOND
3 ONE SO THAT I COULD COORDINATE THE PAGE
4 NUMBERS.

5 ON PAGE 111, YOU STATED, " "
6 "WHILE THE OCCUPATIONAL EXPOSURE PRECEDING
7 THE CANCER HAVE USUALLY RANGED FROM 13 TO 20
8 YEARS, THERE HAVE BEEN FOUR REPORTED CASES OF
9 ANGIOSARCOMA FOLLOWING LESS THAN SIX YEARS OF
10 HUMAN EXPOSURE." AND I BELIEVE TODAY, IS THAT
11 INFORMATION STILL CORRECT OR ARE THERE MORE
12 OR LESS THAN FOUR NOW?

13 A. WELL, WHEN I WAS TALKING TODAY, I
14 CLASSIFIED THEM AS TEN YEARS -- AS UNDER
15 TEN YEARS. AND I CITED TWO, ONLY TWO TODAY,
16 WHICH -- FOR WHICH I WAS CONVINCED ON A
17 RECENT REVIEW OF THE LITERATURE THAT THE
18 ANGIOSARCOMAS HAD OCCURRED WITHIN SIX YEARS.
19 SO --

20 Q. SO, IT'S TWO INSTEAD FOUR?

21 A. WELL, NO, FOR SIX YEARS, THAT'S
22 CORRECT, YES.

23 Q. AND THEN YOU WENT ON IN YOUR BOOK
24 AND SAID, THE TRUE INSURANCE DENSE OF VINYL
25 CHLORIDE CANCER IN EXPOSED WORKERS IS STILL

1 UNKNOWN BECAUSE OF LONG LATENCY PERIODS: IS
2 THAT CORRECT?

3 A. THAT'S CORRECT.

4 Q. AND I BELIEVE YOU ALREADY TOLD US
5 THAT THE AVERAGE -- WELL, LET ME ASK YOU
6 AGAIN: WHAT IS THE AVERAGE LATENCY PERIOD,
7 AS YOU UNDERSTAND IT?

8 A. WELL, THERE HAVE BEEN VARIOUS
9 ESTIMATES OF THIS, AS I INDICATED BEFORE, BUT
10 I CITED REFERENCE TO HEATH BASED ON C.D.C.
11 DATA OF ABOUT 20 POINT THREE YEARS WHICH
12 SEEMS TO BE IN THE KIND OF A BALLPARK.

13 Q. DOCTOR, I WISH YOU'D ONLY HAD ONE
14 PUBLICATION OF THIS BOOK. NOT REALLY; I'M
15 GLAD YOU MANAGE TO SELL IT TWICE.

16 IN THE FIRST BOOK, FOOTNOTE
17 18 IS FOOTNOTE 19 IN THE SECOND BOOK. I CAN'T
18 FIND FOOTNOTE 19. BEAR WITH ME A SECOND,
19 DOCTOR.

20 A. I'LL TURN TO PAGE 557, THAT'S
21 FOOTNOTE REFERENCE -- PLACE --

22 Q. WHAT PAGE?

23 A. PAGE 557 WILL GIVE YOU WAXWEILLER ET
24 AL., 19.

25 Q. NOW, THE WAXWEILLER ARTICLE WHICH

1 YOU HAVE REFERRED TO, DO YOU HAVE A COPY OF
2 THAT?

3 A. YEAH, I THINK SO.

4 A. SURE.

5 Q. NOW, IN THE WAXWEILLER ARTICLE ON
6 PAGE 45, THERE IS A TABLE SHOWING EXPOSURE
7 YEARS AND LATENCY PERIODS FOR ANGIOSARCOMA;
8 IS THAT CORRECT?

9 A. YEAH.

10 Q. AND THAT TABLE SUMMARIZES 11 CASES
11 OF ANGIOSARCOMA AND I GUESS IT GIVES THE
12 TOTAL EXPOSURE IN YEARS AND LATENCY PERIODS;
13 IS THAT CORRECT?

14 A. THAT'S RIGHT.

15 Q. DID YOU RELY ON THAT INFORMATION IN
16 PREPARING YOUR -- THE CHAPTER OF YOUR BOOK
17 DEALING WITH VINYL CHLORIDE.

18 A. AMONGST MANY OTHER.

19 Q. THAT ARTICLE DOESN'T SAY ANYTHING
20 ABOUT SHORT LATENCY PERIOD, DOES IT.

21 A. THAT'S RIGHT.

22 Q. IT DOES HAVE WOULD THAN SHORT
23 EXPOSURE PERIOD, DOESN'T IT, IN THAT TABLE ON
24 PAGE 45?

25 A. SURE, BUT THAT'S NOT LATENCY.

1 Q. SO THERE'S ONE GENTLEMAN WHO HAS A
2 THREE YEAR EXPOSURE PERIOD AND A 17 YEAR
3 LATENCY PERIOD.

4 A. YEAH, ABSOLUTELY.

5 Q. AND DO YOU KNOW FROM OTHER SOURCES
6 THAT THAT GENTLEMEN WAS A REACTOR CLEANER AT
7 THE B.F. GOODRICH PLANT?

8 A. I DON'T HAPPEN TO KNOW THAT, NO.

9 Q. DOCTOR, IS IT TRUE THAT VINYL
10 CHLORIDE WAS USED AS A PROPELLANT IN AEROSOL
11 SPRAY CANS OF HAIR SPRAY, DISINFECTANTS,
12 FURNITURE POLISH AND SO FORTH?

13 A. AND PESTICIDES, SURE.

14 Q. AND DID YOU REPORT IN YOUR BOOK THAT
15 E.P.A. STUDIES SHOW THAT DURING THE USE OF
16 HAIR SPRAY OR INSECT SPRAY, USERS BREATHE
17 VINYL CHLORIDE IN THE RANGE OF 100 TO 400
18 PARTS PER MILLION?

19 A. RIGHT.

20 Q. AND, ALSO, DID YOU REPORT IN YOUR
21 BOOK THAT IN 1974, IT WAS FOUND THAT VINYL
22 CHLORIDE LEVELS AS HIGH AS NINE PARTS PER
23 MILLION COULD BE FOUND IN VEGETABLE OIL SOLD
24 IN SOLID -- SOLD IN LIQUID
25 POLYVINYLCHLORIDE CONTAINERS?

1 A. RIGHT.

2 Q. THEN IT'S TRUE THAT MR. GRASSO OR
3 ANY OF US COULD BE EXPOSED TO VINYL CHLORIDE
4 FROM A VARIETY SOURCES; IS THAT TRUE?

5 A. AT THE PRESENT MOMENT, I WOULD SAY
6 THE MAJOR POSSIBLE SOURCE IS RESIDENTIAL
7 BECAUSE THE SPRAY CANS HAVE BEEN TAKEN OFF
8 THE MARKET AND THE RIGID CONTAINERS, RIGID
9 PVC CONTAINERS ARE NO LONGER USED FOR FOOD
10 PRODUCTS. AND LEVEL OF VC, ALSO, ARE VERY
11 MUCH REDUCED AT THEM. I WOULD SAY AT THE
12 PRESENT MOMENT RESIDENTIAL IS PROBABLY THE
13 MAJOR SOURCE OF NONE OCCUPATIONAL EXPOSURE.

14 Q. BUT BACK IN THE LATENCY SIXTIES,
15 THERE WERE OTHER --

16 A. I COULDN'T AGREE MORE AND CAN'T
17 EXCLUDE THESE POSSIBILITIES.

18 Q. DOCTOR, IN YOUR BOOK, I'LL READ IT
19 TO YOU, IF YOU NEED THE PAGE NUMBER. IT'S
20 PAGE TWO OF THE FIRST EDITION AND IT'S IN THE
21 PREFACE OF THE LATER EDITION. "THE
22 DEVELOPMENT OF CANCER IS -- IS, OF COURSE,
23 PROFOUNDLY INFLUENCED BY GENETIC, ENDOCRINE,
24 IMMUNOLOGICAL, VIRILE, BIOCHEMICAL AND
25 POSSIBLY EVEN PSYCHOLOGICAL FACTORS." IS THAT

1 STILL YOUR OPINION, DOCTOR?

2 A. SURE, THAT'S THE BASIS OF WHAT WE
3 CALL THE MULTIFACTORIAL ETIOLOGY OF CANCER.
4 IN OTHER WORDS, A VERY WIDE RANGE OF AGENTS
5 CAN INFLUENCE THE DEVELOPMENT OF CANCER
6 FOLLOWING EXPOSURE, EVEN TO A SPECIFIC CANCER
7 CAUSING AGENT. CERTAINLY THIS IS, I THINK,
8 THE COMMONLY ACCEPTED VIEWPOINTS.

9 Q. DOCTOR, YOU HAVE SAID -- AND I'LL
10 ASK IF YOU STILL AGREE -- THAT THERE ARE
11 MANY INDUSTRIAL CHEMICAL CARCINOGENS NOT YET
12 IDENTIFIED?

13 A. SURE.

14 Q. ISN'T IT TRUE -- OR DO YOU KNOW
15 -- LET ME ASK YOU -- YOU DO KNOW THAT MR.
16 GRASSO WORKED AT THE DUPONT PLANT.

17 A. SURE.

18 Q. YESTERDAY AN EMPLOYEE FROM THE PLANT
19 TESTIFIED THAT OVER 3,000 CHEMICALS WERE USED
20 THERE. DID YOU KNOW THAT?

21 A. YES.

22 Q. INCIDENTALLY, DO YOU KNOW WHEN THE
23 SPRAY CANS OF VINYL CHLORIDE WERE REMOVED
24 FROM THE MARKET? WAS IT 1974, 75 OR WAS IT
25 SOME TIME EARLIER?

1 A. I'D HAVE TO CHECK THE BOOK. I
2 BELIEVE IT WAS ABOUT 75. I OFFHAND DON'T
3 RECALL EXACTLY, BUT I THINK IT WAS ABOUT 75.
4 LET ME JUST CHECK.

5 THE ANSWER IS THE CONSUMER
6 PRODUCT SAFETY COMMISSION, ON PAGE 1115 SAYS
7 NO NEW CONSUMER PRODUCTS CONTAINING VC WERE
8 MANUFACTURED SINCE 74, BUT ON THE OTHER HAND,
9 THE ARTICLE -- THE BOOK ALSO POINTS OUT
10 THAT THERE WASN'T A RECALL OF THESE PRODUCTS.
11 SO, IT'S POSSIBLE THAT SOME OF THEM REMAINED
12 ON THE MARKET UNTIL 78.

13 Q. THE RATS THAT DOCTOR VIOLA -- IS
14 HE AN M.D. OR -- IF YOU KNOW?

15 A. I THINK HE IS, BUT I'M NOT
16 ABSOLUTELY SURE.

17 Q. WELL, WE'LL CALL HIM DOCTOR VIOLA?

18 A. WELL, HE WAS EITHER; HE WAS A PH.D
19 OR M.D., WHATEVER.

20 Q. WHEN DOCTOR VIOLA EXPOSED RATS IN
21 1970, HE WAS USING DOSES OF 3,000 PARTS --
22 30,000 PARTS PER MILLION, WAS HE NOT?

23 A. AMONG OTHER DOSES. MUCH WAS ALSO
24 USING MUCH LOWER DOSES. BUT HE DIDN'T REPORT
25 ON THE LOWER DOSES IN 1970. HE ONLY REPORTED

1 ON THE HIGHER DOSES IN 1970. HE REPORTED ON
2 THE LOWER DOSES AT A SUBSEQUENT MEETING WITH
3 THE MANUFACTURING CHEMISTS' ASSOCIATION.

4 Q. THIS IS VIOLA OR MATALONI?

5 A. VIOLA.

6 Q. WITH RESPECT TO THE 30,000 PARTS PER
7 MILLION -- THAT'S THREE PERCENT AND THAT'S
8 THE EXPLOSIVE LIMIT, IS IT NOT?

9 A. SOMEWHERE ROUND ABOUT. IT'S A PRETTY
10 HIGH CONCENTRATION.

11 Q. DO YOU KNOW WHY HE WAS CONDUCTING
12 THOSE STUDIES? WHAT WAS HE LOOKING FOR? WAS
13 HE LOOKING FOR CANCER OR WAS HE LOOKING FOR
14 AN EXPLANATION OF THE ACROOSTEOLYSIS?

15 A. YOU'VE ASKED THE QUESTION AND I'VE
16 ANSWERED IT. IT'S BASICALLY AT
17 ACROOSTEOLYSIS THAT HE WAS LOOKING FOR AND
18 HE -- AND HE FOUND THESE IN THE COURSE OF
19 EXPERIMENT.

20 Q. I BELIEVE YOU HAVE TOLD US THAT HE
21 WAS DOING THE STUDIES EITHER AT THE DIRECTION
22 OF OR AS AN EMPLOYEE OF A CHEMICAL COMPANY IN
23 ITALY; IS THAT --

24 A. TO THE BEST OF MY KNOWLEDGE, HE WAS
25 THEN WORKING FOR SALVATE INDUSTRIES.

1 Q. IS THAT A CHEMICAL COMPANY?

2 A. I REALLY DON'T KNOW MUCH ABOUT
3 SULVATE INDUSTRIES, BUT --

4 Q. BEFORE THAT, WAS ANY RESEARCH DONE
5 IN MEDICAL SCHOOLS OR BY THE MEDICAL
6 PROFESSION WITH RESPECT TO VINYL CHLORIDE IN
7 RATS THAT YOU KNOW ABOUT?

8 A. WELL, I WENT THROUGH A BRIEF
9 CHRONOLOGY OF THE -- OF THE STUDIES THAT
10 WERE DONE. IT WOULDN'T -- WHEN I LEFT OUT
11 IN THIS COUNTRY, WHICH WAS UNINTENTIONAL,
12 WERE SOME STUDIES ABOUT DOW, AMONG OTHERS,
13 DORKELSON, BUT THERE WERE VERY FEW STUDIES IN
14 THIS COUNTRY ON CHRONIC TOXIC EFFECTS OF
15 VINYL CHLORIDE. AND THE EXTRAORDINARY THING
16 ABOUT IT, IS THAT THERE WERE NO
17 CARCINOGENICITY SUBSTITUTED DIFFICULTIES,
18 EVEN THOUGH A WIDE RANGE OF WORKERS HAD BEEN
19 HANDLING MATERIAL, AND EVEN ALTHOUGH WE KNEW
20 FROM THE LITERATURE, IT HAD TOXIC EFFECTS
21 EVEN AT LEVELS AS LOW AT 50 P.P.M.. SO, IT IS
22 SURPRISING.

23 Q. BUT IT WASN'T JUST INDUSTRY THAT
24 WASN'T DOING ANY STUDIES, NO ONE DID ANY
25 STUDIES, ISN'T THAT TRUE?

1 A. WELL, THE ONLY TYPE OF INDIVIDUAL OR
2 INSTITUTION THAT WOULD HAVE AN INCENTIVE TO
3 WORK AND TO TEST A PRODUCT IS THAT -- IS
4 THE INDUSTRY THAT MANUFACTURES THE PRODUCT
5 AND EXPOSES ITS WORKERS TO IT.

6 Q. WELL, AT THE PRESENT TIME, YOU'RE
7 INVOLVED WITH CONSIDERING CHEMICAL
8 CARCINOGENS, ARE YOU NOT?

9 A. INDEED.

10 Q. AND YOU ARE NOT PART OF THE CHEMICAL
11 INDUSTRY IN ANY WAY, ARE YOU?

12 A. I DON'T THINK SO.

13 Q. YET, YOU HAVE AN INTEREST, DO YOU
14 NOT?

15 A. YES. BUT TO UNDERTAKE TESTS AS
16 EXPENSIVE AND -- IT'S ONLY VERY RECENTLY
17 THAT THE GOVERNMENT HAS STARTED PAYING FOR
18 TESTS FOR CARCINOGENICITY ON PROFITABLE
19 PRODUCTS. IT HAS BEEN A POSITION OF THE
20 GOVERNMENT THAT INDUSTRY HAS A RESPONSIBILITY
21 FOR PRETESTING ITS PRODUCTS PRIOR TO
22 INTRODUCTION IT TO THE PUBLIC.

23 Q. WAS ANYONE ELSE OTHER THAN INDUSTRY
24 DOING STUDIES? AND I THINK YOU SAID NO.

25 A. I DON'T KNOW OF ANY STUDIES ON VINYL

1 CHLORIDE DONE OF THE CHRONIC TOXICITY NATURE
2 DONE OTHER THAN BY INDUSTRY, WHICHEVER ONE
3 EXCEPTION. THAT IS, SOME OF THE EARLIER
4 STUDIES, THE PATTI STUDIES AROUND THE
5 THIRTIES OR FORTIES WITH THE VERY ACUTE HIGH
6 -- ANIMALS GOT ARYTHMIA AND WENT TO SLEEP,
7 SOME OF THOSE TESTS WERE DONE BY THE UNITED
8 STATES GOVERNMENT. PATTI, I BELIEVE, DID HAVE
9 SOME MONEY FROM THE UNITED STATES GOVERNMENT.
10 I'M NOT CERTAIN ABOUT THAT, BUT I THINK SO.

11 Q. DOCTOR, I BELIEVE YOU'VE INDICATED
12 IN YOUR BOOK THAT UP TO 1974, THE PERMISSIBLE
13 EXPOSURE LEVEL FOR U.S. WORKERS WAS 500 PARTS
14 PER MILLION; IS THAT CORRECT?

15 A. YES.

16 Q. AND I THINK YOU'VE ALSO STATED IN
17 YOUR BOOK THAT IN APRIL OF 1974, OSHA
18 ESTABLISHED A NEW EMERGENCY STANDARD OF 50
19 PARTS PER BILLION; IS THAT CORRECT?

20 A. CORRECT.

21 Q. AND THEN SOMETIME AFTER THAT, THE
22 WORKPLACE STANDARD WAS LOWER TO ONE PART PER
23 BILLION; IS THAT CORRECT?

24 A. YES. THERE WERE SOME STATEMENTS IN
25 BETWEEN, BUT, YES.

1 Q. NOW, DURING THE COURSE OF THIS TRIAL,
2 WE'VE BEEN TALKING ABOUT PARTS PER BILLION
3 AND AT LEAST ON ONE OCCASION YESTERDAY,
4 PROFESSOR PESKIN REFERRED TO PARTS PER
5 BILLION.

6 AM I CORRECT IN UNDERSTANDING
7 THAT THERE ARE 1,000 -- THAT IN ORDER TO
8 TURN -- LET ME ASK IT THIS WAY -- 1,000
9 PARTS PER BILLION EQUALS ONE PART PER MILLION?

10 A. SURE.

11 Q. NOW, IN CONNECTION WITH THIS LAWSUIT,
12 YOU WROTE A REPORT, DID YOU NOT, TO MR.
13 VASSALOTTI?

14 A. I WOULDN'T DIGNIFY IT BY THE NAME OF
15 A REPORT. THESE WERE SOME VERY, VERY,
16 PRELIMINARY KIND OF THOUGHTS IN AUGUST OF
17 LAST YEAR, WHICH WAS VERY PRELIMINARY INDEED.

18 Q. WELL, WHETHER YOU WOULD DIGNIFY IT
19 WITH THE NAME REPORT OR NOT, ON THE COVER, IT
20 DOES SAY "REPORT ON MR. JOHN GRASSO," AND IT
21 SAYS SAM --

22 A. THAT'S RIGHT. ASI-PR 0004393

23 Q. S. EPSTEIN, M.D., AUGUST 13, 1974.
24 WHETHER WE CALL THIS DOCUMENT A REPORT OR NOT,
25 I'D LIKE TO ASK YOU A FEW QUESTIONS ABOUT IT.

1 IF YOU WANT TO CALL IT A PRELIMINARY REPORT,
2 FINE?

3 A. BY ALL MEANS.

4 Q. ON PAGE NINE OF THAT REPORT, YOU
5 STATE: THE FIRST REPORT OF CARCINOGEN IS
6 FREE OF VINYL CHLORIDE CREATE LITTLE IMPACT.
7 THIS WAS BECAUSE VIOLA HAD CLAIMED THAT THE
8 TYPE OF TUMORS INDUCED WERE PECULIAR TO RATS
9 AND WITHOUT HUMAN SIGNIFICANCE AND ALSO
10 BECAUSE THE VERY HIGH LEVELS OF VC TO WHICH
11 THE ANIMALS WERE EXPOSED. IS THAT A CORRECT
12 STATEMENT?

13 A. I THINK SO, YES.

14 Q. THE DISCLOSURE THAT B.F. GOODRICH
15 MADE ABOUT THE THREE CASES THAT DOCTOR CREECH
16 AND DOCTOR JOHNSON FOUND, WHO WAS THAT
17 DISCLOSURE MADE TO, IF YOU KNOW?

18 A. AS FAR AS I RECALL, THIS WAS A
19 PUBLIC DISCLOSURE. AND I'VE FORGOTTEN WHETHER
20 THE MANUFACTURING CHEMISTS' ASSOCIATION MADE
21 THE DISCLOSURE OR B.F. GOODRICH. I THINK IT
22 WAS PROBABLY B.F. GOODRICH'S DISCLOSURE.

23 Q. AND THE INFORMATION THAT WAS
24 DISCLOSED WAS UNCOVERED AS A RESULT OF
25 MEDICAL ANALYSIS AND RESEARCH BY DOCTOR

1 CREECH AND TO A DEGREE DOCTOR JOHNSON, TOWARD
2 THE END OF 1975; ISN'T THAT TRUE?

3 A. I DON'T THINK SO. I THINK THIS WAS
4 IN JANUARY, 74, THE PUBLIC ANNOUNCEMENT WAS
5 MADE.

6 Q. I'M SORRY. PUBLIC ANNOUNCEMENT IN
7 JANUARY, 74 AND THE INFORMATION THAT THEY
8 GATHERED, THEY BEGAN TO GATHER THE MONTH
9 BEFORE, DECEMBER, 73; IS THAT CORRECT?

10 A. WELL, I CAN'T TELL YOU EXACTLY WHEN
11 THEY STARTED DOCUMENTING THE HUMAN CANCER
12 CASES. CERTAINLY ONE KNOWS THAT THE
13 MANUFACTURING CHEMISTS ASSOCIATION HAD
14 INFORMATION ON THE -- DETAILED INFORMATION
15 ON CARCINOGENICITY ABOUT TOWARDS THE END OF
16 1972. SO, THAT INFORMATION ON CARCINOGENICITY
17 WAS KNOWN FOR ABOUT 18 MONTHS BEFORE.

18 Q. WHAT WE'RE TALKING ABOUT IS THE
19 GOODRICH -- DO YOU KNOW WHEN DOCTOR CREECH
20 GOT TOGETHER THE INFORMATION THAT WAS
21 SUBMITTED TO THE PUBLIC IN JANUARY OF 1974?

22 A. KNOW.

23 Q. AGAIN, IN YOUR REPORT -- I THINK
24 IT'S ON PAGE FIVE AND MAYBE YOU DON'T HAVE TO
25 FIND IT -- I BELIEVE YOU STATED THAT VINYL

1 A. YEAH.

2 Q. AND I BELIEVE YOU HAVE TOLD ME THIS
3 IS A GOVERNMENT PUBLICATION?

4 A. YEAH. I'M NOT ABSOLUTELY SURE. I
5 THINK IT'S A C.D.C. DOCUMENT, BUT I'M REALLY
6 NOT 100 PERCENT CERTAIN.

7 Q. WELL, AT THE VERY END, IT SAYS
8 "ADDRESS ALL CORRESPONDENCE FOR CENTER FOR
9 FOR DISEASE CONTROL."

10 A. YEAH, I'M PRETTY SURE, YEAH.

11 Q. AT THE ENDS OF THE CHRISTINE ARTICLE,
12 ON PAGE 215, THERE'S AN EDITORIAL NOTE. WOULD
13 THE EDITORIAL NOTE BE DOCTORS WITH C.D.C.?

14 A. I IMAGINE SO. SURE.

15 Q. NOW, AT THE TOP OF THE SECOND COLUMN
16 IN THE EDITORIAL NOTES, IT SAYS IN ABOUT THE
17 SIXTH OR SEVENTH LINE, "WHILE THESE FINDINGS
18 ESTABLISH NO CAUSAL CONNECTION BETWEEN
19 EXPOSURE TO PVC AND ANGIOSARCOMA OF THE LIVER,
20 THEY DO RAISE THE POSSIBILITY OF SUCH A
21 RELATIONSHIP."

22 A. SURE.

23 Q. DO YOU AGREE WITH THAT STATEMENT?

24 A. WELL, I DON'T THINK IT'S POSSIBLE TO
25 TALK ABOUT CAUSAL RELATIONSHIPS IN ABSOLUTE

1 TERMS. I THINK ALL YOU CAN TALK ABOUT IS
2 PROBABLE ASSOCIATIONS, THE MOST PROBABLE, THE
3 MOST LIKELY. THIS IS IT IS WAY IN WHICH ALL
4 CAUSALITY IS ATTRIBUTED IN MEDICINE. IF YOU
5 KNOW OF SOMEBODY WHO DIES OF LUNG CANCER AND
6 HE SMOKED FIVE PACKS OF CIGARETTES A DAY, IT
7 WOULD BE A RASH, A SCIENTIFICALLY RASH PERSON
8 TO SAY HIS LUNG CANCER WAS ABSOLUTELY CAUSED
9 BY THE SMOKING. SO WE'RE TALKING ABOUT MOST
10 PROBABLE ASSOCIATIONS, AND THE STRENGTH OF
11 THESE ASSOCIATIONS BECOMES GREATER THE MORE
12 CASES THAT APPEAR IN THE LITERATURE.

13 Q. BUT HERE WE'RE TALKING ABOUT THE
14 WORD POSSIBILITY. I MEAN, YOU HAVE TALKED
15 ABOUT PROBABILITY BUT HERE THE AUTHORS OF THE
16 EDITORIAL NOTE WHO YOU HAVE SAID ARE THE
17 DOCTORS AT CENTER FOR DISEASE CONTROL SAY,"
18 "THESE FINDINGS ESTABLISH NO CAUSAL
19 CONNECTION BETWEEN EXPOSURE TO PVC AND
20 ANGIOSARCOMA OF THE LIVER, THEY DO RAISE THE
21 POSSIBILITY OF SUCH A RELATIONSHIP."
22 POSSIBILITY IS LESS THAN PROBABILITY, ISN'T
23 IT?

24 A. YES, IT IS. BUT I WOULDN'T USE THE
25 WORD POSSIBILITY. I WOULD USE THE WORD

1 PROBABILITY AND, IN FACT, THE AUTHOR OF THE
2 REPORT GOES FURTHER THAN THIS.

3 Q. DOCTOR CHRISTINE GOES FURTHER?

4 A. YES. FOR INSTANCE, IF YOU LOOK AT
5 THE THIRD PARAGRAPH, TWO OF THE PATIENTS --

6 Q. THIRD PARAGRAPH, THAT'S BACK ON PAGE
7 210?

8 A. LET'S GET THE APPROPRIATE PLACE.

9 Q. ALL RIGHT, I'M LOOKING AT IT. TELL
10 ME WHAT YOU MEAN OR READ IT TOO ME, IF YOU
11 WANT TO.

12 A. SURE.

13 Q. THE FIRST SENTENCE SAYS, "TWO OF THE
14 PATIENTS APPEAR --

15 A. NO, THAT'S OCCUPATIONAL.

16 BUT ON PAGE 215, ANOTHER TWO
17 PATIENTS WHO HAD NO OCCUPATIONAL EXPOSURE HAD
18 BEEN LONG-TIME RESIDENTS. AND THEN IT GOES ON
19 TO SAY HAD LIVED FOR 35 YEARS, NO HISTORY OF
20 OCCUPATIONAL -- THEY ARE BASICALLY
21 REPORTING ANGIOSARCOMAS IN RESIDENTS NEAR VC
22 PVC PLANTS WHO HAD NO OCCUPATIONAL EXPOSURE.
23 THIS IS BASICALLY WHAT THEY'RE DOING. YOU'RE
24 NOT DISCUSSING -- IT'S A CASE REPORT, WHICH
25 IS EXACTLY -- THEY SAY THEY FOUND AN

1 ANGIOSARCOMA IN A WOMAN WHO LIVED NEAR A
2 PLANT AND A COUPLE OF PEOPLE WHO LIVED NEAR A
3 PLANT WHO HAD NO OCCUPATIONAL EXPOSURE AND
4 THAT'S BASICALLY ALL THEY REPORT.

5 Q. SO, THE AUTHOR ISN'T REALLY
6 EXPRESSING AN OPINION ONE WAY OR ANOTHER OF
7 POSSIBILITY OR PROBABILITY. THEY'RE
8 DESCRIBING A CASE?

9 A. THIS IS A CASE REPORT, I THINK.
10 THAT'S THE BEST WAY OF DESCRIBING IT.

11 Q. I'D LIKE TO REFER YOU TO THE ARTICLE
12 IN THE BRITISH MEDICAL JOURNAL, OCTOBER 2,
13 1977, WHERE PETER J. SAXTER IS THE FIRST
14 AUTHOR.

15 A. SURE.

16 Q. DO YOU HAVE THAT REPORT?

17 A. I THINK SO, HOLD ON A SECOND. I
18 THINK SO. YES.

19 Q. NOW, ON PAGE 18 AT THE BOTTOM OF
20 YOUR -- NOT THIS REPORT BUT OF YOUR REPORT
21 OR YOUR PRELIMINARY REPORT TO THE TOP OF PAGE
22 19, YOU COMMENTED ON THIS ARTICLE BY PETER J.
23 SAXTER. AND YOU OBSERVED THAT A REVIEW OF 14
24 CASES OF ANGIOSARCOMA DIAGNOSIED IN GREAT
25 BRITAIN, 1953 TO 1973 --

1 A. I'M SORRY, WHAT PAGE WAS THAT.

2 Q. I AM NOW --

3 A. OH, 18, SURE, I'VE GOT YOU.

4 Q. DIAGNOSIED IN GREAT BRITAIN INCLUDED
5 ONE CASE WHERE THE INDIVIDUAL INVOLVED WORKED
6 IN A PLANT THAT USED PVC AS RAW MATERIAL. AND
7 I BELIEVE YOU ARE REFERRING TO THE BAXTER
8 ARTICLE FOR THAT INFORMATION; IS THAT TRUE?

9 A. YOU'VE LOST ME NOW. WE'RE TALKING
10 ABOUT THE BAXTER ARTICLE.

11 Q. FIRST I'M TALKING ABOUT YOUR
12 REFERENCE TO IT.

13 A. SURE. AND WE'RE TALKING NOW ABOUT
14 RESIDENTS. ARE WE TALKING ABOUT ANGIOSARCOMA
15 IN RESIDENTS OR ARE WE TALKING ABOUT LATENCY?

16 Q. WELL, LET'S FIRST GO TO YOUR REPORT.

17 A. OKAY, FINE.

18 Q. AUGUST 13, 1980.

19 A. YEAH.

20 Q. AT THE BOTTOM OF PAGE 18, YOU SAY, "A
21 REVIEW OF 14 CASES OF HEPATIC ANGIOSARCOMA
22 DIAGNOSIED IN GREAT BRITAIN DURING 1953-1973
23 FOUND ONE CASE WHO HAD WORKED IN A PLANT
24 WHICH USED PVC AS RAW MATERIAL," AND YOU SAY
25 BAXTER 1977.

1 A. YEAH.

2 Q. AND THE BAXTER 1977 IS THE ARTICLE,
3 IS IT NOT, IN THE BRITISH MEDICAL JOURNAL
4 DATED OCTOBER --

5 A. THAT'S RIGHT, YES.

6 Q. EIGHT --

7 A. RIGHT.

8 Q. NOW, REFERRING TO THE BAXTER ARTICLE,
9 ISN'T IT TRUE, DOCTOR, THAT THE BAXTER
10 ARTICLE REPORTED ON THE FINDINGS OF A PANEL
11 OF DOCTORS WHO REVIEWED 14 -- I'M SORRY,
12 REVIEWED 41 DEATH WHEN THE DEATH CERTIFICATE
13 MENTIONED A DIAGNOSIS OF ANGIOSARCOMA OF THE
14 LIVER.

15 A. I THINK SO, YES, I THINK THAT WAS
16 WHAT THEY DID.

17 Q. ISN'T IT TRUE, DOCTOR, THAT THE
18 PANEL AGREED ON ANGIOSARCOMA OF THE LIVER AS
19 A DIAGNOSIS IN 14 OF THE CASES?

20 A. I THINK SO, YES. THAT'S TABLE TWO,
21 YES, ONE, TWO -- YES.

22 Q. NOW, I'M REFERRING TO PAGE 921 OF
23 THE ARTICLE, THE SECOND PARAGRAPH IN THE
24 RIGHT-HAND COLUMN. AND I ASK YOU, ISN'T IT
25 TRUE THAT THE PANEL AGREED ON ANGIOSARCOMA OF

1 THE LIVER DIAGNOSIS -- I'M SORRY. STRIKE
2 THAT QUESTION

3 ISN'T IT TRUE THAT ONLY ONE
4 CASE OF ANGIOSARCOMA OCCURRING 1953 TO 1973
5 COULD BE CONFIDENTLY ATTRIBUTED BY THE PANEL
6 TO VINYL CHLORIDE?

7 A. YES.

8 Q. NOW, IF WE LOOK BACK TO PAGE 920 IN
9 THE SECOND COLUMN, THE SECOND PARAGRAPH UNDER
10 CASES AGREED BY THE PANEL, IT SAYS ONE HAD
11 BEEN A PROCESS WORKER IN PVC MANUFACTURE
12 EXPOSED TO LEVELS OF VCM EXCEEDING 200 PARTS
13 PER MILLION OVER 20 YEARS. DOESN'T IT?

14 A. YEAH.

15 Q. AND THAT'S THE ONE CASE, IS IT NOT?

16 A. JUST TELL ME WHERE YOU ARE ON THE
17 ARTICLE NOW. I'VE LOST YOU.

18 Q. I'M ON PAGE 920 OF THE ARTICLE.

19 A. YEAH.

20 Q. THE SECOND COLUMN, THE SECOND
21 PARAGRAPH UNDER THE HEADING, "CASES AGREED BY
22 THE PANEL." AND I'M READING ONE HAD BEEN A
23 PROCESS WORKER IN PVC MANUFACTURE EXPOSED TO
24 LEVELS OF VCM EXCEEDING 200 PARTS PER MILLION
25 OVER 20 YEARS.

1 A. UM-HUM. AND.

2 Q. I'M ASKING YOU ISN'T THAT THE ONE
3 CASE TALKED ABOUT BY BAXTER?

4 A. NO, THIS IS A TABLE TWO WHICH HAS
5 -- WHICH HAS ALL THE CASES CLASSIFIED BY
6 THE PANEL AS ANGIOSARCOMA OF THE LIVER.

7 Q. THAT'S RIGHT. BUT AT THE CONCLUSION,
8 THEY SAID ONLY ONE CONFIDENTLY COULD BE
9 ATTRIBUTABLE TO VCM?

10 A. YES, BECAUSE ONLY ONE WAS -- AT
11 THAT TIME TO HAVE LIVED -- TO HAVE WORKED
12 IN PVC AND VC KIND OF PRODUCTS.

13 Q. AND THE ONE THE AUTHORS CONFIDENTLY
14 ATTRIBUTED TO VCM WAS A MAN WHO HAD WORKED IN
15 PVC MANUFACTURE AND WAS EXPOSED TO VCM AT
16 LEVELS EXCEEDING 200 PARTS PER MILLION FOR
17 OVER 20 YEARS; ISN'T THAT TRUE?

18 A. THAT'S RIGHT, YES.

19 Q. SO, HE WAS NOT A PVC FABRICATOR, HE
20 WAS ACTUALLY A PVC MANUFACTURER WORKING WITH
21 THE RAW VINYL CHLORIDE; ISN'T THAT TRUE?

22 A. WELL, IN THIS -- IN THE TABLE,
23 THEY TALK ABOUT A FIBER GAS WORKER WORKING
24 WITH PVC PASTE, THAT WAS THE MAN I WAS
25 REFERRING TO.

- 1 Q. BUT THE AUTHOR SAID ONLY ONE WAS --
- 2 A. I UNDERSTAND YOUR QUESTION. BUT I'M
- 3 REFERRING TO -- TABLE TWO GIVES A LISTING
- 4 OF ALL THE CASES OF ANGIOSARCOMA. ON THE
- 5 RIGHT-HAND COLUMN, IT GIVES STATEMENTS OF
- 6 EXPOSURE TO VCM, ONE OF WHOM WAS OBVIOUSLY A
- 7 PVC FABRICATOR, WHICH IS WHAT I REPORT.
- 8 Q. THAT'S RIGHT. BUT THAT GENTLEMAN,
- 9 ACCORDING TO THE AUTHORS OF THIS ARTICLE
- 10 COULD NOT CONFIDENTLY BE CONSIDERED TO BE
- 11 -- HAVE THE DISEASE CAUSED BY VINYL
- 12 CHLORIDE; ISN'T THAT TRUE?
- 13 A. I THINK THAT IT IS A PARTIAL TRUTH,
- 14 BECAUSE THEY GO TO SAY, THE POSSIBILITIES
- 15 REMAINS THAT THE ANGIOSARCOMA OF THE LIVER
- 16 ASSOCIATED WITH -- WELL, IN THE LAST
- 17 PARAGRAPH, THEY SAY, ONLY ONE CASE COULD BE
- 18 CONFIDENTLY ATTRIBUTED.
- 19 Q. ALL RIGHT.
- 20 A. AND THEN THEY GO ON TO SAY ONE
- 21 PATIENTS WAS SUSPECTED. HE HAD LIVED --
- 22 THE COURT: DOCTOR, THE
- 23 QUESTION TO YOU WAS --
- 24 BY MR. RENNEISEN:
- 25 Q. WHICH CASE CONFIDENTLY CAN BE SAID

1 TO BE BY THESE TO BE ATTRIBUTED VINYL
2 CHLORIDE?

3 A. THEY CAME TO THE CONCLUSION THAT THE
4 ONE WITH VERY HIGH EXPOSURE LINES, THEY WERE
5 CONFIDENT OF THIS. BUT FOR OTHER CASES, THEY
6 CLEARLY RAISED THE POSSIBILITY OR PROBABILITY
7 OF A RELATIONSHIP SUCH AS COMMUNITY OR OTHER
8 KINDS OF EXPOSURE. THEY TALK ABOUT ANOTHER
9 HAD LIVED FOR SIX YEARS --

10 Q. THAT'S TRUE.

11 A. -- NEAR THE PLANT.

12 Q. I RECOGNIZE THEY DISCUSS THE MAN
13 THAT HAD SIX YEAR EXPOSURE. BUT THE MAN THAT
14 THEY SAID CONFIDENTLY HAD A CAUSAL
15 RELATIONSHIP WAS A MAN WHO HAD 20 YEARS
16 EXPOSURE TO --

17 A. THERE'S NO QUESTION AT ALL. IT'S
18 MUCH EASIER TO MAKE A CONFIDENT STATEMENT OF
19 STRONG PROBABILITY IF SOMEBODY HAD BEEN
20 WORKING INSIDE A PLANT. UNTIL RELATIVELY
21 RECENTLY, THE LITERATURE HAS ONLY JUST
22 RECENTLY RECOGNIZED THE WHOLE AREA OF
23 COMMUNITY HAZARDS. AND THIS IS -- THIS IS A
24 CASE IN POINT. THEY CONCLUDE THAT THERE WAS
25 ONE CASE WHO HAD NO OCCUPATIONAL EXPOSURE,

1 WHO LIVED NEAR A PLANT, HAD ONLY LIVED NEAR A
2 PLANT FOR SIX YEARS AND DEVELOPED
3 ANGIOSARCOMA. AND NO HISTORY OF OTHER
4 EXPOSURE TO THOROTRAST.

5 NOW, THIS ISN'T A CONFIDENCE.
6 THIS IS A STATEMENT OF WHAT I WOULD CONSIDER
7 PROBABILITY.

8 Q. THE AUTHORS DIDN'T EVEN SAY
9 PROBABILITY, DID THEY?

10 A. WELL, THE AUTHORS MAKE IT CLEAR THAT
11 THEY CONSIDER THESE TO BE ASSOCIATED. THEY
12 SAY IN THE TABLE, EXPOSURE TO VINYL CHLORIDE
13 LIVED NEAR PVC PLANT. THAT IS FAIRLY EXPLICIT.

14 Q. THAT'S AN EXPLICIT STATEMENT OF
15 WHERE HE LIVED. BUT IT IS --

16 A. NO, IT ISN'T. IT'S A STATEMENT OF
17 EXPOSURE TO VINYL CHLORIDE. THEY HAVE A TABLE
18 WHICH SUMMARIZES DETAIL -- TABLE TWO,
19 DETAILS OF ALL CASES CLASSIFIED BY THE PANEL
20 AS ANGIOSARCOMA OF THE LIVER. THEY HAVE ON
21 THE RIGHT-HAND SIDE COLUMN EXPOSURE TO VCM.
22 THEY HAVE ONE, YES, PROCESS WORKER, YES; THE
23 OTHER POSSIBLY PVC PASTE. HE WAS THE
24 FABRICATOR. THE OTHER, LIVED NEAR PVC PLANT.

25 THE AUTHORS MAKE IT VERY

1 CLEAR THAT THEY REGARD HAD THESE AS SOURCES
2 OF EXPOSURE TO VINYL CHLORIDE.

3 NOW, HAVING SAID THEY WERE
4 EXPOSED TO VINYL CHLORIDE, THEY WENT ON TO
5 SAY, WELL, OBVIOUSLY, THE GUY WHO WORKED IN
6 THE PLANT, WE CAN BE MORE CERTAIN ABOUT
7 MAKING INFERENCES THAN IT IS OTHERS.

8 Q. THE ONLY -- DOCTOR, AM I CORRECT,
9 THE ONLY MAN THAT THEY SPECIFICALLY IDENTIFY
10 IS THE MAN WHO HAD A 20 YEAR EXPOSURE OF 200
11 PARTS PER MILLION?

12 A. THAT IS NOT TRUE. ON PAGE 91, THEY
13 IDENTIFY ANOTHER WHO HAD LIVED FOR SIX YEARS
14 WITHIN A HALF MILE OF A PLANT MANUFACTURING
15 PVC AND IN THE TABLE, THEY REFER TO THIS AS
16 EXPOSURE TO VCM, A CASE OF MAN AGED 70 WHO
17 -- AGE 61 WHO DIED IN 1970 WHO WAS A
18 CASHIER AND WHO HADN'T WORKED IN THE PLANT
19 BUT LIVED NEAR THE PLANT. AND THAT IS --
20 FALLS INTO WHAT I THINK IS PROPER TO REGARD
21 AS A COMMUNITY CANCER CASE.

22 Q. CAN YOU POINT OUT TO ME ANYPLACE IN
23 THIS REPORT WHERE THEY SAY THE PASTE WORKER'S
24 ANGIOSARCOMA WAS PROBABLY OR POSSIBLY CAUSED
25 BY VINYL CHLORIDE, WHERE THEY USE EITHER OF

1 THOSE WORDS?

2 A. THE TABLE IS VERY EXPLICIT. OVER
3 AND ABOVE THE TABLE, THEY HAVE A WHOLE
4 PARAGRAPH ON LEVELS OF VINYL CHLORIDE IN THE
5 ATMOSPHERE UP TO HALF A MILE AWAY FROM THE
6 FACTORY. THEY PRESENT MEAN LEVELS OF VINYL
7 CHLORIDE IN THE ATMOSPHERE UP TO HALF A MILE
8 AWAY FROM THE FACTORY FROM WHERE THE
9 NEIGHBORHOOD CASE OF ANGIOSARCOMA OF THE
10 LIVER OCCURRED, WHERE THE NEIGHBORHOOD CASE
11 OF ANGIOSARCOMA ARE CONSIDERED TO BE SO AND
12 SO AND MAY HAVE BEEN SEVERAL TIMES HIGHER IN
13 THE PASSENGER, INDICATING THE ORDER OF
14 EXPOSURE OF PEOPLE LIVING CLOSE TO FACTORIES
15 MANUFACTURING PVC.

16 Q. DOES THE ARTICLE --

17 A. SO, IT IS CLEAR THAT THEY CONSIDERED
18 THIS TO BE A COMMUNITY CANCER CASE.

19 Q. IT'S CLEAR TO YOU.

20 A. THEY MAY NOT HAVE USED YOUR LANGUAGE
21 OF POSSIBILITIES OR PROBABILITY OR MY
22 LANGUAGE. -THEY REPORT THEIR FINDINGS.

23 THE COURT: LET'S NOT HAVE
24 THE ARGUMENT. JUST ASK THE QUESTION, YOU
25 RESPOND.

1 BY MR. RENNEISEN:

2 Q. DOCTOR, I DON'T THINK WE'RE GOING TO
3 ANSWER THAT QUESTION. WE'LL GO ON.

4 LET'S REFER TO THE BRADY
5 ARTICLE FOR A MINUTE.

6 A. SURE.

7 Q. THAT'S THE ARTICLE THAT APPEARED IN
8 THE GEORGE OF THE NATIONAL CANCER INSTITUTE,
9 NOVEMBER, 1977.

10 A. SURE, I HAVE IT.

11 Q. BEFORE WE GO ON, I WOULD LIKE TO
12 MARK AS AN EXHIBIT -- AND AGAIN I DON'T
13 HAVE A CLEAN COPY, BUT I'LL GET ONE -- AS
14 THE NEXT DEFENDANT'S EXHIBIT, THE BAXTER
15 ARTICLE.

16 THE COURT: DO YOU KNOW WHAT
17 NUMBER THAT IS?.

18 MR. RENNEISEN: YOUR HONOR,
19 I'LL WRITE ON HERE, D-4 AND I'LL SUBSTITUTE A
20 CLEAN ONE FOR IT. I'LL WRITE D-4 AND I'LL
21 WRITE "SUBSTITUTE CLEAN."

22 BY MR. RENNEISEN:

23 Q. NOW, REFERRING TO THE BRADY ARTICLE,
24 DOCTOR, THIS ARTICLE STUDIED 25 PATIENTS, DID
25 IT NOT?

1 A. CORRECT.

2 Q. ISN'T IT TRUE THAT 73 PERCENT OF THE
3 26 PATIENTS STUDIED HAD NO DOCUMENTED DIRECT
4 EXPOSURE TO VINYL CHLORIDE, ARSENIC OR
5 THORIUM DIOXIDE?

6 A. NO, SIR.

7 Q. ISN'T IT TRUE THAT THE ARTICLE SAYS
8 DIRECT EXPOSURE TO THESE CHEMICALS COULD NOT
9 BE DEMONSTRATED FOR 19 OF THE 26 PATIENTS?

10 A. THE ARTICLE SAYS THAT, BUT TABLE ONE
11 MAKES IT VERY CLEAR THAT THAT ISN'T THE CASE
12 AND LET ME EXPLAIN TO YOU MY MEANING, IF I
13 MAY.

14 IF YOU TURN TO TABLE ONE, YOU
15 WILL SEE SEVEN CASES, THE FIRST SEVEN CASES
16 FOR WHICH THERE IS AN EXPOSURE HISTORY, OKAY.
17 YOU WITH ME?

18 Q. YES?

19 A. FINE. HOWEVER, THERE'S ALSO ONE, TWO,
20 THREE, FOUR, FIVE, THE SUBSEQUENT FIVE CASES
21 BELOW WHO LIVED CLOSE TO A VC PVC FACTOR,
22 SEVEN PLUS FIVE IS 12. TWELVE OUT OF 26 IS
23 46 PERCENT AS OPPOSED TO 27 PERCENT.

24 WHEN YOU SAID THAT THERE'S NO
25 -- WHEN YOU INFER THERE'S NO ETIOLOGY IN IN

1 73 PERCENT -- IN 73 PERCENT OF THE CASES,
2 THAT MEANS THAT 27 PERCENT -- ONLY 27
3 PERCENT HAVE AN ETIOLOGY. MY POINT TO YOU IS
4 THAT LOOKING AT TABLE ONE, THEIR OWN TABLE
5 MAKES IT CLEAR THAT IN 45 PERCENT, HALF OF
6 THE CASES, THEY DID HAVE AN ETIOLOGY; SEVEN
7 OF THEM, THE FIRST SEVEN AND THE LAST FIVE
8 WERE COMMUNITY RESIDENTS, PEOPLE WHO LIVED
9 CLOSE TO VC PVC PLANT. SO, IN OTHER WORDS,
10 HALF OF THE CASES IN THIS PAPER HAD A HISTORY
11 OF EXPOSURE TO VINYL CHLORIDE.

12 NOW --

13 Q. DOCTOR, YOU SAY -- .

14 THE COURT: JUST A MOMENT,
15 JUST A MOMENT. QUESTION.

16 BY MR. RENNEISEN:

17 Q. DOCTOR, DO YOU SAY THAT IN SPITE OF
18 THE AUTHORS SAYING DIRECT EXPOSURE TO THESE
19 CHEMICALS COULD NOT BE DEMONSTRATED FOR 37
20 PERCENT OF THE 26 CASES?

21 A. WELL, IT'S DIRECT EXPOSURE. THE
22 POINT IS THAT IN THE TABLE, THEY TALK ABOUT
23 EXPOSURE HISTORY. AND IN THE TABLE OF TABLE
24 ONE WHERE THEY TALK ABOUT EXPOSURE HISTORY,
25 IN 12 OF THE 26 CASES, THERE IS AN EXPOSURE

1 HISTORY.

2 NOW, WHETHER YOU WANT TO USE
3 THE WORD DIRECT FOR THIS IS NEITHER HERE NOR
4 THERE. THIS IS A REPORT OF 25 CASES IN WHOM
5 AT LEAST IN 12 OF THESE WE HAVE AN ETIOLOGY;
6 THE ETIOLOGY VARIES IN DIFFERENT ONES OF THEM,
7 BUT THERE ARE FIVE CASES REPORTED HERE IN
8 WHICH THE ONLY KNOWN EXPOSURE WAS FROM
9 RESIDENTS IN THE VICINITY OF VC PVC PLANT. I
10 MAY ALSO POINT OUT THAT THIS IS -- THE
11 FIGURES SHOULD REALLY BE 12 OUT OF 25, WHICH
12 MAKES IT UP TO 28 PERCENT. BECAUSE IN ONE
13 CASE, THERE WAS NO RESIDENTS' HISTORY. SO, IN
14 FACT, IN 48 PERCENT OF THE CASES IN THAT
15 PAPER, THERE IS A KNOWN ETIOLOGY OR A
16 PRESUMPTIVE ETIOLOGY.

17 Q. IN OTHER WORDS, DOCTOR, YOU DON'T
18 AGREE WITH THE FIRST PARAGRAPH OF THE REPORT?

19 A. NO, THAT ISN'T THE CASE. IT HINGES
20 ON THE INTERPRETATION TO BE USED ON EITHER
21 EXPOSURE ON THE ONE HAND OR DIRECT EXPOSURE.
22 THE TABLE ONE GIVES A HISTORY OF EXPOSURE
23 -- GIVES A COLUMN MARKED EXPOSURE HISTORY.

24 Q. LOOK, DOCTOR, DO YOU ASSUME THAT
25 EVERY CASE OF VINYL CHLORIDE THAT OCCURS

1 WITHIN A MILE OR TWO OF A PVC PLANT --

2 THE COURT: YOU MEAN EVERY

3 CASE OF --

4 BY MR. RENNEISEN:

5 Q. I'M SORRY. DOCTOR, DO YOU EVER

6 ASSUME --

7 MR. RENNEISEN: THANK YOU

8 JUDGE.

9 BY MR. RENNEISEN:

10 Q. DO YOU ASSUME THAT EVERY CASE OF

11 ANGIOSARCOMA THAT OCCURS WITHIN A MILE OR TWO

12 OF A PLANT IS CAUSED BY EMISSION FROM THAT

13 PLANT?

14 A. LET ME ANSWER YOU THIS WAY CLEARLY.

15 IF ONE HAS AN ANGIOSARCOMA

16 OCCURRING IN AN INDIVIDUAL WHO RESIDES CLOSE

17 TO A PLANT FROM WHICH DEMONSTRABLE EMISSION

18 -- THERE HAVE BEEN DEMONSTRABLE EMISSIONS

19 PVC EMISSION AND THE LONGER AND THE MORE

20 INTENSE AND THE MORE INFORMATION YOU HAVE ON

21 THIS, THE MORE CONFIDENT YOU CAN BECOME. BUT

22 THE TWO REQUIREMENTS FOR A DIAGNOSIS OF A

23 COMMUNITY ANGIOSARCOMA ARE, ONE, THE

24 DIAGNOSIS OF THE DISEASE ITSELF; TWO, THE

25 HISTORY OF RESIDENTS CLOSE TO A PLANT; AND,

1 THREE, INFORMATION ON EMISSION FROM THE PLANT.

2 AND IN THE GRASSO CASE, WE
3 HAVE ALL THESE THREE REQUIREMENTS:
4 ANGIOSARCOMA, RESIDENTS CLOSE TO THE PLANT
5 AND DETAILED INFORMATION OF EMISSION BASED ON
6 MODELING AND OTHER DATA. SO, WE HAVE THESE
7 COMBINATION OF THREE FACTORS AND THIS IS
8 PRECISELY WHY IN SCIENCE ONE DEVELOPS A BODY
9 OF INFORMATION FROM WHICH YOU MAKE INFERENCES
10 AND YOU DEVELOP UPON THESE PARTICULAR
11 RELATIONSHIPS. THIS GOES THE WAY WE KNOW
12 ABOUT THE RELATIONSHIP OF SMOKING AND LUNG
13 CANCER; FROM PROBLEMISTIC RELATIONSHIPS, NOT
14 BECAUSE OF ANY ABSOLUTE TERMS.

15 Q. DOCTOR, WITH RESPECT TO THE FIVE
16 PEOPLE REFERRED TO IN THE GRADY REPORT WHO
17 LIVED NEAR A PLANT, DO YOU HAVE ANY EMISSION
18 DATA?

19 A. NO, EXCEPT WHAT THEY SAY IS -- LET
20 US SEE EXACTLY WHAT THEY SAY. OF POSSIBLE
21 IMPORTANCE IS THE FACT THAT THE AMBIENT
22 EMISSION OF VC MONOMER FOR THE FACTORY
23 LOCATED 1,700 FEET FROM THE RESIDENCE OF
24 PATIENT NUMBER TEN WERE AS HIGH AS 92,000
25 P.P.M.. THEY ALSO GO ON TO SAY -- WHERE IS

1 ANGIOSARCOMA?

2 A. I'VE ALREADY ANSWERED THIS, I THINK,
3 BUT I'LL REPEAT THE -- MY ANSWER: THAT THE
4 STRENGTH -- ASSURANCE OF MAKING STATEMENTS
5 OF PROBABILITY DEPENDS, APART FROM THE
6 DIAGNOSIS OF ANGIOSARCOMA, DEPENDS ON
7 PROXIMITY OF RESIDENCE, AND ALSO THE TIME
8 SEQUENCE AND FINALLY, INFORMATION ON EMISSION.

9 Q. BUT, DOCTOR --

10 A. NO, I HAVE TO ANSWER YOU, BECAUSE
11 YOU'VE ASKED ME THIS THREE TIMES AND I
12 BELIEVE I'VE ANSWERED THE SAME WAY.

13 IF YOU HAVE INFORMATION ON
14 EMISSION OF VINYL CHLORIDE FROM THE PLANT BY
15 MODELING OR BY MONITORING, THEN THE STRENGTH
16 OF A STATEMENT ON PROBLEMISTIC -- ON
17 PROBLEMISTIC RELATIONSHIPS BECOMES STRONGER.
18 THIS IS EXACTLY WHAT WE HAVE IN GRASSO. WE
19 HAVE VERY DETAILED INFORMATION --

20 THE COURT: I THINK THE
21 QUESTION HE'S ASKING YOU, DOCTOR IS A CAPABLE
22 OF A RESPONSE, YES OR NO.

23 READ THAT QUESTION. I THINK
24 THE DOCTOR CAN RESPOND YES OR NO.

25 MR. RENNEISEN: THANK YOU,

1 YOUR HONOR

2 (COURT REPORTER READS PENDING
3 QUESTION.)

4 THE WITNESS: NOT IN ANY
5 SITUATION. IN SOME SITUATIONS.

6 MR. RENNEISEN: THANK YOU,
7 DOCTOR.

8 BY MR. RENNEISEN:

9 Q. AND IN THOSE SITUATIONS WHERE YOU
10 HAVE MORE DATA; IS THAT CORRECT?

11 A. IN PARTICULAR, WHERE YOU HAVE DATA
12 ON EMISSION. IF, FOR INSTANCE, YOU HAD A PVC
13 PLANT THAT WASN'T FUNCTIONING AND HAD NEVER
14 FUNCTIONED, THEN I WOULD SAY -- I WOULDN'T
15 BE WILLING TO ASCRIBE A RELATIONSHIP.

16 Q. LET ME CHANGE THE QUESTION, DOCTOR.
17 ARE YOU SAYING THEN THAT IF YOU HAVE AN
18 ANGIOSARCOMA NEAR A FUNCTIONING PVC PLANT
19 WITH EMISSION, THERE IS A SUBSTANTIAL
20 PROBABILITY THAT THAT ANGIOSARCOMA WAS CAUSED
21 BY THE EMISSION FROM THE PLANT?

22 A. YES, ESPECIALLY IN THE ABSENCE OF
23 EXPOSURE TO -- KNOWN EXPOSURE TO OTHER
24 AGENTS INDUCING ANGIOSARCOMA.

25 C. NOW, I THINK WE -- WE BOTH AGREE,

1 DOCTOR, THAT IF YOU HAD A MAN LIVING OUT IN
2 WYOMING AWAY FROM EVERY PVC PLANT AND NEVER
3 USED A SPRAY CAN OF ANYTHING, HE COULD STILL
4 HAVE ANGIOSARCOMA?

5 A. CERTAINLY. I'VE ALREADY DISCUSSED
6 THE FOUR CAUSES.

7 Q. AND IF THAT GENTLEMAN WAS NOT
8 EXPOSED TO THOROTRAST, VINYL CHLORIDE,
9 STEROID OR ARSENIC, HE STILL COULD GET
10 ANGIOSARCOMA, COULDN'T HE?

11 A. WELL, IF HE GETS ANGIOSARCOMA, HE
12 GETS IT, SO, THEREFORE, THERE'S NO ARGUMENT
13 ABOUT IT. THE QUESTION IS WHAT IS THE CAUSE.

14 Q. WELL, YOU'VE ALREADY SAID, DOCTOR,
15 THAT THERE ARE MANY CARCINOGENS NOT YET
16 IDENTIFIED.

17 A. WELL, WE HAVE FOUR KNOWN CAUSES OF
18 ANGIOSARCOMA. I'M UNWILLING TO EXCLUDE THE
19 POSSIBILITY THAT AT SOME STAGE IN THE FUTURE,
20 ANOTHER CAUSE -- I'M NOT GIFTED WITH
21 PROPHECY. ALL WE CAN SAY IS WE NOW KNOW OF
22 THREE DEFINITE CAUSES OF ANGIOSARCOMA AND A
23 FOURTH POSSIBLE CAUSE OF ANGIOSARCOMA.

24 Q. AND TEN YEARS FROM NOW, WE MAY HAVE
25 TEN CAUSES; ISN'T THAT TRUE?

1 A. THAT IS POSSIBLE. BUT IT'S NOT
2 PROBABLE. I'M NOT WILLING TO EXCLUDE THAT
3 POSSIBILITY.

4 Q. IT'S NOT PROBABLE?

5 A. NO.

6 Q. HOW MANY YEARS AGO THERE WERE NO
7 KNOWN CAUSES?

8 A. THE REASON WHY IT'S NOT PROBABLE
9 -- THIS IS A VERY RARE CANCER AND THE --
10 OF THE RARE CANCERS OF ANGIOSARCOMAS WHICH
11 WE'VE SEEN SO FAR, WE HAVE -- THE MORE WE
12 EXAMINE THEM, THE MORE WE'VE BEEN ABLE TO
13 DEVELOP INFORMATION ON ETIOLOGY. AND
14 BASICALLY, WHAT IS HAPPENING NOW IS THAT THE
15 CASES OF ANGIOSARCOMA THAT ARE DEVELOPING ARE
16 BEING EXAMINED MORE AND MORE CAREFULLY AND
17 CONSIDERATIONS SUCH AS PROXIMITY OF RESIDENCE
18 IS NOW BEING RECOGNIZED MORE AND MORE AND
19 OTHER SUCH FACTORS OF IT.

20 Q. WELL, DOCTOR, ARE YOU TELLING ME
21 THAT MORE AS AND MORE CASES ARE BEING
22 EXAMINED, PEOPLE LIKE YOURS ARE TRYING HARDER
23 AND HARDER TO FIT THEM INTO ONE OF FOUR
24 CATEGORIES?

25 A. THAT'S NOT WHAT I SAID. THE

1 SCIENTIFIC COMMUNITY IS PAYING PARTICULAR
2 ATTENTION TO THIS, AMONG OTHER ISSUES,
3 ESPECIALLY BECAUSE ANGIOSARCOMA HAPPENS TO BE
4 A RARE DISEASE AND THEREFORE, IT'S EASIER TO
5 STUDY. WHEN YOU HAVE A VERY COMMON CANCER
6 LIKE LUNG CANCER, IT BECOMES FAR MORE
7 DIFFICULT TO STUDY FROM THIS POINT OF VIEW OF
8 ASCRIBING CAUSALITY. WHEN IT COMES TO
9 RELATIVELY UNUSUAL CANCERS, LIKE MESOTHELIOMA
10 FROM ASBESTOS OR ANGIOSARCOMA, IT THEN
11 BECOMES EASIER TO TRY TO DEVELOP INFORMATION
12 ON CAUSALITY.

13 Q. DOCTOR, WAS THERE A TIME WHEN THE
14 MEDICAL PROFESSION HAD NO KNOWN CAUSES FOR
15 ANGIOSARCOMA?

16 A. CERTAINLY. THE TESTS HADN'T BEEN
17 DONE IN ANIMALS AND THERE HAD BEEN THE FEW
18 CASES THAT HAD OCCURRED IN THE MID-SIXTIES
19 HAD BEEN MISS DIAGNOSIED.

20 Q. AND AS DOCTOR LAUCIUS WHO WAS HERE
21 THIS MORNING SAID THAT ANGIOSARCOMA OF THE
22 LIVER HAD BEEN KNOWN FOR 50 YEARS, DO YOU
23 AGREE WITH THAT?

24 A. I CAN'T TELL YOU THE DATE WHEN
25 ANGIOSARCOMA WAS FIRST RECOGNIZED. I WOULD

1 HAVE TO GO BACK TO THE LITERATURE. I KNOW
2 IT'S BEEN RECOGNIZED FOR SOME TIME, FOR
3 DECADES. BUT I CAN'T REALLY TELL YOU THE DATE
4 OF THE FIRST REPORT.

5 Q. DOCTOR, ISN'T IT FAIR IF THERE WAS A
6 TIME THAT IT EXISTED AND NOBODY KNEW ANY
7 CAUSES AND THEN ONE DAY THERE WAS ONE CAUSE
8 AND THEN THREE AND NOW POSSIBLY FOUR?

9 A. THAT'S CORRECT.

10 Q. AND ISN'T IT REASONABLE TO ASSUME,
11 PARTICULARLY SINCE THERE SEEMS TO BE NO
12 RELATIONSHIP IN THE FOUR KNOWN OR SUSPECTED
13 CAUSES WITH EACH OTHER, THAT THERE ARE
14 PROBABLY OTHER CAUSES; ISN'T THAT TRUE?

15 A. WELL, I'M NOT WILLING TO EXCLUDE
16 THAT AS A POSSIBILITY. ALL I CAN SAY IS THAT
17 AT THE MOMENT, THREE DEFINITE CAUSES HAVE
18 BEEN DEMONSTRATED AND A FOURTH POSSIBLE CAUSE
19 HAS BEEN DEMONSTRATED. THAT'S AS FAR AS AS
20 ONE CAN GO IN THIS LINE.

21 Q. DID YOU REFER TO THE -- I DON'T
22 THINK YOU REFER TO IT BY AUTHOR'S NAME. BUT I
23 THOUGHT YOU WERE REFERRING TO AN ARTICLE BY
24 CHIAZZE ENTITLED MORTALITY AMONG EMPLOYEES OF
25 PVC FABRICATORS?

1. A. I DIDN'T LIST THAT IN THE COMMUNITY
2. CANCER OR IN THE -- OR IN THE ONES WITH
3. LATENCIES UNDER TEN YEARS, NO, I DIDN'T LIST
4. THAT.

5. Q. DID YOU REFER TO IT WHEN YOU WERE
6. TALKING ABOUT CASES IN FABRICATORS --

7. A. THAT'S RIGHT.

8. Q. -- WHERE THERE WAS EXPOSURES OF
9. ZERO TO TWO PARTS PER MILLION?

10. A. YES, IN THAT CONNECTION, I REFER TO
11. CHIAZZE.

12. Q. AND ON PAGE 19 OF YOUR REPORT,
13. REFERENCE IS MADE TO A CROSS-SECTION,
14. MORTALITY STUDY OF 3,845 DEATHS AMONG
15. EMPLOYEES OF PVC FABRICATORS BY LEONARD
16. CHIAZZE; ISN'T THAT TRUE?

17. A. THAT'S TRUE.

18. Q. AND CHIAZZE IN FACT, WITH HIS
19. ASSOCIATES, NICHOLS AND WONG, DID, IN FACT,
20. STUDY DEATH OF PVC FABRICATORS, DID THEY NOT?

21. A. THAT'S RIGHT, YES.

22. Q. AND THESE ARE GENTLEMEN OR WOMEN WHO
23. TOOK POLYVINYLCHLORIDE AND IN SOME PROCESSES,
24. MANUFACTURED INTO PRODUCTS THAT WERE USED
25. TODAY?

1 A. CORRECT.

2 Q. ISN'T IT TRUE THAT DOCTOR CHIAZZE
3 FOUND NO ANGIOSARCOMA DEATH AMONG THE GROUP
4 THAT HE STUDIED?

5 A. THAT'S RIGHT, HE FOUND VARIOUS OTHER
6 CANCERS, BUT NO ANGIOSARCOMAS.

7 Q. ISN'T IT TRUE THAT THE PRIMARY
8 OBJECTIVE OF HIS STUDY WAS TO DETERMINE
9 RELATIVELY QUICKLY WHETHER OR NOT ANY
10 ANGIOSARCOMA DEATH COULD BE IDENTIFIED AMONG
11 THE STUDY GROUP?

12 A. I REALLY DON'T RECALL. IT'S QUITE
13 POSSIBLE HE TRIED TO DO THAT. BUT ESSENTIALLY
14 WHAT HE DID FIND WAS AN EXCESSIVE CANCER OF
15 DIFFERENT MALIGNANCY. AND THIS HAS BEEN
16 REPORTED IN SEVERAL OTHER STUDIES, TOO.

17 C. WELL, IF YOU'LL TO PAGE 523 OF THE
18 BOTTOM OF THE CHIAZZE ARTICLE --

19 A. I DON'T HAVE THAT IN FRONT OF ME, I
20 REGRET.

21 Q. I'M SORRY, I'LL GET YOU ONE.

22 THE COURT: YOU WANT SOME
23 MORE WATER, DOCTOR.

24 THE WITNESS: THAT WOULD BE
25 NICE, THANK YOU.

1 THE WITNESS: I DIDN'T, I SEE
2 THE POINTS YOU WERE MAKING.

3 BY MR. RENNEISEN:

4 Q. AND HE DOES SAY, DOES HE NOT, THE
5 PRIMARY STUDY OBJECT WAS TO DETERMINE
6 RELATIVELY QUICKLY WHETHER ANY -- WHETHER
7 OR NOT ANY ANGIOSARCOMA DEATH --

8 A. CORRECT.

9 Q. COULD BE --

10 Q. COULD BE IDENTIFIED AMONG THE STUDY
11 GROUP.

12 A. CORRECT.

13 Q. AND WHEN HE COMPLETED HIS OBJECT, HE
14 FOUND NONE, ISN'T THAT TRUE?

15 A. CORRECT. BUT OTHER CANCERS, WHICH
16 ALSO HAVE BEEN ASSOCIATED WITH VINYL CHLORIDE
17 EXPOSURE.

18 Q. NOW, YOU REFER TO A BAXTER AND FOX
19 ARTICLE, DID YOU NOT?

20 A. YEAH.

21 Q. AND THAT IS IN THE LANCET, JANUARY
22 31, 1975, ISN'T IT?

23 A. YEAH. HANG ON. OKAY.

24 Q. AND I BELIEVE YOU SUGGESTED THAT
25 BAXTER AND FOX FOUND LUNG AND BRAIN CANCER:

1 IS THAT TRUE?

2 A. I DON'T RECALL SAYING THAT. WHAT I

3 -- LET'S JUST REFRESH MY MEMORY AND YOUR
4 MEMORY, IF I MAY.

5 Q. FINE, DOCTOR.

6 A. FIRST OF ALL, I REFER TO BAXTER AS
7 HAVING DESCRIBED ONE COMMUNITY CANCER CASE OF
8 A LIVER ANGIOSARCOMA WITH A LATENCY OF SIX
9 YEARS IN SOMEBODY WHO LIVED WITHIN A HALF
10 MILE FROM A BRITISH PVC PLANTS. THAT'S ONE
11 POINT I MADE.

12 Q. IS THAT REFERRED TO IN THIS BAXTER
13 AND FOX ARTICLE?

14 A. I THINK SO. SURE. WAIT A SECOND.
15 WE'RE LOOKING AT DIFFERENT BAXTER ARTICLES. I
16 THINK THAT'S THE BASIS FOR THE CONFUSION. I
17 WAS LOOKING AT BAXTER, ANTHONY, RODERICK,
18 MC QUEEN, ET CETERA, WHICH IS BRITISH MEDICAL
19 JOURNAL, OCTOBER, 1977. I'M SORRY I MISLEAD
20 YOU WITH THE REFERENCE.

21 Q. I WAS TALKING ABOUT BAXTER AND FOX.

22 A. WELL, MY REFERENCE THIS MORNING TO
23 THE -- MY REFERENCE PREVIOUSLY TO THE
24 COMMUNITY CANCER AND THE SHORT LATENCY PERIOD
25 WAS BAXTER ET AL., 1977. I THINK THAT'S THE

1 BASIS OF THE CONFUSION.

2 SO, I HAVE THE BAXTER AND
3 FOX ARTICLE HERE, SURE.

4 Q. AND YOU DID REFER TO IT IN YOUR
5 REPORT ON PAGE 19, DID YOU NOT?

6 A. I THINK SO. PAGE 19, NO.

7 I REFER TO BAXTER ET AL., 77,
8 NOT -- AND THIS IS BAXTER 75, BAXTER ET AL.
9 77 IS THE -- IS THE ONE WITH THE COMMUNITY
10 CANCER CASE.

11 Q. YOU ARE FAMILIAR WITH BAXTER AND FOX,
12 ARE YOU NOT?

13 A. I HAVE BOTH OF THEM IN FRONT OF ME,
14 SIR.

15 Q. ALL RIGHT. NOW, IF WE TAKE BAXTER
16 AND FOX --

17 A. YOU SEE, ON PAGE 19, THERE'S TWO
18 REFERENCES TO BAXTER. THAT'S THE PROBLEM.

19 Q. I AM REFERRING TO THE LANCET,
20 JANUARY 31, 1975 --

21 A. FINE.

22 Q. BAXTER AND FOX TOWARD THE END. AND
23 IT SAYS, "VINYL CHLORIDE HAS BEEN SUGGESTED
24 AS CAUSING CANCER OF THE LUNG AND BRAIN AS
25 WELL AS ANGIOSARCOMA OF THE LIVER AND OTHER

1 LIVER DISEASES. IN THIS STUDY, THE OBSERVED
2 NUMBER OF DEATHS FROM THESE CAUSES WERE NOT
3 IN EXCESS OF THOSE EXPECTED."

4 A. THAT'S RIGHT, THAT'S CORRECT. BUT
5 THERE HAVE BEEN A WIDE RANGE OF OTHER STUDIES
6 SINCE THEN WHICH HAVE DEMONSTRATED THAT THERE
7 ARE TARGET ORGANS BESIDES THE LIVER AND THIS
8 IS WELL RECOGNIZED IN THE LITERATURE NOW.

9 Q. DOES THE -- DID THE PEOPLE AT THE
10 CENTER FOR DISEASE CONTROL CONSIDER LUNG AND
11 BRAIN CANCER TO BE CAUSED BY VINYL CHLORIDE,
12 IF YOU KNOW?

13 A. . WELL, ALL I CAN TELL YOU -- I
14 HAVEN'T SEEN ANY CATEGORICAL STATEMENTS ON
15 THIS. BUT THE INTERNATIONAL AGENCY FOR THE
16 RESEARCH ON CANCER, FOR WHICH C.D.C. IS
17 INVOLVED AS KIND OF A MEMBER ORGANIZATION,
18 CLEARLY RECOGNIZES LUNG, BRAIN AND VARIOUS
19 OTHER SITES AS TARGET ORGANS FOR VINYL
20 CHLORIDE INDUCED CANCER.

21 Q. YOU DO RECOGNIZE C.D.C. AS ANOTHER
22 AGENCY WHICH SERVES A PURPOSE FOR THE MEDICAL
23 COMMUNITY AND COLLECTS INFORMATION AND MAKES
24 CONCLUSIONS?

25 A. CERTAINLY, I'M VERY FAMILIAR WITH

1 THE OPERATION OF C.D.C. C.D.C., IN FACT
2 ISN'T -- ITS PRIMARY EXPERTISE ISN'T IN
3 CARCINOGENESIS. NATIONAL CANCER INSTITUTE AND
4 NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY
5 AND HEALTH HAS GREATER EXPERTISE IN THIS AREA
6 AND THE INTERNATIONAL AGENCY FOR THE RESEARCH
7 ON CANCER IS BASICALLY THE INTERNATIONAL
8 AUTHORITY ON THE RECOGNITION ON RELATIONSHIPS
9 BETWEEN EXPOSURE TO CHEMICALS AND CANCER. AND
10 I SAID BEFORE, THERE'S A WIDE RANGE OF
11 PUBLICATIONS DEMONSTRATING THE INVOLVEMENT OF
12 ORGANS LIKE LUNG AND BRAIN AS A CARCINOGENIC
13 RESPONSE TO VINYL CHLORIDE. AND I HAVE MORE
14 THAN -- I HAVE LITERATURE HERE, IF YOU WISH.

15 Q. HENRY FAULK IS WITH THE CENTER FOR
16 DISEASE CONTROL?

17 A. THAT'S RIGHT, YES.

18 Q. AND DO YOU KNOW WHAT HIS POSITION IS
19 THERE?

20 A. I DON'T KNOW WHAT HIS POSITION IS
21 NOW.

22 Q. HAVE YOU HAD DEALINGS WITH HIM?

23 A. OH, YES, YES.

24 Q. WE TALKED EARLIER IN MY QUESTION OF
25 YOU ABOUT HIS ARTICLE WHERE HE TALKS ABOUT

1 OF A SUBSTANTIAL PROBABILITY. THEREFORE, I
2 CAN'T ANSWER YOU AS TO WHAT PERCENTAGE OF THE
3 CASES HAS BEEN ATTRIBUTED IN THE SAME WAY AS
4 THREE OR FOUR YEARS AGO. NOW WE'RE BEGINNING
5 TO SEE MORE AND MORE OF THEM. WE'RE GOING TO
6 SEE MORE AND MORE LUNG CANCER, BECAUSE PEOPLE
7 ARE LOOKING FOR IT NOW. SO, THEREFORE, I'M
8 UNWILLING TO GIVE YOU AN ABSOLUTE FIGURE AS
9 TO THE PERCENTAGE OF CASES OF ANGIOSARCOMA IN
10 WHICH AN ETIOLOGY HAS BEEN DEMONSTRATED. THE
11 FIGURES IN THE LITERATURE SEEM TO SUGGEST
12 -- THE LITERATURE SEEMS TO SUGGEST ANYTHING
13 RANGING FROM 75 TO ABOUT 35, DEPENDING ON
14 WHAT SERIES YOU LOOK AT.

15 Q. DOCTOR, IN MAKING YOUR ANALYSIS OF
16 CAUSE AND EFFECT, OF PROBABLE CAUSE AND
17 EFFECT BETWEEN VINYL CHLORIDE AND
18 ANGIOSARCOMA, YOU BASICALLY ARE RELYING ON
19 DATA IN THE LITERATURE; ISN'T THAT TRUE?

20 A. CERTAINLY. DATA IN THE LITERATURE,
21 PLUS -- PLUS, SIR, INFORMATION ON THE
22 SPECIFICS OF MR. GRASSO'S EXPOSURE AND WHERE
23 HE LIVED.

24 Q. BUT WITH RESPECT TO THE -- THE
25 CASES THAT YOU HAVE TOLD US ABOUT TODAY --

1 NOT MR. GRASSO'S CASE, BUT THE ACCOUNTANT IN
2 CONNECTICUT AND THE 83 YEAR OLD WOMAN,
3 WHEREVER SHE LIVED, THOSE CASES YOU GOT FROM
4 THE LITERATURE.

5 A. CORRECT, SIR.

6 Q. YOU DIDN'T SEND OUT QUESTIONNAIRES
7 YOURSELF TO PATHOLOGISTS AROUND THE COUNTRY
8 AND COLLECT THE DATA YOURSELF?

9 A. NO.

10 Q. IS THAT RIGHT?

11 A. NO.

12 Q. SO THE PRINCIPAL SOURCE OF YOUR
13 INFORMATION ARE ARTICLES WRITTEN BY OTHER
14 REPUTABLE DOCTORS WHO HAVE THEM PUBLISHED IN
15 REPUTABLE JOURNALS?

16 A. BUT LET ME MAKE IT CLEAR THAT WHEN
17 YOU GO TO THE SCIENTIFIC LITERATURE, YOU
18 DON'T NECESSARILY GO THERE LOOKING FOR
19 OPINIONS. YOU GO THROUGH LOOKING FOR FACTS.
20 WHAT I'VE GOT OUT OF THE LITERATURE ARE FACTS
21 AND THE FACTS ARE THIS: THERE ARE A WIDE
22 RANGE OF CASES OF ANGIOSARCOMA IN PEOPLE
23 LIVING CLOSE TO PLANTS, ONE.

24 TWO, THERE ARE ANGIOSARCOMAS
25 AND OTHER MALIGNANCIES IN PEOPLE LIVING CLOSE

1 TO PLANTS AND PEOPLE WORKING WITH INDUSTRIES
2 IN SHORT LATENCIES.

3 THREE, WE KNOW HE LIVED HERE
4 A PLANT. WE KNEW THERE WERE A LOT OF
5 EMISSIONS. SO, WE KNOW NATIONAL ENVIROMENTAL
6 --

7 Q. EXCUSE ME, DOCTOR. DO YOU KNOW WHAT
8 QUESTION YOU'RE ANSWERING. BECAUSE I DON'T.

9 A. I CAN TELL YOU THE QUESTION THAT YOU
10 ASKED ME IS WHAT INFORMATION I GOT FROM THE
11 LITERATURE WHICH ENABLES ME TO COME UP WITH
12 INFERENCES IN THIS AREA.

13 Q. MAYBE WE'LL GO BACK TO THE QUESTION,
14 DOCTOR. OR LET'S GO ON.

15 A. SURE.

16 Q. I THINK I ASKED, DO YOU RELY ON THE
17 LITERATURE. I DON'T THINK I ASKED YOU WHAT
18 --

19 A. I SEE. I RELY ON THE FACTS IN THE
20 LITERATURE.

21 Q. ALL RIGHT. YOU RELY ON THE FACTS IN
22 THE LITERATURE.

23 A. YES.

24 Q. THERE IS LITERATURER WHICH INDICATES,
25 SAY, A POCKET OF PEOPLE IN WISCONSIN WHERE

1 THERE'S NO PLANTS AT ALL AND THERE'S AN
2 UNEXPLAINED GROUPING OF ANGIOSARCOMAS; ISN'T
3 THAT TRUE?

4 A. YES, THE MARSHALL FIELD CLINIC AREA.

5 Q. THAT'S RIGHT. AND THAT'S OTHER DATA
6 THAT YOU CONSIDER --

7 A. MOST CERTAINLY.

8 Q. AND AGAIN, THE DATA THAT YOU ARE
9 CONSIDERING, WHETHER IT BE OPINIONS OR FACTS
10 COMES OUT OF THE LITERATURE THAT YOU READ?

11 A. CORRECT.

12 MR. RENNEISEN: THANK YOU,
13 DOCTOR. THAT'S ALL I HAVE.

14 THE COURT: ANY REDIRECT?

15 MR. VASSALOTTI: JUST A FEW,
16 YOUR HONOR.

17 BY MR. VASSALOTTI:

18 Q. DOCTOR, THERE'S BEEN SOME TESTIMONY
19 ABOUT THE STEROIDS. I DON'T RECALL THE FULL
20 NAME OF THE STEROIDS?

21 A. ANABOLIC STEROIDS.

22 Q. THAT ARE A POSSIBLE -- IMPLICATED
23 AS A POSSIBLE CAUSE OF ANGIOSARCOMA OF THE
24 LIVER.

25 DOCTOR AS PART OF THE

1 MATERIALS THAT WERE PROVIDED TO YOU WITH
2 REGARD TO INFORMATION ON THE MEDICAL HISTORY
3 OF MR. GRASSO, DID YOU RECEIVE LETTERS FROM
4 THREE OF MR. GRASSO'S PERSONAL PHYSICIANS
5 THAT DATE BACK TO 1953?

6 A. YEAH, I'VE GOT SEVERAL LETTERS ON
7 THIS AND, YEAH, I'VE GOT THREE LETTERS,
8 THAT'S RIGHT.

9 Q. AND DO THOSE LETTERS PURPORT TO
10 DESCRIBE ALL THE MEDICATION OR DRUGS THAT
11 WERE ADMINISTERED OR PRESCRIBED TO MR. GRASSO
12 BY THOSE DOCTORS?

13 A. THAT'S CORRECT.

14 Q. ARE THERE --

15 MR. RENNEISEN: I OBJECT TO
16 THIS LINE OF QUESTIONING.

17 THE COURT: I'LL SUSTAIN THAT.

18 MR. VASSALOTTI: EXCUSE ME,
19 YOUR HONOR.

20 THE COURT: SUSTAIN THE
21 OBJECTION.

22 MR. VASSALOTTI: YOUR HONOR,
23 MAY WE APPROACH THE BENCH?

24 THE COURT: SURE.

25 (SIDE BAR ON RECORD.)

1 MR. VASSALOTTI: FIRST, I'D
2 LIKE TO NO WHAT THE BASIS OF THE OBJECTION IS.

3 THE COURT: I ASSUME IT'S A
4 HEARSAY OBJECTION OF THE CASES.

5 MR. RENNEISEN: IT'S HEARSAY
6 AND IT DOESN'T FALL IN THE MEDICAL RECORD
7 EXCEPTION BECAUSE THEY WERE NOT MADE FOR THE
8 PURPOSE OF TREATMENTS. THEY WERE GIVEN TO
9 THIS DOCTOR FOR THE TESTIFYING.

10 THE COURT: I ASSUMED THAT
11 WAS THE BASIS HE WAS OBJECTING ON.

12 MR. VASSALOTTI: THERE IS A
13 RULE, AS I UNDERSTAND, ON THE FEDERAL RULES
14 OF EVIDENCE, IF DOCTOR EPSTEIN SAID HE WOULD
15 RELY ON INFORMATION LIKE THIS, THEN. --

16 THE COURT: WELL, IT WOULD BE
17 USED NOT FOR THE TRUTH. HE WAS BEGINNING TO
18 ASK HIM --

19 MR. RENNEISEN: IT'S -- IT
20 DOESN'T GET INTO EVIDENCE UNDER THE HEARSAY
21 RULE.

22 MR. VASSALOTTI: I UNDERSTAND.
23 THE RULES -- AS AN EXPERT, IF HE WOULD RELY
24 UPON STATEMENTS BY A MAN'S PERSONAL PHYSICIAN
25 AS TO THE TYPE OF MEDICATION THAT WAS

1 PRESCRIBED TO THAT MAN ON THE WAYS OF
2 DETERMINING WHAT CAUSED THE MAN'S CANCER,
3 UNDER THE FEDERAL RULES OF EVIDENCE, THAT'S
4 AN EXPERT'S REPORT UPON --

5 THE COURT: LET ME ASK YOU
6 THIS: HAVE YOU SEEN THE LETTERS?

7 MR. RENNEISEN: NO, SIR.

8 THE COURT: WHY DON'T YOU
9 SHOW HIM THE LETTERS?

10 MR. RENNEISEN: THAT'S NOT
11 GOING TO CHANGE MY OPINION.

12 THE COURT: I UNDERSTAND.

13 MR. VASSALOTTI: JUDGE, I CAN
14 TE;; YOU, I WROTE TO THE PHYSICIANS, WILL YOU
15 PLEASE TELL ME EVERY DRUG YOU PRESCRIBED ON
16 THIS MAN. THE LETTERS WERE SENT TO ME. I SENT
17 THEM TO DOCTOR EPSTEIN.

18 MR. RENNEISEN: THAT CONFIRMS
19 THE BASIS FOR MY OBJECTION. IF YOU'RE GOING
20 TO PROVE HE HAD NO STEROIDS, YOU'VE GOT TO
21 BRING THOSE DOCTORS IN.

22 THE COURT: LET ME ASK YOU
23 THIS: INFORMATION WAS GIVEN TO THIS WITNESS
24 ON WHICH HE BASED HIS OPINION, TOO, FROM
25 EXPERTS WHICH IT'S TECHNICALLY HEARSAY ALSO,

1 TOD.

2 MR. RENNEISEN: NOBODY

3 OBJECTED.

4 THE COURT: WELL, I'M GOING

5 TO REVERSE MYSELF AND ALLOW IT

6 (THE FOLLOWING TAKES PLACE IN

7 OPEN COURT.)

8 BY MR. VASSALOTTI:

9 Q. DOCTOR, DID YOU REVIEW THE LETTERS
10 FROM, I BELIEVE IT WAS DOCTORS ROZANSKI,
11 DE PERSIA AND GILPATRICK?

12 A. YES, SIR.

13 Q. WAS THERE ANY INDICATION IN ANY OF
14 THOSE LETTERS THAT MR. GRASSO RECEIVED ANY
15 STEROIDS?

16 A. NO, SIR.

17 Q. DOCTOR, DURING YOUR
18 CROSS-EXAMINATION, YOU MENTIONED THAT E.P.A.
19 ENACTED A NATIONAL EMISSION STANDARD FOR THE
20 EMISSION OF VINYL CHLORIDE IN -- I THINK IT
21 WAS OCTOBER OF 1975?

22 A. THAT'S CORRECT.

23 Q. ARE YOU FAMILIAR WITH THE FINDINGS
24 THAT THE ENVIRONMENTAL PROTECTION AGENCY MADE
25 AND RELIED UPON AND UPON WHICH THEY BASED

1 THEIR STANDARD?

2 A. YES, I WAS A MEMBER OF AN E.P.A.
3 ADVISORY COMMITTEE THAT CAME UP WITH THIS
4 RECOMMENDATION AT THE TIME.

5 Q. CAN YOU DESCRIBE FOR US THE FINDINGS
6 THAT WERE MADE BY E.P.A. AND UPON WHICH THEY
7 BASE THEIR CONCERN ABOUT EMISSION OF VINYL
8 CHLORIDE?

9 A. YES, I THINK I CAN.
10 MONITORING STUDIES BY THE
11 ENVIRONMENTAL PROTECTION AGENCY IN 1974 HAD
12 DEMONSTRATED AVERAGE LEVELS OF 17 PARTS PER
13 BILLION IN THE VICINITY OF A RANGE OF PLOTS.
14 IT WAS ASSUMED -- IT WAS BELIEVED THAT FOUR
15 POINT SIX MILLION PEOPLE IN THE UNITED STATES
16 WERE LIVING IN THE VICINITY OF PLANTS WITH
17 EXPOSURES ON THE AVERAGE -- I BEG YOUR
18 PARDON -- OF ABOUT 17 PARTS PER BILLION.

19 Q. THAT'S PER BILLION?

20 A. PER BILLION I'M TALKING ABOUT NOW.
21 THE ENVIRONMENTAL PROTECTION AGENCY ESTIMATED
22 THAT WITH THIS LEVEL OF EXPOSURE, ONE COULD
23 ANTICIPATE BETWEEN --

24 MR. RENNEISEN: YOUR HONOR,
25 AT THIS POINT, I OBJECT. IT'S THE OPINION OF

1 A REGULATORY AGENCY WITH --

2 THE WITNESS: THESE ARE
3 FIGURES --

4 MR. VASSALOTTI: YOUR HONOR,
5 IT'S EXACTLY THE POINT. IT'S A FINDING OF A
6 GOVERNMENT AGENCY AND IT CLEARLY FALLS WITHIN
7 THE EXCEPTION OF RULE 3038.

8 THE COURT: ALLOWED.
9 OVERRULED. LET'S PROCEED.

10 THE WITNESS: THE
11 ENVIRONMENTAL PROTECTION AGENCY CALCULATED
12 THAT WITH THIS KIND OF LEVEL OF EXPOSURE,
13 THEY COULD ANTICIPATE BETWEEN LESS THAN ONE
14 AND TEN ANGIOSARCOMAS A YEAR. FOR THESE
15 GROUNDS, THEY FELT IT WAS ESSENTIAL TO REDUCE
16 THE LEVELS OF VINYL CHLORIDE EMISSION. THE
17 NEW STANDARD OF THE ENVIRONMENTAL PROTECTION
18 AGENCY WAS DESIGNED TO REDUCE THE EMISSION BY
19 30 PERCENT.

20 NOW, WE WERE TALKING THERE
21 ABOUT 17 PARTS PER BILLION. AND ON THE 17
22 PARTS PER BILLION LEVEL SPREAD OVER FOUR
23 POINT SIX MILLION PEOPLE, UP TO TEN
24 ANGIOSARCOMAS A YEAR WERE ESTIMATED. WE'RE
25 NOW TALKING IN THIS INSTANCE -- WELL,

1 PERHAPS THIS ISN'T -- THIS ISN'T IN
2 RESPONSE TO THE QUESTION.

3 THE COURT: WELL, LET IT BE
4 IN RESPONSE TO THE QUESTION, OR OTHERWISE YOU
5 CAN'T.

6 BY MR. VASSALOTTI:

7 Q. THAT WAS MY NEXT QUESTION, DOCTOR.
8 THE E.P.A. CONSIDERED LEVELS OF 17 PARTS PER
9 BILLION IN THEIR FINDINGS UPON WHICH THEY
10 BASE THEIR STANDARDS; IN THIS CASE -- AND
11 IS IT TRUE THAT BASED UPON THOSE LEVELS OF
12 EXPOSURE, THE E.P.A. CONSIDERED THAT THERE
13 WAS AN EXCESS RISK OF ANGIOSARCOMA AS A
14 RESULT OF THE VINYL CHLORIDE EXPOSURE?

15 A. CORRECT, SIR.

16 Q. AND THE LEVELS WE'RE TALKING ABOUT
17 IN THIS CASE ARE IN THE PARTS PER MILLION --
18 WHEN I SAY THIS CASE WE'RE TALKING ABOUT
19 GRASSO -- THAT YOU'RE BASING YOUR OPINION
20 ON?

21 A. BASED ON THE DATA WHICH HAVE BEEN
22 SUBMITTED TO ME BY DOCTOR PESKIN, THAT
23 APPEARS TO BE THE CASE. EVEN THE DAMES AND
24 MOORE DATA WOULD BE CONSISTENT WITH THE
25 ESTIMATE OF THE E.P.A.

1 THE COURT: ANYTHING FURTHER?

2 MR. VASSALOTTI: YOUR HONOR,

3 EXCUSE ME.

4 BY MR. VASSALOTTI:

5 Q. DOCTOR EPSTEIN, THERE HAS BEEN SOME
6 MENTION OF ARSENIC BEING USED IN PESTICIDES.
7 DO YOU HAVE ANY INFORMATION RELATING TO
8 SHOWING THAT ARSENIC OR ARSENIC COMPOUNDS
9 CONTAINED IN PESTICIDES ARE CAUSELY RELATED
10 TO ANGIOSARCOMA OF THE LIVER?

11 A. ARSENIC CERTAINLY IS A CAUSE OF
12 ANGIOSARCOMA. AND IF THE ARSENIC IS --
13 WHETHER IT'S CONTAINED IN A PESTICIDE OR ANY
14 OTHER PRODUCT, I WOULD CERTAINLY WISH TO
15 CONSIDER THIS.

16 Q. DOCTOR, IF -- AND I SAY IF BECAUSE
17 IT HASN'T BEEN SHOWN -- SOMEONE LIKE MR.
18 GRASSO HAD BEEN EXPOSED TO SOME UNKNOWN
19 LEVELS OF PESTICIDES THAT CONTAINED ARSENIC
20 AND WAS THEN EXPOSED TO THE VINYL CHLORIDE
21 THAT WE'VE TALKED ABOUT IN THIS CASE, IS
22 THERE ANY MEDICAL EVIDENCE OR SCIENTIFIC
23 EVIDENCE TO INDICATE THAT THE TWO CANCER
24 CAUSING AGENTS WOULD WORK TOGETHER?

25 A. WELL, LET ME ANSWER THIS GENERALLY

1 AND THEY SPECIFICALLY. FROM A GENERAL
2 STANDPOINT, WE HAVE VERY, VERY SUBSTANTIAL
3 LITERATURE TO SHOW THE EFFECTS OF A CHEMICAL
4 CARCINOGEN. IT CAN BE WHAT WE CALL SINOSISED.
5 THAT'S THE EFFECTS CAN BE MULTIPLIED BY
6 EXPOSURE EITHER BEFORE OR AFTERWARDS TO
7 ANOTHER CHEMICAL OR TO ANOTHER CHEMICAL
8 CARCINOGEN. AND THERE'S A LOT OF LITERATURE
9 ON THIS PRACTICE

10 BUT LET ME BE MORE SPECIFIC
11 AS FAR AS VINYL CHLORIDE IS CONCERNED.

12 THERE'S ONE VERY CRITICAL
13 EXPERIMENT WHICH I VERY MUCH REGRET THAT I
14 NEGLECTED TO INFORM THE COURT ABOUT THIS
15 MORNING WHICH YOU JUST TRIGGERED ME. AND THAT
16 IS A STUDY BY A DOCTOR RADICKE FROM
17 CINCINNATI WHICH WAS REPORTED AT THE
18 CONFERENCE, A GOVERNMENT CONFERENCE ON VINYL
19 CHLORIDE IN THE SPRING OF 1990. AND WHAT SHE
20 DID WAS QUITE FASCINATING IN THIS CONTEXT.
21 SHE TOOK SOME RATS, SPAYED OR NEUTERED RATS
22 AND DOSED THEM WITH ALCOHOL, NONE
23 NON-CARCINOGEN. SHE THEN GAVE THE RATS WHICH
24 WERE DOSED WITH ALCOHOL SOME VINYL CHLORIDE.
25 AND THE RATS WHICH HAD VINYL CHLORIDE WITH

1 ALCOHOL PRE-TREATMENT GOT A SINOGISTIC EFFECT
2 IN RELATION TO TWO THINGS: A VERY, VERY,
3 MARKED INCREASE IN THE INCIDENCE OF
4 ANGIOSARCOMA AND AN INCREASE IN HEPATIC
5 CANCERS WHICH ARE DIFFER FROM ANGIOSARCOMAS.
6 SO, THE PRE-TREATMENT, THE MODEST
7 PRE-TREATMENT OF THE RATS WITH THE EQUIVALENT
8 OF A FEW DOUBLE MARTINIS AND WHAT HAVE YOU

9 -- I HAVEN'T TRANSLATED THE DOSE INTO EXACT
10 ALCOHOL CONCENTRATIONS -- MASSIVELY
11 SINOGISED THE INCIDENCE OF ANGIOSARCOMAS OF
12 THE LIVER IN RATE AND ALSO HEPATIC CANCER.

13 THE COURT: COULD YOU DEFINE
14 SINOGISED SO EVERYONE KNOWS WHAT THAT TERM IS.

15 THE WITNESS: I'M SORRY, I
16 SHOULD HAVE DEFINED MY TERMS. LET US SAY YOU
17 HAVE AN AGENT -- LET'S SAY YOU GIVE
18 SOMEBODY -- YOU GIVE A POPULATION OF RATS A
19 DOSE OF ONE CARCINOGEN WHICH GIVES THEM TEN
20 PERCENT CANCER, OKAY, AND A DOSE OF ANOTHER
21 CARCINOGEN WHICH ALONE WOULD GIVE FIVE
22 PERCENT. SO, YOU'D EXPECT WHEN YOU PUT THE
23 TWO TOGETHER, YOU'D GET 15 PERCENT, WOULDN'T
24 YOU. THAT WOULD BE AN ADDITIVE EFFECT. TEN
25 PERCENT OF CANCER IN ONE SET OF EXPERTS. YOU

1 GET TEN PERCENT FROM THE CHEMICAL. ANOTHER
2 SET OF EXPERTS, YOU GET ANOTHER FIVE PERCENT.
3 BUT, IN FACT, WHEN YOU PUT THE TWO TOGETHER,
4 IF YOU GET 15 PERCENT, THAT MEANS IT'S A
5 MULTIPLICATIVE ACTION OR SINOGIST EFFECT. SO,
6 A SINOGISTIS EFFECT IS GREATER THAN YOU COULD
7 ANTICIPATE FROM THE MERE ADDITION OF THE TWO
8 THINGS TOGETHER. SO, ALCOHOL BY ITSELF IS
9 -- THE LITERATURE ON THE CARCINOGENICITY OF
10 ALCOHOL IS COMPLEX WHICH I REALLY WON'T
11 DEVOTE ANY TIME TO. BUT A SMALL PRE-TREATMENT
12 WITH ETHYL ALCOHOL PRODUCED A VERY, VERY
13 MAJOR INCREASE IN THE CARCINOGENIC EFFECTS OF
14 VINYL CHLORIDE.

15 NOW, FOR THIS REASON, I THINK
16 WHAT WE -- WHAT WE NOW HAVE TO CONSIDER IS
17 WHETHER -- THE POSSIBILITY AS TO WHETHER IF
18 HE HAD EXPOSURE TO ARSENIC OR IF HE HAD
19 EXPOSURE TO OTHER CARCINOGENS OR SOME NON-
20 CARCINOGENS AT DUPONT, WHETHER THESE MIGHT
21 POSSIBLY HAVE CONTRIBUTED SOMEWHAT. WE'RE
22 DEALING WITH A PRIME CAUSE WHICH IS THE VINYL
23 CHLORIDE. IN MY OPINION, THE VINYL CHLORIDE
24 IS THE AGENT FOR WHICH THERE IS A SUBSTANTIAL
25 PROBABILITY. BUT I'M UNWILLING TO EXCLUDE THE

1 FACT THAT AN EXPOSURE OF PRIOR EXPOSURE TO
2 ARSENIC OR PRIOR EXPOSURE TO SOME OF THESE
3 OTHER AGENTS MAY HAVE HAD AN ADDITIONAL
4 CONTRIBUTORY ROLE. AND ONE REASON WE MAY WISH
5 TO CONSIDER THAT IS BECAUSE OF THE WHOLE
6 HISTORY. WE DO KNOW AT DUPONT, HE WAS EXPOSED
7 TO OTHER CHEMICALS, ALTHOUGH MY LEVEL OF
8 INFORMATION ON THE NATURE OF THIS EXPOSURE IS
9 NOT OF A HIGH ORDER. NONE OF THESE AGENTS
10 WHICH HE WAS EXPOSED TO AT DUPONT WERE KNOWN
11 TO INDUCE ANGIOSARCOMA OF THE LIVER, HOWEVER.

12 THE COURT: LET'S PROCEED.

13 MR. VASSALOTTI: I HAVE
14 NOTHING FURTHER, YOUR HONOR.

15 THE COURT: REDIRECT --

16 RECROSS.

17 MR. RENNEISEN: THANK YOU.

18 RECROSS-EXAMINATION

19 BY MR. RENNEISEN:

20 Q. THERE, THIS SINOGISTIC EFFECT YOU
21 JUST TALKED ABOUT, THAT APPLIES TO EVERYBODY,
22 DOESN'T IT, NOT JUST MR. GRASSO?

23 A. WHAT APPLIES TO EVERYBODY?

24 Q. A SINOGISTIC EFFECT WHEN THERE'S A
25 CERTAIN COMBINATION OF CHEMICALS OR DRUGS IS

1 A CONDITION THAT IS PRESENCE IN RATS AND
2 PEOPLE AND CHIMPANZEES AND EVERYONE ELSE,
3 ISN'T IT?

4 A. YOU CAN DEMONSTRATE SINOGISTIC
5 EFFECTS.

6 Q. IN ANYBODY, ISN'T THAT TRUE?

7 A. IF ONE HAS THE APPROPRIATE
8 CONDITIONS FOR THE INDUCTION OF THE SINOGISM,
9 SURE. TOO MUCH EXPOSURE TO A PARTICULAR
10 CHEMICAL CARCINOGEN WHICH INDUCES A
11 CARCINOGENIC EFFECT AND IN ADDITION TO THAT,
12 SOME OTHER CHEMICALS CAN SINOGISE. AND WE DO
13 HAVE THE LITERATURE ON THIS BOTH IN ANIMALS
14 AND HUMANS. I DON'T KNOW IF THIS IS WHAT
15 YOU'RE ASKING ME.

16 Q. THAT'S FINE, DOCTOR. HOW MANY CASES
17 OF ANGIOSARCOMA DID THE E.P.A. FIND WITHIN
18 THOSE FOUR POINT SIX MILLION PEOPLE WHO LIVE
19 AROUND PVC PLANTS?

20 A. I DON'T THINK AT THE TIME THEY HAD
21 DONE ANY STUDIES. THEY WERE -- THAT
22 PARTICULAR -- THAT REPORT, THE SO CALLED
23 STAR REPORT IN 1975, BASICALLY DID TWO THINGS:
24 IT LISTED ALL THE KNOWN CASES OF ANGIOSARCOMA
25 AND IT INCLUDED ALSO THOSE TWO CASES WITH

1 SHORT LATENCY PERIODS AND ALSO THEY REPORTED
2 ON MONITORING AND MODELING STUDIES. AND AMONG
3 OTHER THINGS, IT REPORTED ON A STUDY BY THE
4 AMERICAN PUBLIC HEALTH ASSOCIATION ON THE
5 NUMBER OF PEOPLE LIVING IN THE VICINITY OF
6 PLANTS. THEY PUT ALL THE DATA TOGETHER AND
7 SAID ON THE BASIS OF OUR MONITORING DATA, WE
8 THINK THAT THE LEVELS OF VINYL CHLORIDE IN
9 PEOPLE LIVING CLOSE TO VINYL CHLORIDE PLANTS
10 IS ON THE AVERAGE 17 PARTS PER BILLION. WE
11 ESTIMATE ON THE BASIS OF THE AMERICAN PUBLIC
12 HEALTH ASSOCIATION DATA FOUR POINT SIX PEOPLE
13 LIVE IN THESE AREAS. THEY PUT THE TWO
14 TOGETHER AND THEY CAME UP WITH THESE
15 ESTIMATES.

16 NOW, I'M WILLING TO CRITICIZE
17 THESE ESTIMATES. I THINK IT'S VERY DIFFICULT
18 TO MAKE THESE QUANTITIES TAKE THE DIFFERENT
19 ESTIMATES. BUT THE BEST GOVERNMENT ESTIMATES
20 AT THE TIME WAS WE CAN ANTICIPATE IN THE
21 COMMUNITIES BETWEEN LESS THAN ONE -- HE
22 DIDN'T SAY HOW MUCH LESS THAN ONE UP TO TEN.
23 THAT'S A BROAD RANGE. WHEN IT'S LESS THAN ONE,
24 IT COULD BE ZERO POINT ZERO ZERO ONE. GOD
25 KNOWS. BUT THEY WERE CONCERNED ABOUT IT

1 ENOUGH TO SAY ON THE BASIS OF THESE FINDINGS,
2 WE ARE DETERMINED TO LIMIT THE AMOUNT OF
3 EMISSIONS FROM PVC 90 PERCENT.

4 Q. AND YOU WEREN'T CONSULTANT AT THAT
5 TIME?

6 A. I WAS OPERATING ON E.P.A. AT SEVERAL
7 -- I WAS A CONSULTANT AND EXPERT WITNESS IN
8 THEIR SPECIAL CANCER HEARINGS ON PESTICIDES
9 BUT I WAS ALSO A MEMBER OF THE ENVIRONMENTAL
10 HEALTH ADVISORY COMMITTEE AND A SUBCOMMITTEE
11 WHICH WAS CONSIDERING SOME OF THE DATA WHICH
12 WE WERE LOOKING AT.

13 Q. AFTER THIS ESTIMATE WAS MADE, DID
14 ANYBODY GO OUT AND FIND OUT HOW MANY CASES
15 THERE WERE?

16 A. WE'RE DOING JUST THIS KIND OF THING
17 NOW, BECAUSE THERE HASN'T BEEN --

18 Q. WHO IS WE?

19 A. WE ARE CONSIDERING HERE IN THIS
20 COURT --

21 THE COURT: I THINK HE WANTS
22 TO KNOW WHO IS WE.

23 THE WITNESS: WE IN THIS
24 COURT, SIR, ARE CONSIDERING JUST ONE OF THESE
25 CASES, NAMELY A MR. GRASSO.

1 BY MR. RENNEISEN:

2 Q. YOU MEAN IN THIS ROOM?

3 A. WE ARE CONSIDERING ONE COMMUNITY'S
4 CANCER CASE. THERE HASN'T BEEN A SYSTEMIZED
5 STUDY OF THIS WHOLE PROBLEM OF COMMUNITY
6 CANCER. BUT THE ENVIRONMENTAL PROTECTION
7 AGENCY WAS CONCERNED SIX YEARS AGO BY THE
8 FACT THIS THIS LEVEL OF EXPOSURE COULD
9 PRODUCE UP TO 120 CANCERS EVERY YEAR. NOW,
10 IT'S IN ADDITION TO --

11 Q. IT'S PRODUCED TEN CANCERS?

12 A. WELL, THIS WAS THEIR ESTIMATE.
13 SHORTLY AFTER THAT, LEVELS WERE PRODUCED. NOW,
14 THERE HAVE BEEN STUDIES WHICH I REFERRED TO
15 THIS MORNING,, QUITE APART FROM THE
16 ANGIOSARCOMAS OF EXCESS BRAIN TUMORS OF
17 LIVING IN THE VICINITY OF PLANT. NOW, I CAN'T
18 GIVE YOU ABSOLUTE CLEARCUT ANSWERS TO THESE
19 THINGS BECAUSE WE DON'T KNOW. ALL WE KNOW IN
20 THIS CASE IS SOMEBODY WAS EXPOSED TO LEVELS
21 OF VINYL CHLORIDE WHICH APPEAR TO HAVE BEEN A
22 GREAT DEAL HIGHER THAN THOSE WHICH CONCERNED
23 THE ENVIRONMENTAL PROTECTION AGENCY SO MUCH
24 AS TO ORDER INDUSTRY TO REDUCE ITS EMISSION
25 BY 90 PERCENT. THAT SPEAKS FOR ITSELF.

1 Q. ALL RIGHT. I HEARD YOU SAY THAT. HAS
2 ANYBODY CHECKED THAT DATA? DO WE, THE
3 INFORMED PUBLIC, THE DOCTOR EPSTEINS OF THE
4 WORLD, THE MEDICAL COMMUNITY, E.P.A., KNOW
5 HOW MANY ANGIOSARCOMAS ARE IN THAT GROUP OF
6 PEOPLE?

7 A. ONE OF THE THINGS IN THIS COUNTRY IS
8 WE DON'T HAVE A NATIONAL TUMOR INDEX. WE
9 DON'T KNOW THE CAUSE OF DEATH OF EVERYBODY IN
10 THIS COUNTRY. WE DON'T HAVE AN AUTOPSY OF
11 EVERYBODY IN THIS COUNTRY. PEOPLE -- IT'S
12 IMPOSSIBLE TO ANSWER THAT. WE DO HAVE SURVEYS.
13 FOR INSTANCE, THE THIRD NATIONAL CANCER
14 SURVEY OR THE SEARS PROGRAM. THESE ARE BASED
15 ON TEN PERCENT OF THE AMERICAN POPULATION. IN
16 CONNECTICUT, YOU HAVE A GOOD TUMOR REGISTRY.
17 I CAN'T ANSWER YOU THESE QUESTIONS, BECAUSE
18 WE DON'T HAVE A DATA BANK IN THIS COUNTRY
19 WHICH GIVES YOU INFORMATION ON BIRTH TO DEATH,
20 INCLUDING AUTOPSY ON EVERY SINGLE ONE OF THE
21 220 MILLION AMERICANS.

22 Q. I WAS ONLY ASKING ABOUT FOUR MILLION
23 -- FOUR POINT SIX MILLION PEOPLE THAT I
24 THOUGHT THAT YOU AND THE E.P.A. WERE
25 CONCERNED ABOUT.

1 A. SIR, WE DON'T HAVE A DATA BANK
2 COVERING THE WHOLE OF THE U.S. THERE ARE
3 CONCERNS OVER A WIDE RANGE OF ISSUES, NOT
4 ONLY THE VINYL CHLORIDE ISSUE. THE CONCERN
5 THEN RELATED TO FOUR AND A HALF MILLION
6 PEOPLE AND I THINK I'M BEING REPETITIVE AND
7 THE CONCERN WAS ADEQUATE TO RESULT IN THIS
8 REDUCTION OF EMISSION. BUT THERE HASN'T BEEN
9 A SPECIFIC FOLLOW UP OF THESE FOUR POINT SIX
10 MILLION PEOPLE. THERE HASN'T BEEN A DETAILED
11 FOLLOW UP OF THEM. THERE HASN'T BEEN A FOLLOW
12 UP OF THE PEOPLE WHO WERE GIVEN VINYL
13 CHLORIDE AS AN ANESTHETIC AGENT.

14 Q. SINCE THERE'S NO FOLLOW UP TO FIND
15 OUT WHAT HAPPENS TO THIS FOUR POINT SIX
16 MILLION PEOPLE, IS IT FAIR THEN, DOCTOR, TO
17 SAY, WE DON'T KNOW WHETHER THERE'S A HIGHER
18 INCIDENCE OF ANGIOSARCOMA CLOSE TO POLYVINYL
19 PLANTS OR NOT?

20 A. I THINK ON THE BASIS OF THE ABSENCE
21 OF INFORMATION, THE ANSWER WOULD BE YES.
22 HOWEVER, AS I'VE INDICATED, I GAVE YOU A LIST
23 OF A WHOLE SERIES OF ANGIOSARCOMAS, WHICH HAD
24 OCCURRED IN PEOPLE LIVING IN THE VICINITY OF
25 PLANTS. THAT IS --

1 Q. YOU'VE GIVEN ME EIGHT OUT OF FOUR
2 POINT FOUR MILLION PEOPLE?

3 A. NO, SIR, I HAVEN'T. I'VE GIVEN YOU
4 EIGHT OUT OF A VERY SMALL NUMBER OF THE TOTAL
5 NUMBER OF ANGIOSARCOMAS WHICH ARE RECOGNIZED.
6 OF THE TOTAL NUMBER OF ANGIOSARCOMAS THAT ARE
7 RECOGNIZED, WE HAVE, I WOULD SAY, A FAIRLY
8 SUBSTANTIAL NUMBER OF COMMUNITY CANCERS.

9 Q. HOW MANY OUT OF FOUR POINT SIX
10 MILLION?

11 A. FOUR POINT SIX MILLION IS YOUR
12 DENOMINATION.

13 Q. THAT'S YOUR NUMBER.

14 THE COURT: LET'S NOT ARGUE
15 BACK AND FORTH. LET'S GO ON. LET'S MOVE ALONG.

16 MR. RENNEISEN: I HAVE NO
17 FURTHER QUESTIONS, JUDGE.

18 THE COURT: ANYTHING FURTHER?

19 MR. VASSALOTTI: JUST ONE
20 QUESTION.

21 BY MR. VASSALOTTI:

22 Q. DOCTOR, I FORGOT TO ASK YOU, WHEN
23 YOU REFER TO THOSE LETTERS OF DOCTOR ROZANSKI,
24 DOCTOR DE PERSIA AND DOCTOR GILPATRICK,
25 DOCTOR, IN YOUR POSITION AS A PHYSICIAN AND

1 TOXICOLOGIST STUDYING CAUSAL CONNECTIONS --
2 CAUSAL RELATIONS BETWEEN CHEMICAL SUBSTANCES
3 AND CANCER, WOULD YOU ORDINARILY RELY UPON
4 THE REPORTS OF PHYSICIANS OF THE VICTIMS OF
5 CANCER THAT YOU WERE STUDYING IN FORMING YOUR
6 OPINION.

7 MR. RENNEISEN: OBJECTION. I
8 DIDN'T HEAR ONE QUESTION ASKED ABOUT THAT
9 SUBJECT.

10 THE COURT: I SUSTAIN THE
11 OBJECTION, UNLESS YOU REPHRASE YOUR QUESTION.

12 MR. VASSALOTTI: YOUR HONOR,
13 I'M REFERRING BACK TO -- I AGREE
14 WHOLEHEARTEDLY THAT MR. RENNEISEN DID NOT
15 BROACH THIS SUBJECT IN HIS RECROSS. THIS IS A
16 MATTER THAT I OMITTED WHEN I -- WHEN I
17 EXAMINED DOCTOR EPSTEIN IN REGARD TO THIS AND
18 I WANTED TO TIE UP A LOOSE END. THAT'S THE
19 ONLY PURPOSE.

20 THE COURT: ALL RIGHT. I'LL
21 LET YOU DO IT.

22 BY MR. VASSALOTTI:

23 Q. DOCTOR, IN YOUR CAPACITY OR POSITION
24 AS A PHYSICIAN ENGAGED IN THE STUDY OF
25 TOXICOLOGY AND CONSIDERING THE QUESTIONS OF

1 THE CONNECTION BETWEEN CANCER CAUSING
2 CHEMICALS AND DEVELOPMENT OF CANCER, WOULD
3 YOU ORDINARILY RELY UPON LETTERS WRITTEN FROM
4 PHYSICIANS OF THE VICTIMS OF CANCER THAT YOU
5 WERE CONSIDERING WHEN SUCH PHYSICIANS REPORT
6 TO YOU INFORMATION REGARDING THE
7 ADMINISTRATION OR PRESCRIPTION OF ANY
8 MEDICATIONS TO THE PAINT?.

9 MR. RENNEISEN: YOUR HONOR,
10 I'LL STIPULATE THE ANSWER IS YES, SO THE
11 DOCTOR DOESN'T HAVE TO ANSWER THE QUESTION.

12 THE COURT: ALL RIGHT.

13 MR. VASSALOTTI: THANK YOU.

14 THE COURT: THANK YOU.

15 ANYTHING FURTHER NOW?

16 ALL RIGHT. DOCTOR, YOU MAY
17 STEP DOWN.

18 THE WITNESS: THANK YOU, SIR.

19 THE COURT: WHY DON'T YOU JUST
20 STAY RIGHT WHERE YOU ARE FOR THE TIME BEING.

21 THE COURT: LADIES AND
22 GENTLEMEN.-GOOD TIME FOR STOP FOR THE DAY.

23 AS I HAVE CAUTIONED YOU
24 BEFORE AND WILL CONTINUE TO CAUTION YOU
25 DURING THE COURSE OF THIS TRIAL, UNTIL THIS

1 CASE IS SUBMITTED TO YOU FOR DELIBERATIONS,
2 YOU MUST NOT DISCUSS THIS CASE WITH ANYONE OR
3 REMAIN WITHIN HEARING OF ANYONE DISCUSSING
4 IT. NEITHER SHOULD YOU READ ANY NEWSPAPER
5 ARTICLE, LISTEN TO ANY RADIO BROADCAST, NOR
6 VIEW ANY TELEVISION PROGRAM WHICH DISCUSSES
7 THIS CASE.

8 IF, HOWEVER, YOU SHOULD
9 BECOME AWARE OF ANY SUCH STORY, ARTICLE OR
10 NEWS REPORT, YOU ARE TO REPORT THAT MATTER TO
11 ME IN MY CHAMBERS AT YOUR EARLIEST
12 OPPORTUNITY SO THAT WE MAY DISCUSS IT.
13 NEEDLESS TO SAY, SHOULD YOU HAVE SUCH
14 EXPOSURE, YOU SHOULD NOT MENTION THAT FACT TO
15 ANY OF YOUR FELLOW JURORS. YOU ARE TO KEEP
16 AN OPEN MIND AND YOU MUST NOT DECIDE ANY
17 ISSUE IN THIS CASE UNTIL THE CASE IS
18 SUBMITTED TO YOU FOR YOUR DELIBERATIONS UNDER
19 THE INSTRUCTIONS OF THE COURT.

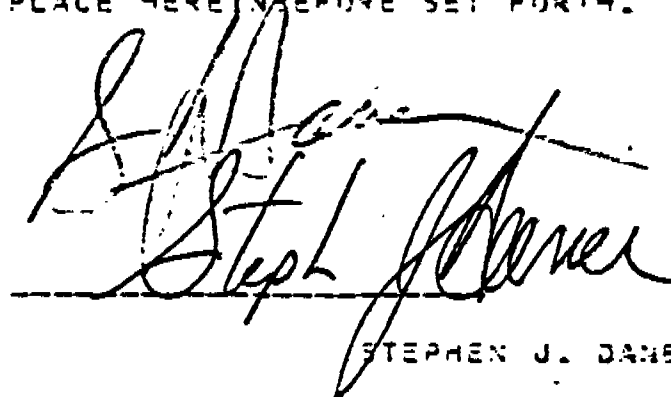
20 WE'LL STAND IN RECESS NOW
21 UNTIL TOMORROW MORNING AT 9:30. HAVE A
22 PLEASANT EVENING.

23 (RECESS FOR THE DAY.)
24
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

C E R T I F I C A T I O N

I, STEPHEN J. DANER, OFFICIAL
COURT REPORTER FOR THE UNITED STATES DISTRICT
COURT, FOR THE DISTRICT OF NEW JERSEY, DO
HEREBY CERTIFY THAT THE FOREGOING MATTER IS A
TRUE AND ACCURATE TRANSCRIPT OF MY
STENOGRAPHIC NOTES TAKEN AT THE TIME AND
PLACE HEREINAFORE SET FORTH.



STEPHEN J. DANER, CP, RPR
OFFICIAL U. S. REPORTER

DATE: 1-22-81